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Perinatal mortality in home births in rural Tanzania

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Abstract

Objective: To compare perinatal mortality, stratified for risk level, in home births attended by a relative or traditional birth attendant without formal training with births attended by trained personnel in a dispensary or hospital. **Study design:** A prospective community based study in five villages in Northwestern Tanzania during 1990, involving 222 women delivering at home and 199 in a dispensary or hospital. **Results:** Twenty-two of the 29 (76%) perinatal deaths occurred in home births. Perinatal mortality, stratified for risk level, was three times higher in home births than it was in births in dispensaries or in hospital (Mantel–Haenszel odds ratio, 3.29; 95% CI, 1.28–9.22). **Conclusions:** This study re-emphasises that all births should be attended by adequately trained personnel. More effective strategies are needed to convince women with high risk pregnancies to deliver in hospital. Emergency referral services are required to deal with unexpected complications arising in low risk births at home.

Keywords: Perinatal mortality; Home births; Hospital births; Tanzania

1. Introduction

It is widely accepted that the quality of maternity care is a main determinant of maternal mortality ratios [1], but it is doubtful whether this applies as much to perinatal mortality. Twenty-five years ago, Baird suggested that the fall in perinatal mortality rates (PMR) in developed countries was due to improved socio-economic conditions rather than medical care [2]. In the developed world there is no evidence that a universal policy of delivery in a hospital is safer than delivery at home assisted by a skilled midwife or doctor [3]. Yet, few countries have incorporated home delivery in their obstetric care network, the Netherlands being an exception with one-third of all births taking place at home. In that country the organizational structure is characterized by a well-organized profession of independent, well-trained midwives, focusing on home deliveries in low risk pregnancies. Such adequate structure of primary obstetric care was judged to be a prerequisite for a home

delivery system [4]. This is not the case in many developing countries, where non-institutionalized birth is the rule rather than the exception.

The present study, therefore, compared perinatal mortality of home births in rural Tanzania attended only by a relative or a traditional birth attendant (TBA) without formal training with that in births attended by trained personnel in a dispensary or hospital.

2. Material and methods

A prospective community based study was performed in Kwimba District in the Mwanza region of Northwestern Tanzania, involving all births during 1990 in five rural villages. Selection of the villages was based on consent of the population of the villages and its leaders, the motivation of the village health workers who were working in the villages and the distance to Sumve District Hospital (12–27 km).

One of us (R.J.B.M.) conducted a fortnightly clinic in each of the villages. At the first visit, each woman was given a standard Tanzanian antenatal card, which was filled in at subsequent visits. This card, based on an evaluation of risk factors in pregnant women in the Dar es

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Salaam region [5] and modified for national use, has sections for maternal, antenatal and intrapartum risk factors (Table 1). R.J.B.M. screened the women for maternal and antenatal risk factors. Information on home births was collected postpartum by R.J.B.M. in a personal interview with the birth attendant, using a structured questionnaire in the local language. For births in a dispensary or hospital a questionnaire was filled in by the trained attendant.

Early enrolment and regular attendance for antenatal care was encouraged by the village health workers, who were also trained to report the outcome of pregnancies, and to assist R.J.B.M. during his visits to the village. Birthweights were measured within 24 h of delivery in a nearby dispensary or in hospital. Additional information was obtained by R.J.B.M. through follow-up at home whenever the data were incomplete. Women identified with high risk pregnancies were encouraged to deliver in the hospital. Roads in the area were in such poor condition that ambulance services were impossible. Often the only available means of transport for emergency cases was a bicycle or an oxcart.

The perinatal mortality was determined according to

the Standard Perinatal Mortality for international comparison, which includes all stillbirths and first-week deaths of infants weighing 1000 g or more [6]. If cultural taboo precluded weighing the infant, cases were only included when gestational age was known to be at least 28 completed weeks (assessed by a combination of the menstrual history and symphysis fundal height measurements).

In the analysis two forms of care, stratified for low and high risk, were compared: birth at home by a relative or a TBA without formal training, and birth in a dispensary or hospital by trained staff (institutional birth). Women with at least one risk factor were assigned to the high risk group, and women without risk factors to the low risk group (Table 1). Perinatal mortality rates in the four groups were compared and analysed in 2×2 tables.

For comparison between groups, Student's unpaired *t*-test and the χ^2 -test with Yates' correction were used (significance-level at $P < 0.05$). Stratified, weighted Mantel-Haenszel odds ratios were calculated together with 95% confidence intervals, using the Epi Info statistical package [7].

