
Referral in pregnancy and childbirth: Concepts and strategies

Albrecht Jahn¹ and Vincent De Brouwere²

Summary

The referral system is an essential component of district health systems. It is particularly important in pregnancy care and childbirth for providing access to emergency obstetric care and for backing up antenatal and delivery care in first line facilities. However, referral patterns, as reported from referral hospitals in developing countries, show that the actual use of a referral system for obstetric care is inversely related to professional needs assessment. Usually, self-referrals constitute more than 50%, institutional referral around 30% and emergency referral less than 5% of women at referral level. Known determinants of the use of obstetric care at referral include distance, cost, perceived quality of obstetric care, health workers attitude and respect for women's social needs, perceived etiology of complications and socio-cultural preferences. Interventions to improve access and use of the referral system target different elements of the referral chain. Priority should be given to the quality of obstetric care at referral level and this needs to be monitored and improved. Then, local solutions should be sought in participation with the community to secure transport whenever an evacuation is required. Finally, health staff should dialogue with the community in order to raise awareness of complications and danger signs at family level. The long-term objective should be to establish an operational referral system for emergencies and elective referrals as part of the district health system. The referral system should not be restricted to pregnancy-related complications. However, obstetric referral provides a good starting point for improvement, because maternal emergencies comprise a considerable part of overall emergencies, because most maternal deaths can be prevented by timely intervention, and because this is commonly a felt need in the community.

¹ Specialist in obstetrics and gynaecology, Department of Tropical Hygiene and Public Health, University of Heidelberg, Neuenheimer Feld 324, 69120 Heidelberg, Germany. Email : Albrecht.jahn@urz.uni-heidelberg.de (correspondence should be addressed to this author).

² Professor at the Department of Public Health, Institute of Tropical Medicine, Antwerpen, Belgium. Email : vdbrouw@itg.be

Introduction

Linking the different levels of care was an essential element of primary health care (PHC) from the very beginning. The referral system was meant to complement the PHC principle of treating patients as close to their homes as possible at the lowest level of care with the needed expertise (King 1966). As emphasised by the WHO (1994), this back-up function of referral is of particular importance in pregnancy and childbirth, as a range of potentially life-threatening complications require management and skills that are only available at higher levels of care. The following levels of care have been identified: (1) family/community, (2) health centre and (3) district hospital (WHO 1996a).

The first referral level is defined as district or sub-district hospital, to which a woman at high risk is referred prenatally or sent for emergency obstetric care, and where the following essential services should be available: (1) surgical obstetrics, (2) anaesthesia, (3) medical treatment, (4) blood replacement, (5) manual procedures and monitoring labour, (6) management of women at high risk, (7) family planning support and (8) neonatal special care (WHO 1991). Most countries have different types of first line facilities (e.g. dispensary, health post, basic health unit) or intermediate levels of care; however, in practical terms these provide usually similar levels of maternity care and are not qualified to manage obstetric complications adequately. Therefore, for our discussion we will use the 3-level model as outlined in *Figure*, whereby the category health centre comprises all first line health facilities. The paper will start with an outline of current referral patterns, then introduce a model of the referral chain (sender – transport – receiver) and discuss potential strategies and interventions along this pathway. This will be followed by a note on conceptual issues. Finally a strategy for improving obstetric referral will be outlined and put in the context of district health services in general.

Referral and its function in district health systems

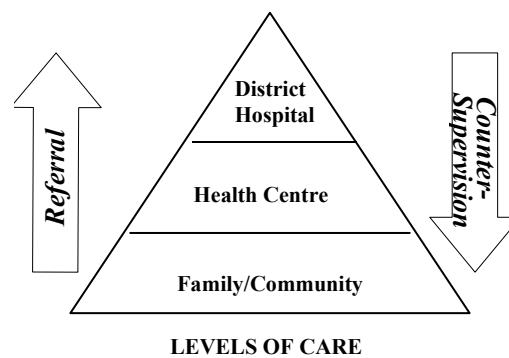
The term referral is used in different ways: For instance, it is used to indicate the advice of a health worker to attend a higher-level health unit, whether followed or not. Here we use the term referral for any upwards movement of health care seeking individuals in the health system (*Figure*). There are many ways to do this with respect to pathway, timing and urgency. Thus, we can categorise referrals in pregnancy and childbirth as (1) institutional or self-

referral, depending on the involvement of first line services; (2) antenatal, delivery or postnatal referral; and (3) elective or emergency referral.

The following data on pregnancy-related referral in Tanzania provide an overview of levels and categories of referral in a rural African district (Jahn *et al.* 1998). Based on the analysis of 415 hospital maternity in-patients, the following referral pattern was observed (values as percentage of all maternity admissions; percentage of expected birth in the catchment area in brackets):

- Self-referral 70% of all maternity admissions (15% of all expected births) vs. institutional referral 30% (6%)
- Referral for delivery 84% (18%) vs. antenatal referral 16% (3%)
- Elective referral (including referral for general safety reasons) 98,8% (20,8%) vs. emergency referrals 1,2% (0,3%).

