PERINATAL CARE IN SIX EASTERN CARIBBEAN COUNTRIES

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A study of six Caribbean countries (Antigua, the Bahamas, Barbados, Dominica, Saint Lucia, and St. Vincent) was conducted in December 1981 for the purpose of evaluating perinatal health care in those countries. The following account provides an overview of the results of that study.

Introduction

Studies of children with handicaps have shown that 30 to 50% of the handicaps are of perinatal origin—that is, they arise as a result of adverse factors operating during pregnancy, birth, and the first few months of life (1–5). Many of these handicaps can be prevented by greater attention, improved care, and public education relating to pregnancy, birth, and the newborn infant (5, 6).

For example, most cases of cerebral palsy (spasticity) originate during the perinatal period (the last 16 weeks of pregnancy and the first 28 days of life). The unhappiness that such handicaps cause to the people affected and to their families can be prevented. Indeed, a reduction in the cerebral palsy rate of over 40% has been achieved over the last 20 years in Sweden and the Netherlands through improved perinatal care (6).

More generally, an extensive perinatal preventive health program in France has shown that it is not only possible to considerably reduce mortality and handicaps of perinatal origin, but also that the costs of the program could be covered by the reduced expenses associated with reduced handicaps (5).

In a period of serious economic problems, the governments of the Caribbean are concerned more than ever about implementation of the maternal and child health strategy as outlined by the Caribbean Community Health Ministers' Conference in 1975. Among the recommendations accepted and endorsed at that conference, one accorded especially high priority was improving the quality of care for pregnant mothers, so as to improve the outcome of pregnancy, improve care of the newborn, and reduce morbidity and mortality (7a). In this regard, the health ministers proposed that the following be included among the goals of the Commonwealth Caribbean territories for the decade of the seventies. (As most of the goals could not be realized then, most will probably be proposed again for the eighties—7b.)

- Reduction of neonatal mortality (mortality in the first 28 days of life) by 25%.
- Reduction of postneonatal mortality by 40%.
- Promotion of breast-feeding, early establishment of breast-feeding, and maternal-infant bonding.
- Improvement in the quality of care for pregnant mothers.
- Reduction of the number of children with developmental abnormalities arising from events of the perinatal period.

So that these goals might be realized, the following recommendations were accepted and endorsed by this conference:
Neonatal units should be adequately equipped.
- A pediatrician should be assigned primary responsibility for neonatal care.
- Training programs for physicians and nurses should be modified to include adequate neonatal care.
- Programs of specialized training should be developed for nurses and midwives.
- All high-risk babies should have access to specialized care facilities.
- All high-risk babies should be closely followed up.
- Adequate nutrition, particularly through breast-feeding, should be maintained.

In recent years, however, training programs in perinatology have been limited to one or two tertiary health centers in the Caribbean, and personnel in the majority of countries have had no access to any form of up-to-date perinatal training. This general situation led the Dutch Government to support a 1981 study of perinatal conditions in six Eastern Caribbean countries (the Bahamas, Antigua, Dominica, Saint Lucia, St. Vincent, and Barbados). Perinatal facilities, staffing, programs, and feeding practices were evaluated, and proposals for two types of perinatal training programs were presented to the appropriate authorities of each country. The purpose of this article is to provide a brief account of the results of this study. Information regarding various perinatal conditions was obtained from available vital statistics data gathered by local pediatricians, obstetricians, and chief

3 The first type of training program proposed would provide short, on-the-job in-service training for one or two weeks. Its curriculum would emphasize the prevention and management of asphyxia neonatorum (restricted oxygen consumption by the fetus or newborn infant) and care of the at-risk pregnant woman.

The second type of program would consist of a centralized half-year training program at a perinatal center in the Caribbean. This certified course would provide regional manpower in perinatal care, including leadership for a number of categories of health workers, and would help to ensure the maintenance of adequate perinatal standards in the region. Arrangements should be made so that the course certificates, after approval by PAHO/WHO, would be recognized by each individual government involved.
An accurate scale and a phototherapy unit, such as the ones shown here, are among the items needed to provide adequate care of the newborn.

Vital Perinatal Statistics

If the recorded rates of stillbirths and neonatal deaths are considered separately, the differences between these rates in the six countries studied appear remarkable (Table 1). However, when these two rates are combined into one joint rate (the perinatal death rate), much of this apparent difference disappears. This suggests that problems in separating stillbirths from neonatal deaths for classification purposes could account for much of the divergence. This is a well-known problem, often because legal or administrative regulations make it easier to classify perinatal fatalities as stillbirths than as neonatal deaths. Other circumstances that might help to account for these differences are presented in the sections on the individual countries studied.

As Table 1 shows, most of the study countries appeared to have perinatal death rates ranging from 29 to 38 deaths per 1,000 deliveries, irrespective of economic conditions indicated by per capita GNP. By comparison, perinatal death rates in Western countries generally range from 10 to 15 per 1,000 deliveries; and data from deliveries at the University Hospital of the West Indies in Jamaica
Table 1. Basic data on stillbirths, neonatal deaths, and perinatal deaths in the six study countries, Jamaica, and South America, together with population and per capita GNP figures.

