Predictors of Severe Neonatal Compromise Following Caesarean Section for Clinically Diagnosed Foetal Distress

O.T. Oladapo*†, S.A. Sotimehin‡, O.Ayoola-Sotubo‡

ABSTRACT
BACKGROUND: The potential harm to a mother and baby from caesarean delivery for clinically diagnosed foetal distress may not always be justified by the degree of neonatal depression at birth.

OBJECTIVE: To assess the accuracy of clinical diagnosis of foetal distress indicating caesarean section and identify antepartum and intrapartum characteristics that may predict severe neonatal compromise at birth.

METHODS: A chart analysis of 246 singleton caesarean births primarily indicated by clinically diagnosed foetal distress over a ten-year period at a Nigerian University Hospital. Gestational and intrapartum characteristics were compared for severely compromised neonates (Apgar score 0–3) and those with Apgar score of four-seven at one minute of birth. Multivariate logistic regression analysis was applied to determine independent predictors of severe neonatal compromise.

RESULTS: Apgar score was < 7 in 236 neonates: 120 (48.8%) were severely compromised, 116 (47.2%) had Apgar scores of four-seven and ten (4.1%) had normal Apgar scores. Eight (3.3%) neonates were stillborn. Multivariate logistic regression analyses indicate that meconium liquor (adjusted OR, 0.24 CI: 0.12–0.46) and long admission–diagnosis interval significantly reduce while combination of abnormal FHR and meconium liquor (OR adjusted: 3.84 IC: 1.89–7.76) significantly increased the odds of severe neonatal compromise at birth.

CONCLUSION: Clinical diagnosis of foetal distress is valuable in identifying foetuses in need of expedited delivery in this setting. However, gestational and intrapartum characteristics have limited impact in predicting before delivery which foetus requires intensive resuscitative measures and neonatal support at birth. WAJM 2009; 28(5): 327–332.

Keywords: Predictors, Caesarean section, Neonatal compromise, diagnosis of foetal distress.

RÉSUMÉ
CONTEXTE: Le danger potentiel d’une mère et son bébé de l’accouchement par césarienne pour souffrance foetale cliniquement diagnostiquée, en mai ne sont pas toujours justifiées par le degré de dépression néonatale à la naissance.

OBJECTIF: Evaluer la précision du diagnostic clinique de la détresse foetale indiquant césarienne et identifier ante-partum et les caractéristiques qui per-partum mai prédire compromis néonatale sévère à la naissance.

MÉTHODES: Une analyse graphique de 246 naissances par césarienne Singleton surtout indiqué par la détresse foetale cliniquement diagnostiquées sur une période de dix ans dans un hôpital universitaire nigérian. Caractéristiques gestationnel et intra-partum ont été comparés pour les nouveau-nés gravement compromise (score d’Apgar 0-3) et ceux avec le score d’Apgar de quatre-sept ans une minute de la naissance. L’analyse multivariée par régression logistique a été appliquée pour déterminer des facteurs prédictifs indépendants de compromis néonatale sévère.

Résultats: score d’Apgar était <7 236 nouveau-nés: 120 (48,8%) ont été gravement compromise, 116 (47,2%) ont obtenu des scores d’Apgar de quatre-sept et dix (4,1%) avaient un indice d’Apgar normal. Huit (3,3%), les nouveau-nés sont mort-nés. Des analyses de régression logistique multivariée indiquent que l’alcool le méconium (OR ajusté: 0.24 CI: 0.12–0.46) et l’admission à long intervalle de diagnostic de réduire considérablement tandis que la combinaison de FHR anormale et de liquide de méconium (OR ajusté: 3.84 IC: 1.89–7.76) augmenté de façon significative les chances de compromis néonatale sévère à la naissance.

CONCLUSION: Le diagnostic clinique de la détresse foetale est importante afin d’identifier les fœtus qui ont besoin d’une livraison accélérée dans ce cadre. Cependant, les caractéristiques et intrapartum gestationnel ont un impact limité dans la prédiction de fœtus avant la livraison qui exige des mesures intensives de réanimation néonatale et de soutien à la naissance. WAJM 2009; 28 (5): 327-332.

Mots-clés: prédicteurs, césarienne, le compromis néonatale, diagnostic de souffrance foetale.