Figure 1. The health care pyramid at district level (Adapted from the Mother-Baby Package (WHO 1994))

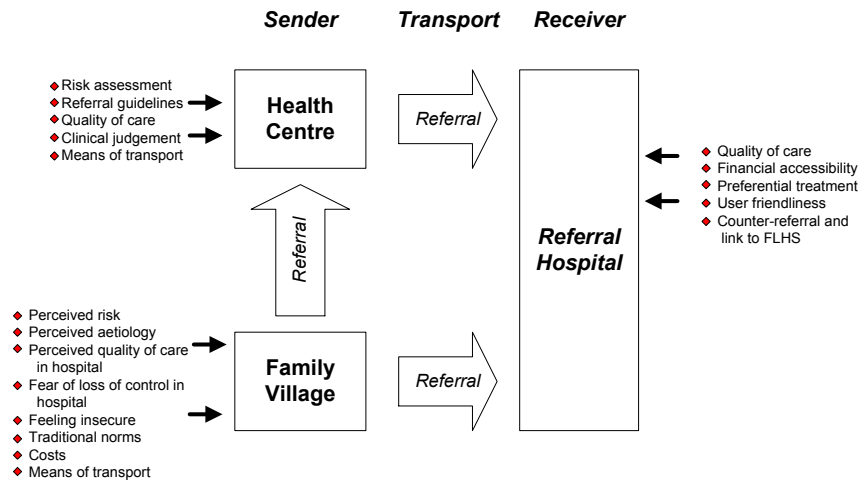


Thus, self-referral for delivery - often without specific medical reason - is the most common mode of referral, while institutional referral is less frequent and emergency referral is very rare. Similar observations have been reported from a rural district in Nepal (Jahn *et al.* 2000) and Burkina Faso (Falkenhorst & Jahn 1997) with population-based rates of emergency referrals of 0,4% and 0,7% respectively. Nkyekeyer (2000) reports from a teaching hospital in Ghana 82% self referrals and 2% emergencies among hospital deliveries. A high proportion of self referrals (80%) has also been observed in Kenya (Norberg *et al.* 1996). From a professional point of view, this skewed referral pattern results in an inappropriate use of referral level care by by-passers of first line services. Measures such as disincentives (e.g. fees) for self-referrals and incentives for institutional referrals have been suggested (Paine

& Siem Tjam 1988), but are problematic as discussed later in the context of informed decision making.

As referral is a dynamic process, we will analyse the current referral pattern and discuss potential interventions along the following model of the referral chain (Figure 2).

Figure 2. The referral chain



While this model identifies the series of actors and links, the current debate on referral is often restricted to the issue of lack of transport and communication. Without denying the importance of this aspect, we want to emphasise the role of all system components (Kowalewski *et al.* 2000). Despite relatively good accessibility of obstetric referral facilities many cities have a high maternal mortality, such as 148 in St Louis (Senegal) to 852 in Kaolack (Senegal) as shown in table 1.

A study from a large referral hospital in Karachi found the 118 mothers brought dead to the hospital maternity had all been residing within a 8 km range. Social and cultural factors played the most significant role (Jafarey & Korejo 1993). A recent maternal death enquiry from South Africa related 18% of avoidable deaths to problems of transport but 57% to problems of the in-service management of emergencies (National Committee on Confidential Enquiries into Maternal death 2000). Similar findings are reported from Ghana (Walraven *et al.* 2000).

Table 1. Maternal mortality ratios in selected African cities

City (country)	Maternal Mortality Ratio per 100,000 live births (C. I. 95%)	Source
Dar Es Salaam (Tanzania)	572	Urassa <i>et al.</i> , 1995
Conakry (Guinea)	559	Touré <i>et al.</i> 1992
Brazzaville (Congo)	645	Le Coeur <i>et al.</i> 1998
Bamako (Mali)	327	Etard <i>et al.</i> 1996
Bamako (Mali)	275 (126-521)	Bouvier-Colle <i>et al.</i> 1998
Abidjan (Côte d'Ivoire)	428 (228-732)	Bouvier-Colle <i>et al.</i> 1998
Niamey (Niger)	371 (149-764)	Bouvier-Colle <i>et al.</i> 1998
Nouakchott (Mauritania)	161 (52-376)	Bouvier-Colle <i>et al.</i> 1998
Ouagadougou (Burkina Faso)	318 (146-604)	Bouvier-Colle <i>et al.</i> 1998
St Louis (Senegal)	148 (31-433)	Bouvier-Colle <i>et al.</i> 1998
Kaolack (Senegal)	852 (453-1,457)	Bouvier-Colle <i>et al.</i> 1998