<table>
<thead>
<tr>
<th>Country</th>
<th>Year of data</th>
<th>Population (in thousands)</th>
<th>Per capita GNP (in US$)</th>
<th>Stillbirths per 1,000 births</th>
<th>Neonatal deaths per 1,000 live births</th>
<th>Perinatal deaths per 1,000 births</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antigua</td>
<td>1980</td>
<td>73</td>
<td>716</td>
<td>15.4</td>
<td>16.2</td>
<td>31.6</td>
</tr>
<tr>
<td>Bahamas</td>
<td>1980</td>
<td>200</td>
<td>2,620</td>
<td>13.6</td>
<td>18.2</td>
<td>31.8</td>
</tr>
<tr>
<td>Barbados</td>
<td>1980</td>
<td>247</td>
<td>1,940</td>
<td>13.7</td>
<td>22.3</td>
<td>36.0</td>
</tr>
<tr>
<td>Dominica</td>
<td>1980</td>
<td>81</td>
<td>440</td>
<td>19.5</td>
<td>9.9</td>
<td>29.4</td>
</tr>
<tr>
<td>Saint Lucia</td>
<td>1981</td>
<td>111</td>
<td>630</td>
<td>23.4</td>
<td>14.0</td>
<td>37.4</td>
</tr>
<tr>
<td>St. Vincent</td>
<td>1981</td>
<td>100</td>
<td>380</td>
<td>15.7</td>
<td>22.5</td>
<td>37.5</td>
</tr>
<tr>
<td>Jamaica</td>
<td>1981</td>
<td>2,200</td>
<td>1,110</td>
<td>16.0</td>
<td>9.1</td>
<td>25.1</td>
</tr>
<tr>
<td>South America</td>
<td>1981</td>
<td>73.88</td>
<td>15.9</td>
<td>36.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* 1980 data (17, 18).
* Data for deliveries at the University Hospital of the West Indies.
* For birth products weighing ≥ 500g (16).
* For birth products weighing ≥ 1,000g (16).
* Precise figures not available.

Table 2. Average birth-weights and the incidence of low birth-weights among infants born at the principal hospital in each of the six countries studied.

<table>
<thead>
<tr>
<th>Country</th>
<th>Year of data</th>
<th>Number of deliveries at principal hospital</th>
<th>Average recorded birth-weight (in grams)</th>
<th>% newborns with low birth-weights (≤ 2,500g)</th>
<th>Data sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antigua</td>
<td>1980</td>
<td>1,299</td>
<td>3,100±d</td>
<td>8.2</td>
<td>11</td>
</tr>
<tr>
<td>Bahamas</td>
<td>1980</td>
<td>5,000</td>
<td>3,150±d</td>
<td>6.7</td>
<td>12, 14</td>
</tr>
<tr>
<td>Barbados</td>
<td>1980</td>
<td>3,815</td>
<td>3,000±d</td>
<td>11d</td>
<td>10</td>
</tr>
<tr>
<td>Dominica</td>
<td>1980</td>
<td>1,819</td>
<td>3,140c</td>
<td>5.9</td>
<td>15</td>
</tr>
<tr>
<td>Saint Lucia</td>
<td>1981</td>
<td>1,923</td>
<td>3,147</td>
<td>7.6</td>
<td>9</td>
</tr>
<tr>
<td>St. Vincent</td>
<td>1981</td>
<td>2,400</td>
<td>3,000±d</td>
<td>10.25</td>
<td>8</td>
</tr>
<tr>
<td>Jamaica</td>
<td>1981</td>
<td>2,640</td>
<td>3,150</td>
<td>6.2-23.0</td>
<td>20</td>
</tr>
<tr>
<td>Latin America</td>
<td>1979</td>
<td>3,069-3,286</td>
<td>3,069-3,286</td>
<td>6.2-23.0</td>
<td></td>
</tr>
</tbody>
</table>

* The data shown are for deliveries at the University Hospital of the West Indies.
* The data shown are the highest and lowest of the national averages from six countries (Brazil, Chile, Colombia, Panama, Suriname, and Uruguay).
* The average recorded birth-weight for boys was 3,286g and for girls was 2,994g.
* Precise data not available.
* Data not available.

are intermediate, indicating a perinatal death rate on the order of 25 deaths per 1,000 deliveries. In this vein, it is also interesting to note that a study of perinatal mortality in South American maternity wards (based on data from 35 maternity wards in 11 countries that delivered approximately 300,000 newborns weighing 500 grams or more) found overall perinatal death rates of 36.1 per 1,000 deliveries among newborns with birth-weights of 500 grams or more and 28.2 per 1,000 deliveries among newborns with birth-weights of 1,000 grams or more (16).

