

Early neonatal deaths in Sub-Saharan Africa

A thesis submitted in partial fulfilment of the requirement for the degree of

Master of Public Health

By

Pieterella Galjaart
The Netherlands

Declaration:

Where other people's work has been used (either from a printed source, internet or any other source) this has been carefully acknowledged and referenced in accordance with departmental requirements.

The thesis Early Neonatal Deaths in Sub-Saharan Africa is my own work.

Signature:

44th International Course in Health Development(ICHHD)
September 24 2007-September 12 2008
KIT(Royal Tropical Institute) Vrije Universiteit Amsterdam
Amsterdam, The Netherlands

September 2007

Organised by:

KIT(Royal Tropical Institute) Development Policy& Practice
Amsterdam, The Netherlands

In co-operation with:

Vrije Universiteit Amsterdam/Free University of Amsterdam(VU)
Amsterdam, The Netherlands

Table of contents

Acknowledgements	iii
Abbreviations.....	iv
Abstract	v
Chapter 1	
Introduction	1
General Objective	3
Specific objectives	3
Methodology	4
Chapter 2	
To determine the factors contributing to early neonatal mortality in Sub-Saharan Countries	5
Chapter 3	
To identify and compare the best practices for interventions available and feasible for implementation in Sub-Saharan Countries	23
Discussion	26
Conclusion.....	31
Recommendations	32

Acknowledgements

In September 2007 I started my first encounter with Public Health in developing countries the ICHD course.

For a retired paediatrician who worked before in a number of countries outside the Netherlands but only in hospitals it became a difficult and very tiresome year. However this stormy year was full of interesting experiences and challenges.

The most rewarding experience for me in this year was getting to know my fellow-students.

Many of the countries they came from I knew from my travel experience but this was a different feeling than travelling.

They have been teaching me a lot about themselves and the countries they live in. I hope they liked rainy windy Holland so different from their own countries.

I am very grateful for the help and especially the patience when I started complaining again of the course coordinators Prisca, Yme and Sanjoy.

But most of all I want to thank Rinia the secretary.

I think that all the students will remember Rinia as a very friendly and very competent lady who helped us with everything and with every problem and we had many problems!

During this study year I have hardly seen my family nor my friends.

I practically did not get the chance to enjoy the cultural life of my home town Amsterdam.

But instead of that I entered a new and different world.

I hope to see in future some of my fellow students in their home countries when I start travelling again.

Abbreviations

Ambu-bag	Bag and mask for resuscitation of the newborn
CHW	Community Health Worker
EmOC	Emergency Obstetric Care
EmNC	Emergency Neonatal Care
IMCI	Integrated Management of Childhood illnesses
IMNCI	Integrated Management of Neonatal and Childhood illnesses
ITN	Insecticide-treated nets
MDG	Millennium Development Goals
MMR	Maternal Mortality Rate
NMR	Neonatal Mortality Rate
NGO	Non Governmental Organisation
SSA	Sub-Saharan Africa
TBA	Traditional Birth Attendant
WHO	World Health Organisation
UNICEF	United Nations Children Fund

Abstract

Problem

More than one million babies in Africa are dying in the first week of their life, half of them at the first day of life. There has been only little progress in reducing the neonatal deaths in the first 4 weeks of life and no measurable progress in reducing the early neonatal deaths.

Objective

To analyse the risk factors of early neonatal deaths and to investigate which interventions can be recommended in order to improve the survival of these newborns.

Methods

This paper is based on literature review. Various documents, books and articles regarding the early neonatal deaths available are referred.

Results

There are various factors determining or contributing to early neonatal deaths. These are unhealthy or unfavourable social, cultural and belief system around pregnancy and child births. Similarly, the poor socio-economic factors that play a vital role to enable people to seek health care services during pregnancy, delivery and during the post natal period are identified to be equally important. In addition to this, lack of existence of functioning health care delivery system played a vital role. Furthermore, lack of, inadequate or poorly trained health care service providers is an other major contributor to escalating early neonatal mortality.

Conclusion

There are three gaps in the continuum of care. These are a gap in the antenatal period, a gap at the delivery and a postnatal care gap. First gap, though the antenatal care is visited better than any other care there is mostly one visit and it is by far not done as described by the WHO as a four focused visit. Second gap: At the delivery there is mostly no skilled birth attendant available at around 40% in the SSA countries. A skilled birth attendant can be a midwife, a community midwife or a nurse with midwifery skills 15 % of the deliveries can have complications and if there is no skilled birth attendant available serious problems can arise, also when the neonate needs resuscitation. Third gap: This is the most serious gap the postnatal period when there is no care for the mother and her child Children can die just because of lack of basic care like hygiene thermal care and no breastfeeding. A solution can be the strengthening of community care and health care system alike with the simultaneously involvement of various sectors.