Referral situation and interventions at community level

Problems of geographical and financial accessibility are well documented reasons for abstaining from or delaying obstetric referral (Thaddeus & Maine 1994, Bouillin *et al.* 1994, Sauerborn *et al.* 1989, Haddad & Fournier 1995). However, these barriers are in most settings not insurmountable. Thus, the final decision for or against referral will often depend on the balance between effort and resources needed for transport and subsequent treatment and the perceived benefit of treatment in hospital. In this decision making process, the perceived quality of care, perceived severity of the condition and local etiological concepts play decisive roles (Dar Iang 1999, Oosterbaan & Barreto da Costa 1995, The prevention of maternal mortality network 1992, Asowa-Omorodion 1997, Campbell & Sham 1995). Often, hospital care is avoided mainly because of poor interpersonal skills and attitudes of health workers and to a lesser degree because of perceived technical incompetence. Rural women in particular fear stigmatisation and discrimination. They are afraid of the unfamiliar environment, the lack of social and emotional support, the loss of dignity, face and control over decisions. In addition, there is a gap between biomedical and traditional concepts of causation of complications. For instance, the risk of repeating adverse outcomes such as perinatal death is well known in communities but often attributed to supernatural powers and thus not seen as reason to attend health services (Kowalewski *et al.* 2000). This has profound implications for the referral behaviour with

referral being more likely when a condition is perceived to have a biomedical background. Pregnancy and birth are embedded in cultural norms and traditions, concerning (among others) the place of birth and the caregivers, thus interfering with referral. For example, in many parts of Tanzania women are expected to go back to their parents home to give birth.

Reported interventions on community level focus (1) on educational activities to raise awareness of danger signs and encourage the use of obstetric services; (2) on reducing geographical and financial barriers through emergency loan schemes and (3) on improving transport and communication. Two studies from Sierra Leone (Kandeh *et al.* 1997) and from Nigeria (Nwakoby *et al.* 1997) report on the promotion of the use of obstetric care through community activists. They were trained to perform health education, mobilise the community and facilitate referral in case of obstetric emergencies. Both studies report an increase in emergency referrals in the initial phase of the project, which could not be sustained. The absolute number of referrals facilitated by the community activists were small in both projects (1 referral per month). Because of missing data about target population and the expected number of deliveries in the project areas, these referrals can not be related to a population base. Promotion of referral has also been part of training of traditional birth attendants. Alisjahbana *et al.* (1995) reported a slight increase in referral rates (6% vs. 13% referral in women with complications), other studies could not detect any substantial impact (Eades *et al.* 1993, Jahn *et al.* 2001). Encouraging experiences are reported from three studies on community loan funds in Nigeria (Essien *et al.* 1997, Chiwuzie *et al.* 1997, Olaniran *et al.* 1997). The idea was apparently well received by the communities and their traditional leaders. All studies focussed exclusively on obstetric emergencies.

The following conditions were set (Essien *et al.* 1997):

- financed and managed by the community
- no interest charged (in other projects interest 2%)
- 6-month grace period and 24-month repayment period
- eligibility requirement of a minimum of 12 month residence prior to loan
- requirement of a resident guarantor with fixed assets
- restriction of loan funds to women with obstetric complications

The approval rate of loans varied from 2 per month in one study to 30

per month in another. There are no clear indications that the use of obstetric services has increased as a result of these schemes. It is acknowledged that sustaining the funds long term will require continuing effort and involvement with the communities.

One of the projects has successfully linked a loan fund with an initiative to involve local car owners in a stand-by transport scheme for emergency referrals (Olaniran *et al.* 1997). Overall, the projects demonstrate that there is a considerable potential to improve the referral system by mobilising and co-ordinating locally available resources. Preliminary experiences from Mali, where referral loan funds are managed by the local health committees, point in a similar direction. After introducing a system of radio calls and ambulances, emergency referral rates increased from 1% to 3% of expected life births in Kolondieba district (De Brouwere 1997) and the C-section rate increased from 0.1% to 1% between 1993 and 1995 in Koulikoro district (Maiga *et al.* 1999).

Another approach has been taken by the RESCUER project in Uganda (Inter-agency group for safe motherhood 1997). Key interventions included upgrading of health units to obstetric referral centres, training of traditional birth attendants and linking them to the referral centres via radio call and walkie talkies, and provision of motorised transport facilities. Since the introduction of this package, obstetric referrals have increased threefold. However, it is not reported to which extent this increase has been due to emergencies and which proportion of all expected pregnancies were referred (population-based referral rate).

Referral situation and interventions on the level of first line health services

Frequently health workers in first line facilities have no access to phones and transport, even in emergency situations (Jahn *et al.* 1998, Jahn *et al.* 2000). Thus, it is up to the mother's family to arrange transport. Health workers will help them depending on their capacity and personal initiative. Occasionally health centres have their own means of transport. In fact, many countries (e.g. Tanzania) had the plan to equip health centres with vehicles but could not sustain the policy due to the high costs.

