Estimation of Gestational Age of African Newborn Infants by a Scoring System

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SUMMARY

The gestational age of 319 newborn African infants born in hospital was determined by a scoring system. A high correlation coefficient between paediatric and maternal data (0.94) was obtained, the 97% confidence limits for gestational age being 2.14 weeks; and this despite the fact that 70% of the mothers were not aware of the exact date of their last menstrual period. The method used is eminently suitable for application in underdeveloped countries. The mean weight for term infants, was 3151.5 g. The incidences of light-for-date pre-term (28 - 37 weeks) and term (38 - 42 weeks) infants in this population, were 22% and 12%, respectively.


The need to assess accurately and rapidly the maturity of a newborn infant is important at the first clinical examination of any neonate. This may be especially so when the exact length of gestation is not known, owing to either the inability of the mother to furnish details of her last normal menstrual period, or to her periods being abnormal for any gynaecological reason. Pre-term infants whose birthweights match the gestational age are at risk from hyaline membrane disease and infection, while light-for-date babies, whether pre-term or term, are more liable to suffer from asphyxia and hypoglycaemia in the course of labour and the immediate postnatal period. In addition, the problem of postmaturity arises when pregnant mothers do not know the details of their last menstrual period. In African obstetric practice in Rhodesia, the majority of mothers delivered in a referral centre like Harari Maternity Hospital, are unaware of the exact date of their last menstrual period, although a perusal of the records of patients referred from the urban maternity clinics in and around Salisbury, shows that most of these patients have this information, have booked early, and attended the antenatal clinic fairly regularly.

It was, therefore, of interest to determine whether a previously described scoring system which would assess rapidly and accurately the maturity of the newborn African infant, whether referred or not, whether 'booked' or not, could be applied to local conditions, and whether this information could be used to determine the incidence of light-for-date pre-term and term infants born in our maternity unit.

MATERIAL AND METHODS

The series comprised 319 consecutive babies born in Harari Maternity Hospital during January and February 1973. All the babies were examined by one observer (L.B.) within 24 hours of birth, using a scoring system used by Dubowitz et al., and the birthweight was recorded. This score is obtained by allocating points on a sliding scale to certain physical and neurological signs which determine the degree of maturity. The only infants excluded were those too ill for the project. Only one examination was done on each infant, at about the same time after a feed, and completed within 7 - 10 minutes. Information was then obtained from the hospital records of the time of gestation recorded by the midwife at the time of delivery. When the mother had booked and attended the antenatal clinic, the exact date of the last menstrual period was frequently known. When the mother had not booked, and presented herself in labour, the midwife estimated the time of gestation by asking the mother the month of her last menstrual period, and whether it occurred at the beginning, middle, or end of that month. As the gestational age/total score correlation coefficient was good, all the birthweights were tabulated in subgroups of gestational ages (28 - 42 weeks) and the mean weight (+ 2 SD) for each subgroup was determined. Light-for-date pre-term (28 - 37 weeks) and term (38 - 42 weeks) infants were those who weighed less than the 10th percentile of the Lubchenco et al., intra-uterine growth curve for the corresponding gestational ages.

RESULTS

Details of the menstrual histories are recorded in Table I. This shows that 30% of the mothers were aware of the exact date of their last menstrual period.

Gestational age and score were correlated and recorded in Table II. This shows a correlation coefficient of 0.94, with a 97% confidence limit of gestational age of 2.14 weeks. The t-test for these findings was significant (P< 0.01). The regression line formula for gestational age (y) against total score (x) is:

\[ y = 0.2256x + 27.133 \]

n = 302

and is shown in Fig. 1.

This regression line was then compared to that obtained by Dubowitz et al., in their Sheffield series, and is recorded in Fig. 2. The 2 regression lines (Rhodesia and Sheffield)
TABLE I. MENSTRUAL HISTORY OF 319 CASES IN THIS SERIES

<table>
<thead>
<tr>
<th>Date of L.M.P.</th>
<th>Records</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Known</td>
</tr>
<tr>
<td>Term</td>
<td>215</td>
</tr>
<tr>
<td></td>
<td>72 (33%)</td>
</tr>
<tr>
<td>Pre-term</td>
<td>101</td>
</tr>
<tr>
<td></td>
<td>23 (23%)</td>
</tr>
<tr>
<td>Total</td>
<td>316</td>
</tr>
<tr>
<td></td>
<td>95 (30%)</td>
</tr>
</tbody>
</table>

TABLE II. COMPARATIVE RESULTS OF GESTATIONAL AGE TO TOTAL SCORE

Rhodesia Sheffield

Correlation coeff. age/score ... 0.940 0.938
97% confidence limits gest. age ... 2.14 wks 2.0 wks
Significance of f-test ... ... ... 47.44 **

** $P <0.01.\]

Fig. 1. The regression line obtained when gestational age is plotted against total score.