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Abbreviations: ANC, Antenatal care; CS, Caesarean section; FHR, Fetal heart rate; GA, Gestational age; OR, Odds Ratio; PCV, packed cell volume.
INTRODUCTION
Foetal distress is a widely used but poorly defined term that commonly indicates concern of the obstetrician about foetal intrauterine condition and often necessitates immediate caesarean section or instrumental vaginal delivery to forestall foetal death. 

For most part of the twentieth century, intrapartum assessment of foetal condition was based on counting of the foetal heart rate (FHR) and checking for the presence of meconium in the liquor with the assumption that an abnormal FHR pattern, especially in the presence of meconium in the liquor, signifies foetal hypoxia and acidosis. However, this assumption is sometimes misleading and has resulted in many unnecessary obstetric interventions. 

In spite of the introduction of foetal scalp blood pH estimation and electronic foetal monitoring into labour management for over three decades, the detection of abnormal FHR or rhythm and meconium staining of liquor still represents the best available indirect evidence of poor fetal oxygenation during labour in resource constrained settings. Studies in developing countries have favourably indicated that this method is able to identify significant proportion of fetuses with early neonatal acidemia and low Apgar score at one minute and thus attempted to validate the use of clinical diagnosis of foetal distress in selecting foetuses that requires expedited delivery and supportive therapy at birth in low resource settings.

On the other hand, the value of a policy of operative delivery for clinical foetal distress has been questioned on the grounds that not all the babies delivered, show evidence of antecedent hypoxic insult. While a few false diagnoses resulting in unnecessary caesarean delivery may be excused against the background of caesarean section safety and the medico-legally driven defensive obstetric practice in the developed countries, the same cannot be said for developing countries where aversion towards caesarean section is strong and caesarean section is still associated with significant maternal morbidity and mortality. Thus, it is imperative that in developing settings, the anticipated degree of depression after the birth of a supposedly compromised foetus is weighed against the maternal risk of caesarean delivery particularly when a conservative approach is equally practicable.

It is against this background that this study was designed to first assess the accuracy of clinical diagnosis of foetal distress indicating caesarean section and secondly to identify antepartum and intrapartum characteristics that may predict severe neonatal compromise (Apgar 0–3) among neonates delivered by caesarean section for foetal distress at a University hospital in Nigeria.

SUBJECTS, MATERIALS, METHODS
This was a chart analysis of all singleton caesarean births indicated by clinically diagnosed intrapartum foetal distress over a 10-year period (January 1997–December 2006) at Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun State, Nigeria. During the period, the diagnosis of foetal distress in labour was based on detection of abnormal FHR and/or rhythm (persistent tachycardia: >160 beat per minute or bradycardia: <110 beat per minute) by intermittent auscultation with the Pinard foetal stethoscope and/or presence of meconium in the amniotic fluid. There was no facility for electronic FHR monitoring, foetal blood gas or pH analysis during the period. All foetuses delivered by caesarean section were attended to by a Registrar, senior resident or Consultant from the Neonatology Unit of the hospital. The Apgar scores were assessed at one and five minutes to assess foetal intrauterine condition and response to resuscitation measures, respectively.

Information was obtained from a combination of labour ward registers, theatre records and retrieved case files of mothers. Data on maternal characteristics such as age, parity, gestational age at delivery, booking status and presence of any pre-existing medical disorders were collected. The Apgar scores at one and five minutes for the neonates were documented. Information was also obtained on antenatal and labour events that could serve as possible predictors of severe neonatal compromise at birth. These included antenatal complications, other intrapartum complications in addition to foetal distress, duration of labour (in minutes), nature of labour onset, use of oxytocin for labour augmentation, baseline FHR at diagnosis of foetal distress, meconium staining of liquor, consistency of meconium stain (thick or thin), interval between admission into labour ward and diagnosis of foetal distress, intrapartum packed cell volume of the mother, stage of labour at diagnosis and maternal oxygen administration. For the purpose of this study, ‘severe neonatal compromise’ was defined as one minute Apgar score of 0–3 while ‘sub-optimal neonatal condition’ referred to Apgar scores < 7. The Scientific and Ethics Review Committee of Olabisi Onabanjo University Teaching Hospital, Sagamu, Nigeria, approved the study.