Despite the high profile of emergency referral we have to keep in mind, that emergency referrals are rare events for first line health facilities. Catering typically to target populations between 5.000 to 10.000 they encounter

about 2 to 10 emergencies per year; in reality the figures are probably even lower, because some cases will bypass first line services and others will not seek modern health care at all. Thus, the vast majority of their referrals are elective referrals triggered by antenatal risk assessment.

In most countries full implementation of national referral guidelines would result in 30% to more than 50% of all pregnant women being referred either antenatally or for delivery (Kulmala *et al.* 2000, Jahn & Kowalewski 1998). For example, the Tanzanian antenatal card stipulates referral for 27 risk factors. In reality 6% to 15% of women attending antenatal care receive a referral advice. However, compliance with this referral advice was only 25% (Jahn & Kowalewski 1998). This is a common observation: reported referral compliance ranges from 12% in Rajasthan (Gupta & Gupta 2000) to 33% in Congo (Dujardin *et al.* 1995), 36% in Nepal (Jahn *et al.* 2000) and 46% in Morocco (Belghiti *et al.* 1998). Referral based on antenatal risk assessment is controversial. Though regarded as an appropriate strategy in the eighties, it has been abandoned by the Safe Motherhood Initiative in 1997 (Inter-agency group for safe motherhood 1997) and emphasis has been shifted to emergency obstetric care. "*The reason for this is that most of these complications cannot be predicted or prevented, but they can be successfully treated. ... The emphasis is on improving the accessibility, quality and utilization of emergency obstetric care for women who develop such complications, rather than on having contact with all pregnant women*" (Maine 1997). Thus, first level health workers find themselves caught between contradicting messages: On one side, they are stipulated to perform antenatal screening and referral according to the national guidelines based on inflated risk categories. On the other side they are told in the new Safe Motherhood slogan "*Every pregnancy faces risks*" that antenatal risk assessment is useless because complications can not be predicted.

Summarising available evidence it can be concluded that routine antenatal screening, as performed in many countries is not very effective because (1) the risk categories are too wide and unspecific, (2) low quality of screening and use of inappropriate screening techniques (3) low acceptability of referral advice and (4) a ritualistic approach to antenatal care (Rooney 1992, Van-neste *et al.* 2000, Dujardin *et al.* 1995, Jahn *et al.* 2000, Jahn *et al.* 1998, Geefhuysen *et al.* 1998). However, there is also evidence that selected screening interventions and referral can be beneficial if implemented properly; examples are taking blood pressure for hypertension and measuring fundal height in order to identify multiple pregnancies (Enkin *et al.* 1995, Villar &

Bergsjö 1997, Villar *et al.* 1998, Vanneste *et al.* 2000, WHO 1996b).

In relation to referral, the crucial question is: Who should be referred? Should it be restricted to women with manifest obstetric complications or is there still a place for elective referral prior to delivery? Based on the above mentioned studies the following core set of maternal and perinatal indications for elective referral can be identified: previous caesarean section, breech presentation, transverse lie, multiple gestation, hypertension and severe anaemia. In rural settings these indications would produce referral rates in the range of 6% to 10%. There is also a need to develop locally adapted and operational referral guidelines, based on the specific epidemiological situation, the capacity of health services and community preferences. The current practice of stereotypical (and often rejected) referral advice should be replaced by a more client centred approach with individual counselling in order to empower mothers and their families to make informed decisions.

We are not aware of interventions addressing specifically these two issues of rationalising risk categories and referral guidelines. Instead interventions focus on improving transport and communication, such as equipping health centres with vehicles and radio calls. However, experience from Safe Motherhood projects in Tanzania show that it is often difficult to keep these vehicles on the road due to the lack of maintenance and fuel. Considering that lack of transport is a big problem in most settings it is also problematic, to restrict the use of such vehicles to referral activities. Another project that distributed bicycles-trailers for referral to first line facilities stopped the practice after realising that the trailers were used for purposes other than referral.

Referral situation and interventions on first referral level

The typical referral pattern among users of hospital-based obstetric care - many self referrals and few emergency referrals - has been outlined in the introductory part.

In order to make referral meaningful and improve survival chances for mother and child, the referral hospital has to provide good quality obstetric care. This is often not the case and a considerable proportion of maternal and perinatal mortality has been attributed to substandard referral level care (Fawcus *et al.* 1996, Urassa *et al.* 1995, Jahn *et al.* 2000). Thus, ensuring quality obstetric care at referral level is a precondition for successful referral.