It should be mentioned that perinatal mortality data from the university hospital in Jamaica are not representative of data from the country as a whole. For example, data from the Victoria Jubilee Hospital in Kingston, where approximately 14,000 children are born annually, indicate perinatal mortality on
Boersma • PERINATAL CARE IN THE CARIBBEAN

49

the order of 40 deaths per 1,000 deliveries.

There are good reasons for thinking that the relatively low neonatal death rates recorded in Dominica and Saint Lucia reflect fairly high standards of neonatal care. These reasons, which are felt to override the poor economic conditions indicated by low per capita GNP and shortages of sufficiently trained personnel, include the following:

- an awareness of perinatal health problems on the part of pediatricians, obstetricians, other health workers, and political authorities that has produced effective action;
- implementation of a strategy that includes early breast-feeding, mother-infant bonding, and keeping the mother and her baby together after birth and for the following days while in the hospital;
- early discharge of low birth-weight babies (those weighing 2,500 grams or less); and
- promotion of good communications between central and peripheral health workers through introduction and use of a "child health passport" (19).

However, recorded rates of stillbirths on Dominica and Saint Lucia are relatively high. This suggests (especially on Saint Lucia) that classification problems may exist. It also underlines the need to make a combined effort against prenatal, delivery, and neonatal problems. Obviously, close cooperation between the health workers involved in the care of the pregnant mother and her newborn child is essential, a point that should be emphasized in the curricula of training programs.

Some Other Indices of Perinatal Health

For the six study countries combined, the average birth-weight of newborns was found to be around 3,100g (see Table 2). This figure, which is within the range of average birth-weights found by a WHO study of birth-weights in six South American countries, is some 400 to 500 grams below the averages typically found in developed countries, about 100 grams above African standards, and 200 to 400 grams above averages in Far Eastern countries such as India and Indonesia.

The percentages of children found to have low birth-weights (2,500g or less) varied considerably (from 5.9 to 11%) in the six countries studied. The low birth-weight rates reported for the Bahamas, Dominica, and Saint Lucia (ranging from 5.9 to 7.6%) were within the range (3.6 to 7.7%) reported for developed countries (20). However, the average birth-weights found in these three Eastern Caribbean countries were lower than the average birth-weights found in the developed countries. It thus appears that birth-weights tend to be distributed in a narrower range in these Caribbean countries, with infants tending to have birth-weights closer to the national average.

Causes of Perinatal Death

In the absence of a postmortem examination, precise causes of death are often hard to

Table 3. Leading causes of perinatal death in the six countries studied and Jamaica.

<table>
<thead>
<tr>
<th>Country</th>
<th>Leading causes of perinatal death</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antigua</td>
<td>Perinatal asphyxia; complications of prematurity</td>
<td>11</td>
</tr>
<tr>
<td>Bahamas</td>
<td>Perinatal asphyxia; complications of prematurity</td>
<td>12, 14</td>
</tr>
<tr>
<td>Barbados</td>
<td>Respiratory distress syndrome; perinatal asphyxia; infections, congenital abnormalities</td>
<td>10</td>
</tr>
<tr>
<td>Dominica</td>
<td>Complications of abnormal growth and maturity; perinatal asphyxia</td>
<td>15</td>
</tr>
<tr>
<td>Saint Lucia</td>
<td>Perinatal asphyxia</td>
<td>9</td>
</tr>
<tr>
<td>St. Vincent</td>
<td>Perinatal asphyxia; infections</td>
<td>_b</td>
</tr>
<tr>
<td>Jamaicaa</td>
<td>Perinatal asphyxia; intracranial bleeding; infections; congenital abnormalities</td>
<td>8, 13</td>
</tr>
</tbody>
</table>

a Causes based on information reported for the University Hospital of the West Indies (8, 13).
b Precise data not available.
These pictures show (a) basic pieces of equipment required for resuscitation of newborns; (b) oxygen hoods of different sizes; (c) oxygen supplied by a hood placed over the head of a newborn suffering from meconium aspiration.
determine. Despite this fact, however, it appears that, in general, complications following perinatal anoxia or hypoxia (perinatal asphyxia), complications of prematurity, and infections of newborns are the main causes of perinatal death (Table 3). As several studies inside and outside the Caribbean area have shown, these causes of death are also the common causes of handicaps when the affected children are able to survive (2, 4-6).

Feeding Practices

Compared to infant formulas (including so-called “humanized” milks), breast-milk is nutritionally superior, imposes little or no economic burden on the parents, and contains maternal antibodies that play a major role in disease prevention. Breast-feeding also appears to have contraceptive, emotional, and psychological effects that are beneficial. Therefore, especially in circumstances where hygiene is inadequate, piped water is absent, incomes are low, and education is poor, breast-feeding without supplementation should be encouraged for an infant’s first four to six months of life.

