Uncertain Gestation and Pregnancy Outcome at Omdurman Maternity Hospital 1996

By
Khadiga Abdalla Abdelmula
M.B.B.S (U of K)

A thesis submitted in partial fulfillment for the requirements of the degree of Clinical M. D. in Obstetrics and Gynecology
April 1997

Supervisor
Professor Abdelsalam Gerais
MD FRCOG
CONTENTS

Contents .............................................................................................................. i
Abbreviations ................................................................................................. ii
Acknowledgement .......................................................................................... iii
Abstract (Arabic) ............................................................................................. iv
Abstract (English) .......................................................................................... vi

CHAPTER ONE
INTRODUCTION ............................................................................................... 1
LITERATURE REVIEW .................................................................................. 3
OBJECTIVES .................................................................................................. 22

CHAPTER TWO
PATIENTS AND METHODS ........................................................................... 23

CHAPTER THREE
RESULTS .......................................................................................................... 27
TABLES ........................................................................................................... 33
FIGURES .......................................................................................................... 43

CHAPTER FOUR
DISCUSSION .................................................................................................... 51
CONCLUSION ................................................................................................. 59
RECOMMENDATIONS ................................................................................... 60
REFERENCES .................................................................................................. 61
APPENDIX ....................................................................................................... 70
ABBREVIATIONS

FSH: Follicle stimulating hormone
LH: Lutenizing hormone
S.V.D: Spontaneous vaginal delivery
PIH: Pregnancy induced hypertension
Acknowledgement

I wish to extend my deep thanks and gratitude to professor Abdel Salam Gerais for his kind, close and critical supervision for this thesis.

I am greatly indebted to Abdalla and Awadalla for their generous support.

Thanks also go to Mrs Elmagam Ali Hassan for typing the manuscript, and to those who rendered help towards the completion of this work.
ملخص الأطروحة

.ومع ذلك، أدّى ظهور هذا النوع من الأشخاص إلى تغيير في الطريقة التي يتم فيها اتخاذ القرارات.

وقد أدى ذلك إلى ارتفاع النسبة المئوية للأشخاص الذين يتوجهون إلى المستشفيات في هذه الدراسة. كجزء من ذلك، تم استخدام آليات مختلفة لتحليل البيانات، بما في ذلك التحليل التحليلي والتحليل الإحصائي.

وتُظهر النتائج أنه من بين الأشخاص الذين تتلقى من قبل الرعاية الصحية، نسبة أكبر من الأشخاص الذين يأتون للحصول على الرعاية الصحية في المستشفيات classe-1

وقد تم استخدام هذه النتائج لتطوير سياسات صحية فعّالة ومستدامة للتعامل مع هذه المشكلةクラス-2

وتستند هذه النتائج بشكل أساسي على البيانات التي تم جمعها وتحليلها في هذه الدراسة، والتي تُعتبر من بين أفضل الدراسات في هذا المجال من حيث نوعية البيانات ودقة التحليل.

وتُظهر النتائج التي تم الحصول عليها من هذه الدراسة أن هناك العديد من العوامل التي تؤثر على استخدام الرعاية الصحية، بما في ذلك العوامل الاجتماعية والاقتصادية والصحية. وتُستخدم هذه النتائج لتطوير سياسات صحية فعّالة ومستدامة للتعامل مع هذه المشكلة.
السلبية والحمل ونتيجة مؤكد. الغير حملی مرن بین قوية علاقة هنالك. الأدراة هذه نختصر الجنين على تؤثر مالباً النتيجة تنقل والتابلي للحمل مثلاً المعالجة. الحقيقة هذه على الضوء إلى جماعة خلال الصحي بالثقه نوصي.
ABSTRACT

The proper management of every pregnancy is largely dependent on certain gestational age (GA).

This study was conducted at Omdurman Maternity Hospital (OMH) during 1996. It is a comparative cohort study, designed to compare the pregnancy outcome of women with uncertain dates to those with certain gestational age, taking into consideration sociodemographic characteristics, and to find out the risk factors responsible for uncertain gestation. Total coverage of women attending delivery was employed, 443 subjects were studied and the data was collected through an interviewer-administered questionnaire. The results showed that the number of women with uncertain gestation was 190 (42.9%) while that of those with certain gestation was 253 (57.1%). Unknown last menstrual period (LMP) was the major contributory factor in uncertain gestational age. About half of subjects with uncertain gestational age were of rural origin compared to about one third with certain gestational age. Uncertain gestation decreased with increasing level of education and with improvement in socioeconomic status (SES). Grandmultiparity was commoner in uncertain gestation. Most women with uncertain gestation were unbooked for hospital delivery and they were poor antenatal care (ANC) attendants. In both groups ultrasound (U/S) scanning was either done late or not done at all.

The study also showed that the rates of emergency caesarean section, preterm labour and low birth weight (LBW) were high among women with
uncertain compared to those with certain gestational age. It is concluded that uncertain gestation has a strong association with adverse pregnancy outcome, mainly foetal. Therefore accurate dating early in pregnancy is an important factor for managing pregnancy properly and subsequently reducing these adverse outcomes.

Health education through mass media highlighting this fact is recommended.
INTRODUCTION

Uncertain gestation is a pregnancy in which the G.A. calculation is uncertain by the traditional clinical methods.

Uncertain gestational age is one of the most common problems facing the clinician every day in practice.

By reviewing the literature there were few studies in which the incidence of uncertain gestation was mentioned. The incidence is not less than 22% in patients attending antenatal clinics\(^{(1)}\). Surveying the British births in 1970, the G.A. was uncertain in 17% of cases\(^{(2)}\). In the next year (1971) Beazley and Underhill obtained an incidence of uncertain gestation in 17% of patients\(^{(3)}\). Grennet L., et al. (1978) reported the incidence of unreliable menstrual history to be 24.9%\(^{(4)}\). Whereas Campell et al., concluded from their study published in 1985 that the incidence of unreliable menstrual history was found in 44.7% of patients\(^{(5)}\). In developing countries we expect to find a higher incidence; but in a study carried out in Zimbabwe, the incidence reported was 21.4% of patients\(^{(6)}\). Hall MH et al., (1985) found the incidence of uncertain gestation to be 7.1% in a total obstetric population\(^{(7)}\).

Perinatal mortality and morbidity is strongly linked with prematurity and intrauterine growth retardation (I.U.G.R). The accurate estimation of the G.A. is of paramount importance for proper management of these conditions.
Uncertain gestation is significantly associated with adverse pregnancy outcome. Thomson et al., (1968) reported a high incidence of L.B.W. babies (10%) with uncertain gestation\(^8\). Hall MH and Hill (1985) observed a positive correlation between uncertain gestation and unfavourable pregnancy outcome, such as increased perinatal mortality, L.B.W. and spontaneous preterm delivery which is not dependent on the adverse maternal characteristics\(^9\). Buchens et al., (1984) related significantly the uncertain gestation to unfavourable characteristics\(^10\). Chimbira (1989) in Zimbabwe found high rates of operative deliveries in uncertain gestation as well as increased neonatal mortality (P < 0.005)\(^6\).

It is of a great value to study uncertain gestation because in research studies using the G.A. as a variable, the women with uncertain gestation were excluded from the study population and this would introduce bias. Resenberg et al., (1982) concluded that the exclusion of women with uncertain gestation who are more likely to have a small for dates baby may lead to lower incidence of growth retardation in a study sample\(^11\). Also the length of gestation is a very important part of research on the development of at risk infants, but issues to determine the accuracy of this information are rarely considered by the developmental researchers\(^12\).
LITERATURE REVIEW

The revolution in obstetrics began in 1960s coinciding with the time when obstetrical researches were focused on the foetus and considered him as a patient generating impulses and stimuli to the mother who in turn responds passively.

The growth of the foetus starts at the time of fertilization and from then onwards there are considerable anatomical and physiological changes of the foetus which are strongly correlated with the duration of pregnancy, and any subsequent management of this particular pregnancy will depend mostly on the accurate dating. In the period from fertilization to the 8th week of pregnancy the human conceptus is termed an embryo, and from the eighth week until delivery it is called a foetus.

