Obstetric care in southern Tanzania: does it reach those in need?

Albrecht Jahn¹, Marga Kowalewski¹ and Suleiman S. Kimatta²

¹ Department of Tropical Hygiene and Public Health, Heidelberg University, Heidelberg, Germany
² UNICEF, Dar es Salaam, Tanzania

Summary

OBJECTIVE To assess whether antenatal care achieves identification and timely referral of high-risk pregnancies in southern Tanzania.

METHODS We compared the risk profiles of pregnant women in general with those attending obstetric care and investigated the reasons for seeking care. The risk profile of inpatients was drawn up through interviews with maternity cases and analysis of their antenatal records at the regional referral hospital (n = 415); population-based data on the prevalence of specific risk factors were obtained from entries in antenatal care registers (n = 1630) and from literature.

RESULTS A significant risk selection towards obstetric referral level care was observed only for previous caesarean section (prevalence hospital 6.7%, all pregnancies 1.5%, P < 0.005) and for nulliparity (hospital 42.8%, all pregnancies 25.0%, P < 0.005). No significant differences were observed for other risk factors such as previous perinatal death, height < 150 cm, multiple gestation and breech presentation. Prevalence of the risk factors age > 34 years and grand multiparity was significantly lower among hospital users. Coverage of obstetric care was below 50% for all risk factors except previous caesarean section (91.5%).

CONCLUSION Despite pursuing the risk approach and very good coverage, antenatal care in Tanzania has only limited effect on extending obstetric care to high-risk mothers. A critical review of the present screening and counselling practices, including a more focused and client-centred application of risk assessment, is warranted.

KEYWORDS Safe motherhood, antenatal care, referral system, risk approach, Tanzania

CORRESPONDENCE Dr Albrecht Jahn, Department of Tropical Hygiene and Public Health, Heidelberg University, Im Neuenheimer Feld 324, 69120 Heidelberg, Germany. E-mail: Albrecht.Jahn@urz.uni-heidelberg.de

Introduction

Reduction of maternal and perinatal mortality depends on provision of quality obstetric services, such as obstetric surgery and blood replacement, which can only be provided in a hospital setting (WHO 1991). An important aim of screening in antenatal care is to identify pregnancies likely to develop complications. These have then to be referred early to a level of care with the necessary expertise and equipment to prevent or minimize the anticipated adverse pregnancy outcome. A link between facilities providing first-level antenatal and delivery care and the referral hospital providing back-up obstetric care is essential for the management of high-risk pregnancies as well as obstetric emergencies. This link is a serious bottleneck (Rooney 1992; Dujardin et al. 1995; Juncker & Vanneste 1995; McDonagh 1996).

Our study was triggered by the observed coexistence of an almost complete coverage (> 95%) of antenatal care (Tanzania Bureau of Statistics 1992), the use of an action-orientated antenatal card with clear referral criteria (Table 1) and persistently high maternal mortality (572–960/100 000 live births) (Urassa et al. 1995; WHO 1996a; Macleod & Rohde 1998) and perinatal mortality (71/1000 live births) (World Bank 1993). We set out to investigate the extent to which health services in southern Tanzania succeed in providing obstetric care to high-risk pregnancies and deliveries as stipulated by national guidelines (Table 1). As antenatal screening and monitoring of deliveries should result in a highly risk-selected clientele at referral level, we compared the prevalence of risk factors in users of referral-level obstetric care to the prevalence in pregnant women in general.
Our specific objectives were to determine the coverage of obstetric referral level care for high-risk pregnancies; to determine the potential of specific risk factors to trigger referral; and to identify determinants for use of referral level care other than risk status.

**Methods**

**Study setting**

The study was conducted in 1996 in Mtwara Region in southern Tanzania, one of the country’s less developed areas where the population is predominantly rural. The study covered Mtwara Urban and Mtwara Rural Districts with a combined population of 274 325 (Tanzania Ministry of Health 1995). Based on the regional crude birth rate of 43 per 1000 (Tanzania Bureau of Statistics 1992), the number of expected deliveries in 1996 was 11796. The regional hospital in Mtwara town is the only facility providing obstetric referral-level care for both districts. A cross-check with hospitals in neighbouring districts revealed little in-and outflow of obstetric patients to and from other districts (5.6% vs. 4.8%). Antenatal and delivery care is provided by 49 first-level health facilities. Coverage of antenatal care in Mtwara Region is almost complete with 99% and comprises on average 5 consultations (Tanzania Bureau of Statistics 1992). Most deliveries (61%) take place at home, 18% in first-level facilities and 21% at hospital. According to health service statistics, maternal mortality is 231 per 100 000 live births (Tanzania Ministry of Health 1995). However, registration is incomplete and surveys in comparable areas of Tanzania suggest that maternal mortality exceeds 500 per 100 000 live births (AMMP 1997; MacLeod & Rohde 1998). The study comprises a hospital-based part investigating the risk profile of users of obstetric care and a population-based part investigating the risk profile of pregnant women in general.