Unfortunately, available data on common feeding practices in the six countries studied are limited (21-29), and lack of uniform data-gathering in the different countries makes comparative analysis difficult. Nevertheless, the available information is sufficient to indicate what is going on in the Eastern Caribbean with regard to initiation of supplementary feeding after birth, the duration of breast-feeding, the principal reasons given for commencement of bottle-feeding, and access to formula feeds. Most of the information involved (see Tables 4-6) was gathered in 1979 or 1980. In Barbados and Jamaica, however, the data were collected considerably earlier and should not be regarded as necessarily reflecting current feeding practices.

As Table 4 shows, bottle-feeding appears to be a common practice in the countries studied, and most mothers start bottle-feeding their infants within a few weeks of delivery. In the Bahamas, while no precise figures are available, it appears that exclusive or supplementary bottle-feeding begins almost immediately after birth.

These data, when combined with those in Table 5, indicate that most mothers habitually give their infants a combination of breast and bottle feedings from around the age of one month until somewhere between four and seven months of age. The only exception indicated by the data would be the Bahamas, where exclusive bottle-feeding is commonly practiced from the age of one month onwards.

Regarding the reasons given for initiating bottle-feeding, those most commonly stated indicate that the mothers involved believe their breast-milk does not satisfy their babies—as demonstrated, for example, when the baby cries after a feed. Unfortunately,

Table 4. Average times at which bottle-feeding begins, as reported by a variety of sources, in the six countries and Jamaica.

<table>
<thead>
<tr>
<th>Country</th>
<th>Year of data</th>
<th>Time when bottle-feeding begins</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antigua</td>
<td>1980</td>
<td>Within 3-4 weeks of delivery</td>
<td>26</td>
</tr>
<tr>
<td>Bahamas</td>
<td>—</td>
<td>At birth*</td>
<td>—</td>
</tr>
<tr>
<td>Barbados</td>
<td>1969</td>
<td>Within 3-4 weeks of delivery</td>
<td>27</td>
</tr>
<tr>
<td>Dominica</td>
<td>1979</td>
<td>Within 2 weeks of delivery</td>
<td>28</td>
</tr>
<tr>
<td>Saint Lucia</td>
<td>1979</td>
<td>Within 2 weeks of delivery</td>
<td>24</td>
</tr>
<tr>
<td>St. Vincent</td>
<td>1980</td>
<td>Within 1 week of delivery</td>
<td>22</td>
</tr>
<tr>
<td>Jamaica</td>
<td>1976</td>
<td>Within 2-3 weeks of delivery</td>
<td>25</td>
</tr>
</tbody>
</table>

* No precise figures available.
Table 5. The reported duration of breast-feeding, whether or not supplemented by bottle-feeding, in the six countries and Jamaica.

<table>
<thead>
<tr>
<th>Country</th>
<th>Year of data</th>
<th>Duration of breast-feeding</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antigua</td>
<td>1980</td>
<td>6 months</td>
<td>26</td>
</tr>
<tr>
<td>Bahamas</td>
<td>—</td>
<td>1 month</td>
<td>—</td>
</tr>
<tr>
<td>Barbados</td>
<td>1969</td>
<td>4 months</td>
<td>27</td>
</tr>
<tr>
<td>Dominica</td>
<td>1979</td>
<td>4 months</td>
<td>28</td>
</tr>
<tr>
<td>Saint Lucia</td>
<td>1979</td>
<td>4 months</td>
<td>24</td>
</tr>
<tr>
<td>St. Vincent</td>
<td>1980</td>
<td>7 months</td>
<td>22</td>
</tr>
<tr>
<td>Jamaica</td>
<td>1976</td>
<td>4 months</td>
<td>25</td>
</tr>
</tbody>
</table>

Table 6. Principal reasons given by mothers in the six study countries and Jamaica for initiating bottle-feeding.

<table>
<thead>
<tr>
<th>Country</th>
<th>Year of data</th>
<th>Main reason(s) given for starting bottle-feeding</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antigua</td>
<td>1980</td>
<td>Breast-milk is not enough</td>
<td>26</td>
</tr>
<tr>
<td>Bahamas</td>
<td>—</td>
<td>Unknown</td>
<td>—</td>
</tr>
<tr>
<td>Barbados</td>
<td>1969</td>
<td>Unknown</td>
<td>—</td>
</tr>
<tr>
<td>Dominica</td>
<td>1979</td>
<td>Baby is not satisfied</td>
<td>28</td>
</tr>
<tr>
<td>Saint Lucia</td>
<td>1979</td>
<td>Breast-feeding is not sufficient</td>
<td>24</td>
</tr>
<tr>
<td>St. Vincent</td>
<td>1980</td>
<td>Breast-feeding is not sufficient</td>
<td>22</td>
</tr>
<tr>
<td>Jamaica</td>
<td>1973</td>
<td>Insufficient supply of breast-milk</td>
<td>25</td>
</tr>
</tbody>
</table>

this also appears to be a belief that most mothers already have at the time of delivery, before they have had any actual experience with their own babies (22). It also appears, contrary to common belief, that work is not usually cited as an important reason for initiating bottle-feeding. All this suggests that in planning future breast-feeding campaigns, steps should be taken to provide mothers with more information about problems associated with breast-feeding, so that they will be better prepared to deal with those problems.