Commonly the epidemiologists calculate the G.A. (length of gestation) as the interval between the first day of the L.M.P. and the date of birth, assuming an invariant 28 day cycle with ovulation occurring at the mid-cycle. This estimation is based on the calculation of the expected date of delivery (E.D.D) by applying Naegle’s rule (by adding 7 days to the date of the first day of the last normal spontaneous menstruation and subtracting 3 months).

This interval is approximately 10 Lunar months or 280 days. Most patients will deliver within 2 weeks of the E.D.D. Kortenoever (1950) agreed with the above mentioned facts. By analysing 7504 pregnancies,
he found the mean duration of pregnancy to be 282 days\textsuperscript{(13)}. In Japan (1972) Nakano found the mean duration of pregnancy to be $279 \pm 17$ days ($\pm 2$ standard deviations)\textsuperscript{(14)}. Gestational age is termed the menstrual age in contrast to the ovulation age (post-conception age or fertilization age) which is used by the embryologists and it is 2 weeks shorter than the G.A.

The G.A. is expressed in complete weeks. Certain G.A. can not be determined precisely unless pregnancy resulted from an isolated intercourse, or there is an accurate temperature record over a period of conception or in cases of induced ovulation\textsuperscript{(15)}.

**Assessment of the gestational age:**

To ascertain the dates accurately multiple parameters must be used together to reach a final evaluation.

Obstetricians concentrate mainly on the prenatal assessment for proper management of pregnancy so as to reach an optimal foetal and maternal outcome, while the postnatal assessment of the G.A. is of a great importance to the paediatricians for the proper management of the neonate.

**Prenatal assessment of the gestational age (G.A.):**

One of the major goals of the initial ANC is to determine the G.A. of the foetus. To achieve this goal, detailed gynaecological and obstetrical history is necessary, in addition to the performance of investigations which can accurately determine the duration of pregnancy.
Gynaecological and obstetrical history:

In the history the very important point is the detailed history of menstruation. The first day of the LMP must be dated correctly; is it a normal spontaneous period or not?, regularity of the cycle and is it shorter or prolonged cycle?. When the menstrual cycle length is prolonged, the proportion of post term (> 42 weeks) and post date (> 40 weeks) births increased because ovulation occurs constantly at 14 days premenstrually i.e. the post ovulation phase of the menstrual cycle is a constant 14 days long\(^{(16)}\). Robert’s \textit{et al.}, (1979) reported that the LMP is not a satisfactory measurement for calculating the G.A. because it was overestimated when its calculation is based on the LMP only\(^{(17)}\). In the Sudan the Lunar or Arabic calendar used by many women in dating the LMP plays a role in making the menstrual history uncertain.

The clinician must enquire about the precedence of the pregnancy by lactational amenorrhoea because in this situation it is very difficult to calculate the G.A. clinically without the help of specific investigations. The mechanisms producing lactational amenorrhoea are complex and not completely understood. Baird \textit{et al.}, (1979) suggested that the main consequent to suckling is a change in the hypothalamic sensitivity to the feed back effects of ovarian hormones\(^{(18)}\). During lactation the sensitivity of the hypothalamus to the negative feed back effects is increased, and it decreases the positive feed back effects of oestrogens. This implies that if there is enough F.S.H. and L.H. for the initial development of ovarian follicles, the oestrogen produced will inhibit the gonadotrophins secretion from the pituitary and subsequently causing the failure of the follicle to
get mature. Glasier et al., (1983) confirmed the inhibition of the pulsatile release of L.H. from the pituitary during lactation\(^{(19)}\).

Prolactin may be a factor in suppression of ovulation and menstruation during lactation. It was released in response to suckling, reaching a peak after 30-45 min. and returning to the basal values 2 hours later depending on the strength, number and duration of the suckling stimulus. The basal levels are highest immediately following delivery and decrease gradually as lactation is established. The non-pregnant levels are reached immediately after weaning and after delivery in bottle-feed mothers.

In bottle-feeding mothers the ovarian activity is normal, and ovulation is established within a few weeks of delivery, compared with breast feeding mothers whose ovarian activities and consequently menstruation are suppressed. At 32 weeks after birth ovarian activity returns when the duration of suckling is decreased. The first cycle is always anovular and the subsequent cycles are characterized by abnormalities in the luteal phase. Normal ovulatory cycles return 52 weeks after delivery.

Nature offers breast feeding as a form of contraception, particularly in developing countries where women breast feed their babies for an average of 2 years, so lactational amenorrhoea may play a role in the high incidence of uncertain gestation. One – 10% of women will get pregnant during lactational amenorrhoea\(^{(20)}\).
History of oral contraceptive pills is important. Usually the pills cause regularity of the menstrual cycles, but in a small number of women may affect the assessment of G.A. by causing disturbances of menstrual cycle such as break through bleeding specially in early cycles following the treatment. Also mid-cycle spotting may occur commonly in association with the lower fixed dose pills. In 1960s amenorrhoea was common when high dose pills were used and if it occurs with low dose pills pregnancy should be excluded. Post pill anovulation can result for a while (21).

Amenorrhoea is relatively common in women taking the pills who have previous history of irregular cycles or those who lost a considerable weight during the treatment and those who exercise heavily while they are on the pills.

Injectable long-acting contraceptive like medroxy-progesterone acetate (Depo-provera) can cause irregular menstruation in early cycles as well as amenorrhoea. Anovulation may occur up to 18 months after discontinuing the treatment so it is not used widely throughout the world.

In the developed countries women are less likely to breast feed their babies and they depend mainly on artificial contraception usually in form of pills and this may contribute to a minor degree to uncertainty of gestation.

In the history questions must be asked about bleeding in the first half of pregnancy. Some women may have unexplained cyclical bleeding
throughout pregnancy. Implantation can cause spotting about 6 days after fertilization until 29-35 days after the LMP in many women.

The date of quickening should be recorded definitely so as to be useful in determining the duration of pregnancy. Usually the first perception of foetal movement occurs at 18-20 weeks in primigravidas and at 16-18 weeks in multigravidas. It is unreliable because it is a subjective sign and may be mistaken for intestinal movements.

Clinical examination of the patient is of paramount importance in dating the pregnancy, especially if it is done early in pregnancy. Assessment of the uterine size is done through the vagina early in the first trimester, later through the abdomen and it is correlated with the G.A. Assessment of the uterine size by pelvic examination early in pregnancy links more closely with the G.A. than assessment made by palpating the fundus through the abdominal wall later in pregnancy because of wide variability in the position of the umbilicus and the length of the maternal abdomen (22).

A relatively accurate method is the measurement of the symphysiofundal height (S.F.H.) using a calibrated tape put on the anterior abdomen measuring the distance from the pubic symphysis to the upper border of the uterine fundus which is adjusted by palpation and percussion. Between 18 and 32 weeks gestation there is a good relationship between the G.A. in weeks and the uterine height in cms. It equals approximately to G.A. in weeks. Jimenz et al., (1983) found that between the period 20 and 31 weeks of gestation, the S.F.H. in cms
equals the G.A. in weeks\textsuperscript{(23)}. Quaranta \textit{et al.}, (1981) previously obtained the same results up to 34 weeks gestation\textsuperscript{(24)}. Bladder must be emptied before measurement because there is a significant difference before and after voiding which was confirmed by Worthen and Bustillo (1980)\textsuperscript{(25)}. Symphysiofundal height is a sensitive measurement for detecting I.U.G.R. and is affected by factors other than the G.A. such as the amount of liquor, I.U.G.R., macrosomia, multiple pregnancy and the engagement of the presenting part.

Vaginal examination in late pregnancy is sometimes helpful. The findings of a ripped cervix with deeply engaged head will denote that the foetus is at least mature\textsuperscript{(26)}. Also during uncomplicated pregnancy the maternal weight stops increasing at near term and begins to fall which signifies that the foetus is mature. Browne (1962) considered this sign as evidence of placental insufficiency which is a common association with prolonged pregnancy.

Amount of liquor diminishes in prolonged pregnancy (more than 294 days), and to be of clinical value, the palpation of the abdomen must be done by the same person at each antenatal visit (Wrigley, 1946). The last three examinations are of less importance in ascertaining the G.A.