3. Results

A total of 447 pregnant women entered the study. Seventeen women moved out of the study area during pregnancy, six aborted and there were three cases of pseudopregnancy. This analysis is thus based on 421 births with a known outcome; birthweight was measured in 419 of the 427 newborns.

Characteristics of the women who gave birth at home, and those who gave birth in a dispensary or hospital are shown in Table 2. Women who delivered at home had significantly fewer years of education than those delivering in a dispensary or hospital ($P < 0.01$).

The 421 women gave birth to 427 newborns; there were 12 stillbirths and 17 early neonatal deaths (Table 3). This gives an overall perinatal mortality rate of 68/1000 births. A total of 222 women delivered at home (53%), accounting for 22 of the 29 (76%) perinatal deaths. Eighty women (19%) delivered in a dispensary, and 119 women (28%) in the hospital. Two perinatal deaths were due to lethal congenital abnormalities: one in the home births group and one in the institutional births group. Three twin-deliveries occurred in each group and two twins, one in each group, died.

No risk factors were present in 326 women (73%); the other 115 women had a total of 162 risk factors (Table 4). At least one maternal risk factor was present in 101 women; 12 women developed risk factors during pregnancy and 16 during labour. Of the 57 identified high risk women delivering at home, 22 (39%) had at least 4 years education.

Perinatal mortality was two to three times higher in

Table 1
Risk factors on the Tanzanian antenatal card

Maternal

- Younger than 16 and older than 35 years
- Height less than 150 cm
- Limp or polio leg
- Gravida 8 or more
- Previous cesarean section
- Vacuum extraction previous delivery
- Previous third stage complications
- Ten years or more since last delivery
- Stillbirth or neonatal death in last pregnancy
- More than one stillbirth or neonatal death

Antenatal risk factors

- Blood pressure above 140/90 mmHg
- Proteinuria
- Gross oedema
- Vaginal blood loss
- Suspected intrauterine death
- Uterus small or large for dates
- Suspected postmaturity
- Unstable lie or malposition
- Intercurrent illnesses

Intrapartum risk factors

- Spontaneous onset of labour or rupture of membranes before 37 weeks
- Malposition in labour
- Antepartum hemorrhage
- Fever higher than 38°C
- Ruptured membranes more than 12 h
- Strong contractions more than 12 h
- Fetal heart rate above 160 or below 120 beats/min
- Meconium stained amniotic fluid
- Failure of cervical dilatation (less than 1 cm/h)

Table 2
Characteristics (means or proportions) of women giving birth at home compared with women giving birth in institutions

	Home birth (n = 222)	Institutional birth (n = 199)
Age (years)	24.9 (6.4)	24.2 (6.2)
Parity	2.9 (2.8)	2.5 (2.6)
Number of children alive	2.6 (2.8)	2.2 (2.3)
Number of antenatal visits	3.7 (1.8)	3.8 (2.0)
Education (years)*	4.0 (3.2)	4.8 (3.0)
Primigravida (%)	21.2	24.1
Height (cm)	157 (7.5)	156 (8.5)
Predelivery:		
Weight (kg)	58.5 (7.9)	58.6 (6.8)
Arm circumference (cm)	24.0 (2.2)	24.2 (1.9)
Fundal height (cm)	33.4 (2.3)	33.2 (2.4)
Mean birth weight (singletons) (g)	3028 (440)	3042 (512)
LBW (< 2500 g) (%)	10.4	9.6

Standard deviations are in parentheses. LBW, low birthweight.

*Difference significant at $P < 0.01$.

home births than in institutional births (Table 5). Among low risk pregnancies perinatal mortality rate in home births was five times higher than in institutional births (73 vs. 14), while perinatal mortality in the high risk group was twice as high at home than in institutions (167 vs. 82). The perinatal mortality rate in low risk pregnancies at home was similar to the rate in high risk pregnancies in a dispensary or hospital: 73/1000 versus 82/1000.

Untrained attendants may have difficulty in recognizing risk factors during labour, and this could have reduced the recorded numbers of high risk deliveries at home. However, even when births with intrapartum risk factors are categorized as low risk, the perinatal mortality remains significantly higher at home than in institutions (Table 6).

