SONOGRAPHIC DETERMINATION OF GESTATIONAL AGE IN THE SECOND AND THIRD TRIMESTER FROM TRANSVERSE CEREBELLAR DIAMETER AMONG PREGNANT WOMEN IN ENUGU, NIGERIA

M.SC. DISSERTATION

BY

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SPECIALTY: MEDICAL IMAGING

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In Partial Fulfilment of the Requirements for the Award of Masters in Science (M.Sc) Degree in Medical Imaging

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THIRD TRIMESTERS FROM TRANSVERSE

CEREBELLAR DIAMETER AMONG

PREGNANT WOMEN IN ENUGU, NIGERIA.

EXAMINATION COMMITTE

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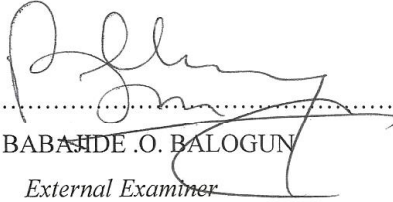**HEAD OF DEPARTMENT**   **SUPERVISOR**

DATE OF APPROVAL í í í í í í í í

CERTIFICATION PAGE

AGUJI EBERE QUEENDALINE, a postgraduate student in the Department of Medical Radiography and Radiological Sciences has satisfactorily completed the requirements for the award of Masters in Science (M.Sc.) in Medical Imaging. The work embodied in this project work is original and has not been submitted in part or full for any other diploma and degree of this or any other university.

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To my lovely parents, Mr. and Mrs. Aguji Ephraim.

ACKNOWLEDGEMENTS

ABSTRACT

Fetal transverse cerebellar diameter (TCD) was found to be useful in gestational age (GA) assessment during routine fetal ultrasound examination. The aim of this study is to establish normogram of fetal TCD in the second and third trimesters of pregnancy and to compare its ability to predict gestational age with previously published nomograms. Six hundred and ninety seven pregnant women with GA between 14 and 40 weeks were scanned using convenience sampling method. Each woman had three ultrasonographic measurements and the best average was obtained. Transverse cerebellar diameter was measured from transverse view of fetal intracranial anatomy through the posterior fossa that included visualization of anatomic landmarks such as thalamus, cavum septum pellucidium and cisterna magna. The TCD measurement was obtained by placing electronic calipers from proximal outer margin to distal outer margin of cerebellum. The women's last menstrual period (LMP) and fetal femur length (FL), biparietal diameter (BPD), head circumference (HC), and abdominal circumference (AC) of the fetuses were also recorded. Values of transverse cerebellar diameter obtained were used to determine fetal gestational age. The mean TCD increases from 13.6 ± 2.2 mm to 27.3 ± 2.6 mm in the second trimester and 28.9 ± 2.0 mm to 42.9 ± 2.0 mm in the third trimester. The relationship of TCD with GA obtained from LMP and FL, BPD, HC and AC were determined. The TCD has a strong correlation with GA ($r = 0.93$; $p < 0.05$). Model equations: GA = 0.63 (TCD) + 7.16 I; GA = 0.54 (TCD) + 14.32 and GA = 0.79 (TCD) + 4.91 in the second, third and combined trimesters were generated. There is no statistically significant difference found between the mean TCD values obtained in this study from that of the previous literatures ($p > 0.05$). The normogram of transverse cerebellar diameter generated shows that TCD can be a good estimator of fetal GA from 14 weeks to term.

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LIST OF ABBREVIATIONS

GA: Gestational age

TCD: Transverse Cerebellar Diameter.

FL: Femur Length.

BPD: Biparietal Diameter.

HC: Head Circumference.

AC: Abdominal Circumference.

IUGR: Intra Uterine Growth Restriction.

CHAPTER ONE

INTRODUCTION

1.1   Background of the Study

Accurate knowledge of fetal gestational age (GA) is important for the attainment of best possible antenatal care and successful pregnancy outcome. Ultrasound is a useful modality for the assessment of gestational age (GA) and this can greatly impact on obstetric management and improve ante partum care (Robin et al., 2009). The routine use of diagnostic ultrasound in obstetrics may be largely due to its non invasiveness, affordability and absence of ionizing radiation.

The cerebellum lies in the posterior cranial fossa. It lies dorsal to the pons and the medulla, separated from them by the 4th ventricle. The cerebellum develops from the dorsolateral part of the alar lamina of the metencephalon. In the embryo, cerebellum appears at the end of the fifth week as well as overriding the 4th ventricle (Nitsana et al., 2004). Measurement and demonstration of fetal cerebellum is useful in assessing gestational age. A prospective study carried out on 50 antenatal patients (20-40 years of age) between 14-40 weeks of pregnancy attending the clinic for routine ultrasound examination showed that transverse cerebellar diameter is useful in gestational age assessment (Prabhat et al., 2010). Physiologically, the cerebellum assists in the coordination of fine movements, muscle tone, balancing and equilibrium in the body (Richard et al., 2010).

Assessment of gestational age is of great importance in obstetric care, and some pregnancies considered to be overdue are due to inaccurate assessment of gestational age. Some gestational age that are not known has been associated with adverse pregnancy outcomes including low birth weight, prenatal mortality and spontaneous delivery, independent of maternal characteristic (Robin et al., 2009).

Accurate gestational age assessment is of great importance in obstetric practice. It helps in counseling patients regarding the option of pregnancy termination, evaluation of fetal growth and detection of intrauterine growth restriction (IUGR). It may also help to avoid undue parental anxiety from miscalculations and superfluous invasive procedures, which may increase pregnancy loss (Kalish and Chervenak, 2002).

Determination of fetal gestational age requires the measurement of some parameters such as biparietal diameter (BPD), abdominal circumference (AC), head circumference (HC), femur length (FL) and transverse cerebellar diameter (TCD). This can be achieved by the use of ultrasonography (Roger and Tom, 2007).

After the first trimester, crown rump length (CRL) is not useful in fetal age determination because of fetal posturing and size. Furthermore, a biological variation with advancing gestational age and fetal position makes BPD not to be accurate in fetal age determination in the third trimester. Fetal long bones used in prediction of GA are sometimes technically difficult to measure and may not give accurate gestational age of fetus. However, previous researcher has demonstrated that TCD can serve as a reliable predictor of GA in the fetus and is a standard against which aberrations in other fetal parameters can be compared, especially when the GA cannot be determined by the date of last menstrual period or an early pregnancy scan (Mark et al., 2001).

The aforementioned common GA estimation parameters may have pitfalls as pregnancy advances in late trimester in our population. Inadequate assessment of gestational age at later stage of pregnancy and inability to determine the fetal gestational age at the presence of intrauterine growth restriction is as a result of not using the correct parameters (Halit et al., 2002). This may have motivated future researchers to explore the accuracy of fetal biometric GA parameters such as the TCD especially in growth restricted fetuses. Interestingly, previous study found out that the TCD of growth-impaired fetus were lower

than expected, but still within the normal range (Kazumusa et al., 2001). Human cerebellum is resistant to chronic hypoxemia due to brain sparing phenomenon and in the human fetus, cerebellar growth may be least affected by intrauterine growth retardation (IUGR) (Saifon et al., 2006). Transverse cerebellar diameter showed a good correlation with gestational age (correlation co-efficient = 0.991 and 1 < 0.001) (Prabhat et al., 2010). Literature reviewed showed paucity of information on the use of transverse cerebellar diameter for dating GA in Nigerian populations. Most studies were done in foreign countries like Australia, India and Thailand (Saifon et al., 2006). The objectives of this study were, therefore, to determine the TCD normogram in relation to patientøs LMP and fetal FL, BPD, HC and AC parameters; to establish a relationship between TCD and GA obtained from patientøs LMP, fetal FL, BPD, HC, and AC parameters in a Nigerian population, and to compare the mean TCD values from present study with that obtained from previous literature.

1.2   Statement of the Problem

1.   Assessment of gestational age is of great importance in obstetric care, and some pregnancies considered to be overdue may be due to inaccurate assessment of gestational age. The most frequently used biometric parameters for the estimation of gestational age are the fetal biparietal diameter, femur length, abdominal circumference, head circumference, last menstrual period, quickening and fundal height measurement. However, they are sometimes difficult to measure and may not give the accurate GA of the fetus (Roger and Tom, 2007; Robin et al., 2009). This provides the challenges for more research.

2.   Variations in the accuracy of many fetal gestational age estimation parameters are marked in late pregnancy. Thus there is need for more accurate methods of determining gestational age as pregnancy advances in age (Kramer et al., 2006).

1.3   Objectives of the Study

1.3.1 General Objectives

To determine the gestational age in the second and third trimesters from transverse cerebellar diameter among pregnant women in Enugu Metropolis by sonography.

1.3.2 Specific Objectives

1.   To determine the transverse cerebellar diameter in relation to patient's LMP and fetal FL, BPD, HC and AC parameters.

2.   To correlate the measured transverse cerebellar diameter with gestational age obtained from last menstrual period and FL, BPD, HC and AC parameters.

3.   To establish a relationship between transverse cerebellar diameter and gestational age obtained from patient's LMP.

4.   To compare the mean transverse cerebellar diameter values from present study with that obtained from previous literatures (Nepalese population and Thai population).

1.4   Significance of the Study

Normal range of TCD for each gestational age (14 – 40 weeks) will help in early detection of intra uterine growth restriction.

Anomaly detection at later stage of pregnancy is of practical importance. This will help the health care providers to prepare for the accurate time and best fetal surgical facilities that will be used on fetuses with anomalies such as encephalocele in order to avoid fetal morbidity and mortality.

1.5 Scope of the Study

The study was carried out at Enugu State University Teaching Hospital Parklane, Enugu and it involves pregnant women who came for antenatal care at period of study.

1.6 Operational Definition of Terms

Cerebellum: The portion of the brain that lies behind the fourth ventricle and below the tentorium. It helps in fine movement coordination, muscle tone, balancing and equilibrium in the body (Richard et al., 2010).

Ultrasound: Is a name given to high frequency sound waves, over 20,000 cycles per second (20KHz). These waves (inaudible to human) can be transmitted in beams and are used to scan the tissues of the body to produce images. (Takedas et al., 2008).

A transducer (probe): Device capable of converting energy from one form to another. It is also a device which turns an electrical signal into a sound pulse of the same frequency. Transducer operates on piezoelectric effect (Barys and Andy, 2010).

Sonography: Is a technique which uses high-frequency sound waves in acquisition of images. It uses a probe to send pulses of sound waves into a body in order to construct an image of a body organ (Dubose and Baker, 2009).

Focusing: Adjustment of ultrasound beams so that it converges at a particular depth in order to improve resolution (Roger and Tom, 2007).

Gestational Age: The period during which embryo develops (about 266 days in humans). The state of being pregnant; the period from conception to birth when a woman carries a developing fetus in her womb (Neil et al., 2009).

CHAPTER TWO

LITERATURE REVIEW

2.1.0 Theoretical Background of the Study

The cerebellum plays major roles in the timing of motor activities and in rapid, smooth progression from one movement to the next. It also helps to control the intensity of muscle contraction when the muscle loads changes. It controls the necessary instantaneous interplay between agonist and antagonist muscle group. Removal of cerebellum causes movements to become highly abnormal. The cerebellum is especially vital to the control of rapid muscular activities, such as running, typing, playing the piano, and even talking. Loss of this area of the brain can cause almost total incoordination of these activities.

The cerebellum receives continuously updated information on the desired sequence of muscle contractions from the brain motor control areas. It also receives continuous sensory information from the peripheral part of the body. The cerebellum then compares the actual movements as depicted by the peripheral sensory feedback information with the movements intended by the motor system. If the two do not compare favourably, then instantaneous appropriate corrective signal are transmitted back into the motor system to increase or decrease the level of activation of the specific muscles (Guyton and Hall, 2002).

In addition, the cerebellum aids the cereberal cortex in planning the next sequential movement, while the current movement is still being executed, thus helping the person to progress smoothly from one movement to the next. Also, it learns by mistake for example if a movement does not occur exactly as intended, the cerebellar circuit learns to make a stronger or weaker movement the next time. To do this, changes occur in the excitability

of the appropriate cerebellar neurons, thus bringing the subsequent contraction into better correspondence with the intended movements (Guyton and Hall, 2002).

2.1.1   Anatomy of the Cerebellum

The cerebellum, largest portion of the hind brain, lies in the posterior cranial fossa. It lies dorsal to the pons and medulla, separated from them by the forth ventricle. Cerebellum is separated from the cerebrum by a fold of duramater called the tentorium cerebelli. The cerebellum consists of a midline part called the vermis and two lateral hemispheres. It is roughly spherical, but somewhat constricted in its median region and flattened, the greatest diameter being transverse (William PL, 1995).

The cerebellum develops from the dorsolateral parts of the alar lamina of the metancephalon. In the embryo, cerebellum appears at the end of fifth weak as well as overriding the fourth ventricle (Prabhat et al., 2010).

Anatomically, the cerebellum is divided into three lobes by two deep fissures: the anterior lobe, the posterior lobe and the flocculonodular lobe (fig 1 and 2). The flocculonodular lobe is the oldest of all portions of cerebellum. It developed along with the vestibular system in controlling body equilibrium. From a functional point of view, the anterior and posterior lobes are organized by lobes but along the longitudinal axis. These shows a posterior view of the human cerebellum after the lower end of posterior cerebellum has been rolled downward from its normally hidden position (Guyton and Hall, 2002).

The vermis is a narrow band separated from the remainder of the cerebellum by shallow grooves. In this area, most cerebellar control functions for the muscle movements of the axial body, neck, shoulders and hips. To each side of the vermis is a large, laterally protruding cerebellar hemisphere. This hemisphere is divided into an intermediate zone

and a lateral zone (fig 2). The intermediate zone of the hemisphere is concerned with controlling muscle contractions in the distal portions of the upper and lower limbs. The lateral zone of the hemisphere operates at a much more remote level, because this area joins with the cerebral cortex in the overall planning of sequential motor movements. Without this lateral zone, most discrete motor activities of the body lose their appropriate timing and sequencing (Guyton and Hall, 2002).
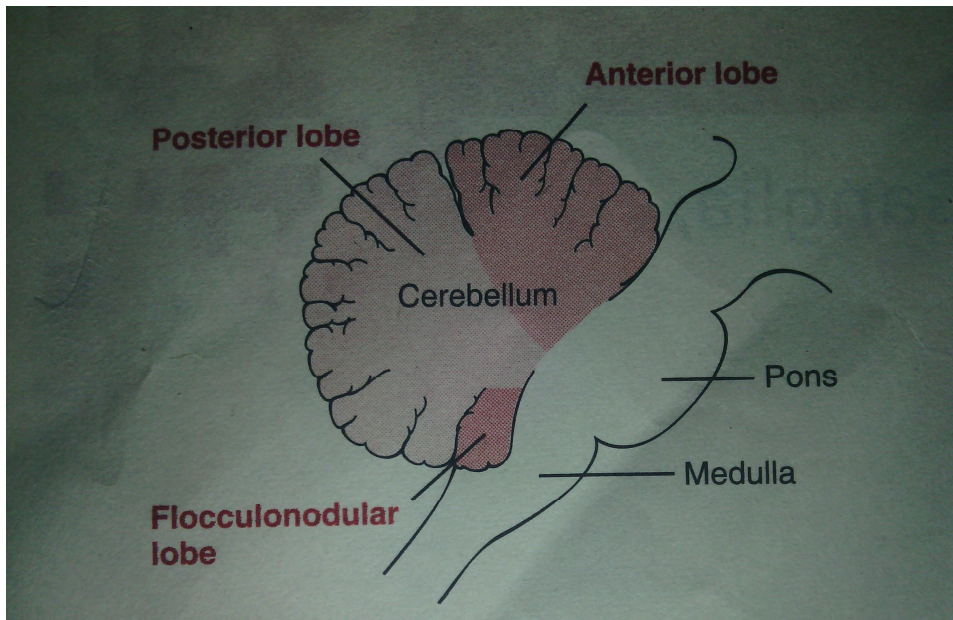
Figure 1: Anatomical lobes of the cerebellum as seen from the lateral side.
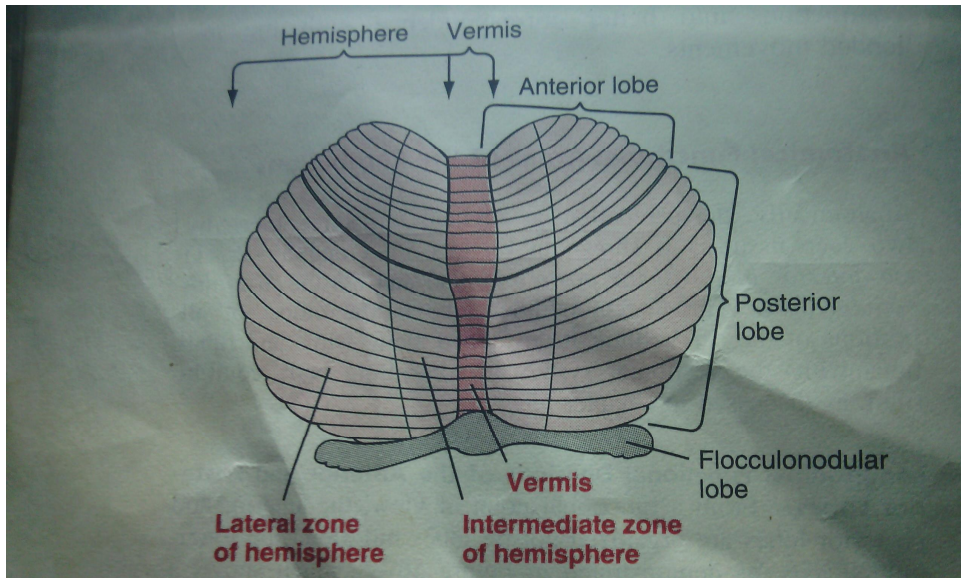
Figure 2: Functional parts of the cerebellum as seen from the posteroinferior view.

2.1.2   Normal Sonographic Appearance of the cerebellum

Sonographically, the cerebellum appears as a homogenous echotexture with medium level echogenicity in the posterior cranial fossa (fig 3a). On transverse view, the posterior fossa reveals a butterfly appearance of the cerebellum. The cerebellum appears as two lobules on the either side of the midline in the posterior cranial fossa.
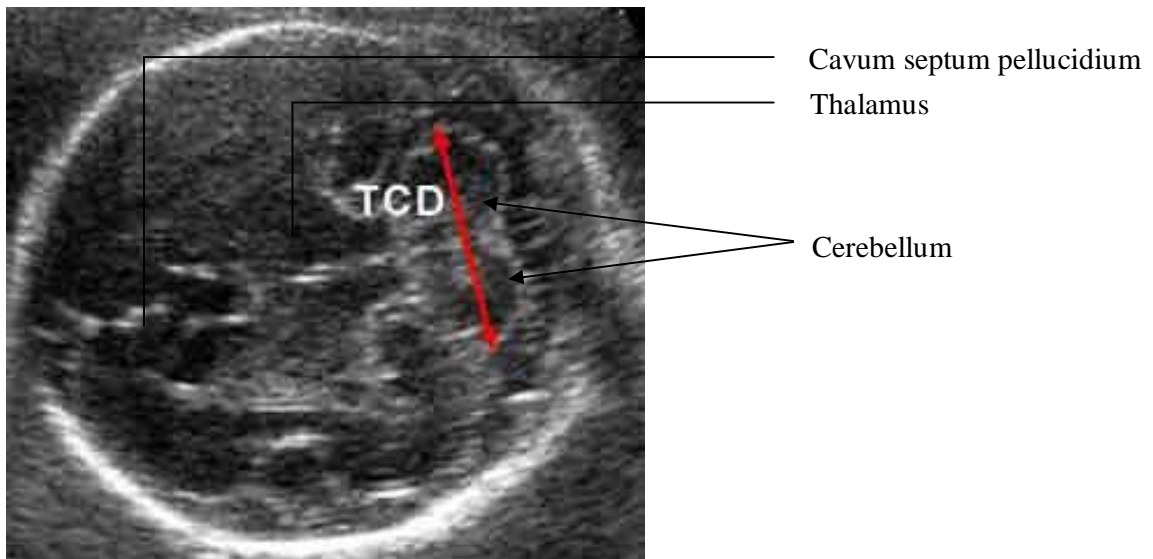
Figure 3a: Sonogram showing the butterfly appearance of the cerebellum.