Birth weight and length of gestation are both influenced significantly by prior birth weight and length of gestation\textsuperscript{(27)}.

**Investigations for the assessment of G.A.:**

To assess the G.A. certainly, investigation must be done and related to the clinical findings.
Fetoplacental hormones levels are related to the G.A. but are not used in assessment because their levels are more influenced by the fetoplacental well-being and in order to increase the sensitivity and specificity, their levels should be correlated to the accurate G.A.

Chemical analysis of the amniotic fluid by amniocentesis can provide information of lung maturity by measuring lecithin to sphingomyelin (L/S) ratio. Other constituents and chemical properties of the amniotic fluid like creatinine, osmolality and the cells change as the foetus is growing. But the changes are widely variable or very minimal to make their measurement unacceptable for prediction of foetal maturity.

X-ray for diagnosing pregnancy and assessing maturity is outmoded in current practice because of known hazards of irradiation in form of teratogenicity. Foci of ossification appear as early as 14 weeks but skeleton after 16 weeks. The foetal bones can be visualized radiologically after 16 weeks of gestation. Bartholomew et al., (1921) diagnosed pregnancy by radiology in one third of patients by 20 weeks of pregnancy and in half of women by 24 weeks.

All the above mentioned investigations are replaced by the use of ultrasonography for dating the gestation very accurately. The introduction of U/S into the medical practice in late 1950s was pioneered by the gynaecologist Ian Donald. Nowadays, nobody can imagine obstetrics and gynaecology without U/S.
Ultrasonography was used for dating pregnancy since 1960s. In obstetrics the commonest indication for U/S scanning was estimation of G.A. or bleeding. It constituted about 90% of scanning\(^{(28)}\).

Ultrasonography will improve the accuracy of G.A. estimate. The most common used parameters for assessing the G.A. is Crown-rump length (CRL) in the first trimester and the biparietal diameter (BPD) in the second trimester. Other parameters such as femur length may be used.

Crown-rump length is to measure the foetal length which corresponds to the sitting height and is more sensitive in estimating the G.A. than the Crown-heal length because of variations in the length of the legs and the difficulty in keeping them in extension.

By measuring the CRL between the 6th and 14th week of menstrual age, the results obtained by Robinson and Fleming showed that foetal maturity could be estimated to within 4.7 days with a 95% probability\(^{(29)}\). After 15 weeks of gestation the measurement of CRL to estimate the G.A. is less accurate due to errors caused by the foetal movements\(^{(30)}\). Drum (1977) reported that 85% of patients with certain menstrual data delivered within 8 days and 93% within 10 days and 95% within 12 days of the delivery date predicated by measuring the CRL and 96.2% of patients with unreliable menstrual dates were delivered within 12 days of the EDD estimated by sonography\(^{(31)}\). He concluded from this study that the CRL was better than the BPD (P < 0.001) and as good as a certain menstrual data (P < 0.5) in predicting the spontaneous onset of labour.
The G.A. determined according to the LMP data was found to be higher than according to CRL, and mean birth weight was found to be greater when correlated to age estimated according to CRL than when related to ages calculated from LMP. This finding can be attributed to the fact that G.A. is over-estimated in the late pregnancy calculated from LMP only. This fact should attain consideration in future foetal growth charts, because intrauterine growth charts are based on LMP data not including the infants whose G.A. is determined by measuring CRL by sonography early in pregnancy\(^{(32)}\).

The sensitive parameter for accurate determination of the G.A. used in the second trimester onwards is the BPD.

The foetal head is detected by U/S as early as 13 weeks of gestation (Champbell, 1968-1970). The measurement of BPD early is difficult so in order to estimate the reliable duration of pregnancy the biparietal cephalometry must be postponed until 17 weeks as advised by Sanders and Conard (1975)\(^{(33)}\).

Campbell (1969) and Varma (1973) recommended during the second trimester, the use of BPD to assess the foetal maturity\(^{(34-35)}\), and Campbell concluded that measurement of BPD from 20\(^{th}\) to the 30\(^{th}\) week of gestation could be used to estimate the correct duration of pregnancy to within 9 days in 95% of cases. Biparietal diameter cephalometry in the 2nd trimester improved the correct estimation of the G.A. if the pregnancy was preceded by irregular menstrual cycles. In a study carried out by Waldenstrom \textit{et al.}, (1991), they found a high incidence of post
term (20.2%) according to the LMP estimate than according to the BPD estimate (2.5%). They concluded that most women with irregular cycles or abnormal LMP (scantier) delivered within 2 weeks of EDD by Biparietal cephalometry (83.6% and 88.3%) than those whose G.A. was calculated basically on the LMP (64.8% and 69.3%) respectively(36). Serial measurements of BPD throughout pregnancy is useful to assess the I.U.G.R. as recommended by Willocks et al., (1967)(37).

Using the vaginal probe, U/S can detect an intra-uterine gestational sac of 2 mm in diameter which corresponds to 16 days post ovulation or 10 days following implantation(38).

If there is a discrepancy of a week or more in the G.A. between that obtained from the menstrual history and that from the U/S, the age estimated by U/S should be used for the patient’s management and a second confirmatory scan is advised to be done early in the second half of the pregnancy (Brindle, 1981).

One of the disadvantages of later U/S in dating was reported by Berg (1992) that if it is done at 18-19 weeks may lead to serious misjudgments in cases of early growth retardation(39).

Rasmussen (1993) questioned the advantage of routine U/S for dating of pregnancy, because the EDD is often estimated later than calculated from LMP, so true post-term pregnancies may be undetected(40). Reuss (1995) reached the same results of underestimation of post tem delivery and recommended that scanning for reasons such as bleeding in early pregnancy, and long period from the LMP and first
antenatal visit may introduce bias and should be carefully considered in interpreting the results of perinatal research\(^{(41)}\).

To estimate the G.A. very correctly the use of multiple parameters offers a significant advantage over any single parameter used alone\(^{(42)}\).

Rose and Lamb (1988) presented a formal justification for the belief that estimation of G.A. dependant on several clinical measures that agree with one another is more reliable than estimate based on a single measurement. These measures should be used in obstetric research studies that need to ascertain the G.A.\(^{(43)}\).

Reeca et al., (1989) reported that using foetal biometry and maturity indices permit dating through pregnancy as a measure of growth. To reach this conclusion Reeca dated the pregnancy by using various parameters such as the CRL, the trunck circumference and the BPD in the first trimester. Then the BPD, the cerebellum-orbital distance, clavicular length, length of the long bones of the upper and lower limbs and the foot length in the second and third trimesters; and the indices of maturity in the late trimester such as colonic grading and the epiphyseal ossification centres of the long bones of the upper and lower extremities\(^{(44)}\).

**Postnatal assessment of the gestational age:**

The postnatal assessment of the G.A. is mainly considered by the paediatricians.

For proper management of the newborn the accurate G.A. must be estimated immediately after delivery by observing the physical
characteristics and the neurological behaviour of the baby which change with age. Many authors have used the combinations of these criteria.

A rapid yet rather accurate estimate of G.A. of the newborn is done immediately after delivery by examining some of the physical signs of the baby. These include sole creases, breast nodule, scalp hair, ear lobe and the external genitalia. Accordingly the baby is categorized into premature (< 37 weeks), mature (37-42) and the signs of post maturity should be looked for such as desquamation of the epidermis and absence of vernix caseosa. This is a simple method for assessment and can be done in the labour room by any doctor who is attending the delivery.

A more definite estimate can be made a few days later by carrying out a detailed neurological examination in addition to the physical examination.

Two methods are used to reach a definite estimate of the G.A. The most accurate but rather a complicated assessment is that mentioned by Dobwitz et al., (1970) using combination of physical and neurological signs and gave a scoring. These scores are relatively accurate in preterm babies but at term the accuracy is only to within 2 weeks\(^{(45)}\).

The more recent and simplified assessment is the one compiled by Ballard et al., (1977)\(^{(46)}\).

The physical characteristics are more reliable (95% confidence limit of 18 days), because it may often be inconvenient to do a neurological assessment immediately after birth.
Postnatal assessment using Ballard method may give biased overestimates of the LMP interval in certain ethnic groups e.g. blacks have an average greater level of maturity as measured by Ballard method\textsuperscript{(47)}.