**Data sources**

For the hospital-based cross-sectional study, we interviewed all but two women (who refused) admitted to the maternity unit of Mtwara Hospital during a 2-month period (June-July 1996) on the day of admission and analysed their antenatal cards (n = 415). A structured questionnaire included questions on risk factors, obstetric history, referral status and reasons for seeking obstetric care. The interviews were conducted with the help of two local interviewers in Kiswahili and then translated into English. At Mtwara Hospital there were no major seasonal changes in admissions. The monthly number of admissions in the study period was close to the yearly average (208 vs. 211).

The delivery book recorded breech presentation and multiple pregnancy on a routine basis. The prevalence of these relatively rare events was derived from entries in the 1996 delivery book, covering 1271 deliveries in the period January to July 1996. Data on the place of residence of patients who had undergone caesarean section (n = 141) were derived from the theatre register covering the period August 1995 to July 1996.

For population-based reference values for prevalence of risk factors we consulted the registers of antenatal clinics, which contain data on risk factors such as previous surgical delivery, first pregnancy, young age and height. Given the almost complete coverage of antenatal care (99%), attendees of antenatal clinics were regarded as representative for all pregnant women. Ten of the 49 first-level health units in the Mtwara districts were randomly selected by lottery method. The registers of these 10 units and of the antenatal clinic of the regional hospital were analysed for all entries from January to May 1996 (n = 1630). Reference values for risk factors not documented there were taken from the Tanzanian Demographic and Health Survey (Tanzania Bureau of Statistics 1992) for multiparity and age > 35 (n = 8032); the study of Moller et al. (1989) in rural Tanzania for breech

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**Table 1 Risk factors and referral criteria according to the Tanzanian antenatal card**

<table>
<thead>
<tr>
<th>Medical history</th>
<th>≥ 10 years since last delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≥ 3 abortions</td>
</tr>
<tr>
<td>Age &lt; 16 or &gt; 35 years</td>
<td></td>
</tr>
<tr>
<td>History of postpartum haemorrhage or retained placenta</td>
<td></td>
</tr>
<tr>
<td>Intercurrent illnesses (TB, heart, diabetes)</td>
<td></td>
</tr>
<tr>
<td>Limping</td>
<td></td>
</tr>
<tr>
<td>Multiparity ≥ 8</td>
<td></td>
</tr>
<tr>
<td>Perinatal death in previous pregnancy</td>
<td></td>
</tr>
<tr>
<td>Previous caesarean section</td>
<td></td>
</tr>
<tr>
<td>Previous vacuum or forceps delivery</td>
<td></td>
</tr>
<tr>
<td>Short primigravida (&lt; 150 cm)</td>
<td></td>
</tr>
</tbody>
</table>

**Findings related to pregnancy – antenatal**

- Anaemia ≤ 8.5 g/%
- Blood pressure > 140/90
- Gross oedema
- Malposition (breech, transverse)
- Postmaturity
- Proteinuria
- Suspected intrauterine death
- Uterus large or small for date
- Vaginal bleeding

**Findings related to pregnancy – delivery**

- Antepartal or postpartal haemorrhage
- Convulsions and/or blood pressure > 140/90
- Fever > 38 ºC
- Foetal distress
- Obstructed labour (> 12 h)
- Premature labour
- Premature rupture of membranes

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The spatial population distribution was derived from the 1988 census (Tanzania Bureau of Statistics 1991). Differences in hospital-based and population-based prevalence of risk factors were tested for statistical significance using the \(\chi^2\)-test and test for a single proportion (Kirkwood 1988). The risk-specific coverage of obstetric care was derived from the above hospital-based and population-based prevalence rates. Pre-eclampsia and anaemia are excluded because we could not obtain population reference values, either from literature or from antenatal documents, as screening for these conditions was incomplete.