TCD = Transverse Cerebellar Diameter.

Cavum septum pellucidium

Thalamus
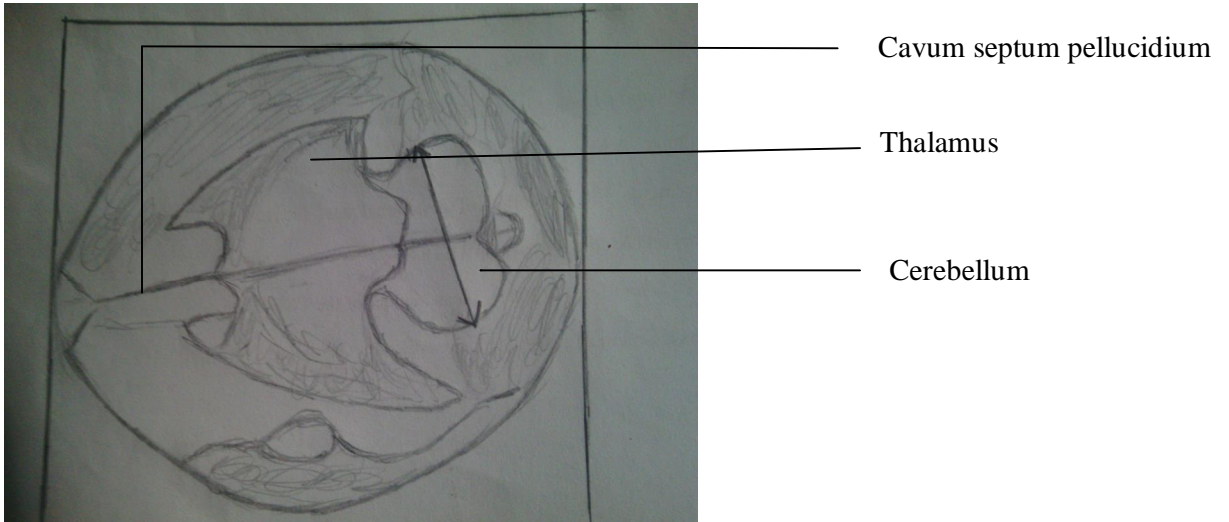
Cerebellum

Figure 3b: Schematic drawing showing the butterfly appearance of the cerebellum.

The anatomical landmarks obtained in a transverse view of the cerebellum are thalamus, cavum septum pellucidium, cisterna magna and nuchal fold (fig). The thalamus is homogenously hypoechoic, cavum septum pellucidium is homogenously hyperechoic, the cisterna magma and nuchal fold are more hypoechoic than the cerebellum.
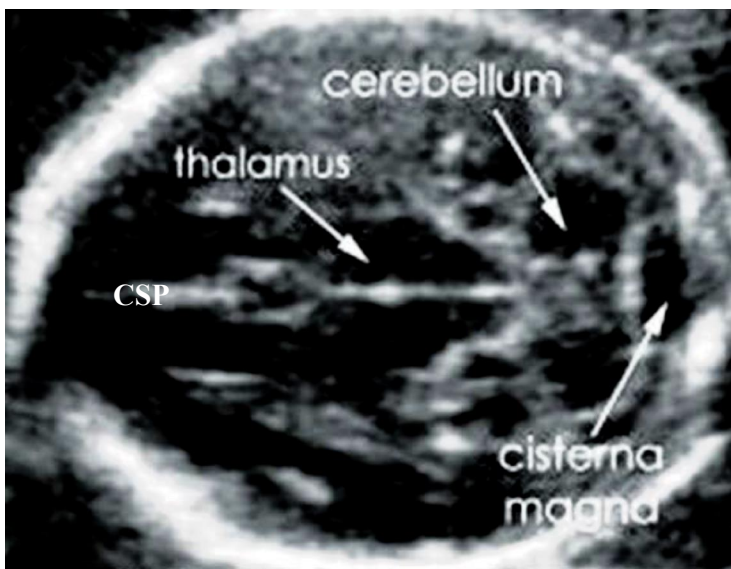
Figure 4a: Sonogram showing the anatomical landmarks obtained in a transverse view of the cerebellum.

CSP = Cavum Septum Pellucidium
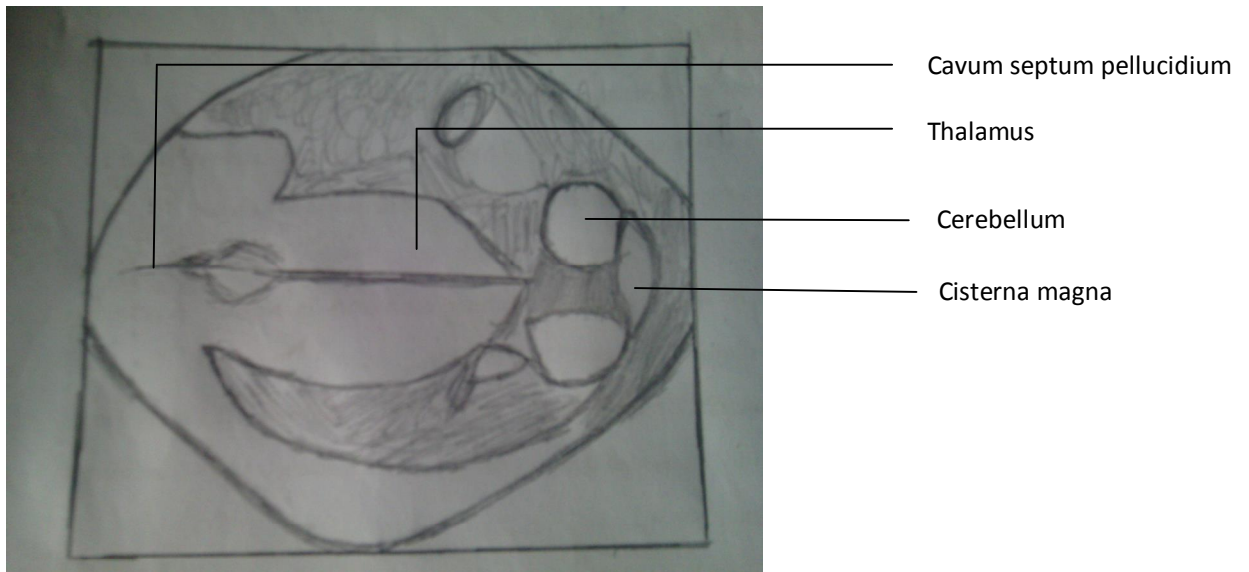
Figure 4b: Schematic drawing showing the anatomical landmarks obtained in a transverse view of the cerebellum.

Measurement of cerebellar diameter was obtained by placing electronic calipers of ultrasound machine from proximal outer margin to distal outer margin of cerebellum (saifon et al., 2006, Faiza et al., 2013, Josh B R 2013).
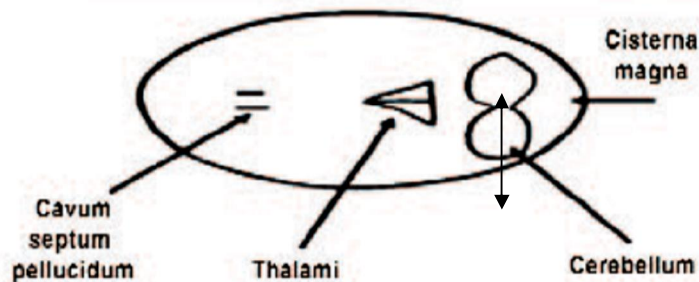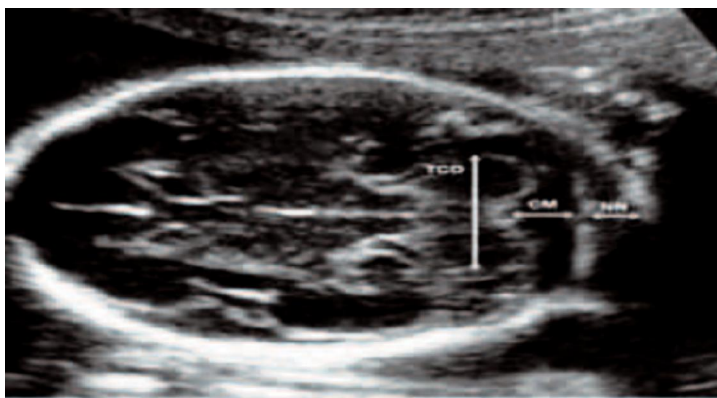
Figure 5: A Sonogram and a schematic representation showing the point of measurement of TCD.

2.2.0   Empirical Literature Review

Transverse cerebellar diameter grows with fetal age and hence was measured to determine the fetal gestational age. The measurement should be accurate and reliable, so that the fetal age can be obtained throughout gestation.

2.2.1   Fetal biometry in relation to gestational age determination

Gestational sac diameter, crown rump length, biparietal diameter, abdominal circumference and fetal long bones are sometimes technically difficult to measure and may not give the accurate gestational age of the fetus. Gestational sac diameter may not be very useful in fetal age determination, because it is usually not visible after 6 weeks. Crown rump length may not give accurate GA result from 12 weeks and above. Biparietal diameter gives less accurate result below 12 weeks and in a condition where there is a variation in the shape of fetal head like dolichocephaly. Abdominal circumference is practically used for fetal weight estimation and its accuracy in GA determination of the fetus is limited. Fetal long bones may be difficult to measure and also, may be difficult to predict GA in breech presentation (Chitkara et al., 2000; Chitty et al., 2002; Konge et al ., 2002).

Assessing gestational age using the menstrual cycle can often be inaccurate. Clinical dating of pregnancy is generally dependent on patientøs recollection of first day of her last menstrual period (LMP) and physical examination of uterine size. These two parameters are not a full proof, because many women do not routinely document or remember their LMP and also many women do not have regular menstrual cycles (Robin et al., 2009).

All these parameters mentioned above may be useful adjuncts, but they are unreliable as the sole tools for the precise gestational age determination.

2.2.2 Transverse cerebellar diameter measurements

Transverse cerebellar diameter was correlated with gestational age (Mark et al., 2001), even in the presence of growth retardation and they found it as a better marker for gestational age estimation as compared to other clinical and biometric parameters. Malik et al., (2006) conducted a study with 135 pregnant women between 26- 38 weeks of gestation with normal pregnancy. They found out that TCD varied in a linear fashion in third trimester (r = 0.99 for TCD, P < 0.0001). Their limitation is presence of limited number of subjects. They concluded that the TCD gives an accurate idea of gestational age.

Transverse cerebellar diameter is a useful biometric parameter in gestational age assessment. In some cases with dolichocephaly or brachycephaly, TCD may be a more reliable predictor than biparietal diameter, since the posterior fossa is not affected by external pressure, which may induce distortion of fetal head. (Kazumusa et al., 2001).

Edward et al., (2007) conducted a study with 52 normal pregnant women between 20 and 32 weeks in a Brazilian population. They found transverse cerebellar diameter a good parameter for the prediction of GA and for early detection of intrauterine growth restriction.

Jose et al (2011) found transverse cerebellar diameter fetal ultrasound as a predictive biometric parameter of gestational age and fetal growth, since it has advantages (for examples TCD is not affected by alterations in the growth of the fetus such as macrosomia or affected where there is variations in size or shape of head such as brachycephalism) over other biometric parameters. They explained that the cerebellum is not liable to change in form and size, because of dense surrounding petrous ridges and occipital bone. They carried out the study with 184 pregnant women from 13 to 40 weeks of gestational age with single fetus.

Prabhat et al., (2010) described that in the normally developing fetus, the TCD increases with advancing GA (r = 0.991 and p < 0.001).They concluded that transverse cerebellar diameter is a good marker for GA estimation and can be used in cases where patients are not sure about their LMP.

Malik et al., (2003) conducted a study on 100 pregnant women between 16 to 40 week using ultrasound scanner GE Logiq Alpha100 with 3.5 MHz transducer. Transverse cerebellar diameter was measured in which the usual thalamic plane used for BPD was obtained. The transducer was then rotated about 300 below the thalamic plane to see the cerebellum.

Fetal transverse cerebellar diameter normogram in Nepalese population was studied by Joshi, (2010). He found out that transverse cerebellar diameter showed a linear correlation with advancing fetal age. He noted that sonographic sizes of the cerebellum increases linearly during the second trimester and at a faster rate at third trimester. He concluded that TCD had a close relationship with gestational age.

Nitsana et al., (2004) carried out a study on transverse cerebellar diameter to abdominal circumference on 643 Thai pregnant women between 13 to 40 weeks. They observed that there is increased TCD/AC ratio in fetus with intra uterine growth restriction. They concluded that increased TCD/AC ratio can predict IUGR at any gestational age, even in the condition of uncertain date. Their limitation is lack of comparism of data with femoral length (FL).

Faiza et al., (2013) carried out a study on the assessment of gestational age of the fetus using transverse cerebellar diameter versus biparietal diameter on 228 pregnant women at 36 weeks. They measured TCD by placing electronic calipers at outer margins of cerebellum. They observed a linear correlation of TCD/BPD in the assessment of

gestational age of the fetus. They concluded that TCD/BPD ratio can be used as a tool to assist in the assessment of gestational age in third trimester.

Mustafa et al., (2013) carried out a study on fetal transverse cerebellar diameter of Sudanese pregnant women between 15 to 40 weeks. They measured the TCD by placing electronic calipers at outer margins of the cerebellum. They observed a linear correlation between the transverse cerebellar diameter and gestational age. They concluded that there is a close relationship between TCD and GA ($r = 0.94$, $P < 0.001$).

Saifon et al; (2006) conducted a study on 780 pregnant women who attended antenatal clinic in Thai. The ultrasonographic measurement was made by ALOKA, Dynaview 2, SSD 1700 with 3.3 MHz convex transducer. The transverse cerebellar diameter was obtained from the outer to outer margin of cerebellum after its identification of posterior fossa. They have a limited number of people at later part of pregnancy. They found that the cerebellum size was less affected by deviation in fetal growth restriction or growth acceleration. They concluded that transverse cerebellar diameter showed linear growth throughout gestation.

2.2.3 Ultrasound role in the measurement of transverse cerebellar diameter in fetal age determination

Proper dating of pregnancy by sonography still depends on adherences to good ultrasound technique. Ultrasound assessment of gestational age using transverse cerebellar diameter has become the principal method of confirming both GA, monitoring fetal growth and development (Kalish and chervenak, 2002). Ultrasound modality used in the determining TCD of fetus is better than other imaging modalities like CT and MRI, because it is non-invasive, non-ionizing and less expensive. Ultrasound is safe for the patient, fetus and the operator (Khalid et al., 2006).

In conclusion, from the findings of this literature review done, all the studies were done abroad like in Indian, Thailand, Australia, Brazil and USA, so it cannot be used as universal pattern to generalize to the Nigerian population because of geographical differences. Fetal biometric studies from Iran, Bangladesh and Pakistan describe the uniqueness and specification of different fetal parameters for their own populations. Biometric curves for one population may give over or underestimation of the fetal age when used for another population with different demographic characteristics (Honarver et al., 2000; Ashrafunnisa et al., 2003). It is very important to have a set of standard normal measurement of transverse cerebellar diameter for gestational age determination in a Nigerian population.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1   Research Design

This is a cross sectional study.

3.2   Duration of Study

The study was carried out for a period of 12 months from June 2013 - May 2014.

3.3   Study Population

A population of obstetric patients was selected. These pregnant women were recruited from ESUT Teaching Hospital Parklane, Enugu, Nigeria.

3.4   Sample Size/Sampling Technique

A convenience sampling method was used. This is because only pregnant women that fall into the inclusion criteria in the study population within the time of study were included in the study.

The sample size was calculated using Yamane formula (1973) (appendix I). The sample size for the study was 697 pregnant women.

3.5   Subject Selection Criteria

Obstetrics patient between 14 - 40 weeks were screened by an obstetrician to ensure that each subject does not have any clinical history abnormality such as hypertension and diabetes mellitus that may affect the outcome of the results.

Inclusion Criteria

The following criteria were included in the study, because in the absence of maternal and fetal abnormalities, TCD maintains its normal anatomy and size.

-        Subject screened by obstetrician and found to be an apparently normal pregnancy;

-        Subject with a known last menstrual period;

- Pregnant woman between 14-40 weeks, because the cerebellum will be visible at that period;

- Subjects without any medical complications such as hypertension or diabetes.

Exclusion criteria

The following criteria were excluded from the study because TCD will be greater than or less than the normal anatomy size.

- Subjects with irregular menstrual cycle;

- Subjects with diabetes;

- Subjects that drinks alcohol;

- Subjects with multiple pregnancy;

- Subjects with congenital anomaly of the brain;

- Subjects with oligohydroaminos;

- Subjects suffering from hypertension;

- Subjects that smoke cigarette.

3.6 Ethical Clearance Informed Consent

Ethical clearance was obtained from the ESUT Teaching Hospital Parklane, Enugu Ethics Committee covering the study area (appendix I). Informed consent was obtained from each subject prior to the commencement of the study (appendix II).

3.7 Equipment

Mindray DP 2200 Plus ultrasound machine and probe frequency of 3.5 MH$_z$ sector probe was used for this study. The machine was manufactured 2012. A low frequency transducer was chosen in order to adequately penetrate the cerebellum measured. The measurements were taken using the electronic calipers of the ultrasound machine, making use of the freeze frame capacity.

3.8 Scanning Technique

The study was carried out by doing pelvic ultrasound. Ultrasound gel was applied on the region of interest before scanning. The patient was scanned in a supine position, shortly after drinking water. Transducer of 3.5 MHz frequency was gently used to scan the patient in order to obtain a good quality sonogram on the cerebellar diameter. Transverse cerebellar diameter was measured from transverse view of fetal intracranial anatomy through the posterior fossa that included visualization of anatomic landmarks such as thalamus, cavum septum pellucidium and cisterna magna. The measurement of transverse cerebellar diameter was obtained by placing electronic calipers from proximal outer margin to distal outer margin of cerebellum. The posterior fossa is revealed with the characteristic butterfly appearance of cerebellum. The cerebellum was seen as two lobules on either side of the midline in the posterior cranial fossa. The sonogram of transverse cerebellar diameter is shown in figures I and II below (Saifon et al., 2006).

All the four common fetal parameters (BPD, FL, AC, and HC) were measured using standard techniques. The BPD was measured as the distance between the outer edge of the cranium nearest to the transducer and the inner edge of the cranium distal to the transducer at the level of the paired hypoechoic thalami and cavum septum pellucidum (Hadlock et al., 1982). The HC was measured using the elliptical calipers over the four points of BPD and occipital frontal diameter in the same plane as BPD, between the leading edge of the frontal bone and the outer edge of the occiput (Campbell et al., 1994). The AC was measured as the length of the outer perimeter of fetal abdomen at the level of umbilical vein junction with the portal vein in a transverse plane perpendicular to the spine (Campbell et al., 1975) and the FL was measured as the length of the ossified diaphysis of the fetal femur from the greater trochanter

to the femoral condyles(Chitty et al., 1994).
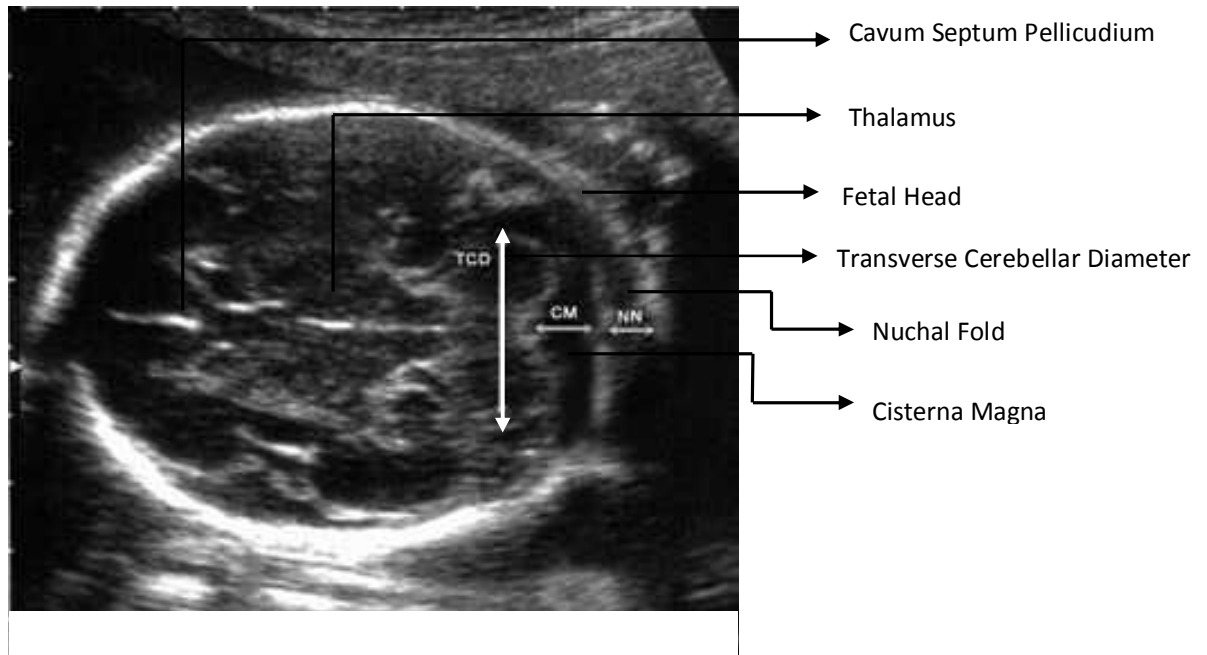
Fig 6: Sonogram showing fetal transverse cerebellar diameter.