**The importance of certain gestation:**

Foetal biophysical tests should be interpreted in relation to G.A. as suggested by Herrmann (1989)\textsuperscript{(48)}. In 1988 Baskett reported that the non-stress test and foetal breathing movements were likely to be abnormal at 26 to 33 weeks gestation in comparison with 34 to 41 weeks. The non-stress test, foetal breathing movements, foetal tone and amniotic fluid volume were more likely to be abnormal at 42 to 44 weeks gestation compared with 37 to 41 weeks\textsuperscript{(49)}.

Chemical tests either maternal or foetal are correlated significantly with the G.A. Levels of maternal alpha fetoproteins should be interpreted to accurate estimation of G.A. in relation to foetal neural tube defects\textsuperscript{(17)}. Uncertain gestation may indicate apparently high levels of alpha-fetoproteins.

Certain G.A. is important for performing chorionic villous sampling and early amniocentesis as early as 10-12 weeks\textsuperscript{(50)}.

Certain G.A. is the most important variable in timing the obstetrical intervention. When caesarean section is decided for foetal interest, its timing is mainly governed by the foetal maturity and the foetal condition. In current practice the obstetricians date any pregnancy by U/S particularly when the indications for caesarean section are clear.
in early pregnancy. Induction of labour is decided according to the G.A. and other confounding factors. Marpeau and Calmar (1990) reached to a conclusion that in order to minimize the foetal distress occurrence which contributed to a higher rate of caesarean sections in primipara, the proper time for delivery would be before 41 full weeks of amenorrhoea\(^{(51)}\).

The G.A. must be ascertained accurately before managing pregnancy with very low G.A. Infants of G.A. 26 weeks or less have poor prognosis for survival, so options for active management of delivery considering foetal indication must need full discussion with the parents taking into account the hazards of caesarean section\(^{(52)}\). But G.A. does not influence decision making in the management of a perinatal lethal condition\(^{(53)}\).

**Pregnancy outcome in relation to the gestational age:**

The accurate estimation of G.A. is an important part of pregnancy management, since uncertain gestation carries an increased risk of perinatal mortality and morbidity.

World Health Organization defines the perinatal mortality as stillbirth and first week mortality at a specified week of gestation divided by all births at the same gestational week. This calculation does not predict the risk of future perinatal mortality of living foetus still in utero. In order to calculate the future prospective risk of perinatal mortality by dividing all future perinatal deaths from a certain week of gestation by all
foetuses, those undelivered. There is a decrease in risk from 16 to 39 gestational weeks and a rise from 39 weeks onwards\(^{(54)}\).

The common causes of perinatal mortality and morbidity are prematurity and I.U.G.R. whose management depends mainly on the accurate estimation of the G.A.

Unexplained stillbirth is an important cause of perinatal mortality (25%), and its rate is highest among preterm deliveries, minimal at 39-40 weeks gestation and rises again at 41-42 weeks. In a study carried out by Yudkin \textit{et al.}, (1987) to measure the risk of unexplained stillbirth (measured as the number of impending stillbirths divided by the total number of undelivered foetuses), they found that the risk was least in preterm pregnancies rising 4 folds after 39 weeks to a maximum at 41 weeks\(^{(55)}\).

The mortality rate decreases with increasing G.A. Synnes \textit{et al.}, (1994) confirmed this information by finding that the mortality rate was 84% at 23 weeks, 57% at 24 weeks, 45% at 25 weeks, 37% at 26 weeks, 23% at 27 weeks and 13% at 28 weeks G.A. It decreases with increasing birth weight for each G.A. Female babies had shown a lower incidence of mortality rate than males (odds ratio 1.9; confidence interval: 1.4 to 2.5). Twins had poor prognosis than singletons. The neonatal services were minimized significantly with increasing G.A. from 25 weeks onwards\(^{(56)}\).

Wilcox and Skjaeven (1992) reported a definite association between birth weight and perinatal mortality which is attributed to both the G.A. and other confounding factors correlated to it. Nowadays in
USA the public health policies emphasize the prevention of LBW by prevention of early confinement\(^{57}\).

Wu (1992) reported a significant relation of the incidence of LBW to the G.A. \((P < 0.01)^{58}\).

Rudigoz \textit{et al.}, (1986) obtained results of cases delivered by caesarean section before 32 weeks and they concluded that caesarean section done before 32 weeks were associated with increased foetal mortality rate\(^{59}\).

Harms \textit{et al.}, (1994) reported from a study concerning mortality of premature infants that an increase in the G.A. of one week resulted in a decreased risk of mortality \((\text{odds ratio } 0.59, P < 0.0001)^{60}\).

By analysing the preterm deliveries, Copper \textit{et al.}, (1993) concluded that the neonatal mortality decreased as the length of gestation advanced, and heavier infants have less mortality for a specific G.A. Females < 29 weeks survived better than males, and singletons < 29 weeks have good prognosis than twins, for term black infants is higher. The largest improvement in survival occurred between 25 and 26 weeks. At 30 weeks survival was > 90\% and improved < 1\% every week thereafter\(^{61}\).

In multiple births the age/weight relationships are usually different\(^{62}\).

Discordance (15\% or more birth weight difference) is not risky when the twin pair is delivered at term and the lighter one weighs at least 2.5 kg\(^{63}\).
Berg (1988) reported that babies delivered before term were at a higher risk of developing neurological abnormalities at 7 years than are term and post-term babies\(^{(64)}\).

The perinatal mortality (6.9/1000 births) increases as G.A. advances beyond 42 weeks particularly in teenage mothers and if there are associated prenatal problems such as PIH\(^{(65)}\).

In addition the morbidity is increased in prolonged pregnancy. Current antepartum and intrapartum foetal monitoring has decreased both morbidity and mortality but the former remains higher in patients delivering beyond term than in those delivering at term. The policy of modern labour induction at term or at an earlier G.A. may prevent the increase in mortality and morbidity without increase in the incidence of prolonged labour and abdominal delivery\(^{(66)}\).

Divon \textit{et al.}, (1995) found a significant association between post term pregnancy and potential foetal complications such as foetal heart rate decelerations and meconium staining\(^{(67)}\).

Angeles (1989) correlated the post term pregnancy with a significant increase in the incidence of macrosomia and dysmaturity. So post-term increases the perinatal mortality and maternal mortality and morbidity by causing dystocia, prolonged labour, fetopelvic disproportion and high rate of operative deliveries\(^{(68)}\).

Lin \textit{et al.}, (1994) confirmed the increased perinatal mortality in post term pregnancies (21.1\%) of LBW than those of G.A. less between 40-42 weeks\(^{(69)}\).
Shime et al., (1984) advised elective induction before 44 weeks, even if the cervix is not favourable because of increased incidence of dysmaturity\textsuperscript{(70)}.

Schneider et al., (1978) reported an increase in the incidence of perinatal morbidity in post date (> 40 weeks), and the rate of caesarean section was double the average rate, and the neonate required a trained personnel of resuscitation. No increase in the mortality was reported in the study\textsuperscript{(71)}.

In order to achieve good pregnancy outcome the G.A. must be ascertained accurately by making use of clinical informations offered by the patient, conducting proper obstetrical examination as early in pregnancy as possible and U/S scanning early in pregnancy if possible.
OBJECTIVES

1. To compare women with uncertain gestational age to those with certain gestation with respect to pregnancy outcome and sociodemographic characteristics.
   b. Maternal outcome: mode of delivery and immediate complications.

2. Try to find out the causes and any unfavourable conditions related to uncertainty of dates.
PATIENTS AND METHODS

Research design:

This is a comparative Cohort prospective study for women who attended for hospital delivery during the period June-August 1996 at O.M.H. The exposed group was composed of women with uncertain gestational age compared to an unexposed control group with certain gestation, the comparison was made as to pregnancy outcome.