Accessibility and perceived quality of care have been identified as important determinants for the use of hospital-based obstetric care. One option to increase accessibility is to increase service outlets for obstetric care according

to population size and distribution. Distances in large rural districts are often too large to be covered by one district hospital. Strategically located existing structures, such as health centres, can be up-graded with limited input. Many Safe Motherhood Programmes include this intervention in their programmes (Inter-agency group for safe motherhood 1997, Chiwuzie *et al.* 1997, Nwakoby *et al.* 1997). An additional option is to link health centres and hospital via radio call and send the hospital ambulance in the event of an emergency. However, this intervention needs to be accompanied by measures to ensure financial accessibility. In Burkina Faso, the costs for obstetric emergency transports are covered by the health services through fuel vouchers.

However, utilisation of obstetric care can also be improved with less capital investment through a set of interventions making it more user friendly and receptive to the social and medical needs of potential users (Sabitu *et al.* 1997). These may include interventions such as preferential treatment for referred patients, 24-hours service, culturally appropriate attitudes, provision of privacy and allowing for an accompanying support person (Kowalewski *et al.* 2000).

As mentioned earlier, cost is a crucial factor in referral decision making. It is very difficult to make general statements on cost of referral. In any case these are substantial for users and providers alike. In Tanzania on average 2 US\$ was spend on transport with a maximum of 12 US\$, depending on distance and means of transport (Kowalewski 1996). Hiring a car (if possible at all) is extremely expensive in local terms. The situation in Nepal is similar with average transport costs of 1,5 US\$ and a maximum of 11 US\$ against a basic salary of 1 US\$/day (Dar lang 1999). In addition to these costs, further costs are incurred for treatment, drugs and food which add up to 96 US\$ on average (maximum 230 US\$). In 1997 in Mali, the average cost of transportation with an ambulance called by radio was 63 US\$ and the additional cost of a caesarean section 84 US\$ (De Brouwere 1997). But the cost varies depending on the district; in Kolondieba for instance, the total cost for an emergency referral was 100 US\$ including transportation by ambulance, intervention kit and post-intervention care. Cost was covered by public sources (35%-58%), the community-funded association of health centres (21%-35%) and the patient herself (21%-30%) (Maige *et al.* 1999)Based on experiences from Uganda, health service capital costs for establishing and maintaining a referral system are estimated to be 22% of overall capital costs or 100.000 US\$ per district per year (Weissman *et al.* 1999).

The crucial issues

Given the diversity of health systems, geographical conditions and infrastructure it is impossible to develop a generally applicable blue print for referral systems. However, we can identify the following crucial issues that need to be addressed early on and that require strategic decisions:

Should interventions focus exclusively on referral of emergencies?

The importance of access to obstetric emergency care is undisputed (WHO 1996a). However, there is also evidence to justify elective referral for maternal and perinatal reasons, as outlined earlier (Villar & Bergsjö 1997). This is also acknowledged by the Safe Motherhood Initiative by stating that a minimum of 15% of all pregnant women should deliver in obstetric referral level facilities (Inter-agency group for safe motherhood 1997). Most of these will not be emergencies. In addition there is often no clear line between emergency and elective referral, as in the case of mild antepartum haemorrhage. It may be sensible to start with a focus on emergency referral. Yet, there is a need to also improve and rationalise referral for all pregnancy-related conditions. This could be done, for instance, through locally adapted and operational referral guidelines and related tools such as referral forms and feedback reports, transport arrangements and special admission routines in the referral centre.

Should interventions focus only on complications of pregnancy and childbirth?

There is a general lack of emergency care, which contributes considerably to the high adult mortality in Africa (Nordberg 1984, Adult Morbidity and Mortality Project (AMMP) 1997). As shown earlier, many Safe Motherhood Projects restrict the eligibility to use their emergency referral arrangements to obstetric complications and exclude other medical or surgical emergencies. None of the reported case studies cited earlier comments on conflicts arising from this rule, although they are likely to occur. From a district health perspective, a restrictive approach has several shortcomings: There are maternal emergencies, which are often not recognised as such; e.g. ectopic pregnancy with an estimated prevalence of 1/100 pregnancies (Amoko & Buga 1995). Given the transport problems in most rural African communities, it may simply be unethical to deny assistance in case of any life-threatening condition. Maintaining a system for emergency care (e.g. ambulance, radio call) needs constant attention and inputs, even if it is idle. The rarity of referrals

in most of the studies (1-2 per month) indicates that the emergency referral arrangements are often under-utilised. Our own experience in a series of village meetings on Safe Motherhood in Southern Tanzania suggests that access to emergency care has a very high priority at the community level but comprises all sorts of emergencies.

There are also projects that have focused on emergency referrals in general. Macintyre & Hotchkiss (Macintyre & Hotchkiss 1999) report on an 8 years experience with a health insurance scheme, covering emergency referral. The most frequent causes for referral were trauma, pregnancy-related, complicated malaria, and severe diarrhoea. Therefore we suggest, expanding Safe Motherhood emergency referral initiatives to other areas of emergency care.