TCD = Transverse Cerebellar Diameter.

CM = Cisterna Magna.

NN = Nuchal Fold.
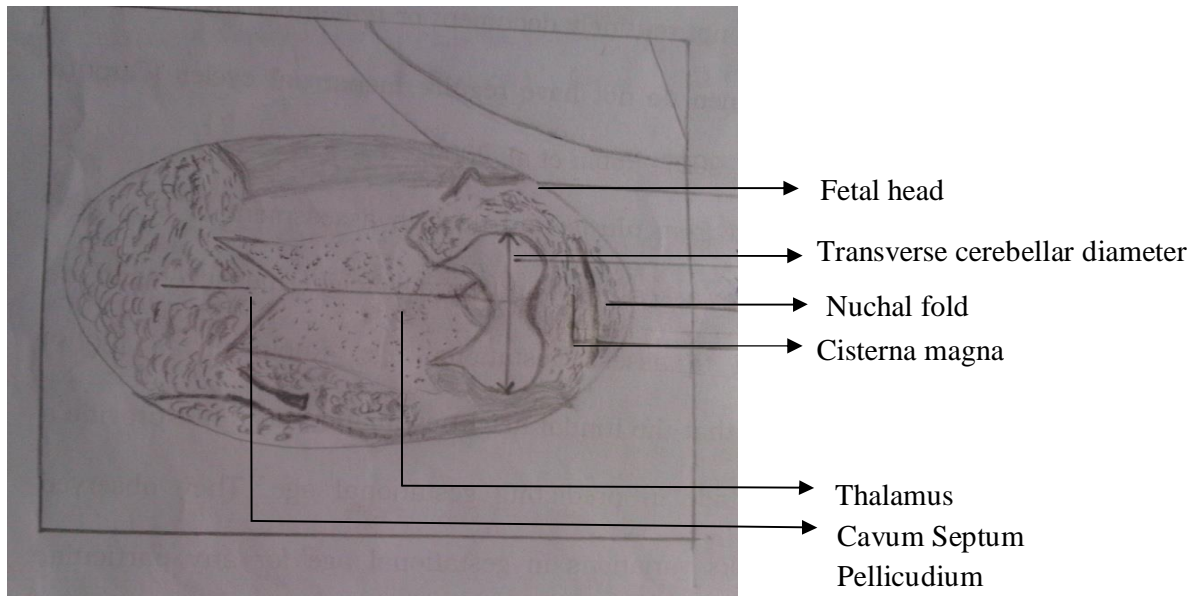
Fig 6b: Schematic drawing of fetal transverse cerebellar diameter.

3.9 Pilot Study

In inter observer variations study the measurement of transverse cerebellar diameter was taken by two different sonographers with the same patient, while in intra observer variations study, measurement of transverse cerebellar diameter was taken thrice by the same sonographer with the same patient at different time.

3.10 Statistical Analysis

Data was analyzed using software package for social sciences (SPSS). To determine the transverse cerebellar diameter in relation to patient's LMP and fetal FL, BPD, HC and AC parameters was done using descriptive statistics. To correlate transverse cerebellar diameter with gestational age obtained from last menstrual period and FL, BPD, HC and AC parameters was established using Pearson correlation analysis. To establish a relationship between transverse cerebellar diameter and gestational age obtained from patient's LMP was done using Pearson correlation and regression analysis. To compare the mean transverse cerebellar diameter values from present study with that obtained from previous literatures (Nepalese population and Thai population) was established using T test analysis.

RESULTS

Table 1: **The Observer Variations in the Measurement of Transverse Cerebellar Diameter Studied (Pilot Study).**

Intra Observer Variations							
Work	Mean	Standard deviations	Number	T	Degree of freedom	Significance	Standard error mean
Intra observer 1	30.3900	10.71516	20	-0.102	19	0.919	0.9750
Intra observer 2	30.4000	10.68240	20				
Inter Observer Variations							
Sonographer 1	30.4000	10.68240	20	1.364	19	0.189	0.12832
Sonographer 2	30.2250	10.35613	20				

Table 1 shows that there is no statistical significant difference found in the intra observer variations 1 and 2 respectively. This is shown by its significant value of 0.919. The inter observer variations also shows that there is no statistical significant difference found in the measurements of sonographer 1 and sonographer 2 respectively. This is shown by its significant value of 0.189.

Table 2: **Distribution of TCD according to gestational age obtained by patient's LMP.**

14 – 26 weeks

Gestational age in weeks	Frequency	Minimum TCD (mm)	Maximum TCD (mm)	Mean TCD (mm) ± Standard
14	23	10.2	17.5	13.6 ± 2.2
15	20	13.5	17.9	15.3 ± 1.4
16	22	14.4	18.8	16.2 ± 1.3
17	20	13.2	18.8	16.0 ± 1.6
18	20	13.8	21.3	16.4 ± 2.3
19	23	13.2	27.1	18.9 ± 3.0
20	23	16.0	26.0	21.1 ± 3.2
21	24	15.4	32.3	21.2 ± 3.1
22	20	17.7	25.2	22.0 ± 2.6
23	22	20.0	31.5	24.0 ± 2.8
24	28	19.3	34.5	25.1 ± 3.0
25	27	21.8	34.0	26.5 ± 1.9
26	27	20.1	30.6	27.3 ± 2.6
Total	299			
Overall mean TCD = 20.3 ± 2.5				
27 ó 40 weeks				
27	29	23.6	35.4	28.9 ± 2.0
28	21	26.5	32.0	29.6 ± 2.0
29	24	22.4	35.2	30.8 ± 2.2
30	40	21.8	40.1	32.1 ± 3.1
31	38	24.7	40.4	32.5 ± 2.5
32	32	17.6	40.4	32.5 ± 0.4
33	40	18.0	37.6	33.8 ± 1.9
34	33	23.6	40.6	34.7 ± 3.5
35	28	29.6	42.4	36.6 ± 2.4
36	28	25.1	43.1	37.1 ± 2.9
37	20	35.2	44.9	40.6 ± 3.0
38	24	30.4	45.5	40.6 ± 3.1
39	20	36.3	45.9	41.5 ± 3.0
40	25	38.5	45.5	42.9 ± 2.0
Total	398			
Overall mean TCD = 38.2 ± 3.2				

Table 2 shows transverse cerebellar diameter according to gestational age obtained from patientø's LMP in the second and third trimesters. This shows that in the second trimester, the mean TCD increases from 13.6 ± 2.2mm to 27.3 ± 2.6mm. In third trimester, the mean TCD increases from 28.9 ± 2.0mm to 42.9 ± 2.0mm. Transverse cerebellar diameter increases with increase in gestational age.

Table 3:   Distribution of TCD According to GA by Patient's LMP and the Combination of FL, BPD, HC and AC Parameters

Gestational age in weeks	Mean TCD (mm) by LMP ± Standard deviation (SD)	Mean TCD (mm) by combination of FL, BPD, HC and AC ± Standard deviation (SD)
14	13.6 ± 2.2	12.1 ± 1.4
15	15.3 ± 1.4	14.6 ± 0.9
16	16.2 ± 1.3	16.7 ± 1.0
17	16.0 ± 1.6	15.5 ± 0.9
18	16.4 ± 2.3	15.9 ± 1.8
19	18.9 ± 3.0	18.6 ± 1.7
20	21.1 ± 3.2	19.2 ± 2.4
21	21.2 ± 3.1	20.4 ± 2.5
22	22.0 ± 2.6	21.5 ± 2.7
23	24.0 ± 2.8	23.3 ± 2.0
24	25.1 ± 3.0	24.4 ± 3.0
25	26.5 ± 1.9	24.9 ± 2.0
26	27.3 ± 2.6	26.5 ± 1.9
Overall mean TCD =	20.3 ± 2.5	19.5 ± 1.7
27 – 40 weeks		
27	28.9 ± 2.0	28.4 ± 2.0
28	29.6 ± 2.0	28.8 ± 2.6
29	30.8 ± 2.2	30.3 ± 2.4
30	32.1 ± 3.1	30.7 ± 3.3
31	32.5 ± 2.5	31.6 ± 2.5
32	32.5 ± 0.4	32.3 ± 0.4
33	33.8 ± 1.9	34.6 ± 1.9
34	34.7 ± 3.5	33.9 ± 3.5
35	36.6 ± 2.4	35.8 ± 2.8
36	37.1 ± 2.9	37.3 ± 3.5
37	40.6 ± 3.0	39.1 ± 3.0
38	40.6 ± 3.1	40.0 ± 3.4
39	41.5 ± 3.0	42.0 ± 3.7
40	42.9 ± 2.0	42.5 ± 2.5
Overall mean TCD =	38.2 ± 3.2	32.6 ± 2.5

Table 3 shows transverse cerebellar diameter according to gestational age by patient's LMP and the combination of FL, BPD, HC and AC parameters in the second and third trimesters. This shows that in the second trimester, the mean TCD increases from 13.6 ± 2.2mm to 27.3 ± 2.6mm (by LMP) and 12.4 ± 1.4mm to 26.5 ± 1.9mm (by combination of FL, BPD, HC and AC). In third trimester, the mean TCD increases from 28.9 ± 2.0mm to 42.9 ± 2.0mm (by LMP) and 28.9 ± 2.0mm to 42.5 ± 2.3mm (by combination of FL, BPD, HC and AC). Transverse cerebellar diameter increases with increase in gestational age.

Table 4:   **Correlation of TCD with GA Obtained by Patient's Last Menstrual Period**

	Trimester	Pearson correlation coefficient (r)	P values	Number of measurements (n)
1	14 - 26	r = 0.875	0.000	299
2	27 ó 40	r = 0.759	0.000	398
3	Combined	r = 0.933	0.000	697

Table 4 shows that transverse cerebellar diameter has a positive correlation with gestational age in the second trimester (14 ó 26 weeks), third trimester (27 ó 40 weeks) and combined trimesters. The r values of 0.875, 0.759 and 0.933 in the second, third and combined trimesters respectively show the relationship. In all the trimesters, the correlation is significant.

Table 5:   **Relationship between Transverse Cerebellar Diameter and Gestational Age Obtained from Patient's LMP and its Predicted Model Equations**

Parameters	TRIMESTERS					
	14 ó 26 weeks		27 ó 40 weeks		Combined	
	Value	Sig (p-value)	Value	Sig (p-value)	Value	Sig (p- value)
R	0.86	0.000	0.76	0.000	0.93	0.000
R^2	0.74	0.000	0.58	0.000	0.87	0.000
F	824.95	0.000	538.69	0.000	4669.09	0.000
Constant	7.16	0.000	14.32	0.000	4.91	0.000
GA by LMP	0.63	0.000	0.54	0.000	0.79	0.000
Model equations	Y = 0.63 (TCD) + 7.16		Y = 0.54 (TCD) + 14.32		Y = 0.79 (TCD) + 4.91	

Table 5 shows that transverse cerebellar diameter has a strong linear relationship with gestational age. The p-value of 0.000 demonstrated the strong relationship and it also shows that the relationship is significant ($p < 0.05$). The larger values of R^2 shows that the model fits the data well. The F statistics shows that this relation is very significant and that variations in transverse cerebellar diameter explain to a large extent the variations in a gestational age. The model equation for determining gestational age for any known transverse cerebellar diameter was obtained: Y = 0.63 (TCD) + 7.16; Y = 0.54 (TCD) + 14.32 in the second trimester and Y = 0.79 (TCD) + 4.91 in the combined trimesters.

Table 6:   **Correlation of Transverse Cerebellar Diameter with gestational Age Obtained from LMP and FL, BPD, HC and AC Parameters**

	TCD and FL (mm)	TCD and BPD (mm)	TCD and HC (mm)	TCD and AC (mm)
R	0.957	0.941	0.940	0.949
P	0.000	0.000	0.000	0.000
N	697	697	697	697

Table 6 shows that transverse cerebellar diameter has a positive relationship with FL, BPD, HC and AC with r values of 0.957, 0.941, 0.940 and 0.949. The p value is less than 0.001. This implies that the relationship is significant.

Table 7: **Comparison of the Mean Transverse Cerebellar Diameter Values from Present Study and that Obtained with Previous Literature (Nepalese Population and Thai Population)**

Work	Mean	Std. deviations	T test for equality of mean				
			t	Degree of freedom	Significance	Mean difference	Standard error difference
Present Study (2014)	28.0667	8.88330	-1.157	52	0.058	-3.95815	2.89712
Joshi (2010)	31.4174	12.15344	-1.360	52	0.058	-3.95815	2.89712
Present study (2014)	28.0667	8.88330	-0.198	52	0.844	-0.48556	2.45849
Saifon et al (2006)	28.5522	9.18038	-0.198	52	0.844	-0.48556	2.45849

Table 7 shows that there is no statistical difference between this work and the report of Joshi (Nepalese Population). This is shown by its significant value of 0.058. There is no statistical difference between this work and the report of Saifon et al (Thai Population). This is shown by its significant value of 0.844.
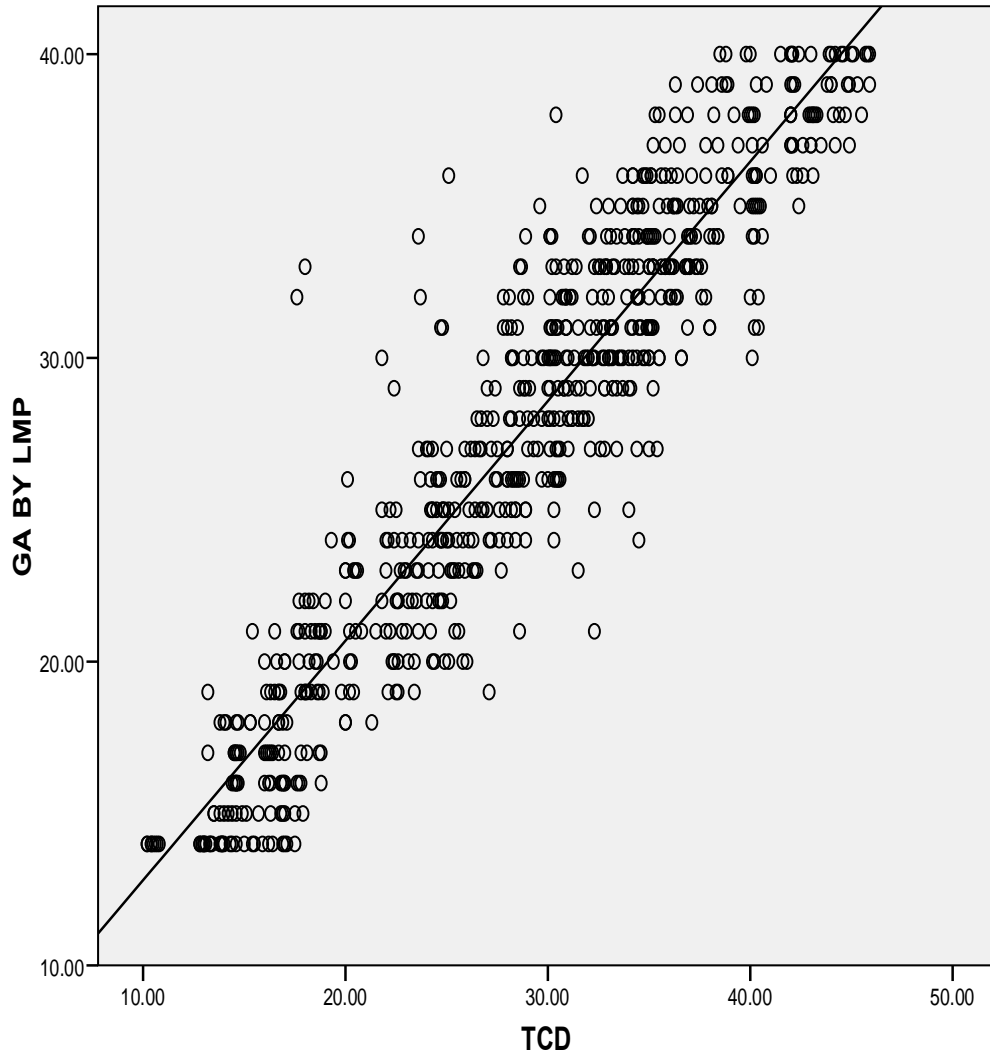
Fig 7: The relationship between transverse cerebellar diameter and gestational age in the combined trimesters.