The study area:

This study was conducted at O.M.H. Omdurman Province constitutes about 39.9% of the estimated population of Khartoum State, according to 1993 population census. Deliveries at O.M.H. account for about 72.8% of the total hospital deliveries per year in the province. The midwifery services are provided for all types of patients either booked or unbooked. The patients are referred from either ANC clinics, institutional health settings, private clinics or those who are brought by the midwives or who come to the hospital on their own. The hospital is well equipped and staffed. The average number of deliveries per month is more than 700. The booked cases are kept in the postnatal word for at least 48 hours, while the unbooked cases are discharged after 2 hours post-delivery unless there are complications or they are delivered by caesarean section.
**Study population:**

This study included all patients admitted for hospital delivery during the study period, whether they were booked or not.

A case of uncertain gestation was defined if the patient possessed any one of the following criteria: unknown LMP or she was not sure about it, irregular or prolonged cycle, lactational amenorrhoea, history of recent contraceptive pills use or bleeding in early pregnancy. Any patient who is sure of her LMP and it is normal, has no lactational amenorrhoea and she did not experience bleeding early in pregnancy was labelled as of certain gestation.

Women with multiple pregnancy and the non-responders were excluded.

**Study sample:**

The minimum sample size was calculated according to the following formula:

\[ n = \frac{pq}{(E/1.96)^2} \]

Where:

\[ n = \text{minimum sample size} \]

\[ p = \text{maximum expected prevalence rate (\%) = 40\%} \]

\[ q = 100 - p = 60 \]

\[ E = \text{tolerated marginal error} = 5\% \]

\[ n = \frac{40 \times 60}{(5/1.96)^2} = 400 \]
It was found to be 400 cases.

During the study period with my attendance every 4th day and taking all subjects who fulfill the criteria, 443 subjects were found to be eligible for the study, from the exposed and non-exposed group and this number was divided into 190 uncertain dates and 253 certain dates.

**Data collection:**

The data was collected by an interviewer-administered questionnaire for each lady who fulfilled the study criteria, who was admitted to the labour room at the time of delivery. Those who were going to deliver by elective caesarean section were interviewed and followed up in the theatre. The data included the sociodemographic characteristics, identification of certainty of gestation then the ANC history was reviewed. The subjects were followed up until they delivered and the mode of delivery was noted together with any complications arising. All patients were followed up for two hours except those who sustained complications. The baby was examined immediately after delivery with respect to Apgar score, weight in grams and assessment of G.A. by examining the baby physically, and accordingly categorizing babies into the obstetrically broad categories premature (< 37 weeks) mature (37-42) and post mature (> 42 weeks) of gestation (Appendix 1).
Data analysis:

Data was transcribed from the questionnaire form to a data sheet with coding. Data was then entered into the computer and processed using EPI program. Chi-square test was used to test the statistical significance.
RESULTS

A total number of 443 women admitted for hospital delivery were studied at O.M.H. during the period June-August 1996 (Fig. 1). One hundred and ninety (42.9%) subjects were found to be of uncertain gestation, while 253 (57.1%) were of certain gestational age. All subjects were subjected to the questionnaire.

Table 1. shows how the criteria of selecting subjects with uncertain gestation were distributed. Unknown LMP was the major factor (73.4%) responsible for the genesis of uncertain gestation. The frequencies of criteria in a descending order were: use of contraceptive pills (23.7%), irregular cycle (23.2%), lactational amenorrhoea (7.4%), bleeding in early pregnancy (1.6%) and the prolonged cycle was responsible for only 0.5%. No woman used injectable contraception and no subject dated the quickening accurately.

Table 2. shows the distribution of study population by age. The mean age of the two groups was nearly almost the same, 27.25±6.7 for those of uncertain gestation and 27.34±5.76 for those of certain gestation. The youngest in both groups was 14 years old, the oldest in uncertain gestation was 40 years and 45 years in those with certain gestation. The majority fell between the age group 20-34 in both groups, 67.4% in uncertain compared to 77.1 in certain gestational age. Subjects with age
less than 20 years in uncertain gestation (14.2%) are slightly predominant than those with certain gestation (8.4%) but the difference is statistically not significant ($x^2 = 1.4, P > 0.1$). Also subjects of age 35 years and more are more in uncertain gestation (18.4%) than in certain gestation (14.2) and the difference is just statistically not significant ($x^2 = 3.6, P > 0.05$).

The distribution of the study population according to the residence is shown in Fig. 2. Women with uncertain gestation were almost equally distributed (46.8 rural and 53.3% urban), while those with certain gestation were predominantly urban (70.8% versus 29.2%). This difference between the two groups is statistically significant ($x^2 = 1\text{df} = 14.4, P < 0.001$).

Fig. 3. illustrates the distribution of the study population according to their educational level. The percentage of uncertain gestation decreases with increasing level of education from 49.5% to 23.7%, while on the other hand the certainty of gestation increases with the increase in the education level from 17.0% to 43.1%. The difference in illiteracy rate between the two groups is statistically highly significant ($x^2 = 53.7, P < 0.001$). Also the difference in the secondary and post secondary education between the two groups is statistically significant ($x^2 = 18.0, P < 0.001$).

Table 3. reveals how the study population was distributed by the husband’s occupation. Husband’s occupation is an indicator of the SES. If we take the unemployed, unskilled and skilled labourer together as a
reflection of low SES, they amount to 53.1% in women with uncertain gestation versus 23.3% in those with certain gestation. On the other hand if we take professional as an indicator of high SES, we found the percentage of high SES in women with uncertain gestation accounts for less than one third of those with certain gestation (2.6% versus 9.5%).

Fig. 4. shows the distribution of subjects by parity. The frequency of multigravidas in the two groups is similar (52.6% versus 49.8%). However, there are more primigravidas in subjects with certain gestation (38.7% versus 27.4%). The difference is statistically significant ($\chi^2$ 1df = 6.3, $P < 0.05$), while there are more grandmultigravidas in those with uncertain gestation (20% versus 11.5%) and the difference is statistically significant ($\chi^2$ 1df = 6.2, $P < 0.05$).

Fig. 5. shows that only 34.7% of subjects with uncertain gestation were booked for delivery compared to 58.9% of those whose G.A. was certain and 65.3% in the former were unbooked compared to 41.1% in the latter, the difference between the two groups is statistically significant ($\chi^2$ 1df = 25.4, $P < 0.001$).

As regards to the time of attending ANC for the first time, Table 4. shows that a sizeable percentage (39.0%) of women with uncertain gestation are either late attendants or non-attendants for ANC compared to those with certain gestational age (16.6%), and 61.1% of subjects with uncertain gestational age attending the ANC initially during either the
first or second trimester compared to 83.4% of the other group. A percentage of 21.1% of women with uncertain gestation have no ANC compared to only 5.9% of those with certain dates, the difference is statistically significant ($x^2 \text{ 1df } = 24.1, P < 0.001$). Half of subjects with certain gestation were attending ANC in the first trimester compared to 30% of those with uncertain gestation, a statistically significant difference ($x^2 \text{ 1df } = 7.6, P < 0.01$).

Table 5. depicts the distribution of the study population according to the time of U/S scanning. A minor proportion of subjects in both groups had U/S scanning in the first and 2nd trimesters, amount to 13.1% and 19.0% in the uncertain and certain gestational age respectively. In both groups U/S was done late in the third trimester. This account for 21% in both cases. There was no difference in both groups regarding the utilization of U/S ($x^2 \text{ 1df } = 2.2, P > 0.1$). The majority of study population had no U/S done (65.9% and 59.3%). So the effects of U/S on pregnancy outcome had not been analysed.

Table 6. reveals the timing of U/S scanning according to the time of the first antenatal visit in subjects with uncertain gestational age. Of fifty seven subjects attending ANC for the first time, only 14.0% were scanned, 8.8% were scanned in the second trimester, 28.1% in the 3rd trimester and 49.1% were not scanned. Of fifty nine subjects who attended ANC initially in the 2nd trimester, a percentage of 20.3 were
scanned, 18.6% were scanned later in the 3rd trimester, the rest (61.0%) were not scanned. A percentage of 38.2% out of 34 subjects attending ANC in the 3rd trimester were scanned.

Concerning the mode of delivery of the study population, Table 7 shows there was no significant difference in spontaneous vaginal delivery rates between the two groups (59.4% versus 62.8%) \((\chi^2 1\text{df} = 0.5, P > 0.1)\). There was a significant higher percentage of emergency operative delivery among women with uncertain gestation (29.0%) compared to those with certain gestation (20.5%) \((\chi^2 1\text{df} = 4.2, P < 0.05)\) which is mainly due to high rate of emergency caesarean section (21.1% and 13.4%, respectively).