**Results**

**Risk-specific coverage of referral level obstetric care**

Comparing the risk profile of pregnant women in general with that of women attending the regional hospital reveals that the prevalence of most risk factors is similar (Table 2). Only the risk factors previous caesarean section and, to a lesser degree, nulliparity, lead to significant selection towards referral level (for both \(P < 0.001\)). The risk factors multiparity and age \(> 34\) years are associated with a significant avoidance of referral-level care (for both \(P < 0.001\)) and thus with the opposite of the expected behaviour. Correspondingly, the coverage of obstetric care is low for most risk-factors; only women with previous caesarean section approach complete coverage. Concerning risk factors emerging during pregnancy, the sensitivity of antenatal screening was low: only 2 of the 8 twin pregnancies and 3 of 14 breech presentations delivered in hospital were recognized in advance. In hospital users the prevalence of anaemia with Hb \(< 8.5\) g/dl (cut-off point in the antenatal card) was 21.7% (90 cases); with Hb \(< 7.0\) g/dl, 7.0% (29 cases). However, only 7 women were referred due to their anaemia. The prevalence of pre-eclampsia/eclampsia in the hospital was 2.1%; 5 of the 9 cases were identified and referred through antenatal screening.

**Referral status: institutional vs. self-referral**

Referrals triggered by health workers because of specific risk factors or health problems were classified as institutional and comprised 30.1% \((n = 125)\) of all users of obstetric care. Referrals triggered by the patient herself or her family were classified as self-referral and constituted 52.3% \((n = 217)\). A third category of referrals concerned patients who had received a recommendation from health workers to attend hospital without giving their individual risk status. In these cases, the reasons stated by health workers were safety of hospital delivery in general and the temporary inability of the dispensary to conduct deliveries. This group constituted 17.6% \((n = 73)\).

**Reasons for referral**

Most patients (55.2%; 229/415) attended hospital not for specific individual health problems but because of the general perception of better service and safety. Among those with specific medical reasons \((n = 186)\), nulliparity, pain and previous caesarean section accounted for more than half (55%) of referrals (Table 3). The proportion of institutional referrals varied widely depending on the specific reason. In case of previous caesarean section, first pregnancy or multiparity, most referrals were triggered by health services, while in case of bleeding, pain or vaginal discharge women tended to self-referral.

<table>
<thead>
<tr>
<th>Table 2</th>
<th>The prevalence of risk factors in pregnant women in general, and in those using referral level care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk factor</td>
<td>Prevalence of risk factor in total population (%)</td>
</tr>
<tr>
<td>-----------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>Previous caesarean section</td>
<td>1.5 a</td>
</tr>
<tr>
<td>Nulliparity</td>
<td>25.0 a</td>
</tr>
<tr>
<td>(&lt; 17) years</td>
<td>3.0 a</td>
</tr>
<tr>
<td>Antepartum haemorrhage</td>
<td>3.1 b</td>
</tr>
<tr>
<td>Previous perinatal death</td>
<td>5.3 c</td>
</tr>
<tr>
<td>Breech presentation</td>
<td>2.6 d</td>
</tr>
<tr>
<td>Height (&lt; 150) cm</td>
<td>25.6 a</td>
</tr>
<tr>
<td>Multiple pregnancy (&gt; 7) pregnancies</td>
<td>14.6 e</td>
</tr>
<tr>
<td>Multiparity</td>
<td>13.7 e</td>
</tr>
</tbody>
</table>

* \(P < 0.001; a\), Antenatal clinic records \((own\ data, n = 1630)\); b, Francome & Savage (1993); c, World Bank (1993); d, Moller et al. (1989), rural Tanzania \((n = 707)\); e, Tanzania Bureau of Statistics (1992), Tanzania Demographic and Health Survey \((n = 8032)\).
Timing of referral

The referral guidelines in the antenatal card are divided in indications for immediate referral, for hospital delivery and for emergency intrapartum referral. Along this line, we categorized referrals as antenatal (during pregnancy before onset of labour), for delivery and emergency intrapartum. Of the 415 admissions observed, 15.9% were antenatal, 82.9% were referrals for delivery, and only 5 (1.2%) were obstetric emergency referrals. In relation to the expected deliveries in the districts, the referral rates were 3.4% for antenatal, 17.5% for delivery and 0.3% for emergencies.

The main reasons for antenatal referrals were pain, anaemia, bleeding, intrauterine death, vaginal discharge and fever. Reasons for emergency referrals were obstructed labour \( (n = 3) \) and foetal malpresentation \( (n = 2) \). Two of the 5 emergencies originated from nearby the hospital, 3 from places more than 10 km away. Sixty-three (43.4%) of the 145 admissions for delivery from distances over 10 km had moved closer to hospital, usually to relatives in town. In 33 cases (22.8%) this move was related to specific health problems, mainly first pregnancy, malpresentation, bleeding and previous caesarean section.