This shows that transverse cerebellar diameter increases as a function of gestational age.
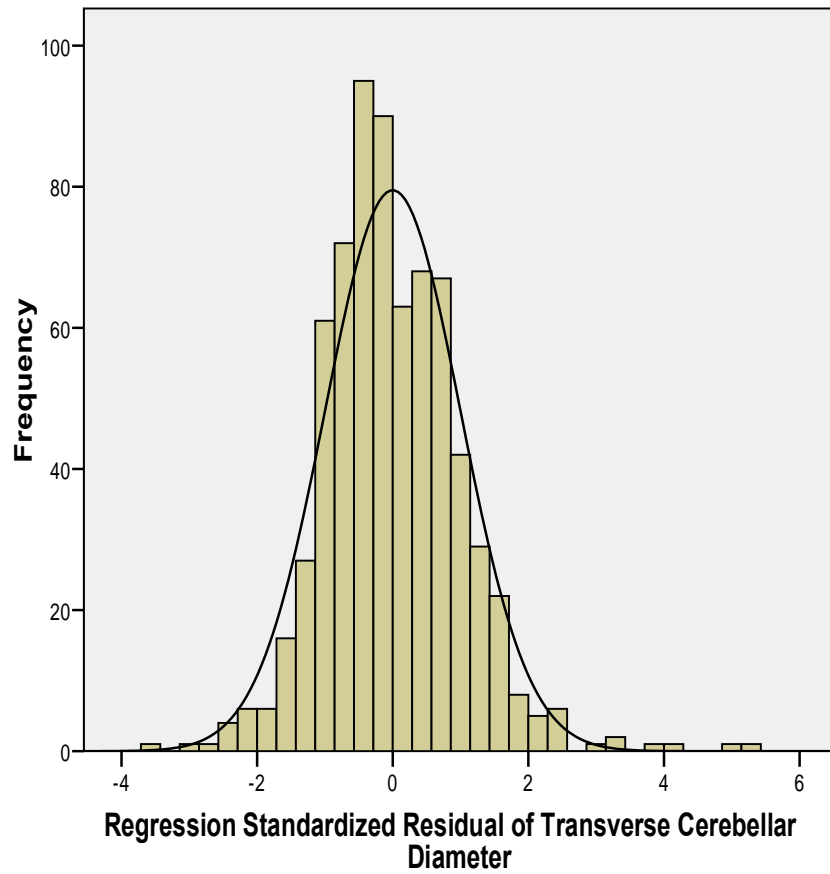
Fig 8: **Histogram Showing the Relationship of Observed Values and Predicted Values in the Combined Trimesters**

The shape of the histogram resembles almost the shape of normal curve which shows the normality of the predicted model in the combined trimesters.
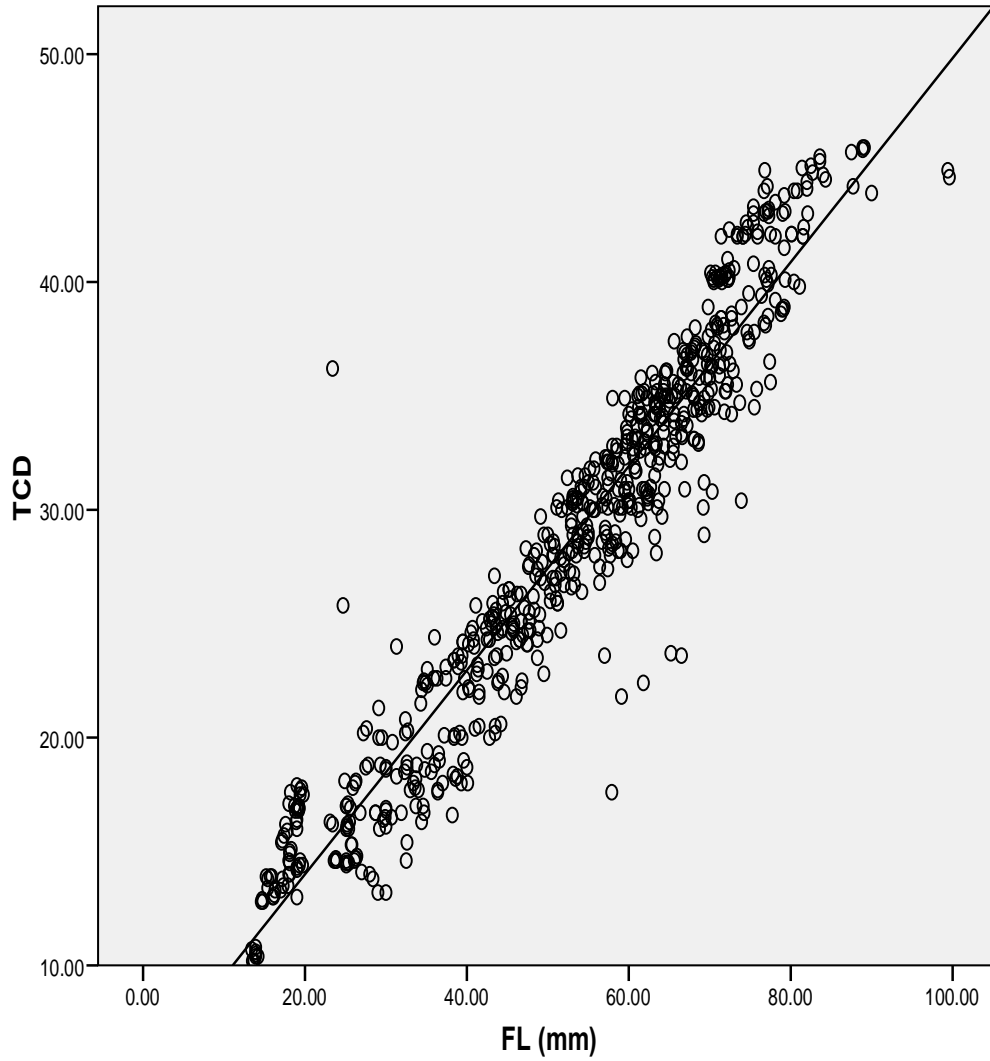
Fig 9: Relationship between Transverse Cerebellar Diameter (mm) and FL (mm)

This shows that as transverse cerebellar diameter increases, femur length increases.
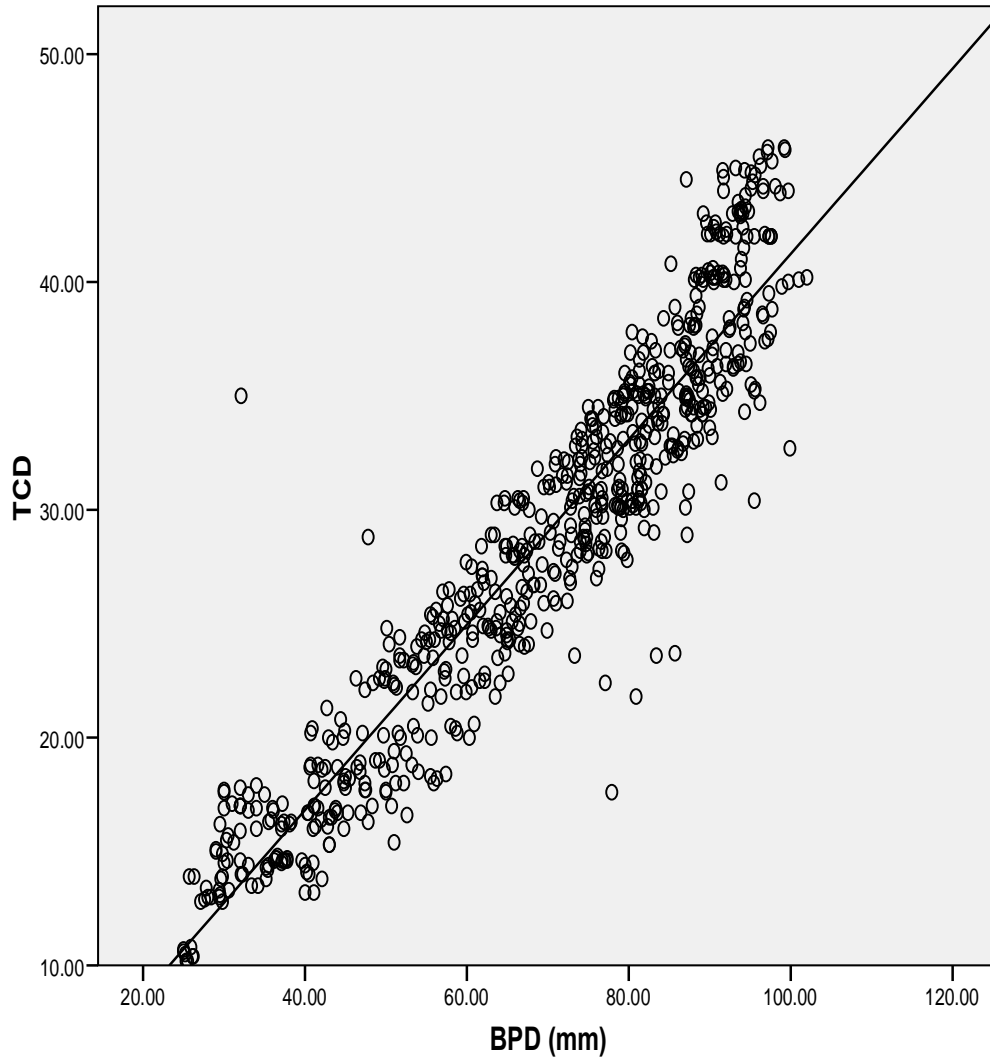
Fig 10: Relationship between Transverse Cerebellar Diameter (mm) and BPD (mm).

This shows that as transverse cerebellar diameter increases, biparietal diameter increases.
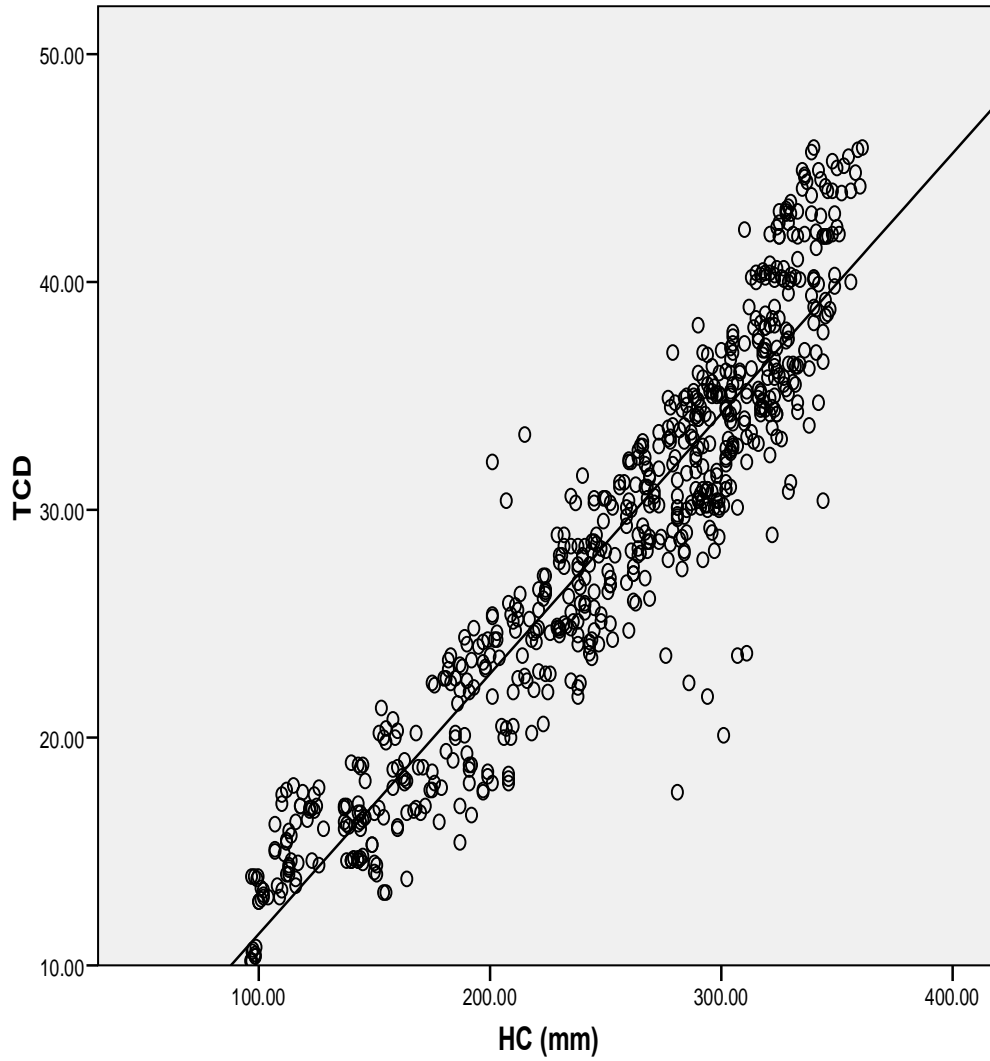
Fig 11: Relationship between transverse cerebellar diameter (mm) and HC (mm).

This shows that as transverse cerebellar diameter increases, head circumference increases.
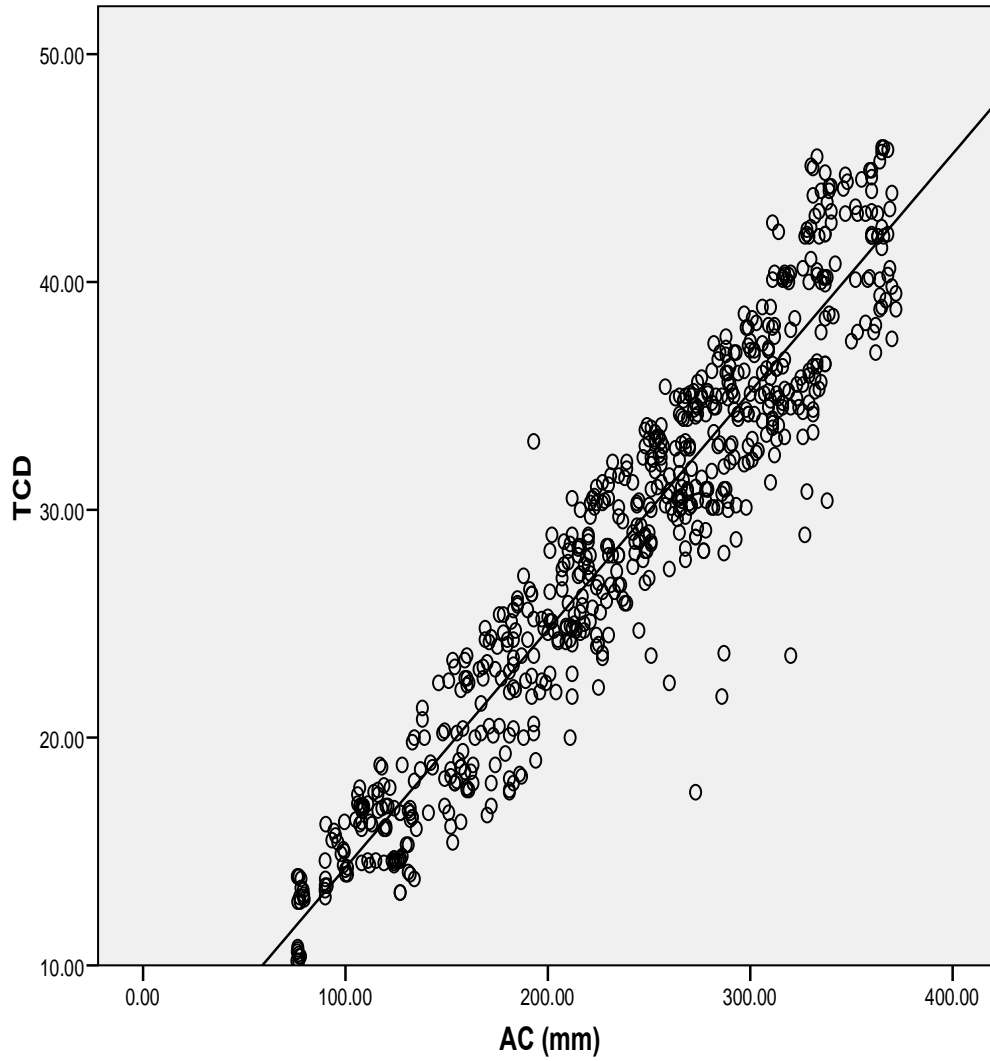
Fig 12: Relationship between transverse cerebellar diameter (mm) and AC (mm).

This shows that as transverse cerebellar diameter increases, abdominal circumference increases.

CHAPTER FIVE

DISCUSSION AND CONCLUSION

5.1 Discussion

Observer variations in the Measurements of Transverse Cerebellar Diameter

The correlation of the intra observer errors is high which implies that there is no statistical significant difference between the measurements made by the same sonographer at different times.

In inter observer variations, the correlation is strong ($p > 0.05$), which shows that there is no significant difference between the variations in the measurements made by different sonographers. This implies that there is reliability in the measurement of TCD within and between sonographers and thus measurement of TCD may be useful in a clinical setting. Two experienced sonographers carried out the determination of intra and inter operator reliability of TCD measurements in our study. This may have affected our results in a positive way as inexperienced sonographers may have reproduced poor TCD measurements. The use of many experienced and inexperienced sonographers for the pilot study and increase in sample size would have made our results more acceptable.

We had non consecutive enrollment of our subjects as some very active fetuses that could not co-operate during the scan for the measurement of their TCD were dropped. This bias may have pre-selected an ÷øoptimaløø scanning population which may have resulted in a positive bias in our results. Thus, there will be need to carry out a further study using consecutive enrolment of subjects. In such further study the pregnant women should be advised to eat less in order to reduce fetal activity, thereby increasing sample size and improving on the accuracy of TCD obtained. All pregnant women studied are purely Nigerian women. In this study, the influence of fetal gender on the TCD measurements was not considered.

Transverse Cerebellar Diameter Measurements

The histogram curve of TCD showed that transverse cerebellar diameter increased with increase in gestational age. The graph of transverse cerebellar diameter and gestational age showed that transverse cerebellar diameter increases linearly as a function of gestational age and could be used to determine gestational age at any stage of pregnancy. The maximum transverse cerebellar diameter obtained in this study is 45.5mm which is lower than the maximum TCD of 48.4mm obtained from Prabhat et al (2010) in India. This difference may be due to racial variations. The mean transverse cerebellar diameter value from 14 - 26 weeks is 13.6 ± 2.2mm to 27.3 ± 2.6mm and the mean transverse cerebellar diameter value from 27 - 40 weeks is 28.9 ± 2.0mm to 42.9 ± 2.0mm. These values show that TCD increases linearly with increase in gestational age and at a faster rate in the third trimester, and hence, could be used to determine the GA in the second and third trimesters of pregnancy in this population. The r values of 0.875 (14 ó 26 weeks), 0.759 (27 ó 40 weeks) and 0.933 (combined trimesters) show that TCD has a strong positive correlation with gestational age. The p-value ($p < 0.05$) shows that the relationship is statistically significant. This finding is similar to the findings of Jose et al (2011) which showed that transverse cerebellar diameter has a strong positive correlation with gestational age (r = 0.96 ; $p < 0.001$). This implies that transverse cerebellar diameter could serve as a reliable predictor of gestational age and fetal growth in late pregnancy.

The minimum and maximum mean transverse cerebellar diameter obtained in this study at 14 and 40 weeks of gestation are 13.6 ± 2.2mm and 42.9 ± 2.0mm respectively. The mean TCD is 28.07. This result is similar to the value reported by Saifon et al (2006), who conducted a similar work with a Thai population in Thailand. They reported a minimum (12.46mm) and maximum (41.61mm) mean of transverse cerebellar diameter in

14 and 40 weeks of gestation respectively. The mean TCD obtained from their work is 28.55. There is no statistically significant difference found between the mean transverse cerebellar diameter values obtained in this study and the values reported by Saifon et al (2006) (p > 0.05). This implies that there is probably no racial difference in the mean transverse cerebellar diameter obtained. Joshi (2010) reported that the minimum and maximum mean of TCD is 11.51mm and 51.29mm in 14 ó 40 weeks of gestation respectively. The mean transverse cerebellar diameter was 31.42mm. This is close to the present study, but the maximum mean is slightly greater than the present study maximum mean. There is no statistically significant difference found between the mean transverse cerebellar diameter values obtained in this study and the values reported by Joshi (2010) (p > 0.05) in Nepalese population. This implies that there is no statistically over or underestimation of mean TCD of this study when compared with Nepalese population. However, reliance on the mean value to make this suggestion may be misleading as it may not give a good idea about the spread of the values across each GA in both trimesters. Moreover, the sample sizes are not the same for both studies. Thus population specific charts for TCD measurements may still be essential. In this study, transverse cerebellar diameter showed linear correlation with advancing fetal age and TCD showed linear growth throughout gestation. This is similar to the work conducted by Joshi (2010) who reported that TCD showed linear correlation with advancing fetal age and increases at a faster rate (0.48mm) in third trimester. It may be difficult to obtain the TCD when the fetal head is engaged. This challenge can be overcome by instructing the patient to turn to either left or right side while scanning her. This implies that TCD normogram obtained can predict gestational age with previously published normograms.

Transverse Cerebellar Diameter and Gestational Age Obtained from last Menstrual Period

The r values of 0.875 (second trimester), 0.759 (third trimester) and 0.933 (combined trimesters) respectively were obtained from Pearson's correlation analysis. The p-value ($p < 0.05$) shows that the relationship is significant. This implies that there is a significant positive relationship between the gestational age obtained from last menstrual period in all the trimesters and as transverse cerebellar diameter increases, the gestational age of fetus increases.

The significant F value of the statistics is 0.000. This implies that the result from present study showed that transverse cerebellar diameter values explained to a large extent the variations in gestational age of a fetus.

The following linear model equations produced by the regression analysis shows the relationship between gestational age (y) in weeks and transverse cerebellar diameter (TCD) in mm.

Y = 0.63 (TCD) + 7.16, in the second trimester

Y = 0.54 (TCD) + 14.32, in the third trimester

Y = 0.79 (TCD) + 4.91, in the combined trimesters.

With the above equations, gestational age (Y) can be obtained by substituting the measured transverse cerebellar diameter in these equations. The larger values of R^2 in the combined trimesters show that the model equations fit well. The regression sum of squares is 33034.79 and the residual sum of squares is 4917.26. This implies that the model has a larger regression sum of squares. It also implies that transverse cerebellar diameter can be used as a good estimator of gestational age from second and third trimesters.

In this study, the histogram plot obtained during regression analysis is very close to the shape of the normal curve which was superimposed on the histogram. This shows that the model fits very well.

Relationship between Transverse Cerebellar Diameter Obtained by Patient's LMP and FL, BPD, HC and AC Parameters

Model equations showing the relationship of the four common fetal biometric parameters with transverse cerebellar diameter were shown by regression analysis; TCD = 3.917 + 0.316FL + 0.088BPD – 0.008HC + 0.017AC. Thus, there is a significant linear relationship between transverse cerebellar diameter and FL, HC, BPD and AC used in determination of fetal gestational age.