Self referral and informed decision making

Referral by health workers is often handled in a rather directive way. Instead, there should be a mutual understanding about the need for, and purpose of the referral between health worker and patient (Paine & Siem Tjam 1988). The mother baby package (WHO 1996a) suggests the antenatal care should be used to help women and their families to develop an appropriate delivery plan (including place of delivery), based on the women's history and health status. The Safe Motherhood Initiative emphasises that women's choices should be respected and ensured (Inter-agency group for safe motherhood 1997). This adds another dimension to the discussion on antenatal risk assessment and referral, because it implies involving the mother in defining the need for referral and shifts the focus from predictive power of risk factors to the risk as perceived by the individual mother. There is a wide gap between these approaches as evidenced by the high rates of self-referral and the low compliance with referral advice given by health workers. Thus a mother with her first uncomplicated pregnancy may prefer to deliver in hospital for safety reasons (and many do so) while a mother with her tenth pregnancy may prefer to deliver at home, because she feels better cared for in her domestic environment. Taking informed decision making seriously would imply to move from rigid application of referral criteria to individual counselling based on professional needs assessment and women's preferences.

Steps in improving the referral system

Referral can only be justified if the referral facility provides a reasonable level quality of care. Therefore, as a first step, the quality of obstetric care at refer-

ral level needs to be ascertained, monitored and improved. The next steps would include raising awareness of complications and danger signs at the community level and assessing locally available resources for emergency transport and communication. These include private cars, buses, lorries and all potential means of communication (e.g. radio call of police station). In a process involving the community and local health workers, feasible and sustainable options for referral can be identified as described earlier. Examples from literature (Essien *et al.* 1997) include arrangements with local owners of transport, provision of means of transport and emergency loan schemes. Then institutional referral policies and guidelines need to be reviewed and rationalised. The long-term objective should be to establish an operational referral system for emergencies and elective referrals as part of the district health system. This should not be restricted to pregnancy-related complications. However, obstetric referral provides a good starting point because maternal emergencies are most often a felt need, because they comprise a considerable part of overall emergencies, because most maternal deaths can be prevented by timely intervention and because unmet obstetric needs can be better quantified and monitored than other life-threatening emergency conditions (De Brouwere *et al.* 1996)

References

- Adult Morbidity and Mortality Project (AMMP) (1997). Policy implications of adult morbidity and mortality - End of phase 1 report, Tanzania/Ministry of Health, Dar es Salaam.
- Alisjahbana A, Williams C, Dharmayanti R *et al.* (1995). An integrated village maternity service to improve referral patterns in a rural area in West-Java. *International Journal of Gynaecology and Obstetrics* **48**(Suppl), S83-S94.
- Amoko DHA & Buga GAB (1995). Clinical presentation of ectopic pregnancy in Transkei, South Africa. *East African Medical Journal* **72**,770-773.
- Asowa-Omorodion FI (1997). Women's perceptions of the complications of pregnancy and childbirth in two Esan communities, Edo State, Nigeria Women's perceptions of the complications of pregnancy and childbirth in two Esan communities, Edo State, Nigeria. *International Journal for Quality in Health Care* **44**(12),1817-1824.
- Belghiti A, De Brouwere V, Kegels G and Van Lerberghe W (1998). Monitoring unmet obstetric need at district level in Morocco. *Tropical Medicine and International Health* **3**(7):584-591.
- Bernard F, De Brouwere V, Laabid A, Dujardin B (1996). L'évaluation des filières dans les systèmes de santé: revue de la littérature. *Santé Publique* **7**,443-459.
- Bouillin D, Fournier G, Gueye A, Diadiou F & Cissé CT (1994). Surveillance épidémiologique et couverture chirurgicale des dystocies obstétricales au Senegal. *Cahiers Santé* 399-406.
- Bouvier Colle M H, Prual A and de Bernis L (1998). *Morbidité maternelle en Afrique de l'Ouest*. Ministère des Affaires Etrangères - Coopération et Francophonie, Paris.
- Campbell M & Sham ZA (1995). Sudan: Situational analysis of maternal health in Bara district, North Kordofan. *World Health Statistic Quarterly* **48**,60-65.
- Chiwuzie J, Okojie O, Okolocha C *et al.* (1997). Emergency loan funds to improve access to obstetric care in Ekpoma, Nigeria. The Benin PMM Team. *International Journal of Gynaecology and Obstetrics* **59** (Suppl 2), S231-S236.
- Dar Iang M (1999). Assessment of antenatal and obstetric care services in a rural district of Nepal, Peter Lang, Bern.
- De Brouwere V, Laabid A & van Lerberghe W (1996). Estimation des besoins en interventions obstétricales au Maroc. Une approche fondée sur l'analyse spatiale des déficits. *Revue Epidemiologie et de Sante Publique* **44**,111-124.