Use of obstetric care and obstetric interventions in relation to distance from the hospital

Most (57.7%) obstetric care users originated from within a 10 km-radius around the hospital, where only 31.8% of the expected deliveries in Mtwar Districts took place. As shown in Figure 1, the proportion of obstetric care users declines sharply with distance from hospital. There also is a decline in population-based rates of caesarean sections beyond 10 km, but they remain stable at around 1% even if distance increases further.

Discussion

According to the risk approach, users of referral level obstetric care should constitute a selected group of women with high-risk pregnancies (WHO 1991, 1996b). However, reality looks different: There is little risk selection overall and only few established risk factors (previous caesarean section, first pregnancy) lead to a marked selection towards referral level. The proportion of antenatal referrals before onset of labour and of emergency referrals sub partu is particularly low, even in the population close to the hospital. Distance from home to hospital rather than risk status is the most important determinant for using obstetric referral level care.

Professionally defined need for referral level care vs. actual care-seeking behaviour

According to risk status, only 35% of women using referral obstetric care do need it. On the other hand, there is low compliance with professional referral advice: only 25% of advice is followed (Jahn et al. 1995). Similar observations were made in other parts of Africa (Voorhoeve et al. 1984; de Groot et al. 1993; Dujardin et al. 1995). This wide gap between professional and community perception of reasons for hospital use raises questions about their underlying rationales. Official referral criteria as included in the Tanzanian antenatal card (and used with some variations in

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### Table 3 Medical reason for the use of hospital obstetric care and the referral status

<table>
<thead>
<tr>
<th>Reason for admission*</th>
<th>Number of admissions</th>
<th>Percentage of all admissions</th>
<th>Ratio institutional referrals vs. self-referrals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nulliparity</td>
<td>57</td>
<td>13.7</td>
<td>0.75</td>
</tr>
<tr>
<td>Pain</td>
<td>25</td>
<td>6.0</td>
<td>0.28</td>
</tr>
<tr>
<td>Previous Caesarean section</td>
<td>21</td>
<td>5.1</td>
<td>0.95</td>
</tr>
<tr>
<td>Bleeding</td>
<td>15</td>
<td>3.6</td>
<td>0.33</td>
</tr>
<tr>
<td>Multiparity</td>
<td>14</td>
<td>3.4</td>
<td>0.93</td>
</tr>
<tr>
<td>Wrong lie</td>
<td>11</td>
<td>2.7</td>
<td>0.91</td>
</tr>
<tr>
<td>Anaemia</td>
<td>11</td>
<td>2.7</td>
<td>0.64</td>
</tr>
<tr>
<td>Vaginal leaking</td>
<td>10</td>
<td>2.4</td>
<td>0.20</td>
</tr>
<tr>
<td>No foetal movement/IUFD</td>
<td>9</td>
<td>2.2</td>
<td>0.67</td>
</tr>
<tr>
<td>Pre-eclampsia/eclampsia</td>
<td>9</td>
<td>2.2</td>
<td>0.56</td>
</tr>
<tr>
<td>Fever/malaria</td>
<td>8</td>
<td>1.9</td>
<td>0.50</td>
</tr>
<tr>
<td>Others**</td>
<td>21</td>
<td>5.1</td>
<td>0.52</td>
</tr>
</tbody>
</table>

* double mention possible; ** others: < 150 cm, > 10 years since last delivery, accident, big child (3), cough, difficult last delivery, disability, eczema, haematuria, heart problem, high age, mentally ill, preterm labour, previous abortion, prolonged labour (2), vomiting (3).
many other countries) are based on the relative risk as measure of the increased probability of an adverse outcome for those with a specific risk factor. It is assumed that referral-level care will reduce or alleviate the associated excess risk. However, there is no proof that this assumption holds true for all referral criteria. Furthermore, in a country like Tanzania with high maternal and perinatal mortality, the absolute risk in ‘low-risk’ pregnancies is still much higher than in ‘high-risk’ pregnancies in more developed countries (WHO 1996c).

The majority of women opting for referral-level care base their decision on general considerations of safety and perceived better survival chances for themselves and their baby regardless of their professionally defined risk status. This is also a rational choice: perinatal mortality in Tanzania is lower in health institutions for high-risk pregnancies but even more so in low-risk pregnancies (Walraven et al. 1995).