Other circumstances encouraging bottle-feeding were that infant formula or food was commonly advertised, infant formula was very accessible, and in some countries (the Bahamas, Saint Lucia, and St. Vincent) samples were commonly given away free.

Conditions and Needs in Specific Countries

The Bahamas

The main island of New Providence—which includes the capital, Nassau—has rates of perinatal mortality (31.8 deaths per thousand births), neonatal mortality (18.2 deaths per thousand live births), and thus an incidence of handicaps that are higher than might be expected in view of the island’s relatively good socioeconomic infrastructure (12, 14). This is especially true of neonatal mortality (see Table 1). Little is presently known about perinatal conditions on the out-islands of the Bahamas, which number approximately 700.

Facilities for managing newborns are relatively good at the well-equipped and well-staffed main hospital. However, resuscitation facilities are poor. Breast-feeding is extremely unpopular, and over 90% of all mothers employ bottle-feeding exclusively from birth without attempting to breast-feed their babies.
In general, the nurses, pediatricians, obstetricians, and Chief Medical Officer on New Providence showed great awareness of perinatal problems, and all expressed great interest in upgrading perinatology training for health workers at all levels. An initial on-the-job in-service training course, sponsored by PAHO/WHO, was conducted in 1983.

Priority perinatal health needs in the Bahamas include the following:

- promotion and implementation of training in perinatal care, via both short- and long-term courses, with emphasis on adequate monitoring of the “at risk” mother during the last stage of pregnancy and the resuscitation and management of the asphyxiated newborn;
- improvement of resuscitation facilities;
- promotion of breast-feeding and early bonding;
- improvement of the communication between central and peripheral health workers through introduction of a “child health passport,” preferably one with a home-based growth chart (19);
- evaluation and promotion of perinatal care on the out-islands;
- measures to prevent neonatal cross-infections;
- enlargement of the neonatal interior care unit.

**Antigua**

The island of Antigua is rather flat and has a population of about 73,000 people. Facilities for care of the pregnant mother and newborn child are poor. Two-thirds of all deliveries in Antigua take place in the main medical facility, Holberton Hospital. Only one obstetrician and one pediatrician were available at the time of this study, and the obstetrician was planning to leave soon. Plans for building a new and larger pediatric ward had not been implemented.

Basic resuscitation facilities for newborns were very poor. There was no heat supply and no light; only an adult resuscitation bag and an oversized mask were available. Observation of at risk pregnant mothers and at risk newborns was inadequate.

Breast-feeding is a common practice on Antigua and is promoted at the prenatal clinics as providing the only infant food needed during the first four months of life. Most mothers continue breast-feeding until their babies are six months old. However, supplemental bottle-feeding is generally introduced before the child is four weeks old.

Food supplementation for lactating mothers has been provided by an extensive supplementary feeding program sponsored by the World Food Program. However, a comparison of mothers receiving the supplement and ones not receiving it failed to demonstrate that the program was having any positive effect on breast-feeding practices (26). Health service authorities, including the Chief Medical Officer and the Permanent Secretary of the Ministry of Health, were highly conscious of the need to improve perinatal care by promoting training for health workers.

Priority perinatal health needs on Antigua include the following:

- improvement of resuscitation facilities for newborns—including provision of a source of heat and light as well as infant bag-and-mask ventilators (Rendell Baker sizes 00, 01, and 02 for different face sizes);
- upgrading of facilities for providing proper care of mothers and newborn infants;
- promotion of training for nurses, midwives, and other health workers in the field of perinatology;
- recruitment of two pediatricians and two obstetricians to serve the entire island.

**Dominica**

The departure of the only pediatrician on the island a few months before my visit had had a large impact, but the energy and spirit exhibited by people at the Health Ministry and by the main hospital’s lone obstetrician were impressive.

Despite very difficult circumstances created by the 1979 hurricane and poor resources, the existing team of health workers and staff members was able to provide a relatively high standard of perinatal care.
It appears that a few modifications in the prevailing principles of perinatal care could contribute to an improved result for mothers and their babies. Nevertheless, the relatively high standards of care that now exist, together with accurate and well-documented statistics, appropriate operational research, and strong general interest in public health work could make this country, like Saint Lucia, an example for the entire Caribbean region.

Breast-feeding is popular, and although many mothers begin some bottle-feeding of their babies within two weeks of delivery, breast-feeding is continued by most mothers for over four months.

Priority perinatal health needs on Dominica include the following:

- the recruitment of a total of two pediatricians and another obstetrician;
- upgrading the training of nurses, midwives, and other health workers in prenatal and perinatal care through provision of both short-term and long-term courses;
- establishment of a better liaison with other teaching units in the Caribbean dealing with perinatal care (on Barbados, Curacao, Jamaica, and Trinidad);
- reduction of pregnancies among teenagers under 17.