The data were analysed using EPI 2002 statistical package. The frequencies of neonates delivered with Apgar scores of 0–3, 4–7, and 8–10 were computed. For neonates that were delivered in sub-optimal condition, the relationship between antepartum and intrapartum events and severe neonatal compromise at one minute of birth was explored through bivariate analyses. Independent predictors of severe neonatal compromise were explored with multivariate logistic regression analyses. Predictor variables were restricted to outcome measures that were statistically significant at p < 0.20 in the bivariate analyses. Logistic regression results were computed as adjusted OR and 95% confidence intervals. A p-value < 0.05 or confidence limits that did not embrace unity was considered as statistically significant.

RESULTS
During the reviewed period, 246 caesarean sections primarily indicated by foetal distress with or without other indication were performed for singleton pregnancies. A total of 1077 caesarean sections were performed out of the 4335 deliveries conducted during the same period. Thus caesarean section for clinical foetal distress among singleton births accounted for 22.8% of all caesarean sections and 5.7% of all
deliveries. The age of the women who had caesarean section for foetal distress ranged between 17 and 42 years with a mean of 28.6 years (SD 5.8). One hundred and fourteen (46.3%) women were nulliparous. Majority (84.6%) of the babies were born at term while 30 (12.8%) and six (2.6%) were born preterm and post-term respectively. One hundred and twenty eight (52.0%) of the women were booked for antenatal care and delivery at the hospital. Only 14 (5.2%) of the mothers had pre-existing medical condition before the index pregnancy.

Table 1 shows the frequencies of antenatal and intrapartum complications recorded among the women. A total of 96 (39.0%) women had records of antenatal complications while 162 (65.9%) had associated intrapartum complications. Pre-eclampsia/eclampsia (16.3%) was the most frequent antenatal complication while poor progress in labour (34.1%) was the most frequent intrapartum complication recorded among the women.

The mean duration of labour was 1268.1 (907.8%) minutes. The mean time between decision to perform caesarean section and delivery of the baby was 249.4 (181.6%) minutes ranging from 26 minutes to 960 minutes. Only two (0.8%) women had caesarean section within 30 minutes and 22 (8.9%) within one hour of decision to perform surgery. At one minute of delivery, 236 of the neonates had Apgar score < 7. One hundred and twenty (48.8%) of the neonates were severely compromised, 116 (47.2%) had Apgar scores between four and seven while ten of the fetuses were delivered with normal Apgar scores. Eight (3.3%) neonates were stillborn.

Table 2 shows the comparison of gestational and intrapartum characteristics for severely compromised neonates and those born with Apgar scores of four-seven at one minute of delivery. At the bivariate level, the presence of meconium in liquor and intrapartum complications were significantly more frequent for foetuses delivered with Apgar score of four-seven compared to those with zero-three. However, among all neonates with

Table 1: Frequencies of antenatal and intrapartum complications among the women studied

<table>
<thead>
<tr>
<th>Complication</th>
<th>Frequency</th>
<th>N</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Antepartum</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>152</td>
<td>61.8</td>
<td></td>
</tr>
<tr>
<td>PROM*</td>
<td>20</td>
<td>8.1</td>
<td></td>
</tr>
<tr>
<td>Pre-eclampsia/eclampsia</td>
<td>40</td>
<td>16.3</td>
<td></td>
</tr>
<tr>
<td>Prolonged pregnancy</td>
<td>14</td>
<td>5.7</td>
<td></td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>2</td>
<td>0.8</td>
<td></td>
</tr>
<tr>
<td>IUGR†</td>
<td>4</td>
<td>1.6</td>
<td></td>
</tr>
<tr>
<td>Carpal tunnel syndrome</td>
<td>2</td>
<td>0.8</td>
<td></td>
</tr>
<tr>
<td>Anaemia</td>
<td>6</td>
<td>2.4</td>
<td></td>
</tr>
<tr>
<td>Malaria</td>
<td>2</td>
<td>0.8</td>
<td></td>
</tr>
<tr>
<td>Antepartum haemorrhage</td>
<td>4</td>
<td>1.6</td>
<td></td>
</tr>
<tr>
<td><strong>Intrapartum</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>66</td>
<td>26.8</td>
<td></td>
</tr>
<tr>
<td>Poor progress in labour</td>
<td>84</td>
<td>34.1</td>
<td></td>
</tr>
<tr>
<td>Pre-eclampsia/eclampsia</td>
<td>22</td>
<td>8.9</td>
<td></td>
</tr>
<tr>
<td>Cord prolapse</td>
<td>4</td>
<td>1.6</td>
<td></td>
</tr>
<tr>
<td>Prolonged/obstructed labour</td>
<td>40</td>
<td>16.3</td>
<td></td>
</tr>
<tr>
<td>Antepartum haemorrhage</td>
<td>4</td>
<td>1.6</td>
<td></td>
</tr>
<tr>
<td>Prolonged rupture of membranes</td>
<td>8</td>
<td>3.3</td>
<td></td>
</tr>
<tr>
<td>Mal-presentation</td>
<td>8</td>
<td>3.3</td>
<td></td>
</tr>
<tr>
<td>Previous CS§</td>
<td>6</td>
<td>2.4</td>
<td></td>
</tr>
</tbody>
</table>