Faiza et al (2013) and Nitsana et al (2004) also found that TCD had a positive correlation with other fetal parameters in their studies and Malik et al (2006) concluded that TCD gives an accurate idea of GA in the third trimester.

The r value of 0.957 (TCD and FL mm), 0.941 (TCD and BPD mm), 0.940 (TCD and HC mm), 0.949 (TCD and AC mm) and 0.933 (TCD and LMP) were obtained respectively from the correlation. The value of TCD obtained from patient's LMP is relatively lower than the rest, although, it is not statistically significant ($p > 0.05$) probably because some women do not routinely document or remember correctly their LMP. This result is similar to the findings of Robin et al (2009). The correlation of TCD with other fetal parameters is little bit higher than that of LMP, although, there is no statistically significant difference. The standard error of TCD value (0.4) is lower than the standard error (0.5) of other fetal parameters (FL, BPD, AC and HC) in the second and third trimesters. This shows that there is a significant positive relationship between these biometric parameters and transverse cerebellar diameter. Saifon et al (2006) found out that human cerebellum is resistant to chronic hypoxemia due to brian sparing phenomenon and in the human fetus,

cerebellar growth may be least affected by intrauterine growth retardation (IUGR). This finding is similar to the findings of Jose et al (2011) which showed that TCD is easier to obtain gestational age of the fetus in certain circumstances such as breech presentation and dolichocephaly (except in anencephaly) where other fetal parameters cannot be used. This implies that transverse cerebellar diameter can assist clinically in the prediction of gestational age of patients who are not sure of date.

In this study, graphs for the relationship between transverse cerebellar diameter TCD and FL, TCD and BPD, TCD and HC, TCD and AC were provided. This implies that in case of doubt in measuring these fetal parameters during sonographic examinations, reference can be made to the graph. Abnormal transverse cerebellar diameter measurement for any gestational age may be an indicator for intrauterine growth restriction (IUGR) or growth retardation. This shows that the above relationship between TCD and other fetal parameters can be very useful in the determination of fetal gestational age.

Reference value for TCD generated from 14 weeks to term can be used for determination of fetal gestational age. Normogram values for TCD measurements generated in this study can be used for determination of fetal gestational age in our locality, especially in the third trimester, when other common GA estimation parameters may be less accurate. This normogram can also be used for the assessment of the development of the cerebellum in the posterior fossa in our population.

5.2 Conclusion

This study showed that TCD has a linear relationship with GA in the second and third trimesters of normal pregnancy. A normogram of TCD which can be used for the determination of fetal GA from 14 weeks to term was generated in a Nigerian population. A significant relationship was found between TCD, LMP and other fetal biometric

parameters like femur length, biparietal diameter, head circumference and abdominal circumference. The TCD normogram obtained can predict gestational age with previously published normograms.

5.3   Recommendations

1.   Transverse cerebellar diameter should be used in evaluation of fetal growth.

2.   Transverse cerebellar diameter can be used in determination of fetal GA in the second and third trimesters, when LMP or other biometric parameters are in doubt.

3.   Multicentre studies in other regions of the country are suggested to generate a reliable nationwide normogram.

4.   Feature study should cross validate TCD normogram with IUGR patient.

5.   Sonographic normogram of TCD in relation to patient weight and height is suggested to validate this normogram.

5.4   Limitation of the Study

Sonographic measurement of the TCD in some very active fetuses was difficult and this limited the sample size. Determination of the intra and inter operator reliability of TCD measurements was done in this study using only 2 experienced ultrasound practitioners. Assessment of TCD in this study was carried out on normal fetuses only, therefore, the effect of IUGR or fetal anomaly on TCD was not assessed, thus, the reliability of the normogram from the study in the cases may not be guaranteed. Vaginal scan would have decreased the limitation of active baby, but it was not used, because the field of view decreases as the pregnancy advances in age (second and third trimesters).

5.5 Areas for further Studies

1.   Sonographic assessment of transverse cerebellar diameter in a hypertensive pregnant woman.

2.   Evaluation of transverse cerebellar diameter measurement with IUGR patient.

3.   Determination of fetal gestational age by the use of transverse cerebellar diameter in multiple pregnancies.

4.   Sonographic evaluation of transverse cerebellar diameter in relation to patient weight and height.

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APPENDIX 1

The formular below is an infinite population formular. The formular was used for calculating a minimum sample size for infinite population so that the sample size results will represent the entire population studied. The sample used for the study was calculated using the following formular

Sample size: n= N/1 + N (e)^2 (Yamane,1973)

ní í í í í í í í Sample Size

Ní í í í í í í í population size

eí í í í í í í í percentage error (percentage error at 95% level of confidence = 0.05). Using the total no of patients who attended antenatal clinic at Enugu State Teaching Hospital Parklane Enugu, a population of 2230 was obtained.

N = 2230

e = 0.05

n= N/1 +N(e)^2

n= 2230 + 2230(0.05)^2

n=2230/6.57 =   339.42

n= 339.42 Thus, the sample size was increased to 697 to increase the statistical power and also in order to ensure that the outcome of the results from a large infinite population studied can be generalized to the entire population.

APPENDIX III

CONSENT FORM

SONOGRAPHIC DETERMINATION OF GESTATIONAL AGE IN THE SECOND AND THIRD TRIMESTER FROM TRANSVERSE CEREBELLAR DIAMETER AMONG PREGNANT WOMEN IN ENUGU, NIGERIA.

INTRODUCTION

You have been selected to participate in a study: Sonographic Determination Of Gestational Age In The Second And Third Trimester From Transverse Cerebellar Diameter Among Pregnant Women In Enugu, Nigeria.

The information obtained from this study will be helpful in estimating (more accurately) the gestational age of pregnancies even at advance stage when other parameters for gestational age estimation may not be reliable.

The study will help in evaluation of fetal growth and detection of intrauterine growth restriction (IUGR). This study could also help the health care providers to prepare for the accurate time and best fetal surgical facilities that will be used on fetuses with anomalies such as encephalocele in order to avoid fetal morbidity and mortality.

VOLUNTARY NATURE OF PARTICIPATION

Participation is completely voluntary. You are free to give consent or do otherwise.

STUDY PROCEDURE/RISKS

It has been established that ultrasound study is safe to both the fetus and the mother and is a reliable imaging modality for assessment of umbilical cord.

COST

There is no additional cost/charge for participating in this study. Once you volunteer, the study becomes part of the normal obstetrics scan, which you have already paid for.

CONFIDENTIALITY

All information obtained will be treated as confidential.

FEEDBACKS

The researcher can be contacted at department of Medical Radiography and Radiological Science, UNEC or at Radiology department National Orthopaedic Hospital, Enugu.

YOUR RESPONSE

I have read and understood the above (or someone read and explained the study). I fully understand the nature and benefits of the study and hereby give my consent to participate.

_____
Signature of the participant

Thank you.

Pilot Study Data:

Measurement 1 and 2 (intra observer variations).

Intra observer 1	Intra observer 2
13.00	13.10
14.90	14.60
16.20	16.80
18.00	17.00
18.20	18.80
22.00	22.40
24.20	24.20
26.70	26.30
28.10	28.50
31.40	31.00
33.60	33.60
34.20	34.90
35.80	35.50
37.00	37.30
38.10	38.10
40.00	40.40
42.80	42.30
43.20	43.00
44.60	44.40
45.80	45.80

Pilot Study Data

Measurement 1 and 2 (Inter observer variations).

Sonographer 1	Sonographer 2
13.10	13.90
14.60	15.00
16.80	16.10
17.00	17.50
18.80	18.30
22.40	21.90
24.20	23.80
26.30	26.10
28.50	28.70
31.00	30.50
33.60	33.00
34.90	35.00
35.50	34.90
37.30	37.10
38.10	38.00
40.40	40.80
42.30	42.00
43.00	43.90
44.40	43.50
45.80	44.50

Raw data from Normal Subjects studied

	DATE OF SCAN	LMP	TCD	FL (mm)	FL (wks)	BPD (mm)	BPD (wks)	HC (mm)	HC (wks)	AC (mm)	AC (wks)	GA BY FP	GA BY LMP
1	01/08/2012	05/11/2011	36.9	67.7	34	87.6	34	292	32	293	33	34	34
2	01/08/2012	07/03/2012	21.5	34.3	20	55.2	22	186	20	167	21	21	21
3	01/08/2012	30/11/2011	38.1	70.9	34	88.1	35	290	31	309	34	35	35
4	01/08/2012	11/12/2011	35.2	64.3	33	86.2	34	288	31	309	34	33	29
5	01/08/2012	16/12/2011	36.1	64.7	33	81.3	32	302	33	281	32	33	32
6	01/08/2012	16/11/2011	42.3	72.4	37	92	37	310	34	328	36	37	36
7	01/08/2012	26/11/2011	40.4	72	36	91.6	37	321	36	320	35	36	31
8	01/08/2012	02/02/2012	24.8	48.9	26	66.3	26	235	25	212	25	26	25
9	01/08/2012	18/01/2012	29.5	52.9	28	70.7	28	249	27	237	27	28	27
10	01/08/2012	06/02/2012	25.8	24.7	25	65.4	26	241	26	217	26	26	20
11	01/08/2012	21/11/2011	38	68.2	35	92.5	37	319	35	298	33	36	31
12	01/08/2012	10/12/2011	37.3	70.6	36	95	38	310	34	306	34	34	33
13	01/08/2012	05/11/2011	40.2	70.3	36	90.5	36	319	35	316	35	36	31
14	01/08/2012	30/11/2011	33.1	68	35	88.5	35	303	33	301	34	35	30
15	01/08/2012	28/11/2011	34.2	69	35	87.7	35	303	33	299	33	35	35
16	01/08/2012	14/11/2011	35.2	72	37	95.5	38	304	33	319	35	37	37
17	10/08/2012	25/12/2011	33.9	65.6	33	81.6	32	304	33	306	34	33	32
18	10/08/2012	04/12/2011	37.9	70.2	35	92.4	37	328	37	320	35	36	35
19	10/08/2012	27/02/2012	23	41.4	23	57.4	23	198	22	174	22	23	23
20	10/08/2012	06/12/2011	36.3	71.2	36	87.4	35	323	36	316	35	36	35
21	10/08/2012	07/12/2011	40.4	70.7	36	90.1	36	315	35	317	35	36	35
22	10/08/2012	02/01/2012	34.9	58	30	82.1	33	277	30	289	32	31	31
23	10/08/2012	01/12/2011	36.1	72.9	37	88	35	324	36	329	36	36	36
24	10/08/2012	26/11/2011	41	72.2	36	93.9	38	333	37	330	37	37	36
25	10/08/2012	16/11/2011	42	73.4	37	95.5	38	333	37	334	37	38	38
26	10/08/2012	21/01/2011	32.1	57.5	30	80.9	32	201	30	290	31	31	29
27	10/08/2012	20/02/2012	23.6	43.7	24	59.4	24	214	23	187	24	24	24
28	10/08/2012	31/12/2011	36.9	69.3	35	80.2	32	279	30	292	33	33	31
29	10/08/2012	28/12/2011	40	70.5	36	90.5	36	315	35	319	35	36	32
30	10/08/2012	10/03/2012	24.2	39.5	22	55	23	197	21	171	22	22	21
31	10/08/2012	30/01/2012	28	50.6	27	65.6	26	230	27	235	27	27	27
32	10/08/2012	29/02/2012	30.9	58.7	30	79.2	31	298	35	251	29	31	31
33	10/08/2012	18/11/2011	43	75.4	38	93.7	31	328	37	347	33	38	37
34	10/08/2012	11/01/2012	34.2	60	31	84.3	33	304	33	294	33	32	30
35	10/08/2012	07/01/2012	35.5	64.4	33	80.2	32	294	32	290	33	32	30
36	26/10/2012	29/01/2012	43.2	77.3	39	93.9	38	328	37	369	41	39	38

37	10/08/2012	18/11/2011	40.6	77.3	39	93.8	38	327	37	369	41	39	37
38	17/09/2012	04/06/2012	14.2	19	15	35.4	16	113	15	100	14	15	15
39	17/09/2012	13/01/2012	37.5	74.8	38	97.2	39	329	37	370	48	40	35
40	17/09/2012	15/01/2012	37.1	70.5	36	90.4	36	324	36	309	34	35	36
41	17/09/2012	18/02/2012	34.7	63.2	32	79.1	31	280	30	281	32	31	30
42	17/09/2012	23/01/2012	34.5	70.6	36	87.2	35	306	34	309	34	34	34
43	17/09/2012	25/12/2011	37.4	74.9	38	96.8	39	328	37	350	38	38	39
44	17/09/2012	29/01/2012	36.8	67.2	34	88.7	35	294	32	288	32	33	33
45	09/10/2012	12/01/2012	43.3	75.4	38	94.4	38	329	37	352	38	38	38
46	09/10/2012	08/02/2012	34.4	69.7	36	88.8	35	317	35	331	36	36	35
47	09/10/2012	01/06/2012	20	29.5	19	42.9	19	154	18	139	19	19	18
48	09/10/2012	05/06/2012	18.8	27.8	18	40.7	18	145	17	117	18	18	17
49	09/10/2012	22/05/2012	22.4	34.9	21	48.4	20	175	20	161	21	20	20
50	09/10/2012	04/03/2012	28.2	60.5	31	76.7	30	284	31	277	32	31	31
51	09/10/2012	23/04/2012	24.7	47.8	26	63	25	230	25	214	26	25	24
52	18/09/2012	26/12/2011	40.3	76.8	39	91.8	37	349	40	368	39	39	39
53	09/10/2012	07/02/2012	35.5	72.2	37	88.6	36	327	37	323	36	36	35
54	09/10/2012	03/02/2012	40.1	79.3	40	94.4	38	340	41	364	40	40	35
55	09/10/2012	29/05/2012	20.2	27.2	18	40.7	18	152	18	155	19	19	19
56	09/10/2012	12/06/2012	14.5	25.1	17	41	18	150	18	124	18	18	17
57	09/10/2012	01/02/2012	35.9	71.2	36	90	36	325	36	329	36	36	35
58	09/10/2012	21/02/2012	36	62.9	32	84.9	34	290	33	289	33	33	33
59	09/10/2012	15/02/2012	28.9	69.3	35	87.2	35	322	36	327	35	35	34
60	09/10/2012	08/02/2012	38.4	71.4	36	84.3	33	315	35	322	35	35	34
61	09/10/2012	27/02/2012	36.00	66.7	34	83.2	33	299	33	288	33	33	32
62	09/10/2012	20/02/2012	32.80	63.1	33	85.1	34	292	32	284	32	32	33
63	09/10/2012	14/03/2012	30.8	54.1	29	75	30	271	29	269	30	30	29
64	09/10/2012	25/01/2012	37.8	74.6	39	97.5	40	344	39	361	39	39	37
65	09/10/2012	13/03/2012	33	62	32	77.7	31	266	29	256	30	30	30
66	17/10/2012	13/06/2012	16.7	28.7	19	40.4	18	143	17	127	18	18	18
67	17/10/2012	28/03/2012	28.1	52.6	28	75	30	265	28	243	29	29	28
68	17/10/2012	22/02/2012	33.3	66.5	34	85.5	34	215	35	308	35	34	33
69	17/10/2012	26/02/2012	37	69	35	83.3	33	300	33	309	35	34	33
70	17/10/2012	20/02/2012	38.4	71.4	36	87.7	35	325	36	301	34	35	34
71	17/10/2012	04/02/2012	43.1	77.2	39	93.5	37	333	38	360	40	38	36
72	17/10/2012	11/07/2012	13.1	16.2	15	29.5	15	102	14	79.3	14	14	14
73	17/10/2012	09/06/2012	14	28	18	40.5	18	151	18	132	19	18	18
74	17/10/2012	03/06/2012	13.2	30	19	41.1	18	155	18	127	18	18	19

75	17/10/2012	10/03/2012	30.4	60.1	31	79.8	32	298	33	278	32	32	31
76	17/10/2012	23/05/2012	18.5	35.6	21	54	22	199	22	159	21	21	20
77	17/10/2012	15/02/2012	34.9	68.1	35	87	35	316	35	314	35	35	34
78	17/10/2012	07/05/2012	25.9	43.2	24	61	24	208	22	185	23	23	23
79	17/10/2012	12/03/2012	32.7	63.3	33	86.1	34	305	34	270	31	33	31
80	17/10/2012	15/02/2012	40.6	73	37	90.4	36	324	36	326	36	36	34
81	17/10/2012	21/01/2012	36.9	72.1	37	93.5	37	341	39	362	40	38	38
82	17/10/2012	02/01/2012	44	80.4	41	99.7	41	356	41	335	37	40	40
83	17/10/2012	19/01/2012	39.9	77.2	39	89	36	342	39	337	38	38	38
84	17/10/2012	17/05/2012	18.8	36	21	53.2	22	192	21	174	22	21	21
85	17/10/2012	23/03/2012	31.6	57.8	30	74.1	29	285	31	265	31	30	29
86	17/10/2012	16/04/2012	30	51.7	27	67.7	27	261	28	216	26	27	26
87	19/10/2012	23/03/2012	34	63.9	33	75.5	30	295	32	267	31	31	30
88	19/10/2012	17/03/2012	32.2	62.7	32	73.8	29	289	31	265	31	31	30
89	19/10/2012	04/05/2012	20.2	43.5	24	58.8	24	218	23	193	24	24	24
90	19/10/2012	17/04/2012	28.5	50.3	27	65.7	26	246	26	211	26	26	26
91	19/10/2012	10/07/2012	10.2	13.7	14	25.5	14	96.5	14	76	14	14	14
92	19/10/2012	23/03/2012	32.3	57.4	30	71	28	264	28	256	30	29	30
93	19/10/2012	28/05/2012	22.6	36.3	21	49.2	20	181	20	160	21	20	20
94	19/10/2012	23/04/2016	21.8	46.1	25	63.5	25	238	25	212	26	25	25
95	19/10/2012	20/03/2012	33.6	59.7	31	75.9	30	277	30	251	29	30	30
96	19/10/2012	24/05/2012	17	34.6	20	50.7	21	187	20	172	22	21	20
97	19/10/2012	27/04/2012	24.5	46.9	25	64.1	25	230	25	230	28	26	25
98	10/08/2012	20/11/2011	42	74.1	39	97.3	40	344	39	360	39	39	39
99	19/10/2012	13/07/2012	13.9	15.9	15	25.7	14	96.9	14	76.4	14	14	14
100	19/10/2012	26/05/2012	23.4	38.4	22	51.7	21	192	21	159	21	21	20
101	19/10/2012	15/05/2012	19	36.6	22	49.2	20	184	20	156	21	21	22
102	19/10/2012	09/03/2012	30.7	62.5	32	74.7	30	291	32	286	33	32	32
103	17/09/2012	20/12/2011	42	74.1	39	97.3	40	344	39	360	39	39	38
104	19/10/2012	03/02/2012	43.5	78.1	40	93.5	38	330	37	338	38	38	37
105	19/10/2012	17/04/2012	30.6	53.1	28	73.2	29	235	25	223	27	27	26
106	19/10/2012	25/05/2012	17.6	36.4	36	50	21	197	21	181	23	21	21
107	19/10/2012	27/01/2012	35.3	75.8	38	95.6	39	328	37	334	37	38	38
108	22/10/2012	10/03/2012	32.7	62	32	99.9	32	302	33	268	31	32	32
109	22/10/2012	16/03/2012	34.1	64.2	33	79	31	289	31	273	31	31	31
110	22/10/2012	04/05/2012	28	57.7	27	64.8	26	240	26	221	27	26	24
111	22/10/2012	26/05/2012	22.8	49.5	27	65.1	26	224	24	212	26	26	21
112	22/10/2012	12/02/2012	36.2	23.4	37	92.9	37	338	38	313	35	37	35

