A CLINICO-EPIDEMIOLOGICAL EVALUATION OF INFANTS BORN BEFORE ARRIVAL AT HOSPITAL

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Babies born before arrival (BBA) at a hospital constitute a special group with regard to mortality and morbidity. Births at home in England and Wales have fallen significantly from 3.2% in 1975 to 0.95% in 1987,[1] and some studies in the 1970s focused on mortality and morbidity rates and social factors associated with home births.[1-6] However, there is a lack of clinical data on the prevalence of BBA in the Middle East. We therefore conducted this prospective study to estimate the rate of BBA and the mortality and morbidity rates associated with such deliveries.

Subject and Methods

This was a prospective study of 100 consecutive babies born before arrival at Khoula Hospital, a tertiary care hospital at Muscat, Oman, which caters for about 3500 deliveries per year. All BBA babies born from November 1997 through August 1998 were studied. A detailed history of time and place of birth, obstetric history, antenatal risk factors and complications, booking and immunization status were taken. The distance between home and hospital was recorded from maps, and the reasons for delay in arriving at the hospital were noted.

On admission, temperatures were recorded, gestational assessment was done by Dubowitz's scoring,[7] and a complete blood count (CBC) was done at 6 hours of age by Cell Dyn–3500R (Abbott Diagnostics, Abbott Laboratories, IL 60064). Serum bilirubin measurement was done by timed end-point Diazo method (Synchrom CX 5CE system by Beckman). Blood cultures were taken in Oxoid Signal Blood Culture System medium (Oxoid Ltd, Basingstoke, England). Glycemic control was monitored in all the babies for 48 hours. The presence of morbidity factors like hypothermia (core temperature of less than 35ºC), hypoglycemia (blood sugar of less that 2.2 mmol/L), prematurity (gestational age of less than 37 weeks), respiratory distress (respiratory rate of more than 60/min), sepsis (positive blood and/or cerebrospinal fluid [CSF] culture), polycythemia (venous hematocrit of more than 65%), anemia (hematocrit of less than 40%), and birth asphyxia were all recorded.

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Results

Out of 3459 deliveries in the study period, 100 babies (2.9%) were born before arrival at a hospital. Comparison of the distance which the mother had to cover between home and hospital for the BBA group and a random sample of inborn babies is shown in Table 1. The vast majority of women (98%) giving birth to BBA babies were multigravida. The place of delivery in 82% of babies was at home, while 18% delivered in a vehicle on the way to the hospital. The umbilical cord was cut at home or in the car in an unsterile environment in 20 cases (20%), and in 80 cases (80%) the cord was cut in hospital by the staff nurse. All the mothers were booked at a neighboring health facility and had had an antenatal follow-up, and the tetanus immunization status was 100%. The reasons for BBA were analyzed and are shown in Table 2. Several morbidity factors were analyzed and are also shown in Table 3. Sixty-two BBA babies (62%) needed admission to the Special Care Baby Unit (SCBU) for various reasons. During the corresponding period, there were 3359 hospital deliveries, of which 531 babies (15.8%) were admitted to SCBU. Bacteriologically proven sepsis was seen in two cases (2%) and the organisms isolated from blood and/or CSF were *E. coli* and *S. aureus*.

Of the babies in the BBA group, two (2%) died—one of meningitis with *E. coli* and the other of severe birth asphyxia. The neonatal mortality rate in the BBA group was 20 per 1000, as compared to 2.5 per 1000 in the hospital-born group during the study period. The hospital stay of BBA babies was more than 48 hours in 66 cases (66%), as compared to fewer than 5% in the control group of hospital-born babies.

Discussion

The analysis of BBA babies shows that they comprise 2.9% of all deliveries in our region. Some earlier studies on home births in the U.K. showed incidence rates varying between 0.44% and 2.2%. [1,2] The place of birth for BBA

babies shows that the majority of the deliveries occur at home because of a multiplicity of factors, and that a small number of these occurred on the way to hospital. When analyzed, the reasons for home delivery showed that in most cases, adequate transport facilities were not available at the time of active labor, or that active labor occurred when a husband or a relative was not available at home. Increasing distance from hospitals is a significant risk factor for BBA,[2] and in the majority of BBA infants in our study, the mother had to cover a distance of more than 10 km to reach the nearest hospital. Precipitate labor, usually a feature in multiparous women, also contributed to a small percentage of BBA deliveries in our study group.