*Intrauterine growth restriction, †Pre-labour rupture of membranes, §Caesarean section

Table 2: Comparison of Gestational and Intrapartum Characteristics for Neonates Delivered with severe Neonatal Compromise and Suboptimal Neonatal Condition

<table>
<thead>
<tr>
<th>Factors</th>
<th>Severely Compromised (Apgar ≤3) n=120</th>
<th>Suboptimal Condition (Apgar 4–7) n=116</th>
<th>Odds Ratio (OR) (95% CI) P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean maternal age (years)</td>
<td>28.4</td>
<td>28.8</td>
<td>0.67 (0.39–1.15) 0.1210</td>
</tr>
<tr>
<td>Nulliparity</td>
<td>50(41.7)</td>
<td>60(51.7)</td>
<td>0.76 (0.45–1.27) 0.2932</td>
</tr>
<tr>
<td>Mean GA* at delivery (days)</td>
<td>276.2</td>
<td>274.7</td>
<td>1.56 (0.92–2.66) 0.0945</td>
</tr>
<tr>
<td>Booked for ANC†</td>
<td>58 (48.3)</td>
<td>64 (55.2)</td>
<td>1.46 (0.73–2.53) 0.2643</td>
</tr>
<tr>
<td>Antepartum complication(s)</td>
<td>52 (43.3)</td>
<td>38 (34.9)</td>
<td>1.56 (0.92–2.66) 0.0945</td>
</tr>
<tr>
<td>Intrapartum complication(s)</td>
<td>70 (58.3)</td>
<td>84 (72.4)</td>
<td>0.53 (0.31–0.92) 0.0231</td>
</tr>
<tr>
<td>Mean duration of labour (mins)</td>
<td>1248.3</td>
<td>1294.4</td>
<td>0.56 (0.39–0.81) 0.0059</td>
</tr>
<tr>
<td>Oxytocin augmentation</td>
<td>38 (31.7)</td>
<td>46 (39.7)</td>
<td>0.70 (0.41–1.20) 0.2000</td>
</tr>
<tr>
<td>Induced labour</td>
<td>14 (11.7)</td>
<td>14 (12.1)</td>
<td>0.96 (0.43–2.11) 0.9238</td>
</tr>
<tr>
<td>Meconium liquor</td>
<td>42 (35.0)</td>
<td>62 (53.4)</td>
<td>0.47 (0.27–0.79) 0.0043</td>
</tr>
<tr>
<td>Admission diagnosis interval (mins)</td>
<td>270.1</td>
<td>436.6</td>
<td>0.0139</td>
</tr>
<tr>
<td>Intrapartum PCV‡</td>
<td>32.4</td>
<td>32.7</td>
<td>0.6161</td>
</tr>
<tr>
<td>No maternal oxygen administration</td>
<td>30 (25.0)</td>
<td>26 (22.4)</td>
<td>1.15 (0.61–2.20) 0.6405</td>
</tr>
<tr>
<td>Decision-delivery interval</td>
<td>293.3</td>
<td>309.0</td>
<td>0.6353</td>
</tr>
<tr>
<td>Abnormal FHR at diagnosis</td>
<td>74 (61.7)</td>
<td>73 (62.9)</td>
<td>0.94 (0.56–1.60) 0.8412</td>
</tr>
<tr>
<td>Abnormal FHR§ + Meconium liquor</td>
<td>46 (38.3)</td>
<td>26 (22.4)</td>
<td>2.15 (1.21–3.81) 0.0079</td>
</tr>
</tbody>
</table>