- De Brouwere V (1997). Appui à la mise en oeuvre et à l'évaluation du système de référence avec la périnatalité comme porte d'entrée dans le Cercle, UNICEF Mali.
- Dujardin B, Clarysse G, Criel B, De Brouwere V & Wangata N (1995). The strategy of risk approach in antenatal care: evaluation of the referral compliance. *Social Science and Medicine* **40**,529-535.
- Eades CA, Brace C, Osei L and LaGuardia KD (1993). Traditional birth attendants and maternal mortality in Ghana. *Social Science and Medicine* **36** (11):1503-1507,
- Enkin M, Keirse MJNC, Renfrew M & Neilson JP (1995). *A Guide to Effective Care in Pregnancy & Childbirth* - 2nd edition, Oxford University Press, Oxford.
- Essien E, Ifenne D, Sabitu K *et al.* (1997). Community loan funds and transport services for obstetric emergencies in northern Nigeria. *International Journal of Gynaecology and Obstetrics* **59** (Suppl 2), S237-S244.
- Etard J F, Balique H, Traore S and Kodio B (1996). Maternal mortality in Bamako, Mali. *Arch. Public Health* **53** (Suppl.1),48-48.
- Falkenhorst G & Jahn A (1997). Qualität der Schwangerenvorsorge in einem Gesundheitsdistrikt in Burkina Faso. Heidelberg, *Jahrestagung der Deutschen Tropenmedizinischen Gesellschaft*.
- Fawcus S, Mbizvo MT, Lindmark G & Nyström LA (1996). Community-based investigation of avoidable factors for maternal mortality in Zimbabwe. *Studies in Family planning* **27**(6),19-327.
- Geefhuysen CJ, Isa AR, Hashim M & Barnes A (1998). Malaysian antenatal risk coding and the outcome of pregnancy. *Journal of Obstetrics and Gynaecology Research* **24**,13-20.
- Gupta J & Gupta H (2000). Perceptions of and constraints upon pregnancy-related referrals in rural Rajasthan, India. *Health Serv.Manage.Res.* **13**,6-15.
- Haddad S & Fournier P (1995). Quality, cost and utilization of health services in developing countries: a longitudinal study in Zaire. *Social Science and Medicine* **40**, 743-753.
- Inter-agency group for safe motherhood (1997). *The safe motherhood action agenda: Priorities for the next decade*. 1-95. Colombo, Sri Lanka.
- Jafarey SN & Korejo R (1993). Mothers brought dead: An inquiry into causes of delay. *Social Science and Medicine* **36**,371-372.
- Jahn A, Carvalho I & Kalinga MJ (2001). Evaluating Traditional Midwife Training Programs: Lessons learned from Tanzania. *International Journal of Gynaecology and Obstetrics*, **73**(3): 277-278.

- Jahn A, Dar Iang M, Shah U & Diesfeld HJ (2000). Maternity Care in rural Nepal: A health service analysis. *Tropical Medicine and International Health* 5,657-665.
- Jahn A & Kowalewski M (1998). The risk approach in antenatal care: Pitfalls of a global strategy The risk approach in antenatal care: Pitfalls of a global strategy. *Curare* SB15,195-209.
- Jahn A, Kowalewski M & Kimatta SS (1998). Obstetric care in Southern Tanzania: Does it reach those in need? *Tropical Medicine and International Health* 3,926-932.
- Kandeh HB, Leigh B, Kanu MS *et al.* (1997). Community motivators promote use of emergency obstetric services in rural Sierra Leone. The Freetown/Makeni PMM Team. *International Journal of Gynaecology and Obstetrics* 59(Suppl 2), S209-18.
- King M (1966). *Medical Care in Developing Countries*, Oxford University Press, Oxford.
- Kowalewski M (1996). Antenatal referral practices and determinants of parturients compliance with referral advice. University of Heidelberg, Institute of Tropical Hygiene and Public Health. MSc Thesis.
- Kowalewski M, Jahn A & Kimatta SS (2000). Why do at-risk mothers fail to reach referral level care? Barriers beyond distance and cost. *African Journal of Reproductive Health* 4,100-109.
- Kowalewski M, Tautz S, Löhken S & Jahn A (1998). The community perspective of problems in pregnancy and child birth. *Curare* 15,181-193.
- Le Coeur S, Pictet G, M'Pelé P and Lallemand M (1998). Direct estimation of maternal mortality in Africa. *Lancet* 352,1525-1526,.
- Macintyre K & Hotchkiss DR (1999). Referral revisited: community financing schemes and emergency transport in rural Africa *Soc Sci Med* 49,1473-1487.
- Maiga Z, Traoré Nafoussi F & El Abassi A (1999) La réforme du secteur santé au Mali (1989-1996). *Studies in Health Services Organisation & Policy* 12. ITGPress, Antwerpen.
- Maine D (1997). The strategic model for the PMM Network. *International Journal of Gynaecology and Obstetrics* 59 (Suppl 2),23-25.
- National Committee on Confidential Enquiries into Maternal death (2000). A review of maternal deaths in South Africa during 1998. National Committee on Confidential Enquiries into Maternal Deaths. *S.Afr.Med J.* 90,367-373.
- Nordberg E, Holmberg S & Kiugu S (1996). Exploring the interface between first and second level of care: referrals in rural Africa. *Tropical Medicine and International Health* 1(1),107-111.

