Anthropometric and Other Assessment Indices of the Newborn in Jos, Nigeria

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Abstract

Background: Certain neonatal measurements are potential tools for evaluating the status of the newborn. The neonatal anthropometrics measurements and other assessment indices are therefore religiously performed by the attending midwife and entered into the labour room register.

Method: This was a retrospective analysis of the infants delivered between January 2004 and December 2005 in the Jos University Teaching Hospital, Nigeria.

Results: There were 4,266 deliveries during the study period. The mean age and parity of the mothers were 28.7 ± 5.8 and 3.0 ± 1.9 respectively. The mean gestational age of the infants at birth was 38.3 ± 2.8 weeks and the mean Apgar scores for the first and fifth minutes were 7.4 ± 1.7 and 8.5 ± 1.5 respectively. The mean birth weight of the babies was 3.1 ± 0.8 kg. The mean birth length and head circumference of the newborns were 47.2 ± 5.0 cm and 33.8 ± 2.9 cm respectively. The mean umbilical cord length was 52.9 ± 7.3 cm and the mean placental weight was 560 ± 118 grams. There were more male infants (53.1%) compared with female infants (46.9%) during the period of study. Twin infants contributed 3.8% of the deliveries in the study.

Conclusion: Anthropometric and other assessments indices of the newborn infants at birth in Jos, Nigeria are similar to those in other parts of the country and the world.

Key words: Head circumference, birth length, birth weight, cord length

Résumé

Fond: Les certaines mesures néo-natales sont des outils potentielles pour évaluer le statut du nouveau-né. Les mesures néo-natales de anthropometrics et les autres index d'évaluation religieusement sont donc exécutés par la sage-femme qui assiste et entré dans le registre de pièce travailliste.

Méthode: Ceci était une analyse rétrospective des bébés livrés entre le 2004 janvier et le 2004 décembre dans l'Hôpital d'Enseignement d'Université de Jos, Nigéria.

Résultats: Il y avait 4.266 livraisons pendant la période d'étude. L'âge et la parité moyen des mères étaient 28,7 ± 5,8 et 3,0 ± 1,9 respectivement. L'âge moyen de gestational des bébés à la naissance était 38,3 ± 2,8 semaines et les scores de Apgar moyens pour les premières et cinquièmes minutes étaient 7,4 ± 1,7 et 8,5 ± 1,5 respectivement. Le poids moyen de naissance des bébés était 3,1 ± 0,8 kg. La longueur moyens de naissance et la circonférence de tête du nouveau-né étaient 47,2 ± 5,0 cm et 33,8 ± 2,9 cm respectivement. La longueur moyenne de cordon ombilical était 52,9 ± 7,3 cm et le poids de placental moyen étaient 560 ± 118 grammes. Il y avait bébés plus des mâles (53.1 %) comparé aux bébés femelle (46.9 %) pendant la période d'étude. Les bébés jumeaux ont contribué 3,8% des livraisons dans l'étude.

Conclusion: Anthropometric et les autres index d'évaluations des bébés nouveau-nés à la naissance dans Jos, Nigéria est similaire à ceux-là dans les autres parties du pays et le monde.

Mots clés: La circonférence de tête, la longueur de naissance, la naissance pèse, la longueur de corde

Introduction

Anthropometric measurements and other newborn assessment techniques are quite popular, easy to perform and are religiously performed by the attending accoucheur / midwife on all infants delivered in most delivery rooms worldwide. The measurements routinely performed include the head (occipito-frontal) circumference, birth (crown-heel) length, umbilical cord length, birth weight and placental weight. The gestational age of the baby at the time of delivery is calculated from the last normal

menstrual period (LMP) if known, or using the Dubowitz method[1] of estimation of gestational age in weeks. The Apgar scores at the first and fifth minutes of delivery are assessed and documented. The baby's gender/sex and the number of babies that are of multiple births are also recorded. The length of a normal newborn is 51 cm on average and varies from 43.6cm to 56.5 cm and the head circumference is 32.2 cm with a range of 32.2 - 36 cm[2].

Certain neonatal body measurements are potential tools with the observation that they have strong correlation with birth weight and foetal asphyxia. Because of this, circumference tape measures are now available for the screening of protein-calorie malnutrition based on the earlier work.[3]Apgar score assess the level of asphyxia at birth with implications for the infant, paediatrician and obstetrician.

The head (occipito-frontal) circumference is quite popular and easy to perform as the head is easily available. It is taken as the circumference encompassing the supra-orbital ridges and the maximum occipital prominence.[4] The head circumference has been shown to have a significant correlation with birth weight[5,6] and the gestational age.[7,8] It has also found usage in the assessment of the gestational age of the new born.[9,10] Birth (crown-heel) length has been found to correspond with intrauterine growth of the infants,[11] birth weight[7,11,12] and gestational age.[8,13] Landicho et al[12] have identified a crown-heel length of less than 48.0 cm as the best cut-off point for screening for low birth weight in Guatemala. Crown-heel length has a very important place in the calculation of the body surface area especially when considering drug and fluid dosage adjustments in paediatric practice.