Saint Lucia

With guidance and support from the Health Ministry and a coordinating pediatrician, an effective team of health workers has brought about an enormous improvement in maternal and child health care in recent years. At the time the island was visited, gastroenteritis no longer appeared to be a great problem. Important advances made recently included provision of relatively good prenatal care, early discharge of the newborn from the hospital, introduction of the “child health passport,” encouragement of breast-feeding, early mother and child bonding in the hospital, development of research on local growth patterns, establishment of good basic statistical records, and education of the general public via the mass media. In general, health team members (including the Health Minister) at the time of the visit felt that the next burst of energy should be directed at identifying and eliminating the causes of early childhood morbidity and mortality, many of which have their origins in the perinatal period.

On the negative side, it should also be noted that despite the breast-feeding campaign, some 80% of all mothers begin bottle-feeding their babies within six weeks of birth. Also, resuscitation facilities for newborns are poor, and the relatively high stillbirth rate (see Table 1) suggests special attention should be focused on better management and care of the pregnant woman, especially in the last trimester of pregnancy and during delivery.

In general, under the conditions prevailing in Saint Lucia, it could be expected that upgrading the knowledge of various levels of health workers in the area of perinatal care and modifications in perinatal care procedures would have a beneficial effect on the outcome of pregnancy.

Priority perinatal health needs on Saint Lucia include the following:

- better resuscitation facilities;
- upgrading of training in perinatal care;
- upgrading of neonatal care facilities;
- upgrading the monitoring of “at risk” mothers during the last stage of pregnancy;
- encouragement of ongoing research.

St. Vincent

Environmental health services on St. Vincent are poor, and most houses are without any “official” supply of piped water. The quality of the water is poor, especially after the rains.

The attendance rate at the clinics of the
maternal and child health services is low, and immunization coverage is too low (on the order of 17%) to be of any general preventive value.

Gastroenteritis and malnutrition are major problems in the first year of life, contributing to the highest infant mortality figure (49.9 deaths per thousand live births) among the Eastern Caribbean countries (17). Perinatal services are poor, as is suggested by high perinatal mortality.

At the Kingstown General Hospital, newborns are separated from their mothers and nursed in a different room. Late discharge is a common practice, making the normal establishment of breast-feeding extremely difficult. Resuscitation facilities are very poor, hygienic standards are low, and an adult resuscitation bag and oversized face mask are used during the resuscitation procedure. There is no source of heat or light, and adequate facilities for clearing the newborn’s airways during the resuscitation procedure are lacking.

More than half of the mothers start supplemental bottle-feeding of their newborns within seven days of delivery, and within a month 89% of the children are receiving supplementary feeding. Provision of free formula feed samples to mothers is still a common practice. These poor feeding habits, combined with poor water supply and sanitary facilities, could help to explain the high incidence of gastroenteritis and malnutrition.

Although facilities at the main hospital have been improved by the establishment of a new pediatric ward, the standards of facilities for newborns are low. The two energetic pediatricians of the recently established Offshore Medical School are working under extremely difficult conditions. The instruction of nurses and midwives in basic principles of perinatal care, which began quite recently, may have a beneficial effect on the care provided for pregnant women and perinatal health.

Priority perinatal health needs on St. Vincent include the following:

- strengthening of baseline public health services such as sanitation, piped water, immunization, prenatal and postnatal care—and recruitment of more manpower to provide these services;
- encouragement of breast-feeding;
- provision of better facilities for management of the “at risk” pregnant woman and newborn infant—especially improved resuscitation facilities for the newborn child;
- adaptation of existing practices to provide for establishment of early bonding without any separation of the mother and newborn, early discharge of low birth-weight infants (<2,500g), and better screening and management of “at risk” pregnant women;
- encouragement of basic training in perinatal care for all health workers;
- introduction on a broad scale of the “child health passport” in order to improve communication between the hospital maternity ward, pediatric health workers, and parents after the newborn is discharged (19).

**Barbados**

Partly because of stimulation provided by the pediatric faculty and personnel at the Queen Elizabeth Hospital and the University of the West Indies campus on Barbados, the way has been paved for better management of the newborn infant. Research directed at identifying and eliminating perinatal care problems is underway; perinatal care facilities are good; and high standards of hygiene, careful observation, and adequate management have reduced the number of infections among admitted newborns.

Nevertheless, perinatal mortality (principally the neonatal mortality component) is still relatively high—higher than in many other countries of this region. It thus seems likely that neonatal mortality can be reduced sharply by means of some simple and inexpensive measures—measures that could also be expected to produce a noteworthy decline in the incidence of mental and neurologic handicaps among young Barbadian children.

Discussions with medical personnel and administrators at the Ministry of Health indicated that an existing need to upgrade the perinatal training of health workers at various levels was widely recognized.
Regarding breast-feeding, the last infant feeding survey was performed in 1969, too long ago to necessarily reflect current practices, and so knowledge of this subject is lacking.