113	22/10/2012	14/05/2012	25.6	43.6	24	56.2	23	212	23	183	23	23	23
114	22/10/2012	12/07/2012	17	19.2	16	32	16	118	15	108	16	16	14
115	22/10/2012	06/05/2012	28.4	53.7	28	66.8	27	232	25	215	26	26	24
116	22/10/2012	06/05/2012	22.4	43.8	24	64.1	25	239	26	199	25	25	24
117	22/10/2012	18/05/2012	24.1	47.4	26	66.5	26	238	25	212	26	26	24
118	22/10/2012	20/04/2012	28.3	47.3	26	71.3	28	248	26	215	26	26	26
119	22/10/2012	18/03/2012	34.6	63.3	33	83.7	33	285	31	273	31	32	31
120	22/10/2012	09/04/2012	27	50.6	27	76	30	267	29	220	26	28	28
121	22/10/2012	23/04/2012	28.2	53	28	66.5	27	244	26	201	25	26	26
122	22/10/2012	11/06/2012	20.3	32.7	20	44.9	19	160	18	149	20	19	20
123	22/10/2012	13/02/2012	36.4	69.7	36	94.5	38	331	37	311	35	36	36
124	26/10/2012	24/04/2012	28.2	48.6	26	67.4	27	250	27	210	26	26	25
125	26/10/2012	23/05/2012	21.8	41.5	23	56.8	23	201	22	192	24	23	22
126	26/10/2012	10/03/2012	30.8	62.2	32	84	33	296	32	269	31	32	32
127	26/10/2012	20/04/2012	26.1	51	27	70.7	28	269	29	237	28	28	25
128	26/10/2012	22/04/2012	28.8	54.9	29	77	30	269	29	220	26	28	26
129	26/10/2012	03/05/2012	28.9	50	27	63.4	25	229	25	220	26	26	25
130	26/10/2012	27/05/2012	24.3	42.5	24	55.4	22	203	22	169	22	22	20
131	26/10/2012	16/02/2012	35.6	77.5	39	91.3	36	331	37	335	37	38	36
132	26/10/2012	12/05/2012	23.5	48.7	26	63.8	25	244	26	227	27	26	23
133	26/10/2012	20/02/2012	36.2	67.1	35	89.8	36	313	35	308	35	35	35
134	26/10/2012	28/04/2012	27.6	52	28	67	27	238	25	208	25	26	25
135	26/10/2012	30/04/2012	28.4	50.8	27	64.9	26	238	25	216	26	26	25
136	26/10/2012	06/03/2012	34	66.8	34	83.5	33	310	34	311	35	34	33
137	26/10/2012	11/04/2012	28	53.5	28	73.6	29	254	27	232	28	28	27
138	26/10/2012	04/03/2012	33.8	66.5	34	83.6	34	310	34	311	35	34	33
139	26/10/2012	06/04/2012	27.4	57.4	30	76.3	30	283	31	260	30	30	29
140	26/10/2012	12/02/2012	34.7	68.7	35	96.2	39	342	39	329	37	37	35
141	26/10/2012	19/01/2012	42	81.5	41	97.6	40	345	39	363	40	40	40
142	26/10/2012	04/06/2012	17.7	36.4	21	50	21	197	21	181	23	21	20
143	26/10/2012	05/02/2012	40.2	70.9	36	90.4	36	326	37	336	38	37	35
144	26/10/2012	20/05/2012	20.4	41	23	58.6	24	207	22	183	23	23	23
145	26/10/2012	01/04/2012	28.8	57.3	30	74.8	30	283	30	273	31	30	29
146	09/10/2012	17/01/2012	44.9	99.4	40	91.6	37	335	38	360	39	39	37
147	26/10/2012	06/04/2012	22.4	61.8	32	77.1	30	286	31	260	30	31	29
148	26/10/2012	18/05/2012	20.6	44.2	24	60.9	24	223	24	193	24	24	23
149	26/10/2012	07/02/2012	42	75.9	38	93.2	37	325	36	329	37	37	37
150	26/10/2012	25/01/2012	38.8	79.1	40	97.7	40	347	40	372	37	40	39

151	26/10/2012	10/02/2012	42.1	73.4	37	92.1	37	336	38	337	38	37	37
152	26/10/2012	10/04/2012	31	54.1	29	70.2	28	267	29	224	27	28	28
153	26/10/2012	10/05/2012	25.8	41.1	23	57.6	23	211	23	185	22	23	24
154	26/10/2012	17/03/2012	38	71	36	88	35	319	35	311	35	35	31
155	26/10/2012	04/04/2012	32.8	65.5	34	85.3	34	307	34	299	34	34	29
156	26/10/2012	12/03/2012	30.9	60	31	81.1	32	302	33	279	32	32	32
157	26/10/2012	15/03/2012	34.5	69.9	36	89.2	36	317	35	316	36	36	32
158	26/10/2012	27/04/2012	30.5	57.2	30	76.7	30	268	29	265	31	30	29
159	26/10/2012	23/02/2012	37.2	68.2	35	86.9	35	319	35	299	34	35	35
160	26/10/2012	11/03/2012	40.4	70.1	30	91.1	36	319	35	312	35	36	32
161	26/10/2012	28/02/2012	38	72.9	37	86.1	34	314	35	299	34	35	34
162	26/10/2012	09/03/2012	31.2	69.3	35	91.4	36	330	37	310	35	36	33
163	26/10/2012	30/03/2012	28.3	57.5	30	76.3	30	264	28	268	31	30	30
164	26/10/2012	08/03/2012	36	64.5	33	83.2	33	308	34	294	33	33	33
165	01/11/2012	23/02/2012	38.6	72.7	37	88.4	35	319	35	297	34	35	36
166	01/11/2012	01/02/2012	42.1	77.5	39	89.7	36	331	37	337	38	37	39
167	01/11/2012	03/02/2012	42.2	75.9	38	90.8	36	341	39	314	35	37	39
168	01/11/2012	02/02/2012	43.8	79.2	40	94.4	38	339	39	331	37	38	39
169	01/11/2012	21/03/2012	30.9	64.4	33	78.6	31	294	32	279	32	32	32
170	01/11/2012	26/04/2012	24.1	47.5	26	67.6	27	247	26	225	27	26	27
171	01/11/2012	06/07/2012	16.9	25.6	18	41.6	18	152	18	124	18	18	16
172	01/11/2012	17/02/2012	34.7	73.7	37	89.9	36	333	38	316	36	37	36
173	01/11/2012	17/05/2012	22.9	42.5	24	57.2	23	221	24	181	23	23	23
174	01/11/2012	15/05/2012	25.5	44.8	25	60.5	24	235	25	216	26	25	24
175	01/11/2012	26/03/2012	29.7	64.1	33	76.8	30	284	31	268	31	31	30
176	01/11/2012	01/03/2012	34.5	75.5	38	89.5	36	318	29	324	36	36	35
177	01/11/2012	09/06/2012	22.1	34.4	21	47.4	20	187	35	157	21	20	19
178	01/11/2012	07/04/2012	28.6	56.7	30	71.5	28	273	21	243	29	30	28
179	01/11/2012	11/04/2012	30.8	59.5	31	76.2	30	293	32	260	30	31	29
180	01/11/2012	28/05/2012	20.5	41.5	23	53.4	22	205	22	171	22	22	21
181	01/11/2012	03/06/2012	19	39.6	23	48.7	20	163	21	194	21	21	21
182	01/11/2012	05/03/2012	23.6	66.5	34	83.4	33	307	34	320	36	34	34
183	01/11/2012	13/03/2012	36.2	67.3	35	87.7	35	320	36	313	35	35	33
184	01/11/2012	05/04/2012	31.9	60.7	31	83.4	33	292	32	287	33	32	30
185	01/11/2012	27/03/2012	33.1	61.1	32	79.3	31	288	31	253	30	31	31
186	09/11/2012	04/05/2012	30.3	54.3	29	63.7	25	252	27	227	27	27	24
187	09/11/2012	11/05/2012	27.6	47.7	26	69.3	27	243	26	218	26	26	24
188	09/11/2012	25/02/2012	40.2	71.2	36	88.7	36	332	37	338	38	37	34

189	09/11/2012	01/08/2012	16.2	17.6	15	29.5	15	107	15	90.3	15	15	14
190	09/11/2012	16/06/2012	23.4	38.4	22	52.2	21	182	20	153	21	21	19
191	09/11/2012	15/03/2012	37.6	67.2	35	90.3	36	316	35	288	33	35	32
192	09/11/2012	05/06/2012	25.4	43.3	24	55.5	23	201	22	176	23	23	21
193	09/11/2012	02/04/2012	33.7	61.9	33	82.5	33	284	31	256	30	31	30
194	09/11/2012	20/04/2012	32.8	59.6	31	73.4	29	266	29	257	30	29	27
195	09/11/2012	08/04/2012	29.2	57.1	30	81.9	33	295	32	274	31	31	30
196	09/11/2012	11/05/2012	28.6	50.7	27	68.4	27	244	26	220	26	26	26
197	09/11/2012	15/06/2012	20	39.4	22	51.8	21	185	20	164	21	21	22
198	09/11/2012	27/05/2012	26.3	46.7	25	59.6	24	213	23	192	24	24	23
199	09/11/2012	25/05/2012	23.2	41.3	23	53.3	22	187	21	183	23	22	24
200	09/11/2012	06/05/2012	35	61.1	32	87	35	285	31	276	32	32	27
201	09/11/2012	29/04/2012	27.5	56.4	29	73	29	262	28	242	28	28	27
202	09/11/2012	08/07/2012	18.8	29.3	19	41.6	18	143	17	128	18	18	16
203	09/11/2012	16/03/2012	34.4	68.4	35	87	35	319	35	314	35	35	32
204	09/11/2012	10/05/2012	25.4	49	27	66	26	248	26	213	26	26	25
205	09/11/2012	13/05/2012	28.9	49.5	27	63	25	232	25	212	26	26	24
206	09/11/2012	08/04/2012	34.4	63.8	33	78.3	31	283	31	272	31	31	30
207	17/11/2012	17/07/2012	18.6	34.8	21	49.8	20	191	21	152	20	20	19
208	17/11/2012	09/03/2012	35.1	69.8	36	87.1	35	317	35	313	35	35	36
209	17/11/2012	28/07/2012	14.7	23.8	17	37.8	17	141	17	124	18	17	16
210	17/11/2012	03/03/2012	39.4	76.4	39	88.3	35	339	39	364	40	38	37
211	17/11/2012	14/06/2012	24.7	44.3	24	56.8	23	220	24	184	23	23	22
212	17/11/2012	07/07/2012	22.6	35.9	21	46.3	19	180	20	159	21	20	19
213	17/11/2012	18/04/2012	28.2	59	31	79.1	31	297	32	277	32	32	30
214	17/11/2012	28/04/2012	29.1	54.3	29	74.6	30	279	30	278	29	29	29
215	17/11/2012	07/04/2012	32.2	65.1	34	81.4	32	302	33	301	34	33	32
216	17/11/2012	03/05/2012	28.2	58.7	30	74	29	268	29	248	29	29	28
217	17/11/2012	17/03/2012	40.5	72.4	37	89.8	36	318	35	333	37	36	35
218	17/11/2012	07/03/2012	40.3	77.6	39	91.7	37	330	37	333	37	37	36
219	17/11/2012	20/03/2012	35.3	70.2	36	92.1	37	316	35	317	36	36	34
220	17/11/2012	08/04/2012	30.4	60.1	31	80.4	32	292	32	274	31	31	31
221	17/11/2012	09/05/2012	33.4	59.8	31	76.8	30	273	29	253	30	30	27
222	17/11/2012	12/05/2012	29.3	54.8	29	74.6	30	266	29	244	29	29	27
223	17/11/2012	20/05/2012	28.9	53.1	28	67.8	27	246	26	202	25	26	25
224	17/11/2012	03/05/2012	31.7	60.9	31	76.7	30	289	31	253	30	31	28
225	17/11/2012	17/06/2012	25.6	48.3	26	61.6	25	221	24	190	24	24	21
226	17/11/2012	25/05/2012	31.2	59.8	31	82.1	33	302	34	256	30	32	28

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227	17/11/2012	05/08/2012	16.2	23.4	17	38.1	17	138	17	113	17	17	17
228	30/11/2012	03/08/2012	16.1	25.2	17	41.3	18	139	17	120	18	17	17
229	30/11/2012	20/04/2012	34.5	64.8	33	80.4	32	302	33	282	32	32	32
230	30/11/2012	24/04/2012	28	55.8	29	74.8	30	264	28	230	27	28	31
231	30/11/2012	25/05/2012	30.5	53.1	28	64.7	26	245	27	222	27	27	27
232	30/11/2012	10/03/2012	38.4	72.7	37	92.4	37	322	36	337	38	37	37
233	30/11/2012	23/04/2012	34.5	63.4	33	76.2	30	291	32	274	31	31	31
234	30/11/2012	04/05/2012	30.2	58.2	30	75.8	30	269	29	271	31	30	30
235	30/11/2012	02/05/2012	32.8	58	30	77.2	33	273	29	270	31	30	30
236	30/11/2012	08/04/2012	28.6	53.7	28	68.9	27	245	26	208	25	26	33
237	30/11/2012	02/04/2012	35.1	63	32	81.8	33	299	33	300	34	33	34
238	30/11/2012	10/04/2012	30.2	53.6	28	76.7	30	273	29	250	29	29	33
239	30/11/2012	16/07/2012	16.5	29.9	19	43	19	146	17	133	19	18	19
240	30/11/2012	07/05/2012	31.4	52.4	28	73.9	29	269	29	238	28	28	29
241	30/11/2012	06/07/2012	24.4	36	21	51.7	21	189	21	172	22	21	20
242	30/11/2012	13/07/2012	17	33.7	21	48.3	20	172	19	149	20	20	20
243	01/12/2012	04/05/2012	30.1	52.4	28	72.8	29	259	28	235	28	28	30
244	01/12/2012	23/03/2012	34.2	65.6	34	89.1	36	317	35	299	34	34	36
245	01/12/2012	31/03/2012	32	63.6	33	78.7	31	302	33	297	34	33	34
246	01/12/2012	15/06/2012	20.1	37.2	22	49.7	21	189	21	173	22	21	24
247	01/12/2012	17/06/2012	25	43	24	56.6	23	232	26	213	26	24	24
248	01/12/2012	27/04/2012	30.1	57.4	30	80.1	32	281	30	266	31	31	31
249	01/12/2012	16/07/2012	18.7	30	19	42.5	19	160	18	143	20	19	19
250	01/12/2012	26/04/2012	29.6	61.5	32	79.1	31	281	30	264	31	31	35
251	01/12/2012	09/06/2012	27	49.1	26	63	25	241	26	207	25	25	25
252	01/12/2012	22/04/2012	31.7	60.8	31	81.3	32	298	33	281	32	32	36
253	01/12/2012	25/04/2012	34.9	62.2	32	78.2	31	289	31	276	32	31	34
254	01/12/2012	22/03/2012	40.2	71.4	36	90.8	36	313	35	337	38	36	36
255	01/12/2012	03/04/2012	35.5	66.1	34	81.3	32	305	34	302	34	33	30
256	01/12/2012	07/07/2012	23.6	38.9	22	51.7	21	183	20	160	21	21	21
257	01/12/2012	05/03/2012	44	76.7	39	91.7	37	346	40	360	39	39	39
258	01/12/2012	18/05/2012	31.1	57.5	30	71	28	263	28	230	27	28	32
259	01/12/2012	01/06/2012	30.4	51.3	27	66.5	27	207	27	245	29	27	26
260	06/12/2012	13/07/2012	20.2	39.1	22	51.5	21	185	20	167	22	21	21
261	06/12/2012	23/03/2012	42.6	74.5	38	89.6	36	325	36	340	38	37	36
262	06/12/2012	09/06/2012	20.8	32.4	20	44.4	19	158	18	138	19	19	21
263	06/12/2012	12/04/2012	37.1	68.1	35	86.4	34	304	33	288	33	34	34
264	06/12/2012	23/04/2012	36	67.7	35	79.5	31	304	33	306	35	33	34

265	06/12/2012	23/04/2012	31.2	55	29	70.1	28	256	27	242	29	28	32
266	06/12/2012	28/06/2012	25.4	45.4	25	60.1	24	209	23	178	23	24	23
267	06/12/2012	05/07/2012	24	40.9	23	53.8	22	195	21	175	22	22	22
268	06/12/2012	22/05/2012	32.3	57.1	30	75.8	30	267	29	247	29	29	21
269	06/12/2012	22/05/2012	29.7	54.3	29	76	30	281	30	221	27	29	28
270	06/12/2012	25/07/2012	19.8	30.8	19	43.4	19	155	18	133	19	19	19
271	06/12/2012	22/06/2012	27.7	49.3	26	59.9	24	230	25	210	26	25	23
272	06/12/2012	10/05/2012	31.8	55.7	29	77.3	30	273	29	271	31	30	30
273	06/12/2012	18/04/2012	36.9	66.9	34	81.8	33	305	34	285	33	33	33
274	06/12/2012	28/06/2012	25.2	43.4	24	58.2	23	212	23	197	24	23	23
275	06/12/2012	24/06/2012	22	41.5	23	58.7	24	210	23	196	24	23	23
276	06/12/2012	14/06/2012	24.3	40.8	23	56	23	202	22	183	23	23	25
277	06/12/2012	01/05/2012	32.1	57.9	30	75.2	30	261	28	232	28	29	31
278	06/12/2012	25/04/2012	35	64.8	33	83.2	33	300	33	265	31	32	32
279	06/12/2012	02/07/2012	22.2	40.2	23	51.3	21	193	21	183	23	22	21
280	13/12/2012	07/05/2012	28.5	58	30	74.7	30	278	33	251	29	30	31
281	13/12/2012	05/06/2012	25	45.8	25	66.5	27	252	27	218	26	26	27
282	13/12/2012	20/05/2012	27	51	27	72.7	29	252	27	250	29	28	29
283	13/12/2012	16/07/2012	18.8	33.8	21	50.8	21	191	21	163	21	21	21
284	13/12/2012	21/03/2012	36.3	70.1	36	90.9	36	332	37	331	37	37	38
285	13/12/2012	15/04/2012	35.8	61.5	32	80.4	32	292	32	276	32	32	33
286	13/12/2012	20/03/2012	40	71.5	36	93	37	329	37	329	37	37	38
287	13/12/2012	25/06/2012	22.1	40.3	23	55.5	23	219	24	184	23	23	24
288	13/12/2012	17/07/2012	18.7	32.6	20	46.4	19	171	19	157	21	20	21
289	13/12/2012	16/05/2012	26.8	56.4	29	72.8	29	259	28	248	29	28	30
290	13/12/2012	12/05/2012	28.8	55	30	74.4	29	274	29	248	29	29	30
291	13/12/2012	02/05/2012	17.6	57.9	18	77.9	31	281	30	273	31	30	32
292	13/12/2012	04/08/2012	14.8	26.4	18	36.6	17	145	17	128	18	17	17
293	13/12/2012	25/04/2012	30.6	62.3	65	79.1	31	281	30	266	31	31	28
294	13/12/2012	03/04/2012	34.8	65	34	87.5	35	318	35	310	35	35	36
295	13/12/2012	14/04/2012	37	67.8	35	85.1	34	318	35	300	34	34	33
296	14/12/2012	12/04/2012	38.1	71.7	36	87.5	35	323	36	312	35	35	35
297	14/12/2012	14/07/2012	15.4	32.6	20	51	21	187	21	153	21	20	21
298	14/12/2012	30/05/2012	30.3	54.3	29	76.6	30	271	29	244	29	29	28
299	14/12/2012	28/06/2012	26.3	46.2	25	60.4	24	224	24	192	24	24	24
300	14/12/2012	15/07/2012	16.6	38.2	22	52.6	22	192	23	170	22	22	20
301	14/12/2012	15/06/2012	28.4	57.8	27	64.7	26	241	26	230	27	26	26
302	14/12/2012	26/04/2012	35.6	63.3	33	84.9	34	307	34	289	33	33	33