Birth weight is a well established tool for the evaluation of intrauterine growth.[7] Simple devices to estimate birth weights and screen for low birth weights in developing countries have been developed and validated.[14] Low birth weight babies are those whose weights at birth are less than 2.500 Kg.[13] Combinations of these measured parameters have been used variously including foot length measurements to identify a newborn at risk.[15] Weighing scales are placed in most maternity units for taking the birth weights of new borne. These weights are judiciously performed and recorded in order to help identify low birth weight babies who are referred to paediatricians for further management. Babies of normal birth weight with no obvious problems on gross examination are not referred but discharged home with the mother within 24 hours of birth.

Midwives have performed the measurements for years but the data has not been documented in this environment. It is in this view that we report on average variables of the new born in Jos, Nigeria.

Materials and Methods

This was a retrospective observational study. The records of all babies delivered in the maternity unit of Jos University Teaching Hospital between January 2004 and December 2005 were included in the study.

The age of the mothers in years, and parity were obtained. The gestational age of the infant at birth in weeks, Apgar scores at the first and fifth minutes, birth weight in kilograms, head (occipito-frontal) circumference, birth (crown-heel) length, umbilical cord length in centimetres, and placental weight in grams were also obtained from the records. The number of babies that were of multiple births and their sexes were also extracted from the records.

The gestational age of the baby at the time of delivery was calculated from the last normal menstrual period (LMP) if known, or using the Dubowitz method of estimation of gestational age in weeks. The Apgar scores were those taken at the first and fifth minutes of delivery. These assessments were done using an 'Apgar Score Assessment Chart' placed on the walls of each cubicle of the labour room or the operating theatre for babies delivered at caesarean section. The linen tape was used for the measurements of foetal length and head circumferences, and all readings were rounded up to the nearest centimetre. A standard neonatal weighing scale was used for the measurement of the infants and placental weights. The weights of babies below 500 g were considered as abortions and therefore excluded from the study. Data was analyzed using Epi-Info 2002 software. Results obtained were taken within the 95% confidence interval (CI).

Results

A total of 4,266 babies were delivered in the maternity unit of the hospital between January 2004 and December 2005. The age of the mothers ranged from 15-52 years with a mean age of 28.7 ± 5.8 years, and parity ranged from 1-10 with a mean of 3.0 ± 1.9. They were of the active reproductive age group.

Table 1 shows that the mean gestational age of the infants at birth was 38.3 ± 2.8 weeks. The mean Apgar scores for the first and fifth minutes were 7.4 ± 1.7 and 8.5 ± 1.5 respectively. Babies of low birth weight (birth weight < 2.50 kg) accounted for 13.2% of the total deliveries. There was mild to severe asphyxia at birth in 24.8% of the infants which improved to 6.8% in the fifth minute.

Table 2 shows that the birth weights of the infants ranged from 0.5 - 9.0 kg with a mean of 3.1 ± 0.8 kg. Infants of low birth weight accounted for 13.1% of the study population. The mean head (occipito-frontal) circumference and birth (crown-heel) length of the newborns were 47.2 ± 5.0 cm and 33.8 ± 2.9 cm respectively. The mean umbilical cord length was 52.9 ± 7.3 cm. the mean placental weight was 560 ± 118 grams. There was the preponderance of male infants compared with female infants. Male infants constituted 53.1% of the total deliveries. Twin infants contributed 3.8% of the deliveries in the study.

Table 1: Infant assessment indices at birth

Parameter	Mean ± SD	Median	Range
Gestational age (weeks)	38.3 ± 2.8	38	28 – 48
Apgar score 1st minute	7.4 ± 1.7	7	0 – 10
Apgar score 5th minute	8.5 ± 1.7	8	1 - 10

SD: Standard deviation

Table 2: Summary of anthropometric measurements of the new born babies

Parameter	Mean ± SD	Median	Range
Birth Weight (Kg)	3.1 ± 0.8	3.1	0.5 – 9.0
Head circumference (cm)	33.8 ± 2.9	34.0	16 – 60
Birth length (cm)	47.2 ± 5.0	48.0	20 – 66
Umbilical cord length (cm)	52.9 ± 7.3	52	10 – 99
Placental weight (g)	560.2 ± 117.9	560	100-2500

SD: Standard deviation

Discussion

The mothers of the infants in the study were women of the reproductive age and parity similar and comparable to women in a previous study.[16]