*Gestational age, †Antenatal care, ‡Packed cell volume, §Foetal heart rate
meconium stained liquor, thick meconium
was significantly more likely to be
associated with severe neonatal
compromise compared to thin meconium
(OR 2.61 CI: 1.08-6.36) (not shown in
table). The admission-diagnosis interval
was significantly much shorter and
abnormal FHR in combination with
meconium staining of liquor more
frequent for severely compromised
neonates compared to those with Apgar
score of four-seven. Multivariate logistic
regression analyses indicate that
meconium liquor (adjusted OR 0.24 CI:
0.12-0.46) and long admission-diagnosis
interval significantly reduce the odds
while combination of abnormal FHR and
meconium liquor (adjusted OR: 3.84 CI:
1.89-7.76) significantly increases the odds
of severe neonatal compromise at birth
(Table 3).

**DISCUSSION**
This investigation was motivated by the
need to address the dilemma often faced
by obstetricians practising in low
resource settings when confronted with
clinical evidence of intrauterine hypoxia
that cannot be confirmed by more
objective methods. The results indicate
that majority of neonates delivered by
cesarean section due to clinically
diagnosed foetal distress in this
institution had suboptimal Apgar scores
with approximately half of them being
severely depressed at birth. It also
suggests that antepartum and intrapar
tum characteristics have limited
impact in predicting before delivery
which foetus may require intensive
resuscitative measures and neonatal
support and whose caesarean section
should be performed without hesitation.
Of all the potential predictors assessed,
only short admission-diagnosis interval
and detection of abnormal FHR in
addition to meconium liquor are
significantly associated with severely
compromised foetus. We believe that
these findings have important
implications for the providers of
maternity care in developing settings and
among underserved populations in
developed settings.

To our knowledge, this is the first
study that attempted to identify the
determinants of the extent of neonatal
depression following caesarean birth for
clinical foetal distress in addition to
determining its accuracy. The potential
predictors of immediate neonatal
outcome were selected on the grounds
that foetal response to processes that are
often responsible for intrapartum hypoxia
(such as uteroplacental vascular disease,
reduced uterine perfusion and reduced
foetal reserves) can be modified by
reduced uterine perfusion and reduced
utero-placental vascular disease, and
detection of abnormal FHR in
addition to meconium staining of liquor
as against singly employing either of the
two for intrapartum diagnosis of foetal
distress. The relationship between abnormal FHR
(as a single entity) and the immediate
neonatal outcome in this study was not
surprising as the use of intermittent
auscultation with the Pinard stethoscope
for full assessment of the characteristics
of FHR has many limitations. These
include its inability to assess baseline
FHR variability and poorness in
detecting decelerations that occur during
uterine contractions. Besides, foetal
tachycardia may be a reflection of other
influences (such as maternal pyrexia and
anxiety) that are not directly related to
foetal acidemia, and in theory may be a
sign of good central nervous system
response to hypoxia. This is supported
by the finding of Gilstrap et al14 who
found that umbilical cord blood acidemia
was present in 40% of neonates with
foetal bradycardia and only 18% of those
with tachycardia.

Conversely, the use of meconium
staining of liquor alone as an evidence
of non-reassuring foetal condition that
warrants urgent delivery is more
controversial. While some workers
demonstrated that foetuses with
meconium stained liquor are at significant
risk of neonatal morbidity and
mortality,15,16 others have shown that it
correlates poorly with infant
condition.17,18 Fenton and Steer19 who
attempted to separate meconium passage
from other markers of foetal compromise
indicated from their study that the
passage of meconium does not have any
hypoxic consequences on the foetus if
the FHR is greater than 110 beats per
minute. Besides this explanation, the