Priority perinatal health needs in Barbados include the following:

- a "Quantum jump" forward in virtually all areas of perinatal health;
- upgrading the training of one of the pediatricians in perinatology, preferably at a Caribbean center; or, alternatively, employment of an outside consultant perinatologist familiar with "tropical perinatology" to provide adequate training for various categories of health workers;
- upgrading of the training in perinatal care provided for nurses and midwives;
- encouragement of ongoing perinatal research;
- establishment of better liaison with other perinatal centers in the Caribbean.

Discussion and Conclusions

If the Table 1 data presented on the six study countries are truly comparable, they would appear to indicate that neonatal mortality in these countries is not directly related to differences in their reported gross national products; and this suggests, in turn, that factors such as adequate staffing of health facilities and available knowledge are apt to be more critical than prevailing differences in socioeconomic conditions.

Since most deliveries take place in hospitals, and since most neonatal deaths occur within the first 48 hours after birth, it seems appropriate that particular attention should be paid to providing adequate care for the at-risk pregnant woman and newborn infant within the hospital. Partly for this reason, strict separation of health care into "primary," "secondary," and "tertiary" categories does not seem appropriate for perinatal care in the six study countries. To the extent that such a separation exists, however, it appears that all levels need to be improved. Specifically, the health personnel interviewed during the course of this study felt that upgrading health workers' training in perinatal care at all levels could make a major contribution to reducing both perinatal mortality and the incidence of handicaps arising during the perinatal period.

Another point that should probably be mentioned is that in the Caribbean as a whole over 80% of all deliveries are attended by midwives. Therefore, within this larger context, the upgrading of midwife training and performance is essential.

Overall, with regard to the six study countries, it is possible to identify a number of approaches and specific measures that appear feasible and that could play an important part in improving perinatal care. These include the following:

1) Public health education should be provided through leaflets, posters, booklets, and radio or television messages and spot announcements. Prenatal and postnatal clinics could assist in distributing mimeographed or printed materials throughout the country. Such health education should cover important matters previously noted that are relevant for the general public and should also deal with all aspects of family planning and contraception, especially those of importance for adolescents and women over 35 years of age.

2) Training should be provided for all staff members working in the perinatal care field—both at the community (primary care) level and in the maternity wards providing secondary or tertiary care. This training should include the following: (a) provision of various types of courses in perinatal care for registered nurse/midwives and medical personnel that will help to ensure adequate standards of care in all maternity units; (b) development of regional manpower in perinatal care, so as to provide leadership in various health worker categories and ensure the maintenance of adequate standards in the region; (c) dissemination of up-to-date knowledge in perinatology to various categories of health workers (including the issuance of manuals describing minimum standards of perinatal care, serving as guides to resuscitation equipment, listing basic drugs appropriate for all midwives and hospitals, and guiding the organization of workshop seminars and on-the-job training courses); and (d) training of public health workers.

3) The equipment in all maternity units should...
be upgraded and properly maintained, for which purpose personnel should be trained to maintain it. The basic equipment required for the resuscitation of newborns (see pictures) is as follows:

- mucous extractors,
- bag-and-mask ventilators with different mask sizes for infants with different face sizes (Rendell Baker sizes 00, 01, and 02),
- means of keeping the baby warm (e.g., a portable standing lamp with a 60 to 100 watt bulb),
- a laryngoscope with a straight blade, replacement lamps, and batteries,
- oral/nasal endotracheal tubes (sizes 2.5, 3.0, and 3.5),
- McGill forceps,
- an oxygen supply.

Other equipment essential for care of the newborn includes:
- an accurate scale (see picture),
- a bilirubino-meter (measuring total serum bilirubin from capillary blood),
- a phototherapy unit (a blue lamp with an emission spectrum centered at 440-460 nanometers—see picture),
- a perspex hood to supply oxygen over the head of the infant (different size hoods for different head sizes).

4) Steps should be taken to promote the early detection and management of jaundice in the community.

5) Free distribution of anti-D-globulin should be ensured for Rh-negative mothers who give birth to Rh-positive children (whether live or stillborn).

6) Linkages between delivery of babies in the hospital and their subsequent care in the community should be improved (e.g., by use of a “child health passport” or its equivalent \(19\)).

7) The system for early detection and management of high-risk pregnancies and high-risk children should be improved. Obstetric activities that can reasonably be improved include the management of hypertension, breech presentation, and prolonged rupture of the membranes, as well as management of distressed mothers and their unborn children, mothers with cephalopelvic disproportion, and mothers who are under 17 years old or over 35.

8) Measures should be taken to encourage and provide funding for research in “tropical” perinatology.

9) Development of appropriate technology should be endorsed with an eye to providing maternity units with the necessary equipment and facilities as economically, simply, and efficiently as possible while ensuring proper maintenance of this equipment.