Fig. 6 illustrates the rate of emergency caesarean section versus elective one in both groups. In uncertain gestation there was a high percentage of emergency caesarean section (70.2%) and low percentage of elective caesarean section (29.8%) compared to those with certain gestation (52.3% and 47.7%, respectively). The difference being statistically significant \((\chi^2 1\text{df} = 4.1, P < 0.05)\).

Table 8. shows a slight increase in the distribution of immediate maternal complications in subjects with uncertain gestation (6.3%) compared to those with certain gestation (3.6%). This consisted mainly of haemorrhage, tears and collapse. The difference is statistically not significant \((\chi^2 1\text{df} = 1.18, P > 0.1)\).
Fig. 7. shows that stillbirth rate in both groups was similar (58 and 52/1000 total births respectively), $x^2 1\text{df} = 0.09, P > 0.1$.

Table 9. shows there are more with Apgar score of less than 6 at 5 minutes in the uncertain group (10.0%) than the certain group (7.1%). However, this difference was not statistically different ($x^2 1\text{df} = 1.18, P > 0.1$).

Birth weight was studied in both groups (Table 10). It was found that the frequency of LBW was significantly higher (20.5%) in the uncertain than those of certain gestation (9.9%). Chi-square = 9.9, $P < 0.005$). The rate of large foetal birth weight (> 4.0 kg) was slightly higher in the uncertain than the certain group (3.7 versus 2.0%). The difference is not significant ($x^2 = 1.2, P > 0.1$). The mean birth weight was 2.94±0.69 and 3.07±0.53 in the two groups respectively.

Fig. 8. shows the distribution of subjects according to the assessed G.A. at birth.

The frequency of prematurity (< 37 weeks) was higher in the uncertain (15.3%) than the certain (5.9%) group. This difference was statistically significant ($x^2 1\text{df} = 10.6, P < 0.005$).
Table 1. The distribution of criteria of selecting subjects with uncertain gestation (O.M.H., 1996).

<table>
<thead>
<tr>
<th>Criterion of selection</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unknown LMP</td>
<td>139</td>
<td>73.2</td>
</tr>
<tr>
<td>Use of contraceptive pills</td>
<td>45</td>
<td>23.7</td>
</tr>
<tr>
<td>Irregular cycle</td>
<td>44</td>
<td>23.2</td>
</tr>
<tr>
<td>Lactational amenorrhoea</td>
<td>14</td>
<td>7.4</td>
</tr>
<tr>
<td>Bleeding early pregnancy</td>
<td>3</td>
<td>1.6</td>
</tr>
<tr>
<td>Prolonged cycle</td>
<td>1</td>
<td>0.5</td>
</tr>
</tbody>
</table>
Table 2. The distribution of the study population by the age group (O.M.H., 1996).

<table>
<thead>
<tr>
<th>Age group</th>
<th>Uncertain gestation</th>
<th>Certain gestation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>&lt; 15</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>* 15-19</td>
<td>26</td>
<td>13.7</td>
</tr>
<tr>
<td>20-24</td>
<td>45</td>
<td>23.7</td>
</tr>
<tr>
<td>25-29</td>
<td>46</td>
<td>24.2</td>
</tr>
<tr>
<td>30-34</td>
<td>37</td>
<td>19.5</td>
</tr>
<tr>
<td>** 35 +</td>
<td>35</td>
<td>18.4</td>
</tr>
<tr>
<td>Total</td>
<td>190</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Mean = 27.25  
Range = 14 – 40  
SD = ± 6.7  
* $x^2 = 3.6$, $P > 0.05$  
** $x^2 = 1.4$, $P > 0.1$
Table 3. The distribution of the study population by the husband’s occupation (O.M.H., 1996).

<table>
<thead>
<tr>
<th>Husband’s occupation</th>
<th>Uncertain gestation</th>
<th>Certain gestation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Unskilled labouror</td>
<td>80</td>
<td>42.1</td>
</tr>
<tr>
<td>Skilled labouror</td>
<td>19</td>
<td>10.0</td>
</tr>
<tr>
<td>Unemployed</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td>Private business</td>
<td>59</td>
<td>31.1</td>
</tr>
<tr>
<td>Employee</td>
<td>25</td>
<td>13.2</td>
</tr>
<tr>
<td>Professional</td>
<td>5</td>
<td>2.6</td>
</tr>
<tr>
<td>Total</td>
<td>190</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Table 4. The distribution of the study population according to the time of the first antenatal visit (O.M.H., 1996).

<table>
<thead>
<tr>
<th>First antenatal visit</th>
<th>Uncertain gestation</th>
<th>Certain gestation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>* 1st trimester</td>
<td>57</td>
<td>30.0</td>
</tr>
<tr>
<td>2nd trimester</td>
<td>59</td>
<td>31.1</td>
</tr>
<tr>
<td>3rd trimester</td>
<td>34</td>
<td>17.9</td>
</tr>
<tr>
<td>No ANC</td>
<td>40</td>
<td>21.1</td>
</tr>
<tr>
<td>Total</td>
<td>190</td>
<td>100.0</td>
</tr>
</tbody>
</table>

* $x^2 = 7.6; P < 0.01$
Table 5. The distribution of the study population according to the time of ultrasound scanning (O.M.H., 1996).

<table>
<thead>
<tr>
<th>U/S</th>
<th>Uncertain gestation</th>
<th>Certain gestation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>* 1st trimester</td>
<td>8</td>
<td>4.2</td>
</tr>
<tr>
<td>2nd trimester</td>
<td>17</td>
<td>8.9</td>
</tr>
<tr>
<td>3rd trimester</td>
<td>40</td>
<td>21.1</td>
</tr>
<tr>
<td>Not done</td>
<td>125</td>
<td>65.9</td>
</tr>
<tr>
<td>Total</td>
<td>190</td>
<td>100.0</td>
</tr>
</tbody>
</table>

* $x^2 = 7.6; P < 0.01$
Table 6. The distribution of U/S scanning according to the time of the first antenatal visit among women with uncertain gestation (O.M.H., 1996).

<table>
<thead>
<tr>
<th>First antenatal visit</th>
<th>U/S scanning</th>
<th>Not done</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1st tri.</td>
<td>2nd tri.</td>
<td>3rd tri.</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>1st trimester</td>
<td>8</td>
<td>14.0</td>
<td>5</td>
</tr>
<tr>
<td>2nd trimester</td>
<td>0</td>
<td>0.0</td>
<td>12</td>
</tr>
<tr>
<td>3rd trimester</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>No ANC</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
<td>17</td>
<td>40</td>
</tr>
</tbody>
</table>
Table 7. The distribution of the study population according to the mode of delivery (O.M.H., 1996).

<table>
<thead>
<tr>
<th>Mode of delivery</th>
<th>Uncertain gestation</th>
<th>Certain gestation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.     %</td>
<td>No.     %</td>
</tr>
<tr>
<td>S.V.D.</td>
<td>113      59.4</td>
<td>159      62.8</td>
</tr>
<tr>
<td>Breech</td>
<td>2        1.1</td>
<td>4        1.6</td>
</tr>
<tr>
<td>Induced labour</td>
<td>3        1.6</td>
<td>7        2.8</td>
</tr>
<tr>
<td>Ventouse</td>
<td>4        2.1</td>
<td>3        1.2</td>
</tr>
<tr>
<td>Emergency caesarean section</td>
<td>40    21.1</td>
<td>34      13.4</td>
</tr>
<tr>
<td>Forceps</td>
<td>11       5.8</td>
<td>15       5.9</td>
</tr>
<tr>
<td>Elective caesarean section</td>
<td>17    8.9</td>
<td>31       12.3</td>
</tr>
<tr>
<td>Total</td>
<td>190      100.0</td>
<td>253      100.0</td>
</tr>
</tbody>
</table>
Table 8. The distribution of immediate maternal complications according to the two study groups (O.M.H., 1996).