Table 3
Outcome in 421 women, 222 of them giving birth at home compared with 199 women giving birth in institutions

	Home birth (n = 222)	Institutional birth (n = 199)	Total (n = 421)
Newborns ^a	225	202	427
Live births	217	198	415
Stillbirths	8	4	12
Early neonatal deaths	14	3	17
Perinatal mortality rate (per 1000 births)	98/1000	35/1000	68/1000

^aIn each group three sets of twins were born.

Table 4
Distribution of maternal, antenatal and intrapartum risk factors between women giving birth at home compared with women giving birth in institutions

Risk factors ^a	Home birth 57 women	Institutional birth 58 women	Total 115 women
Maternal risk factors	69	58	127
Antenatal risk factors	4	11	15
Intrapartum risk factors	5	15	20
All risk factors	78	84	162

^aSee Table 1.

4. Discussion

Few studies in Africa compare home deliveries by birth attendants without formal training with institutional deliveries by trained staff [8]. In our study, comparison of means and proportions between the two forms of care over a variety of characteristics showed no significant differences between the women, except in terms of education. The latter difference may be important, because a lower level of education may relate to an overall lower socio-economic status. Remarkable, though, is the considerable proportion of better educated women identified as being high risk, who delivered at home.

In general, women with high risk pregnancies showed poor compliance, as half of them did not deliver in a hospital. This was also found by others [10,11]. Van Roosmalen emphasised that the use of risk factors should not only consider the involved risks, but also the available resources in the community [12]. Further study of specific combinations of risk factors may reduce the percentage of women labelled as high risk.

Table 5
Perinatal mortality rate per 1000 births (PMR) in women giving birth at home compared with women giving birth in institutions, stratified for high and low risk births

	High Risk PMR (deaths/n)	Low Risk PMR (deaths/n)	Total PMR (deaths/n)
Home birth	167 (10/60)	73 (12/165)	98 (22/225) ^a
Institutional birth	82 (5/61)	14 (2/141)	35 (7/202)
Total	124 (15/121)	46 (14/306)	68 (29/427)

^aThe Mantel-Haenszel odds ratio of perinatal mortality for home and institutional births, stratified for high and low risk, was 3.29 (95% confidence interval, 1.28-9.22).

Table 6
Perinatal mortality rate per 1000 births (PMR) in women giving birth at home compared with women giving birth in institutions, stratified for high and low risk, when births with intrapartum risk factors are categorized as low risk

	High risk PMR (deaths/n)	Low risk PMR (deaths/n)	Total PMR (deaths/n)
Home birth	123 (7/57)	89 (15/168)	98 (22/225) ^a
Institutional birth	56 (3/54)	27 (4/148)	35 (7/202)
Total	90 (10/111)	60 (19/316)	68 (29/427)

^aThe Mantel-Haenszel odds ratio of perinatal mortality for home and institutional births, stratified for high and low risk, was 3.06 (95% confidence interval, 1.22–8.61).

The emphasis should be on those conditions that can be diagnosed with high sensitivity and specificity at community level [13].

Our data show a perinatal mortality rate two to three times higher for women delivering at home than in institutions. These results are in agreement with a study of a 'Faith Assembly' group of people in Indiana USA, who did not seek prenatal care and who delivered at home without trained attendants: perinatal mortality rate was three times higher than current rates in that area [14]. On the other hand, in Machakos, Kenya, perinatal mortality was found to be surprisingly lower in home births than in hospital [9]. The following possible explanations were given: the readily available health facilities in that district with reasonably good roads, the comparatively good nutrition of women and children, the absence of endemic malaria and the little interference by those who attended home deliveries.

The present study strongly suggests that there are large risks in home deliveries supervised by attendants without formal training. However, it was not possible to differentiate between avoidable deaths at home due to unqualified obstetric care or poor transfer facilities from home to hospital. It is quite likely that a combination of both factors are responsible for the high perinatal mortality rate at home. Hospital delivery for all may not be feasible and is not necessary. Strategies to reduce perinatal mortality should include the following elements: (1) the availability of trained caregivers for each birth, (2) hospital birth for high risk pregnancies, (3) efforts to convince women with high risk pregnancies to deliver in hospital, and (4) emergency referral services for dealing with unexpected complications arising in low risk deliveries at home. There is consensus that traditional birth attendants and other community health workers must

be trained. Furthermore, they should not work in isolation, but be linked to an efficient supervisory and referral system [15,16]. This requires team building and working effectively together. It should also include delegation of responsibilities, based on knowledge of ethno-obstetric practices, and innovative approaches to basic and continuing education [14].

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