303	14/12/2012	01/05/2012	36.3	67.1	35	82.9	33	296	32	290	33	33	32
304	14/12/2012	30/04/2012	35.1	61.6	32	81	32	304	33	270	31	32	31
305	14/12/2012	25/05/2012	32.8	58.5	30	74.2	29	265	28	248	29	29	29
306	14/12/2012	13/07/2012	18	40.1	23	52.2	21	201	22	172	22	22	21
307	14/12/2012	27/06/2012	24.3	46.5	25	60.7	24	218	23	190	24	24	24
308	14/12/2012	08/05/2012	34.9	59.5	31	78.7	31	284	31	263	30	31	31
309	14/12/2012	07/06/2012	26.7	52	28	68.2	27	252	27	236	28	27	27
310	14/12/2012	28/05/2012	29	55	29	70.3	29	267	29	242	29	28	27
311	14/12/2012	18/05/2012	34.8	63.8	33	78.1	32	290	32	267	31	31	30
312	14/12/2012	11/04/2012	40.1	71.1	36	91.7	38	334	38	311	30	36	34
313	14/12/2012	07/06/2012	31.8	55.2	29	68.7	29	268	29	239	28	28	28
314	14/12/2012	09/05/2012	31	62.7	32	78.8	33	304	33	266	31	32	30
315	15/12/2012	14/04/2012	34.4	68	35	90.1	36	323	36	298	34	35	32
316	15/12/2012	07/05/2012	33.4	62.2	32	82.1	33	287	31	282	32	32	29
317	15/12/2012	10/04/2012	33	61.9	32	81.4	32	284	31	268	31	31	35
318	15/12/2012	24/03/2012	43	76.7	39	92.8	37	330	37	353	39	38	38
319	15/12/2012	14/03/2012	25.9	51.2	27	69.5	27	239	26	239	28	27	26
320	15/12/2012	03/08/2012	16.7	34.7	21	46.9	20	170	19	141	19	20	19
321	15/12/2012	01/04/2012	36.4	71.7	36	93.5	38	334	38	337	38	37	35
322	15/12/2012	06/05/2012	30.9	59.5	31	81.1	32	292	32	287	33	32	31
323	15/12/2012	03/07/2012	22.5	43.9	31	62.2	25	216	23	197	24	24	22
324	15/12/2012	14/05/2012	29	58.3	24	79	31	285	31	265	31	31	28
325	15/12/2012	27/07/2012	22.4	34.6	30	50.9	21	183	20	146	20	20	20
326	15/12/2012	15/05/2012	30.1	60.3	21	79	31	281	30	261	30	31	29
327	15/12/2012	05/05/2012	35	65.3	31	79.3	31	288	31	292	33	32	30
328	15/12/2012	01/07/2012	26.5	45.2	24	57.8	23	221	24	191	24	24	23
329	15/12/2012	07/06/2012	20	42.8	25	60.3	24	209	23	188	24	23	23
330	15/12/2012	01/06/2012	30	61.1	24	81.9	33	299	33	289	33	32	28
331	15/12/2012	12/05/2012	30	55.6	32	79.3	31	294	32	265	31	31	30
332	15/12/2012	19/05/2012	35	64.5	29	82.1	33	296	32	268	31	32	30
333	15/12/2012	02/08/2012	17.8	33.6	33	45	19	179	20	160	21	20	19
334	15/12/2012	28/12/2012	33.2	65.8	34	83.2	33	311	34	317	36	34	33
335	15/12/2012	07/06/2012	30.1	55.2	29	79	31	297	32	281	32	31	27
336	28/12/2012	17/06/2012	30.5	53.7	28	66.3	26	250	27	230	27	27	26
337	28/12/2012	13/07/2012	24.7	45.8	25	57.6	23	211	23	203	25	24	24
338	28/12/2012	18/07/2012	23.6	39.4	22	54.7	22	200	22	193	24	22	23
339	28/12/2012	10/05/2012	32.9	63.4	33	80.8	32	295	32	266	31	32	33
340	28/12/2012	24/04/2012	32.9	68.6	35	86.7	35	316	35	285	33	34	34

341	28/12/2012	24/04/2012	35	68	35	87.3	35	323	36	286	33	35	34
342	28/12/2012	15/08/2012	16.7	31.9	20	45.3	19	164	19	151	20	19	19
343	28/12/2012	16/05/2012	35.6	65.5	34	80.1	32	296	32	274	31	32	32
344	28/12/2012	09/06/2012	23.6	57	29	73.3	29	276	29	251	29	29	27
345	28/12/2012	01/06/2012	33.2	59.8	31	76	30	278	30	254	30	30	30
346	28/12/2012	13/06/2012	30.4	53.1	28	73	29	260	28	228	27	28	27
347	28/12/2012	17/05/2012	34.2	63.3	33	79.9	32	293	32	278	32	32	35
348	28/12/2012	21/05/2012	30.9	66.9	34	81.6	32	294	31	269	30	32	30
349	28/12/2012	26/06/2012	20.1	38.5	22	53.9	22	301	22	181	23	22	26
350	28/12/2012	01/07/2012	27.9	51.6	27	65.9	26	240	26	219	26	26	25
351	28/12/2012	16/07/2012	24.6	45.5	25	60.7	24	226	24	216	26	25	23
352	28/12/2012	11/05/2012	35.2	67.1	35	82.3	33	295	32	291	33	33	33
353	28/12/2012	29/05/2012	22	39.5	22	53.3	22	191	21	181	23	22	21
354	28/12/2012	29/05/2012	33	68.6	35	88	35	314	35	193	33	34	30
355	28/12/2012	31/05/2012	32.7	60.5	31	78.6	31	290	32	263	30	31	30
356	28/12/2012	21/05/2012	35	64.1	33	81.2	32	304	33	271	32	32	33
357	09/01/2013	30/04/2012	40.3	71.9	36	88.3	35	323	36	317	36	36	36
358	09/01/2013	02/05/2012	35.8	69.6	36	88.3	35	320	36	325	36	36	37
359	09/01/2013	04/04/2012	44.6	99.6	40	91.7	37	336	38	360	39	39	40
360	09/10/2012	09/05/2012	42.4	74.7	38	90.5	36	324	36	330	37	37	35
361	09/01/2013	15/05/2012	34.2	66.8	34	89.1	36	324	36	302	34	35	34
362	09/01/2013	12/06/2012	28.2	54.5	29	77.2	30	261	28	249	29	29	30
363	09/01/2013	11/07/2012	25.7	47.1	26	66.6	27	245	26	222	27	26	26
364	09/01/2013	18/08/2012	24.9	45.6	25	62.6	25	229	25	209	25	25	20
365	09/01/2013	23/05/2012	37.4	65.6	34	82.8	33	316	35	300	34	34	33
366	09/01/2013	14/05/2012	37.3	68.3	35	87	35	305	34	282	32	34	34
367	09/01/2013	03/08/2012	24.6	43.8	24	58	24	219	24	200	24	24	22
368	09/01/2013	03/08/2012	25.2	42.8	24	57.1	23	217	23	193	24	23	22
369	09/01/2013	26/06/2012	30.6	56.8	30	73.9	29	271	29	259	30	29	27
370	09/01/2013	30/07/2012	30.3	53	28	66.9	27	237	25	224	27	27	25
371	10/01/2013	03/06/2012	35.2	61.9	32	79.5	31	296	32	279	32	32	31
372	10/01/2013	10/05/2012	33.1	68.1	35	86.9	35	326	37	313	35	35	34
373	10/01/2013	20/05/2012	34.5	68.9	35	88	35	322	36	320	36	35	33
374	10/01/2013	08/04/2012	40.8	75.4	38	85.2	34	321	31	342	38	36	39
375	10/01/2013	04/06/2012	32.4	60.6	31	77.4	30	289	34	255	30	31	31
376	10/01/2013	27/05/2012	35.2	66	34	82.5	33	311	34	291	33	33	33
377	10/01/2013	08/07/2012	30.5	53.5	28	67	27	249	27	212	26	27	26
378	10/01/2013	28/08/2012	27.1	43.4	24	61.9	25	224	24	188	24	24	19

379	10/01/2013	21/08/2012	24.8	40.7	23	50.1	21	193	21	169	22	22	22
380	10/01/2013	20/05/2012	30.8	70.3	36	87.4	35	329	37	328	37	36	33
381	10/01/2013	28/05/2012	28.8	63.2	33	47.8	31	299	33	273	31	32	32
382	10/01/2013	20/05/2012	36.8	69.7	36	90.3	36	318	35	302	34	35	33
383	10/01/2013	13/07/2012	28.4	54.5	29	61.8	24	235	25	229	27	26	25
384	10/01/2013	15/07/2012	26.8	49.6	27	62.1	25	238	25	225	27	26	25
385	10/01/2013	09/07/2012	29.7	49.1	26	69.2	27	259	28	235	28	27	26
386	10/01/2013	17/04/2012	43.1	79.3	40	93.9	38	325	36	334	37	38	38
387	10/01/2013	29/08/2012	18	26.2	18	44.8	19	163	19	154	20	19	19
388	10/01/2013	06/06/2012	35.1	61.3	32	79.5	32	298	33	279	32	32	31
389	10/01/2013	26/08/2012	18	33.4	20	47.4	20	176	20	154	21	20	19
390	10/01/2013	21/05/2012	35	64	33	32.1	33	311	34	305	34	33	33
391	10/01/2013	26/04/2012	42.1	74.4	38	90.1	36	321	36	328	37	37	36
392	18/01/2013	02/06/2012	30.5	62.3	32	81.3	32	290	32	264	31	32	31
393	18/01/2013	21/08/2012	18.5	32.3	20	46.8	20	175	20	162	21	20	21
394	18/01/2013	28/05/2012	36.1	64.6	64	83.7	33	308	34	297	34	33	33
395	18/01/2013	15/06/2012	31.5	63.2	33	81.5	33	298	33	260	30	32	31
396	18/01/2013	17/08/2012	18.2	38.6	22	56.3	23	208	22	181	23	22	22
397	18/01/2013	10/07/2012	24	31.3	27	67.1	27	243	26	224	27	27	27
398	18/01/2013	15/06/2012	33.1	60.4	31	74.2	29	277	30	250	29	30	31
399	18/01/2013	03/07/2012	26.4	50.3	27	67.4	27	245	26	233	28	27	27
400	18/01/2013	09/08/2012	19.3	36.5	22	52.5	22	190	21	179	23	22	24
401	18/01/2013	19/05/2012	33.4	64.3	33	80.5	32	313	35	331	37	34	34
402	18/01/2013	12/06/2012	30.2	56.7	30	78.3	31	293	32	244	29	30	31
403	18/01/2013	28/06/2012	31	54.5	29	69.5	27	256	27	273	31	28	29
404	18/01/2013	20/06/2012	30.1	58.8	30	78.7	31	291	32	270	31	31	30
405	18/01/2013	21/06/2012	16.3	34.4	21	47.8	20	178	20	157	21	20	19
406	18/01/2013	27/06/2012	33.7	61	31	75.5	30	279	30	249	29	30	29
407	18/01/2013	01/07/2012	32.5	65.5	34	86.5	35	304	33	303	34	34	33
408	18/01/2013	18/09/2012	14.6	32.5	20	39.6	18	143	17	126	18	18	17
409	18/01/2013	11/17/2012	25.9	51.2	27	71	28	263	28	238	28	28	27
410	18/01/2013	12/07/2012	27.3	52.7	28	70.7	28	251	27	234	28	28	28
411	18/01/2013	27/04/2012	30.4	73.9	37	95.5	39	344	39	338	38	38	38
412	18/01/2013	11/07/2012	27.2	53.2	28	70.9	28	262	28	221	27	28	27
413	23/01/2013	28/07/2012	32.3	59.5	31	74.2	29	280	30	251	29	30	25
414	23/01/2013	19/04/2012	38.1	76.9	39	88.3	35	321	36	362	40	37	39
415	23/01/2013	16/06/2012	21.8	59.1	31	80.9	32	294	32	286	33	32	30
416	23/01/2013	17/09/2012	13.8	28.4	18	42.1	18	164	19	134	19	18	18

417	23/01/2013	09/06/2012	35	65.7	33	84	33	298	33	283	32	33	31
418	23/01/2013	12/06/2012	30.9	61.7	32	81.6	33	302	33	288	33	33	32
419	23/01/2013	23/06/2012	34.1	61.4	32	76.9	30	289	31	266	31	31	29
420	25/01/2013	13/05/2012	35.1	67.8	35	91.6	37	329	37	307	35	36	36
421	25/01/2013	18/05/2012	34.9	69.3	35	87.2	35	321	36	323	36	35	36
422	25/01/2013	05/06/2012	32.3	63.8	33	84.5	34	302	33	292	33	33	33
423	25/01/2013	03/08/2012	22.5	46.8	25	61.6	25	235	25	189	24	25	25
424	25/01/2013	19/06/2012	30.2	59.9	31	78.6	31	294	32	258	30	31	31
425	25/01/2013	18/08/2012	18.4	38.3	22	57.4	23	208	22	186	23	22	22
426	25/01/2013	14/08/2012	20.5	43.5	24	58	23	210	23	176	23	23	23
427	25/01/2013	07/09/2012	23.1	37.4	22	49.6	21	188	21	154	21	21	20
428	25/01/2013	17/09/2012	34.2	61.3	32	79.1	31	290	32	274	31	31	31
429	25/01/2013	12/07/2012	31.5	54.6	29	71.8	28	240	26	235	28	28	28
430	25/01/2013	13/06/2012	28.1	63.4	33	79.4	31	284	31	287	33	32	32
431	25/01/2013	01/06/2012	32.1	66.5	34	82.3	33	311	34	299	34	34	34
432	25/01/2013	01/09/2012	18	37	22	51.2	21	191	21	163	21	21	33
433	25/01/2013	08/06/2012	30.4	63.7	33	81.2	32	299	33	289	33	33	33
434	25/01/2013	07/07/2012	32.9	63.1	33	81.6	33	305	34	291	33	33	33
435	25/01/2013	12/09/2012	16.8	30	19	43.7	19	167	19	131	19	19	19
436	25/01/2013	27/09/2012	29.8	58.9	30	74.5	30	281	30	262	30	30	30
437	25/01/2013	24/06/2012	33.5	62.3	32	74.1	29	282	30	248	29	30	30
438	25/01/2013	05/07/2012	30	55.8	29	76	30	285	31	251	29	30	29
439	25/01/2013	20/5/5/2012	35.8	70	36	88.4	35	327	37	332	37	36	33
440	01/02/2013	12/09/2012	22.3	35.1	21	51	21	176	20	160	21	20	20
441	01/02/2013	26/07/2012	24.7	47.5	26	64.9	26	245	26	218	26	26	26
442	01/02/2013	10/05/2012	35.5	73.3	37	95.1	38	332	37	326	37	37	38
443	01/02/2013	07/06/2012	30.1	63.5	33	83	33	299	33	284	32	32	34
444	01/02/2013	21/05/2012	40.1	70.5	36	88.1	35	323	36	316	36	36	36
445	01/02/2013	24/05/2012	38.9	69.8	36	88.7	36	323	36	310	35	36	36
446	01/02/2013	13/07/2012	28.9	53.7	28	72.9	29	264	28	248	29	28	29
447	01/02/2013	25/07/2012	32.6	58.5	30	75.7	30	264	28	256	30	29	27
448	01/02/2013	25/07/2012	31	55.9	29	75.1	30	268	29	254	30	29	27
449	01/02/2013	01/08/2012	28	48.3	26	67.1	27	247	26	215	26	26	26
450	01/02/2013	27/08/2012	22.6	39.7	23	57.3	23	212	23	177	23	23	22
451	01/02/2013	27/08/2012	24.3	42.8	24	54.4	22	199	22	180	23	22	22
452	01/02/2013	13/08/2012	22.8	41.2	23	62.2	25	226	24	201	15	24	24
453	01/02/2013	08/08/2012	24.8	44.4	24	63.6	25	230	25	214	26	25	25
454	01/02/2013	01/08/2012	23.7	44.9	25	64.7	26	243	26	227	27	26	26

455	01/02/2013	11/08/2012	22	44.6	25	59.9	24	225	24	204	25	24	24
456	01/02/2013	24/06/2012	30.9	62	32	76.6	30	289	31	278	32	31	31
457	01/02/2013	05/08/2012	22.2	46.7	25	60.6	24	238	25	225	27	25	25
458	01/02/2013	09/08/2012	24.9	43.6	24	62	25	233	25	211	26	25	25
459	01/02/2013	20/09/2012	16.1	30	19	42.8	19	160	18	152	20	19	19
460	01/02/2013	07/09/2012	18.7	40	22	44	19	169	19	157	21	20	21
461	11/03/2013	09/07/2012	32.4	60.6	31	85.5	34	321	36	312	35	34	35
462	11/03/2013	20/10/2012	26	50.3	27	72.4	28	262	28	229	27	28	20
463	11/03/2013	07/10/2012	18	39.3	22	55.9	23	208	22	183	23	22	22
464	11/03/2013	18/06/2012	34.3	71.8	36	94.3	38	333	38	326	36	37	34
465	11/03/2013	13/10/2012	28.6	54.7	29	76.6	30	269	29	251	29	29	21
466	11/03/2013	06/07/2012	33.2	66.6	34	90.3	36	324	36	326	36	35	31
467	11/03/2013	09/08/2012	36.6	66.8	34	87.1	35	323	36	317	36	35	30
468	11/03/2013	25/06/2012	35.2	71.9	36	89.1	36	317	35	332	37	36	33
469	12/11/2013	23/10/2012	17.7	34	21	47.4	20	175	20	161	21	20	22
470	12/11/2013	13/06/2012	44.9	76.8	39	94.3	38	342	39	359	40	39	39
471	12/11/2013	26/06/2012	42.6	75.4	38	90.7	36	329	37	311	35	37	37
472	12/11/2013	15/08/2012	34	60.3	31	78.3	31	290	32	269	31	31	29
473	12/11/2013	18/09/2012	27.4	48.7	26	61.9	25	238	25	207	25	25	26
474	12/11/2013	17/07/2012	33.8	64.3	33	84.1	33	305	34	311	35	34	34
475	12/11/2013	08/10/2012	23.3	39.3	22	53.4	22	197	21	170	22	22	22
476	12/11/2013	20/07/2012	34.2	63.1	33	84.2	33	321	36	294	33	34	33
477	12/11/2013	09/10/2012	24.6	40.5	23	54.8	22	203	22	178	23	22	26
478	12/11/2013	10/07/2012	33.6	65.6	34	90	36	322	36	311	35	35	35
479	12/11/2013	10/08/2012	31.3	59	31	78.9	31	281	30	267	31	31	30
480	12/11/2013	15/10/2012	18.3	38.8	22	55.5	22	199	22	187	23	22	21
481	12/11/2013	11/09/2012	24.5	49.9	26	64.9	26	238	25	224	27	26	26
482	12/11/2013	09/09/2012	25.5	47.7	26	64.1	25	241	26	226	27	26	26
483	14/03/2012	29/07/2012	23.7	65.2	34	85.7	34	311	34	287	33	34	32
484	14/03/2013	31/10/2012	18.9	32.6	20	46.8	20	140	20	142	20	20	19
485	14/03/2013	17/07/2012	38.2	70.7	36	86	34	317	35	303	34	35	34
486	14/03/2013	28/07/2012	37.8	71.8	36	80.4	32	305	34	335	37	34	32
487	14/03/2013	27/09/2012	27.1	48.5	26	61.9	25	223	24	215	26	25	24
488	14/03/2013	04/10/2012	22.7	44.4	24	59.6	24	215	23	192	24	24	23
489	14/03/2013	05/07/2012	34.2	72.7	37	87.8	35	324	36	331	37	36	36
490	14/03/2013	01/10/2012	20	38.4	22	55.6	23	206	22	211	26	23	23
491	14/03/2013	22/08/2012	33.2	60.8	31	73.6	29	287	31	255	30	30	29
492	14/03/2013	18/07/2012	30.1	69.2	35	87	35	307	34	298	34	34	34