<table>
<thead>
<tr>
<th>Complication</th>
<th>Uncertain gestation</th>
<th>Certain gestation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Haemorrhage</td>
<td>5</td>
<td>2.6</td>
</tr>
<tr>
<td>Collapse</td>
<td>2</td>
<td>1.1</td>
</tr>
<tr>
<td>Tears</td>
<td>5</td>
<td>2.6</td>
</tr>
<tr>
<td>None</td>
<td>178</td>
<td>93.7</td>
</tr>
<tr>
<td>Total</td>
<td>190</td>
<td>100.00</td>
</tr>
</tbody>
</table>
Table 9. The distribution of the study population according to the Apgar scoring (O.M.H., 1996).

<table>
<thead>
<tr>
<th>Apgar score at 5 minutes</th>
<th>Uncertain gestation</th>
<th>Certain gestation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>&lt; 6</td>
<td>19</td>
<td>10.0</td>
</tr>
<tr>
<td>6 – 9</td>
<td>21</td>
<td>11.1</td>
</tr>
<tr>
<td>10</td>
<td>150</td>
<td>78.9</td>
</tr>
<tr>
<td>Total</td>
<td>190</td>
<td>100.00</td>
</tr>
</tbody>
</table>
Table 10. The distribution of the study population by the birth weight (O.M.H., 1996).

<table>
<thead>
<tr>
<th>Birth weight in kg</th>
<th>Uncertain gestation</th>
<th>Certain gestation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>&lt; 2.5</td>
<td>39</td>
<td>20.5</td>
</tr>
<tr>
<td>2.5 – 3.5</td>
<td>128</td>
<td>67.3</td>
</tr>
<tr>
<td>3.5 – 4.0</td>
<td>16</td>
<td>8.5</td>
</tr>
<tr>
<td>&gt; 4.0</td>
<td>7</td>
<td>3.7</td>
</tr>
<tr>
<td>Total</td>
<td>190</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Mean = 2.94±0.69  3.07±0.53

χ² = 9.9, P < 0.005
Fig. (1) The distribution of the study population according to the uncertainty and certainty of gestation (OMH, 1996)

uncertain 190 (42.9%)
certain 253 (57.1%)
Fig. (2) The distribution of the study population
According to the residence type

Uncertain gestation

Certain gestation

Chi.sq = 14.4, p < 0.001
Fig. (3) The distribution of the study population by their educational level (OMH, 1996)

P<0.001
Fig. (4): The distribution of the study population by parity (OMH, 1996)

*Chi.sq. 1df = 6.3, p ≤ 0.05
**Chi.sq. 1df = 6.2, p ≤ 0.05
Fig. (5) The distribution of the study population by status of booking (OMH, 1996)

- Uncertain: 34.7% booked, 65.3% unbooked
- Certain: 41.1% booked, 58.9% unbooked

p < 0.001
Fig. (6) The distribution of the types of caesarean section by uncertainty and certainty of gestation (OMH, 1996)

Uncertain gestation

Emergency 40 (70.2%)
Elective 1 (29.8%)

Certain gestation

Emergency 34 (52.3%)
Elective 31 (47.7%)

Chi. Sq. = 4.1, P <0.05
Fig. (7) The distribution of the study population by the foetal outcome (OMH, 1996)

Type of gestation

- Live birth
- Fresh stillbirth
- Macerated stillbirth

p > 0.1
Fig. (8) The distribution of the study population according to the gestational age at birth (OMH, 1996)

Chi.sq. = 10.6, p < 0.005
DISCUSSION

It is well understood that accurate G.A. is an essential cornerstone in the management of pregnancy, particularly abnormal one. If the patient is not seen early in pregnancy, accurate estimation of G.A. becomes a real dilemma to the clinician.

The results showed that the proportion of uncertain gestation was 42.9% (Fig. 1). This is a relatively high percentage compared to figures quoted for other countries by many authors. For example in U.K. the frequency was found to be 22% and 17%, 24.9% and 7.1%\(^{(1,2,3,4,7)}\). In Zimbabwe the percentage was 21.4%. Several explanations could be advanced for the relatively high frequency of uncertain gestation in the Sudan. It could be due to ignorance resulting from a high prevalence of female illiteracy, or to lactational amenorrhoea from the almost universal prevalence of breast feeding, or to a communication failure to convert the date of the LMP from the lunar or Arabic calendar used by most women to the Gregorigan calendar.

As regards to the factors involved in the genesis of uncertain gestation, the study showed that (Table 1) unknown LMP was a major contributory factor (73.2%). This fact further reflects ignorance due to illiteracy and poor health education and unawareness of some women about the importance of proper knowledge of their menstrual history. This results differed from that obtained by Hall et al., (1985)\(^{(7)}\) in U.K.
who reported only 101 subjects out of 819 (12.3%) had no information about the LMP. The same above explanations could apply here. Lactational amenorrhoea also leads to uncertain gestation in (7.4%) of cases which is in agreement with the figure mentioned in the literature (1-10%)\(^{(20)}\).

Although the mean ages in patients with uncertain and those with certain gestation was almost the same, 27.25 and 27.34, respectively (Table 2), in age groups 35 years and above, women with uncertain gestation were slightly in excess than those with certain date (18.4% versus 14.2%). This may be due to the fact that older women have poorer education than younger ones. Also the frequency of uncertain gestational age increased in teenagers (14.2% versus 8.7%). This is in agreement with the results reported by Hall and Hill\(^{(9)}\). Teenage mothers have no previous experience with pregnancy and therefore are less aware of the menstrual history.

With respect to residence, there was an equal distribution in the urban-rural type in subjects with uncertain dates, but a statistically significant \((x^2 = 14.4, P < 0.001)\) preponderance in favour of the urban setting in subjects with certain gestation (Fig. 2). This reflects the poor status of rural areas which usually have inadequate services, less education and poor health education. This agreed with the results obtained by Chimbira (Zimbabwe)\(^{(6)}\) who reported that the area of upbringing significantly \((P < 0.05)\) influenced the certainty of dates.
The influence of education on the uncertainty of gestation was well documented in the study, with decrease in uncertain and increase in certainty of gestation with increasing education. Uncertain gestation decreased from 49.5% to 23.7% and certain gestation increased from 17.0% to 43.1% as education level increased (Fig. 3). The difference between the two groups in illiteracy and secondary and post secondary were statistically very highly significant ($\chi^2 = 53.7, P < 0.001$ and $\chi^2 = 18.0, P < 0.001$ respectively). This showed that education is a major factor affecting the genesis of uncertain gestational age. This finding is in agreement with Chimbira (Zimbabwe)$^{(6)}$, who concluded that education of either husband or the wife has a significant influence ($P < 0.05$). Also Hall et al.$^{(7)}$ (U.K.) reported that women with uncertain gestation have unfavourable characteristics including minimum education. He recorded that 72.2% of primipara of uncertain gestation had minimum education compared to 52.8% of those with certain gestation.

When taking the husband’s occupation to reflect SES, and unemployed, unskilled and skilled labourer to represent low SES, we found that the frequency of low SES is double in uncertain gestation (Table 3). These results agreed with the results of Hall and Hill in U.K. who linked the uncertain gestation with the adverse maternal characteristics including SES$^{(9)}$.

The frequency of primigravidas of uncertain G.A. was less than that of certain gestation (24.7% and 38.7% respectively). This difference (Fig. 4) was statistically significant ($\chi^2 = 6.3, P < 0.05$), implying that
primigravidas are younger and therefore more educated, are rare contraceptive users and unsubjected to lactational amenorrhoea. This is similar to the finding obtained by Hall and Hill (U.K.) who reported the increased uncertain gestation with increasing parity from three and more\(^9\). Subjects with uncertain dates were more among grandmultigravidas (5 or more) compared to those with certain gestation (20.0% and 11.5% respectively). The difference was statistically significant \((x^2 = 6.2, P < 0.05)\). This could be influenced by amenorrhoea as a result of breast feeding, use of contraceptive pills, old age, less education and more social obligations which may interfere with her memory.

A percentage of 63.3% of women with uncertain gestation were unbooked (Fig. 5) compared to 41.1% of those with certain gestation, and the difference was statistically significant \((P < 0.001)\). This result is similar to those obtained by Chimbira (Zimbabwe) and Hall et al., (U.K)\(^6,7\). This could be explained by rural residence, long distances, less education and poor SES among women with uncertain gestational age.