**Table 3: Multivariate logistic regression analysis showing independent predictors of severe neonatal compromise**

<table>
<thead>
<tr>
<th>Term</th>
<th>Odds Ratio</th>
<th>95% C.I.</th>
<th>Coefficient</th>
<th>S. E.</th>
<th>Z-Statistic</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admission-diagnosis interval (mins)</td>
<td>0.9992</td>
<td>0.9984- 0.9999</td>
<td>−0.0008</td>
<td>0.0004</td>
<td>−2.1053</td>
<td>0.0353*</td>
</tr>
<tr>
<td>Antenal complication (Yes/No)</td>
<td>1.5084</td>
<td>0.8242- 2.7608</td>
<td>0.4111</td>
<td>0.3084</td>
<td>1.3329</td>
<td>0.1826</td>
</tr>
<tr>
<td>Duration of labour (mins)</td>
<td>1.0001</td>
<td>0.9998- 1.0005</td>
<td>0.0001</td>
<td>0.0002</td>
<td>0.8138</td>
<td>0.4158</td>
</tr>
<tr>
<td>Abnormal FHR + meconium liquor (Yes/No)</td>
<td>3.8412</td>
<td>1.8992- 7.7689</td>
<td>1.3458</td>
<td>0.3594</td>
<td>3.7448</td>
<td>0.0002*</td>
</tr>
<tr>
<td>Intrapartum complication (Yes/No)</td>
<td>0.5588</td>
<td>0.2990- 1.0441</td>
<td>−0.5820</td>
<td>0.3190</td>
<td>−1.8246</td>
<td>0.0681</td>
</tr>
<tr>
<td>Meconium liquor (Yes/No)</td>
<td>0.2407</td>
<td>0.1249- 0.4639</td>
<td>−1.4241</td>
<td>0.3347</td>
<td>−4.2545</td>
<td>0.0000*</td>
</tr>
<tr>
<td>Oxytocin augmentation</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parity (nullipara/multipara)</td>
<td>0.8361</td>
<td>0.4658- 1.5007</td>
<td>−0.1790</td>
<td>0.2984</td>
<td>−0.5999</td>
<td>0.5486</td>
</tr>
<tr>
<td>CONSTANT</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>0.6796</td>
<td>0.4007</td>
<td>1.6960</td>
</tr>
</tbody>
</table>

* P < 0.05
relationship between meconium staining of liquor (as a single entity) and extent of neonatal depression in our study may be attributable to the lack of discrimination in the consistency of meconium used for diagnosis since the evidence linking thick meconium staining of liquor to severe birth asphyxia is not in dispute. This is supported by the reversal of the relationship between meconium liquor and severe neonatal compromise when the consistency of meconium was separately considered.

Short interval between admission and diagnosis of foetal distress as a determinant of severe neonatal compromise at birth may reflect the profound nature of the hypoxic insult that left obstetrician with little doubt about the severity of ongoing or imminent intrapartum foetal acidosis. This therefore implies that the earlier the diagnosis of foetal distress, the more demanding the resuscitative measures required for the expected neonate.

Of serious concern is the mean decision for caesarean delivery interval that is far in excess of the recommended standard of 30 minutes for foetal distress. This interval is, however, similar to the mean decision-delivery interval for all emergency caesarean sections in another tertiary centre in southwest Nigeria suggesting that foetal distress does not receive special treatment with respect to swiftness of labour attendants in this environment. Although the decision-caesarean delivery interval in Nigeria is generally long, the reported implications for perinatal morbidity and mortality should be expected to have far more reaching consequences where it concerns foetal distress. While the progression of hypoxic insults tends to be slow and delivery within 30–60 minutes is unlikely to result in serious harm, the proportion of neonates in this study that were delivered after one hour of decision to intervene may have contributed to the recorded neonatal outcome. Nevertheless, the lack of an association between decision-delivery interval and severe neonatal compromise in our study supports the reports of MacKenzie and Dunphy et al which showed no relationship between this interval and important neonatal outcome measures.

A recognised limitation of this study is the use of Apgar score for assessment of neonatal condition. Apgar score may not correlate perfectly with neonatal acidaemia and is not universally accepted as evidence of or consequence of asphyxia. Although a low score may be evidence of hypoxia, the scores may also be influenced by other non-asphyxial factors that affect infant’s responsiveness, tone and respiration. While this calls for caution in the application of our study findings to settings where neonatal outcome is assessed differently, it should be realised that low Apgar score at one minute nevertheless suffices as an excellent indicator of infants in need of resuscitation in a setting where no other method of assessment is available. In addition, it remains relevant in our environment where Apgar score is the primary tool used for determination of resuscitation needs of babies and selection of those requiring intensive care.

In conclusion, a significant proportion of neonates delivered abnormally following clinical diagnosis of foetal distress in this institution were severely compromised at birth suggesting that this method is still valuable in identifying foetuses in need of expedited delivery in this setting. The identified predictors of very low Apgar score at birth may serve as potential targets for interventions to prevent intrapartum foetal death and severe neonatal morbidity and mortality especially in situations where the option of conservative management also exists.

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REFERENCES