TABLE 1. *Distance from home to hospital in BBA and random sample of hospital-born infants.*

Distance in kilometers	BBA (%)	Random (%)
Less than 10	9	47
More than 10	91	53
Total	100	100

TABLE 2. *Reasons for BBA deliveries.*

Reason for BBA	Number of women
No transport	56
No relative at home	26
Rain/flash floods	10
Precipitate labor	7
Not sure of labor	1
Total	100

TABLE 3. *Morbidity pattern in BBA group.*

Type of morbidity	No. of births
Polycythemia	22
Hypoglycemia	18
Hypothermia	9
Anemia	5
Prematurity	5
Sepsis	2
Severe birth asphyxia	1
Non-moribund	38
Total	100

Gestational age assessment of the studied population showed that the majority of BBA babies were term babies, which signifies that premature deliveries in Oman do not comprise a risk factor for BBA. Analysis of maternal parity revealed that women of higher parity were more likely to deliver before arrival in a hospital, as a majority of the BBA babies belonged to a multigravida mother in our studied population. The multiparity rate among the studied population was 75% and the higher rate of BBA among multigravida may also be related to the high multiparity rate in this population. Similar observations have been made in other studies which noted that multiparous women were more likely to deliver before arrival due to pre-labor spontaneous rupture of membranes.[4] This could also be attributed to the casual approach of patients and relatives towards labor, as well as a shortened second stage of labor in multigravida mothers. Multiparous mothers, therefore, need to be kept under close

observation in the latter part of pregnancy by relatives and attending primary care doctors.

As BBA babies comprise a special group with its own complications and risk factors, we also reviewed the morbidity rate. About 62% of the babies needed admission to a neonatal unit for various reasons. The polycythemia and anemia in these babies could be related to cord clamping time and positioning of the baby in relation to the placenta. However, these factors could not be ascertained precisely, because the delivery occurred at home or on the way to hospital. Hypothermia was not a significant morbidity factor and was seen in 9% of cases, which is low compared to BBA studies conducted in Western countries.[2,4] This could be because of the warm climatic conditions in the Middle East, which provide a more suitable temperature for the newborn even before they are wrapped up properly. Hypothermia, however, can be a significant morbidity factor in cold weather conditions in any part of the world.[2,4]

There was a significant increase in the mortality in the BBA group, which was eight times higher than that of the hospital-born babies in the corresponding period. Other studies have also pointed towards a higher perinatal mortality in BBA babies, and a higher incidence of neonatal sepsis.[1-5]

With improvements in health facilities in Oman, there has been an increased awareness among the general population of the importance of hospital deliveries, as mothers who deliver at home try to reach a hospital as soon as possible for the purpose of birth registration, which is not otherwise possible.

The concept of planned or intentional home deliveries is currently not common in Oman. Better education of women during antenatal visits regarding the importance of hospital delivery and the dangers associated with home deliveries, the proper method of cord cutting by sterile instruments in case of unavoidable home delivery, improvements in the socio-economic status and in the level of education can all play a role in further reducing the number of home deliveries and, therefore, the morbidity related to births before arrival at hospital.

References

1. Campbell R, Davies IM, et al. Home births in England and Wales, 1979. Perinatal mortality according to intended place of delivery. BMJ 1984;289:721-4.
2. Bhoompalam PS, Watkinson M. Babies born before arrival at hospital. Br J Obstet Gynaecol 1991;98:57-64.
3. Murphy JF, Dauncey M, Gray OP, Chalmers I. Planned and unplanned deliveries at home: implications of a changing ratio. BMJ 1984;288: 1429-32.
4. Herve C, Gaillard M, Metadier D, et al. Deliveries outside maternity hospitals: 5-year prospective study apropos of 150 cases. Arch French Pediatr 1986;43:513-6.
5. Mondal GP, Raghavan M, Bhat B, et al. Neonatal septicemia among inborn and outborn babies in a referral hospital. Indian J Pediatr 1991; 58:529-33.
6. Spillane H, Khalil G, Turner M. Babies born before arrival at the Coombe Women's Hospital, Dublin. Irish Med J 1996;89:58-9.
7. Nelson WE, Behrman RE, Kliegman RM, Arvin AM. Prematurity and intrauterine growth retardation. In: Nelson Textbook of Pediatrics. 15th edition. Philadelphia: WB Saunders Company, 1996:454-62.