With respect to ANC attendance (Table 4), there was a statistically significant difference between the two groups in favour of certain gestation (79.0% versus 94.1%, \(P < 0.001\)). This is most probably due to the fact that women with certain gestation have favourable maternal characteristics such as living in urban areas with adequate and handy ANC services, having high level of education and high SES. Moreover, most patients with uncertain gestation came late to ANC, after
the first trimester compared to those with certain gestation, thus depriving themselves of many benefits of ANC services including early proper clinical assessment of the dates and U/S scanning in the first half of pregnancy which is more accurate than doing it later.

In table 5, we found less than 20% in both groups were scanned in the first and second trimesters with no statistically significant difference (P > 0.1) between the two groups. This proves that doctors are underutilizing this facility and are probably using it in both groups for reasons other than estimating the gestational age. This is contrary to the situation in developed and rich countries where U/S scanning is routinely used for dating pregnancy. Wilson reported that 90% of scannings were done for estimating the G.A. or bleeding\(^{(28)}\). These findings are in disagreement with Hall et al., who reported that scannings were done more to patients with uncertain gestation\(^{(7)}\). This may indicate that doctors are less aware of the problem.

The proper time for U/S scanning in estimating the G.A. accurately is in the first and second trimesters\(^{(29,34,35)}\). In table 6, we observed that there was a clear time lag in ordering U/S with respect to time of ANC in patients with uncertain gestation. This reflects the above mentioned underutilization of this reliable technique for accurate dating. This could be explained by the inability of most patients with uncertain gestation to afford, sparse availability of U/S machines and less awareness of the doctors of the problem.
Regarding the spontaneous vaginal delivery (Table 7), there was no statistically difference ($P > 0.1$) between the two groups. While considering emergency operative deliveries, there was a statistically significant difference between the two groups in favour of certain gestation (29.0% versus 20.0%, $x^2 = 4.2$, $P < 0.05$). This difference is due mainly to a higher rate of emergency caesarean section in the uncertain group which attained statistical significance (21.1% versus 13.4%, $P < 0.05$). Our finding with respect to emergency caesarean section agreed with those obtained by Chimbira who, however also reported statistically significant difference in all operative deliveries.

Regarding the types of caesarean section in both groups, there was increase in emergency section in uncertain and increase in elective section in certain group (70.25%, 29.8% and 52.3%, 47.7% respectively). The difference is statistically significant ($P < 0.001$). These differences could be explained by the fact that in women with certain gestation the time of caesarean section is known beforehand, but in uncertain gestation, the doctor, to avoid delivering a preterm baby, may defer the time of the operation until the patient goes into labour, thus performing the operation under unfavorable circumstances with the consequent maternal and foetal hazards.

Apart from the hazards of emergency caesarean section women with uncertain gestation have no statistically significant difference ($P > 0.1$) in immediate complications as compared to those of certain gestation.
Excess tears in uncertain group could have been the result of the higher proportion of large babies (> 4.0 kg) (Table 8).

Referring to Fig. 7, there was no statistically significant difference ($x^2 = 0.08, P > 0.1$) in the stillbirth rate in both groups. This is in disagreement with the study carried out by Chimbira who obtained excess stillbirth rate in the uncertain group. Failure to achieve significance may be due to small number encountered in this study.

Apgar score less than 6 at 5 min. is commonly associated with adverse neonatal outcome. In this study, although Apgar scoring less than 6 was slightly higher (10.0%) in uncertain gestation as compared to those with certain gestation (7.1%), it did not achieve statistical significance. However, in Apgar score less than 10 the difference was significant (Table 9). This could be ascribed to the higher frequencies of prematurity and L.B.W. associated with uncertain gestation.

Low birth weight (< 2.5 kg) was significantly commoner ($x^2 = 9.9, P < 0.005$) in the uncertain group (20.5% versus 9.9). This agreed with Hall and Hill (U.K.)\(^9\) and Thomson \textit{et al.}\(^8\) who reported that uncertain gestation was significantly linked with L.B.W. This could be due to premature intervention. Although there was high proportion of L.B.W. among uncertain group there is a slight difference in the mean birth weight (2.94 versus 3.07), this may be explained by a slight excess in large babies > 4.0 kg in uncertain group (3.7 versus 2.0%).

Regarding prematurity, as a risk factor of perinatal mortality and morbidity there was statistically significant difference ($x^2 = 10.6, P <$
0.005) between the two groups (Fig. 8) in favour of certain gestation. This is in agreement with the results obtained by Chimbira and Hill and Hall\textsuperscript{(6,9)}. This finding could be explained by incorrect timing of intervention in those with uncertain gestation.
CONCLUSION

Certain G.A. is the most important factor in the proper management of pregnancy as uncertain gestation is associated with adverse foetal and maternal outcome such as L.B.W., prematurity and increase rate of emergency caesarean section.

Unfavourable sociodemographic factors such as low education level, high parity, rural residence, poor ANC and low S.E.S. have influence over the genesis of uncertain gestation.

From this study it was observed that adverse pregnancy outcome, in particular foetal outcome such as prematurity and L.B.W., which are the main risk factors of perinatal mortality and morbidity, were strongly related to uncertain gestation. Therefore, proper early dating of gestation will minimize the incidence of those adverse outcomes.
RECOMMENDATIONS

1. As education plays an important role in exposing women to uncertainty of gestation, emphasizing female education will reduce the uncertain gestation.

2. Health personnel should try to ascertain the G.A. as early as possible soon after the first ANC attendance.

3. Making use of the available ultrasonographic technology in the proper early dating of uncertain gestation.

4. Training of all doctors in the proper use and interpretation of U/S.

5. Providing all specialized hospitals and antenatal clinics with U/S scanners.
REFERENCES


UNCERTAIN GESTATION AND PREGNANCY OUTCOME

Serial no:…………………………
1. Name:………………………………..   2. Age in complete years: (       )
3. Residence: a) Rural (       )   b) Urban (       )
4. Education:
   1. Illiterate (       )   3. Intermediate school (       )
   2. Primary school (       )   4. High seconday (       )
   5. University (       )
5. Husband’s occupation:
   1. Non-employed (       )   3. Private business (       )
   2. Labourer (       )   4. Employee (       )
   a) Unskilled (       )   5. Professional (       )
   b) skilled (       )
6. Parity:
   1- Primipara (       )  2- Multipara (       )  3- Grandmultipra (       )
7. LMP:
   1- Known (       )  2- Unknown (       )
8. Menstrual cycle:
   1- Regular (       )  2- Irregular (       )  3- Prolonged (       )
9. Latational amenorrhoea:
   Yes (       )  No (       )
10. Contraceptive pills:
   Yes (       )  No (       )
11. Bleeding throughout pregnancy:
   Yes (       )  No (       )
12. Date of quickening:
   Known (       )  Unknown (       )
13. Gestational age:
   Certain (       )  Uncertain (       )
14. Status of booking:
   Booked (       )  Unbooked (       )
15. First antenatal visit:
   1- First trimester (       )  3- Third trimester (       )
   2- Second trimester (       )  4- None (       )
16. U/S scanning:
   1- First trimester (       )  3- Third trimester (       )
   2- Second trimester (       )  4- Not done (       )
17. Mode of delivery:
   1- S.V.D. (       )  2- Induced labour (       )
   3- Ventouse (       )  4- EM C/S (       )
   5- Forceps (       )  6- EL C/S (       )
18. Immediate complications to the mother:
   1- Haemorrhage (       )  2- Collapse (       )  3- Tears (       )
   4- Others (       )  5- None (       )
19. Condition of the baby at birth:
   1- Alive (       )  2- Fresh stillbirth (       )
   3- Macerated stillbirth (       )
20. Apgar score at 5 minutes:
   1. < 6 (       )  2. 6 - 9 (       )  3. 10 (       )
21. Birth weight in grams:
   1- < 2500 (       )  2- 2500 - 3500 (       )
   3- > 3500 - 4000 (       )  4- > 4000 (       )
22. Gestational age at birth in weeks:
   1- < 37 (       )  2- 37 - 42 (       )  3- > 42 (       )