Nordberg EM (1984). Incidence and estimated need of caesarean section, inguinal hernia repair, and operation for strangulated hernia in rural Africa. *British Medical Journal* 289,92-93.

Nwakoby B, Akpala C, Nwagbo D *et al.* (1997). Community contact persons promote utilization of obstetric services, Anambra State, Nigeria. The Enugu PMM Team. *International Journal of Gynaecology and Obstetrics* 59(Suppl 2), S219-24.

Nkyekyer K (2000) Peripartum referrals to Korle Bu teaching hospital, Ghana-a descriptive study. *Tropical Medicine and International Health* 5, 811-817.

Olaniran N, Offiong S, Ottong J, Asuquo E, & Duke F (1997). Mobilizing the community to utilize obstetric services, Cross River State, Nigeria. The Calabar PMM Team. *International Journal of Gynaecology and Obstetrics* 59(Suppl 2),S181-9.

Oosterbaan MM & Barreto da Costa MV (1995). Guinea-Bissau: What women know about risk- an anthropological study. *World Health Statistic Quarterly* 48,39-48.

Paine LHW & Siem Tjam F (1988). Information, financing and referral system: In Hospitals and the health care revolution First edn. eds. Paine LHW & Siem Tjam F, WHO, Geneva, pp.94-100.

Rooney C (1992). Antenatal care and maternal health: How effective is it?, Maternal Health and Safe Motherhood Programme, WHO, Geneva.

Sabitu K, Alti-Mu'azu M, Musa AA *et al.* (1997). The effect of improving maternity services in a secondary facility, Zaria, Nigeria. The Zaria PMM Team. *International Journal of Gynaecology and Obstetrics* 59(Suppl 2), S99-106.

Sauerborn R, Nougara A, Sorgho G, Tiebelesse L & Diesfeld HJ (1989). Assessment of MCH services in the district of Solenzo; Burkina Faso. II. Acceptability. *Journal of Tropical Pediatrics* 35,10-13.

Thaddeus Sa & Maine D (1994). Too far to walk: Maternal Mortality in context. *Social Science and Medicine* 38,1091-1110.

The prevention of maternal mortality network (1992). Barrier to treatment of obstetric emergencies in rural communities of West Africa. *Studies in Family Planning* 23,279-291.

Toure B, Thonneau P, Cantrelle P *et al.* (1992). Level and causes of maternal mortality in Guinea (West Africa). *International Journal of Gynaecology and Obstetrics* 37,89-95.

Urassa E, Lindmark G & Nystrom L (1995). Maternal mortality in Dar es Salaam, Tanzania: Socio-economics, obstetric history, and case accessibility of health care factors. *African Journal of Health science* 2,242-249.

Vanneste AM, Ronsmans C, Chakraborty J & de Francisco A (2000). Prenatal screening in rural Bangladesh: from prediction to care. *Health Policy Plan.* 15,1-10.

Villar J, Bakketeig LS, Donner A *et al.* (1998). The WHO Antenatal Care Randomised Controlled Trial: rationale and study design. *Paediatr Perinat.Epidemiol* 12, 27-58.

Villar J & Bergsjö P (1997). Scientific basis for the content of routine antenatal care. *Acta Obstetrica et Gynecologica Scandinavica* 76,1-14.

Walraven G, Telfer M, Rowley J & Ronsmans C (2000) Maternal mortality in rural Gambia: levels, causes and contributing factors. *Bull.World Health Organ* 78,603-613.

Weissman E, Sentumbwe-Mugisa O, Mbonye AK & Lissner C (1999). Costing Safe Motherhood in Uganda. *Reproductive Health Matters: Safe motherhood Initiatives: Critical Issues*, 85-92.

WHO (1991). Essential elements of obstetric care at first referral level, Macmillan Press Ltd., London, Basigstoke.

WHO (1996). Care in Normal Birth: a practical guide, Maternal and Newborn Health / Safe Motherhood Unit, Family and Reproductive Health, WHO, Geneva.

WHO (1994). Mother-Baby-Package: Implementing safe motherhood in countries, Maternal Health and Safe Motherhood Programme, WHO, Geneva.