Regarding the educational side of these recommendations, any funding agency wishing to promote implementation of the maternal and child health strategy endorsed some time ago by the Caribbean Health Ministers \(7\) could make a worthwhile contribution by supporting “on-the-job” training courses designed to improve care for at risk mothers and infants, and to overcome the limitations in expertise and facilities in each country involved. It also appears that certain centers of learning, including the University of the West Indies campuses in Barbados, Jamaica, Trinidad, and the Bahamas, and the advanced Medical School of the Netherlands Antilles at Curacao could serve as centers for dissemination of knowledge in this field within a relatively short period of time.

Epilogue

As in many other fields of medicine, “tropical” perinatology differs from “Western” perinatology in many ways. Differences are found in the physiology of the pregnant woman, the pattern of complications commonly found during pregnancy and labor, the pattern of complications experienced by newborn infants, the physiology of the newborn, the composition of the mother's breast-milk, feeding practices during the first year of life, the infant's growth pattern, the motor and neurologic development of the infant, and so forth.

Hardly any information about these differences can be found in commonly used textbooks; and whatever information is given is often placed in a negative context.

In some ways, however, the pregnant woman and newborn living in the tropics are “better off” than their industrialized-country counterparts. Respiratory problems of the preterm infant due to the Respiratory Distress Syndrome are rare compared to Western
standards (30). Although born with a lower average birth-weight, the “tropical” child’s growth tends to be faster just before and during the first month after birth compared to Western standards (31, 32). And the breast-milk of mothers in poor tropical countries tends to contain a fat component that is better absorbed by the young infant than is the fat component of Western breast-milk samples (33, 34). All in all, it appears that tropical perinatology and the particular countries involved have sufficiently distinctive characteristics and conditions so that it is not appropriate to simply apply “Western” knowledge and care in a “tropical” setting. Rather, the knowledge disseminated and applied should be predicated upon each country’s local conditions, facilities, and experiences. Put simply, a holistic approach is required.

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SUMMARY

In view of Caribbean Government concern about perinatal problems, combined with very limited resources for conducting perinatology training programs, the Government of the Netherlands sponsored a study of perinatal conditions in six Caribbean countries—Antigua, the Bahamas, Barbados, Dominica, Saint Lucia, and St. Vincent. The study, conducted in December 1981, involved a series of visits to the six countries, assessment of the data available there, and discussion of the situation with local health authorities.

Hospital data from the six countries indicated wide divergences in the rates of stillbirths and neonatal deaths. However, when the two rates were combined into one (perinatal mortality) a good deal of the divergence disappeared, suggesting that much of it could have been accounted for by the problems involved in accurately classifying stillbirths versus neonatal deaths on official registers. In general, perinatal mortality in the six countries appeared to range from about 29 deaths per thousand births in Dominica to about 38 deaths per thousand in St. Vincent. Complications following perinatal asphyxia (anoxia or hypoxia), complications of prematurity, and infections of the newborn were the main causes of perinatal death. The average birth-weight of newborns was found to range between 3,000 and 3,150 grams in the six countries, while the incidence of low birth-weights (≤ 2,500 grams) appeared to range from 6 to 11%.
With regard to infant feeding, breast-feeding was said to last anywhere from one month on the average in the Bahamas to seven months on the average in St. Vincent. Bottle-feeding typically began anywhere from immediately after birth (in the Bahamas) to three or four weeks after delivery (in Antigua and Barbados).

In general, health personnel interviewed in the course of the study felt that upgrading health workers' training in perinatal care at all levels could make a major contribution to reducing both perinatal mortality and the incidence of handicaps arising during the perinatal period. Other basic recommendations for improving perinatal health in most of the study countries include improved health education for the general public; provision and effective maintenance of adequate resuscitation and other equipment; better early detection and management of jaundice; ensured free distribution of anti-D-globulin for Rh-negative mothers delivering Rh-positive birth products; introduction of a "child health passport" and other measures designed to improve coordination between health workers delivering babies and others providing pediatric care; improvement of the system for detecting and managing high-risk mothers and newborns; encouragement of research on "tropical" perinatology; and development of technology suitable for perinatology services in the Caribbean.

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FIRST INTERNATIONAL SEMINAR ON DENGUE HEMORRHAGIC FEVER IN THE AMERICAS

A seminar sponsored by the Puerto Rico Department of Health, the Pan American Health Organization, and the United States Centers for Disease Control will be held in San Juan, Puerto Rico, on 14-16 June 1985.

The purpose of the seminar is to better inform medical communities and health officials in the Americas about the potential threat of epidemic dengue hemorrhagic fever, to acquaint them with current methods of diagnosis and treatment, and to emphasize the need for prevention and control measures.

Seminar presentations, to be made by invitation only, will deal with clinical diagnosis and treatment, pathophysiology, pathogenesis, vaccines, laboratory diagnosis, surveillance, and control.

Inquiries regarding the seminar should be addressed to Duane J. Gubler, Chief, Dengue Branch, and Director, San Juan Laboratories, Centers for Disease Control, CID, G.P.O. Box 4532, San Juan, PR 00936, U.S.A.