Fig. 2. Comparison of regression lines obtained in the Rhodesian and Sheffield series, when gestational age is plotted against total score.

lie entirely within each other's 97% confidence limit, i.e., they do not differ significantly at the 97% level of confidence. Fig. 3 records the mean and modal score for
term infants. Table III records the mean weight ± 2 SD for each increment of gestational age. Smoothed regression lines of intra-uterine growth of these babies were recorded in Fig. 4, and the plotted mean was compared with the mean and 10th percentile intra-uterine growth curves of the Lubchenco et al. series. From our data, 22% of the pre-term and 12% of the term infants fell below the Denver 10th percentile growth curve, and were considered to be light-for-date.

TABLE III. INTRA-UTERINE GROWTH—RHODESIAN AFRICAN INFANTS

<table>
<thead>
<tr>
<th>Gest. age (wks)</th>
<th>No.</th>
<th>Mean wt (g)</th>
<th>2SD (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>5</td>
<td>1240.1</td>
<td>312.6</td>
</tr>
<tr>
<td>30 + 31</td>
<td>11</td>
<td>1495.6</td>
<td>453.6</td>
</tr>
<tr>
<td>32 + 33</td>
<td>15</td>
<td>1604.7</td>
<td>388.4</td>
</tr>
<tr>
<td>34 + 35</td>
<td>22</td>
<td>1948.7</td>
<td>435.0</td>
</tr>
<tr>
<td>36 + 37</td>
<td>32</td>
<td>2038.6</td>
<td>634.4</td>
</tr>
<tr>
<td>40</td>
<td>218</td>
<td>3151.5</td>
<td>979.1</td>
</tr>
</tbody>
</table>
DISCUSSION

It has been found from this series that the simple scoring system of assessing gestational age (maturity) as described by Dubowitz et al. is well suited to the needs of an underdeveloped country. The assessment is reasonably quick, and well within the capabilities of the sisters in charge of any neonatal unit after some supervision. There are a number of methods described in the literature for assessing maturity of the newborn, including neurological tests and electro-encephalographic criteria. They all have the disadvantage of complexity and require assessment by a neonatologist. The high correlation coefficient and 97% confidence level (2.0 weeks) obtained by the Sheffield group is confirmed by this study. It would appear from Fig. 2 that the babies in our series appeared less mature, i.e. to have a lower score in the third trimester than those in the Sheffield series, but to overtake the Sheffield babies at about 44 weeks.

Perhaps it is surprising that uneducated mothers can give a reasonably accurate estimate of the period of gestation, but menstruation must be difficult for any woman to ignore. That there were fewer mothers with babies delivered pre-term than at term who knew this information is not totally unexpected. Premature labour is often associated with a higher incidence of illegitimacy, and unmarried mothers frequently do not book in at the antenatal clinics, nor avail themselves of treatment for pre-eclampsia or chronic cardiorenal disease.

When the mean weights were plotted as smoothed regression lines and compared with other series, it appeared that intra-uterine growth in the African population of Rhodesia is greater than that of the Denver series at gestational ages prior to 31 weeks, but is less from 32 weeks to term. No statistical comparison, however, was made. This pattern has been observed previously by workers in India. In well-developed countries, the incidence of light-for-date term babies has been found by

Fig. 3. Mean and modal score values obtained in term infants.

Fig. 4. Comparison of the smoothed regression lines of the mean weight ± 2 SD of intra-uterine growth in the present series with those of the mean and 10th percentile of the Lubchenco et al. series.
Psychopathology in Bantu Culture*

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SUMMARY

A study was undertaken to establish the major personality disorders prevailing in the northern homeland areas, where 4 ethnic groups reside. A survey is given of problems in intercultural research and special attention is paid to problems of diagnosis of derangement.

Evidence obtained from a group of subjects who can, in terms of educational standards, be considered well informed, indicates a dearth of specific terms for various disorganizational conditions. There is an obvious ignorance of the nature of derangements.

Specific terms and concepts indicative of mental derangement, and explanations of the conditions as indicated by respondents to a questionnaire, are dealt with.


The purpose of this article is to draw attention to the importance of an historical-cultural approach to the study of mental abnormalities among the Bantu of South Africa. It is stressed that a knowledge of the cultural background of the Bantu will enhance both the understanding of syndromes and improve diagnosis and treatment. Some concepts and terms relating to specific abnormalities among 4 ethnic groups, the Nguni, Sotho, Venda and Tsonga, are discussed. This article is based partly on responses to a questionnaire and partly on written reports of psychology students at a Bantu university.

For Western man a period of gradual adaptation to a new outlook on various facets of life came about after the Middle Ages. During the 3 centuries of the Renaissance, and the Reformation particularly, but even later, up to this day, conditions were created which brought new insights into the composition of the physical and psychophysical environment. Ceremonies and rituals built up and adhered to for centuries, were rejected, while others were broken down and rebuilt, also over centuries, allowing the acceptance of a new way of life without undue feelings of loss, strain, or disorganization. Over this extended period, the educated Westerner was able to rid himself of the paralysing fear of demons and other supernatural forces.

For the South African Bantu, however, such a gradual conversion from a primitive to an enlightened approach to mental conditions, did not take place. Transitions, which for the Western man took centuries, are for present-day Bantu telescoped into decades. The rejection of beliefs in the spirits of the forefathers, of rites, rituals and ceremonies held dear by specific communities and Bantu society in general, is being forced upon individuals, particularly the

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*Date received: 11 June 1973.