Low rates of antenatal and intrapartum referrals

Only 3.4% of pregnant women attended referral-level care before onset of labour. By contrast, full implementation of official referral guidelines (Table 1) should result in an antenatal referral rate of at least 20%, and straightforward indications such as bleeding, pre-eclampsia, intrauterine death, severe anaemia and multiple pregnancy still add up to about 10%, close to WHO estimates (8–9%) for antenatal referral rates (WHO 1991). Most antenatal referrals were triggered by symptoms (pain, bleeding, vaginal leakage) and not by screening procedures. This pattern was observed earlier (Jahn et al. 1995) and may be expected because symptoms detected by women themselves have a higher potential to trigger referral (Dujardin et al. 1995). However, low-quality antenatal screening also plays a role, as the majority of twins and breech presentations were not detected prior to delivery.

In recent years emergency obstetric care has gained increasing attention as a means of reducing maternal mortality (Maine 1991). In this context the low rate of intrapartum emergency referrals is particular worrying. Even when assuming that deliveries outside the hospital were mainly ‘low-risk’ (which is not the case), a rate of at least 5% of obstetric complication is to be expected in this group (Rooks et al. 1989; Maine 1991; Walraven et al. 1995; WHO 1996b). Application of the partogramme would yield about 10% of deliveries with the referral indication of prolonged labour (crossing the action line) (WHO 1994). Yet, within the 2-month study period there were only 5 intrapartum referrals, constituting 0.3% of the estimated 1543 deliveries taking place outside the hospital in the same period. Even in the nearby area, intrapartum referrals were extremely rare with only two referrals (0.5%) from within a 10-km radius against an estimated 380 deliveries there. It appears that there is generally an enormous reluctance to change the predecided delivery setting even in case of severe complications. As pointed out by Caldwell et al. (1989), socio-cultural factors such as the concept of avoidability of adverse outcomes and preparedness to change unsuccessful treatment are important determinants for effective use of health services and finally for mortality levels in societies. This aspect is also crucial to
the concept of essential obstetric care and warrants more in-depth research on health-seeking behaviour and decision-making in communities.

Geographical accessibility

As shown in Figure 1, obstetric coverage declines with increasing distance. Similar observations were reported from other parts of Africa (Voorhoeve et al. 1984; de Groot et al. 1993; Bouillin et al. 1994; Fawcus et al. 1995). Interestingly, there is a difference between the pattern of distance-related decline of referral rates and population-based rates of caesarean sections, the latter serving as proxy for complicated deliveries (Figure 1): While overall referral rates decline continuously with increasing distance, the rates of caesarean sections remain stable beyond 10 km. This indicates that there is a core group of women and families who try, by all means, to reach hospital in case of complications. The example of mothers with a history of previous caesarean section, almost all of whom return to hospital for the next delivery, highlights that geographical barriers may be overcome depending on the perceived severity of the reason for referral (Dujardin et al. 1995).

Implications for health services

Low effectiveness of antenatal and obstetric services has various causes such as geographical barriers and low quality of care as seen in low detection rates in antenatal screening. However, beyond these factors, we want to highlight conceptual problems of the risk approach as currently applied in antenatal care: The exclusively professional definition of risk, the mix of risk factors with different predictive properties and scope for prevention and the lack of responsiveness to women’s preferences.

Antenatal care needs to consider women’s perceived risk status and delivery preferences not only to increase compliance with referral advice. Women’s psychological well-being and confidence in the caregivers of their choice is in itself a determinant for positive pregnancy outcome (WHO 1996b). Still, professional risk assessment plays an important role because it provides the basis for competent individual counselling, which should be at the centre of antenatal care. However, the current focus on ‘low-risk’ and ‘high-risk’ categories is not a useful starting point for counselling. Instead, the specific meaning of the risk factors identified should be evaluated in the context of the living conditions and preferences of the pregnant women. In summary, the focus of antenatal care needs to be shifted from schematic allocation of risk categories and referral advice to assisting the mother and her family in optimizing their health behaviour in general and their use of services in particular.

Acknowledgements

We gratefully acknowledge the co-operation and invaluable help of the staff at the Regional Hospital, the health centres and dispensaries of Mtwara Urban and Mtwara Rural districts. Dr Daniel Kisimbo, Medical Assistant Training Centre Mtwara, assisted in organizing the field work and translating questionnaires.

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