493	14/03/2013	12/11/2012	18.1	24.9	17	41.1	18	146	17	134	19	18	17
494	14/03/2013	23/07/2012	37.6	69.8	36	81.7	33	305	34	312	35	34	33
495	14/03/2013	01/08/2012	32.6	61.4	32	86	34	304	33	304	34	33	33
496	14/03/2013	25/10/2012	19.4	35.1	21	51	21	181	20	158	21	21	20
497	14/03/2013	28/06/2012	42.9	77.3	39	93.8	38	343	39	332	37	38	38
498	14/03/2013	09/07/2012	37	71.3	36	92	37	336	38	309	35	36	35
499	14/03/2013	30/08/2012	32	58.7	30	70.9	28	267	29	256	30	29	28
500	14/03/2013	06/10/2012	23.5	43.4	24	55.8	23	204	22	183	23	23	22
501	14/03/2013	11/11/2012	17.8	25.9	18	42.5	18	158	18	122	18	18	17
502	14/03/2013	06/08/2012	32.8	64.3	33	85.4	34	305	34	290	33	33	31
503	14/03/2013	13/09/2012	26.7	53.3	28	69.1	27	252	27	231	27	27	25
504	25/03/2013	27/06/2012	43.1	76.9	39	94.8	38	328	37	340	37	38	38
505	25/03/2013	08/10/2012	26.5	45.2	25	61.3	24	224	24	207	25	24	28
506	25/03/2013	04/09/2012	32.1	57.3	30	72.5	29	260	28	239	28	29	27
507	25/03/2013	16/09/2012	31.5	53.7	28	72.4	28	269	29	231	27	28	23
508	25/03/2013	15/10/2012	25.3	43.1	24	55.8	28	201	22	200	25	23	23
509	25/03/2013	10/10/2012	24.8	42.4	24	58.5	23	221	24	198	24	24	31
510	25/03/2013	19/08/2012	28.7	59.6	31	74.5	24	282	30	293	33	31	33
511	25/03/2013	04/08/2012	36.6	67.9	35	81.3	29	304	33	284	32	33	30
512	25/03/2013	15/08/2012	30.3	62.4	32	81.5	32	287	31	270	31	32	30
513	25/03/2013	28/08/2012	34	62.8	32	75.3	33	290	32	294	33	31	25
514	25/03/2013	24/09/2012	25.1	47.7	26	65.6	30	238	25	221	27	26	36
515	25/03/2013	11/07/2012	40.1	72.3	37	89.2	26	327	37	318	36	36	30
516	25/03/2013	15/08/2012	35.4	66.4	34	82.5	36	297	32	258	30	32	27
517	25/03/2013	14/09/2012	24.7	51.6	27	69.9	33	260	28	245	29	28	31
518	25/03/2013	13/08/2012	34.4	60.4	31	83	28	302	33	292	33	32	27
519	25/03/2013	15/09/2012	27.8	52	27	72.3	33	277	30	247	29	28	32
520	25/03/2013	25/08/2012	34.2	61.6	32	79.6	28	286	31	265	31	31	34
521	25/03/2013	26/07/2012	35.8	68.7	35	88.8	32	323	36	310	35	35	36
522	25/03/2013	16/07/2012	40.3	71.5	36	89	36	317	35	319	36	36	35
523	25/03/2013	13/09/2012	28.6	58.4	30	74	29	268	29	245	29	29	29
524	25/03/2013	01/09/2012	34.5	61.2	32	75	30	278	30	283	32	31	24
525	25/04/2013	16/10/2012	24.3	48.7	26	65.3	26	253	27	211	26	26	27
526	25/04/2013	23/12/2012	14.6	25.1	17	37.2	17	138	17	115	17	17	17
527	25/04/2013	17/12/2012	16	25.4	17	37.1	17	144	17	108	17	17	18
528	25/04/2013	16/08/2012	33.7	67.2	35	88.4	35	338	38	314	35	36	36
529	25/04/2013	10/10/2012	26.7	50.9	27	68.3	27	252	27	235	28	27	28
530	25/04/2013	03/11/2012	26.1	45.3	25	59.2	24	223	24	185	23	24	24

531	25/04/2013	14/11/2012	24.1	40.2	23	50.4	21	190	21	180	23	22	23
532	25/04/2013	20/11/2012	22.6	37.4	22	49.9	21	185	20	168	22	21	22
533	25/04/2013	01/11/2012	24.2	39.5	23	57.8	23	220	24	209	25	24	25
534	25/04/2013	10/10/2012	29.3	52.9	28	72.8	29	259	28	246	29	28	28
535	25/04/2013	05/12/2012	16	29.2	19	44.8	19	160	18	135	19	19	20
536	25/04/2013	22/09/2012	32.2	55.9	29	72	28	260	28	252	29	29	30
537	25/04/2013	08/09/2012	30.1	59.2	31	80.9	32	287	31	282	32	31	32
538	25/04/2013	02/08/2012	36.3	70.3	36	92.9	37	333	38	333	37	37	39
539	25/04/2013	25/10/2012	25.9	44.4	24	67	27	241	26	210	26	25	26
540	25/04/2013	20/09/2012	33	59.8	31	75.6	30	278	30	253	30	30	32
541	25/04/2013	05/09/2012	30.2	61.3	32	80.5	32	301	33	293	33	32	34
542	25/04/2013	10/09/2012	29	57.1	30	83.1	33	296	32	250	29	31	32
543	25/04/2013	24/09/2012	32	58	30	74	29	279	30	251	29	29	30
544	25/04/2013	16/09/2012	27.8	59.8	31	79.8	32	292	33	268	31	31	31
545	25/04/2013	08/10/2012	30.1	51.1	27	65.9	26	253	27	223	27	27	28
546	25/04/2013	14/10/2012	26.6	52.9	28	66.8	27	239	26	224	27	27	27
547	25/04/2013	13/08/2012	38.9	73.9	37	85.7	34	312	36	306	306	35	36
548	10/05/2013	16/11/2012	25.1	46.7	25	63.7	25	236	25	201	25	25	20
549	10/05/2013	09/12/2012	23	35.1	21	50	21	182	20	166	22	21	21
550	10/05/2013	06/12/2012	23.1	38.9	22	53.7	22	198	22	168	22	22	22
551	10/05/2013	20/10/2012	30.4	59.9	31	80.4	32	290	32	266	31	31	30
552	10/05/2013	12/11/2012	24.3	46.5	25	65	26	244	26	205	25	25	25
553	10/05/2013	19/12/2012	18.2	33.7	21	45.5	19	163	19	149	20	20	20
554	10/05/2013	25/10/2012	31.2	55.6	28	72.3	28	258	28	227	27	28	28
555	15/05/2013	09/01/2013	15.3	25.8	18	43	19	149	18	131	19	18	18
556	15/05/2013	11/01/2012	16.7	26.8	18	44	19	150	18	132	19	18	17
557	15/05/2013	20/11/2012	25.1	46.7	25	67.9	27	248	26	202	25	26	25
558	15/05/2013	29/09/2012	36.4	72.5	37	92	37	329	37	337	38	37	32
559	07/06/2013	22/10/2012	35.2	63.5	33	80.5	32	292	39	272	31	32	34
560	07/06/2013	07/11/2012	26.2	48.2	26	64.9	26	234	25	217	26	26	27
561	07/06/2013	26/10/2012	31.4	57.4	30	81.1	32	295	32	276	32	32	33
562	07/06/2013	13/12/2012	27.5	47.6	26	60.6	24	232	25	220	26	25	26
563	07/06/2013	22/01/2013	18.3	31.3	20	45	19	162	19	152	20	19	19
564	07/06/2013	21/09/2012	42	71.4	36	91.7	37	325	36	327	37	37	37
565	07/06/2013	12/10/2012	37	66.7	34	86.7	34	319	35	302	34	34	34
566	07/06/2013	24/01/2013	20.2	32.4	20	47.1	20	168	19	148	20	19	20
567	07/06/2013	23/12/2012	26.4	44.5	24	57	23	224	24	201	25	24	23
568	07/06/2013	27/12/2012	25.1	41.9	18	59.7	24	210	23	182	23	23	24

569	07/06/2013	20/02/2013	.14.6	18	15	32	16	123	16	111	17	16	15
570	07/06/2013	11/09/2012	40.1	77	39	92	37	330	37	352	39	38	38
571	07/06/2013	22/02/2013	14	18	15	32.1	15	113	16	101	15	15	15
572	07/06/2013	25/02/2013	13.3	17	14	30.6	15	110	15	89.9	15	15	14
573	07/06/2013	20/02/2013	13.8	17.2	14	35.2	16	116	15	90.1	15	15	15
574	07/06/2013	26/02/2013	14.6	19.4	15	30.4	15	114	15	89.9	15	15	14
575	07/06/2013	21/02/2013	15.1	18.3	15	29	16	107	15	98.9	15	15	15
576	07/06/2013	27/02/2013	13	19	15	29.4	16	109	14	90	14	15	14
577	07/06/2013	18/02/2013	14.9	18.1	15	29.8	15	111	15	97.8	15	15	15
578	07/06/2013	27/02/2013	15.5	17.2	15	30.3	15	112	14	93.3	14	15	14
579	07/06/2013	21/02/2013	16.3	18.9	15	35.5	15	116	14	99.5	14	15	15
580	07/06/2013	18/02/2013	17	19.2	16	32	15	118	15	109	16	16	15
581	07/06/2013	25/02/2013	17.1	18	15	31	16	110	16	111	17	16	14
582	07/06/2013	11/02/2013	16.8	18.8	16	33	15	124	16	116	16	16	16
583	07/06/2013	19/02/2013	16.9	19	15	30	16	123	15	118	16	16	15
584	07/06/2013	11/02/2013	17.6	18.2	16	30	15	119	16	114	17	16	16
585	07/06/2013	11/02/2013	14.5	18.1	16	30	15	117	16	108	16	16	16
586	07/06/2013	12/02/2013	17	18.7	15	32	16	125	16	107	15	16	16
587	07/06/2013	22/02/2013	14.4	19.7	16	33	15	126	16	112	16	16	15
588	07/06/2013	13/02/2013	16	19	16	34	16	128	15	119	17	16	16
589	07/06/2013	19/02/2013	17.5	19.4	15	35	16	110	16	116	16	16	15
590	07/06/2013	14/02/2013	17.8	19.6	16	32	15	126	16	107	16	16	16
591	07/06/2013	26/02/2013	16.9	19.3	16	36	16	122	15	108	17	16	14
592	07/06/2013	12/02/2013	14.6	23.9	17	37.8	17	140	17	125	18	17	16
593	07/06/2013	04/02/2013	17	25.1	17	41.1	18	137	17	120	18	17	17
594	07/06/2013	05/02/2013	14.7	26.2	18	36.4	17	144	17	127	17	17	17
595	07/06/2013	30/01/2013	17.1	25.3	17	37.2	17	143	17	106	17	17	18
596	07/06/2013	27/0/2013	13	16.1	15	28	14	102	14	79.2	14	14	14
597	07/06/2013	28/02/2013	13.4	15.4	15	27.8	15	101	14	78	14	14	14
598	07/06/2013	01/03/2013	10.4	14.2	14	26.1	14	98.5	15	77.1	14	14	14
599	07/06/2013	28/02/2013	10.6	13.9	14	25	14	97.1	14	76.2	15	14	14
600	07/06/2013	28/02/2013	12.8	14.8	14	27.1	15	100	14	76.4	14	14	14
601	08/06/2013	25/03/2013	13.9	15.7	15	29.8	15	99.7	14	77	14	14	14
602	08/06/2013	02/04/2013	10.8	13.9	14	25.9	14	98.8	15	76.4	15	14	14
603	08/06/2013	27/03/2013	13.3	16.3	15	29.4	15	102	15	79.1	14	14	14
604	08/06/2013	26/03/2013	13	16	15	28.4	15	104	15	77.3	14	14	14
605	08/06/2013	25/03/2013	10.4	13.9	14	26.2	14	98.4	14	77.8	14	14	14
606	08/06/2013	28/03/2013	10.2	13.5	14	25.3	14	97	14	76.9	14	14	14

607	08/06/2013	02/04/2013	13.8	15.4	15	29.6	15	99.2	15	78	15	14	14
608	08/06/2013	26/03/2013	12.8	14.6	14	29.8	15	99.9	14	77.6	14	14	14
609	08/06/2013	01/04/2013	13.9	15.2	15	26.3	14	98.1	15	76.2	14	14	14
610	08/06/2013	28/03/2013	10.7	13.4	14	25	14	97.5	15	76.5	14	14	14
611	08/06/2013	28/03/2013	10.5	13.9	14	25.2	14	98.4	14	76.8	15	14	14
612	08/06/2013	25/03/2013	12.9	14.7	15	27.6	15	101	15	79.6	15	14	14
613	08/06/2013	26/03/2013	14	18.1	15	32.3	16	112	15	100	14	15	14
614	08/06/2013	25/03/2013	14.3	19	15	35.2	16	113	16	101	15	15	14
615	08/06/2013	28/03/2013	14.4	19.3	15	35.5	15	113	15	98.9	15	15	14
616	08/06/2013	27/03/2013	15	18.1	14	29	15	107	15	99.4	14	15	14
617	08/06/2013	18/02/2013	13.5	17.3	14	33.4	15	108	15	90	15	15	15
618	08/06/2013	27/03/2013	15.4	17.1	14	31.2	16	112	14	96.2	15	15	14
619	08/06/2013	28/03/2013	15.9	17.8	15	32	15	113	14	94.3	14	15	14
620	08/06/2013	21/02/2013	15.7	17.4	15	30.5	15	114	15	95.1	15	15	15
621	08/06/2013	19/02/2013	13.5	17.9	15	34.2	15	116	14	91	15	15	15
622	08/06/2013	28/03/2013	16.4	19	16	35.8	16	121	15	105	16	16	14
623	08/06/2013	22/02/2013	16.8	19.2	16	36.1	15	122	15	108	17	16	15
624	08/06/2013	16/02/2013	17.7	19.4	16	30	15	112	15	116	17	16	16
625	08/06/2013	20/02/2013	17.9	19	15	34	16	115	15	119	17	16	15
626	08/06/2013	01/04/2013	17.5	19.8	16	33	15	124	16	106	16	16	14
627	08/06/2013	13/02/2013	16.9	19.2	15	34	16	137	16	109	16	16	16
628	08/06/2013	16/02/2013	14.6	23.6	17	37.5	17	140	17	123	18	17	16
629	08/06/2013	08/02/2013	16.3	23.1	17	38.3	17	137	18	112	17	17	17
630	08/06/2013	11/02/2013	17	25.1	17	41.2	18	138	17	121	18	17	16
631	10/06/2013	04/02/2013	14.7	26.3	18	36.5	17	143	17	127	18	17	18
632	10/06/2013	11/02/2013	14.5	25.4	17	37.1	17	145	17	119	17	17	17
633	10/06/2013	19/02/2013	16.2	25.2	17	37.1	17	143	17	107	17	17	16
634	10/06/2013	22/02/2013	14.6	23.8	17	37.5	17	140	17	124	18	17	16
635	10/06/2013	11/02/2013	16	25.1	17	41	18	137	17	120	18	17	17
636	10/06/2013	04/02/2013	14.6	26.1	18	36.2	17	143	17	127	17	17	18
637	10/06/2013	21/02/2013	16.3	25.5	17	37.4	17	144	17	108	17	17	16
638	10/06/2013	14/02/2013	18.7	27.5	18	40.6	19	144	17	118	18	18	17
639	10/06/2013	18/02/2013	14.4	25.1	17	40	18	151	18	124	18	18	16
640	10/06/2013	08/02/2013	16.7	28.7	19	40.3	18	144	17	127	18	18	18
641	10/06/2013	06/02/2013	14.1	27	18	40.2	18	150	18	131	19	18	18
642	10/06/2013	15/02/2013	13.2	29	19	40	18	154	18	127	18	18	17
643	10/06/2013	09/02/2013	15.3	25.7	18	43	19	149	18	130	19	18	18
644	10/06/2013	13/02/2013	16.4	29.7	19	42	19	145	18	132	18	18	17

645	10/06/2013	07/02/2013	21.3	29.1	19	42.7	19	153	18	138	19	19	18
646	10/06/2013	28/01/2013	20.4	27.6	18	40.9	18	155	18	158	19	19	19
647	10/06/2013	22/01/2013	18.6	30	19	42.1	19	158	18	137	19	19	20
648	10/06/2013	16/01/2013	16.5	30.7	19	43.3	19	154	18	133	19	19	21
649	10/06/2013	28/01/2013	18.1	26.3	18	44.8	19	164	19	155	20	19	19
650	10/06/2013	06/02/2013	16.9	30	19	43.8	19	168	19	132	19	19	18
651	10/06/2013	05/02/2013	20	29.1	19	44.7	19	159	18	134	19	19	18
652	10/06/2013	29/01/2013	22.5	34.7	21	49.8	20	190	21	151	20	20	19
653	10/06/2013	16/01/2013	17.7	33	21	47.5	20	174	20	160	21	20	21
654	10/06/2013	25/12/2012	24.8	45.7	25	62.7	25	229	25	209	25	25	24
655	10/06/2013	10/12/2012	24.2	46.1	25	65	26	243	26	205	25	25	26
656	10/06/2013	10/12/2012	28	50.7	27	65.8	26	231	27	235	27	27	26
657	10/06/2013	25/12/2012	27.2	51.6	27	67.6	27	262	28	216	26	27	24
658	10/06/2013	17/12/2012	26.4	54.2	29	63.5	25	251	27	227	27	27	25
659	10/06/2013	11/12/2012	30.3	53.1	28	64.6	26	245	27	221	27	27	26
660	10/06/2013	24/09/2012	36.5	77.4	39	93.8	38	344	39	333	37	38	37
661	11/06/2013	02/10/2012	37.8	75.5	38	94.4	38	329	37	353	38	38	36
662	11/06/2013	18/09/2012	40.2	72.4	37	102	41	340	39	359	40	39	38
663	11/06/2013	24/09/2012	40.1	72.2	37	101	41	340	39	358	40	39	37
664	11/06/2013	20/09/2012	38.2	76.7	39	94.1	38	340	39	357	40	39	38
665	11/06/2013	17/09/2012	44.4	82	42	95.3	39	337	38	348	38	39	38
666	11/06/2013	20/09/2012	44.7	84	42	95.6	39	336	38	347	38	39	38
667	11/06/2013	22/09/2012	44.1	82	42	95.1	39	335	38	346	38	39	38
668	11/06/2013	04/09/2012	38.5	77.2	39	96.6	39	345	39	341	38	39	40
669	11/06/2013	25/09/2012	44.2	77.1	39	96.6	39	345	39	340	38	39	37
670	11/06/2013	10/09/2012	38.6	78.8	40	96.5	39	346	40	339	38	39	39
671	11/06/2013	11/09/2012	44	80.8	40	96.6	39	348	40	339	38	39	39
672	11/06/2013	08/09/2012	39.5	74.8	38	97.3	39	329	37	372	48	40	35
673	11/06/2013	03/09/2012	43	79	40	94.1	38	339	41	363	40	40	40
674	11/06/2013	08/09/2012	38.8	78.9	40	94.2	38	341	41	364	40	40	40
675	11/06/2013	13/09/2012	38.9	79.2	40	94.3	38	340	41	365	40	40	39
676	11/06/2013	21/09/2012	39.2	78.1	40	94.6	38	345	41	367	40	40	38
677	11/06/2013	04/09/2012	42.1	80.1	40	96.8	38	348	41	368	40	40	40
678	11/06/2013	07/09/2012	39.8	81.1	40	98.9	38	349	41	370	40	40	40
679	11/06/2013	04/09/2012	40	80.4	41	99.7	41	356	41	335	37	40	40
680	11/06/2013	05/09/2012	45.1	82.5	41	96.3	41	353	41	330	37	40	40
681	11/06/2013	03/09/2012	45	81.4	41	93.2	41	350	41	331	37	40	40
682	11/06/2013	18/09/2012	45.5	83.6	41	96.1	41	355	41	333	37	40	38

683	11/06/2013	14/09/2012	44.8	82.7	41	95.1	41	358	41	337	37	40	39
684	11/06/2013	07/09/2012	41.5	79.2	40	94.2	38	341	41	365	40	40	40
685	13/06/2013	03/09/2012	44.2	87.7	41	98.1	41	360	40	339	40	40	40
686	13/06/2013	07/09/2012	45.8	88.9	40	99.3	38	359	41	368	40	40	40
687	13/06/2013	10/09/2012	45.9	89.1	40	97.2	38	361	41	365	40	40	39
688	13/06/2013	19/09/2012	42	81.5	41	97.6	40	345	39	363	40	40	38
689	13/06/2013	10/09/2012	45.3	83.6	41	97.7	40	348	39	364	40	40	39
690	13/06/2013	06/09/2012	42.1	80.1	40	91.2	38	351	41	360	40	40	40
691	13/06/2013	04/09/2012	42.4	81.6	40	94.1	38	350	41	365	40	40	40
692	13/06/2013	03/09/2012	45.9	88.9	41	99.2	40	340	39	366	40	40	40
693	13/06/2013	27/09/2012	43	82.1	40	89.2	38	349	41	357	40	40	37
694	13/06/2013	08/09/2012	43.9	90	41	98.7	40	352	39	370	40	40	40
695	13/06/2013	03/09/2012	44.5	84.3	40	87.1	38	343	41	355	40	40	40
696	13/06/2013	05/09/2012	45.7	87.5	41	97.1	40	339	39	365	40	40	40
697	13/06/2013	07/09/2012	42	78.1	40	94.6	38	346	41	366	40	40	40

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