The mean gestational age of the babies was 38.3 ± 2.8 weeks at birth. The infants' gestational age at birth was calculated from the last normal menstrual period. The mean gestational age was 38.3 ± 2.8 weeks in the study. This is also similar the recorded gestational age of the babies at delivery, using the Dubowitz method of estimation of gestational age, in an earlier study in Jos, which was 38.63 ± 1.25 weeks.[16]

The mean birth weight of the babies delivered during the period of review was 3.1 ± 0.8 kg. This figure is higher than the mean birth weight 2.89 ± 0.47 kg in an earlier study in 1999 in Jos[16] and similar to the 3.167 ± 0.45 recorded in Ilorin.[17] This change in mean birth weight in the institution however was not statistically significant ($p < 0.05$). The slight lower birth weight compared with that in Ilorin might be due to the higher altitude of the Jos Plateau which stands at 1,250 metres above sea level.[18] The birth weight in this study was higher than that reported from Nnewi, Anambra state birth weight 2.89 kg.[19] The average birth weight of babies in an Indian study was reported as 2.8 kg[2]. This is also lower than that in this study. The mean birth weight of the infants was higher in males compared with female babies, which is in agreement with reports from other centres.[17, 20-22]

Low birth weight in the study was found to be 13.2%. This was similar to that reported from Cameroon, 13.6%.[6] It was however lower than the recorded low birth weight rate of 18.8% in the same population 5 years earlier,[16] and those from Southern Zaria[21] and Malumfashi.[22] It was however higher than the 12.2% in the same institution in 1985[23]. It was also high compared with the reported 10.0% in the southern part of the country.[24,25] The Zaria and Malumfashi studies were rural while this study is urban and may explain the lower low birth weight rate

in Jos compared with Zaria and Malumfashi figures. Another reason may be the decreasing number of unbooked patients in favour of the booked patients.

The mean occipito-frontal circumference in this study was 33.8 ± 2.9 cm. This was similar to that reported in Cameroon with 33.7 ± 2.4 cm[6]. It was however lower than the mean occipito-frontal circumferences of 34.49 ± 1.59 cm in an earlier study in Jos[16] and 34.2 ± 2.6 cm in Benin-City, Nigeria[24]. It was also a little higher than the mean head circumference of 32.2 cm in a study in India.[2] The reason for the difference between the head circumference with the one from India may be constitutional or racial.

The mean birth length of the newborn babies in the study was found to be 47.2 ± 5.0 cm. This was lower than the mean birth length of 51.0 cm in normal newborn babies reported in India.[2] The reason for this difference is that the Indian study considered only babies at term, while this study considered all babies delivered during the period of study. The mean birth length however of the babies born at term was 48.1 ± 3.8 cm, which was still lower than the Indian mean birth length.

The mean umbilical cord length in the study was 52.9 ± 7.3. The umbilical cord is commonly about 50 cm in length but varies greatly from 7.5-180 cm, with an average of 50-70 cm for infants born at term[26]. In this study the average umbilical cord length was similar to that reported in the literature, but lower than the recorded 57.5 cm in Lagos, Nigeria.[27] The reason for this difference may not be easily speculated or identified. Very long umbilical cords may predispose to cord accidents with adverse effects on the Apgar score at birth.

A factor often neglected that gets recorded in the delivery records is placental weight of the infants delivered. The mean placental weight in the study was 560.2 ± 117.9 g and a range from 100-2500 g. The largest placenta was that of a diabetic mother, and weighed 2500g. Rhesus isoimmunisation in-utero is also known to predispose to an increase in placental

size and weight. This was not identified in this study.

The babies delivered in the centre showed that 53.1% were boys while 46.9% were girls giving a sex ratio of 1.0 girl to 1.13 boys. The ratio in the study was similar to the ratio of 1 girl to1.07 boys, reported world wide.[28] Sex ratio of the infants delivered in Jos, also appears to favour the male infant and is similar to that of the world. The reason for this phenomenon is however unclear.

One hundred and thirty seven twins were recorded in the study, which is 3.8%, or 1 set of twins in 27 deliveries. This is higher than the 2.6% or 1 in 38 deliveries in earlier reported twin pregnancy rate in the same centre.[29] The reason for this is not immediately clear but may be due to seasonal changes in twin pregnancy rates nationally and even internationally.

In conclusion, reliable data are necessary not only to define a problem but also to choose appropriate interventions and evaluate their effectiveness. Difficulties with data are a major problem for newborn health programming. Even when national or local data are available, they are often not used to inform problem definition, to prioritize, or to evaluate interventions. Expensive cumbersome surveillance systems are not required. Simple techniques can translate easily collected data into useful information in order to manage health care decision-making at local and national levels. The anthropometric measurements of infants in Jos were seen to be similar to the ones recorded in the other parts of the country and Asia.

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