Keywords

Early neonatal deaths, community care, health system, postpartum care.

Chapter 1: Introduction

Burden of disease

More than one million babies in Africa are dying in the first week of their life, half of them at the first day of life. Most deaths occur at home unseen and uncounted (Lawn

2005). My focus is on the rural areas of Sub-Saharan Countries and the early neonatal deaths in the first week of life.

The proportion of child deaths that occurs in the neonatal period is increasing and the Millennium Development goal for child survival cannot be met without substantial reductions in neonatal mortality. The neonatal mortality occurs during the first four weeks after birth and early neonatal deaths in the first week of life. Early neonatal deaths account for 75% of all neonatal deaths. Many babies who die are unnamed and unrecorded (Lawn 2005). The average neonatal mortality of SSA countries is 41 but there are big differences amongst the countries. The NMR of Liberia is 66 per 1000 and of Eritrea is 25 per 1000 newborns. There has been little progress in reducing neonatal deaths and no measurable progress in reducing the early neonatal deaths in SSA countries (Countdown to 2015 2008). Some countries have been doing well in reducing the NMR with a low GNI per capita (less than \$500 per year). Like Eritrea, Malawi, Burkina Faso, Tanzania, Uganda and Madagascar. There was a strong commitment to child health at all levels of the governments in promoting and spending more on health. (Countdown to 2015 2008)

Less than 3 % of neonatal deaths take place on countries with vital registration data reliable for cause of deaths analysis (Lawn 2005). Population based information in high mortality settings is largely dependent on verbal autopsy methods of variable quality. Estimates from 2000 of the distribution of direct causes of death indicate that 23% died of complications of asphyxia, of preterm birth 28% of severe infections 36% including sepsis/pneumonia 26% of tetanus 7% and diarrhoea 3%. Of the remaining 14% 7 % of deaths were related to congenital abnormalities (Countdown to 2015 2008).

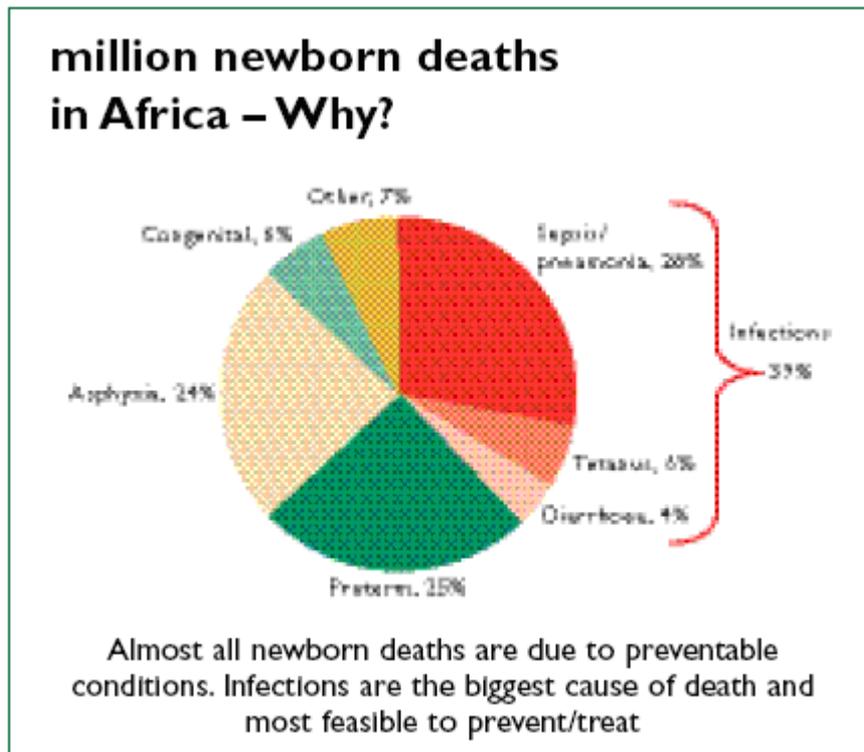
Prevention of neonatal deaths in the first week of life can possibly be achieved through a continuum of care starting with antenatal care in pregnancy (4 focused antenatal care visits WHO 2006) the IMPAC (Integrated management of pregnancy and childbirth (WHO 2006) the skilled obstetric care, the skilled neonatal care and the postnatal care as a part of the childhood care. However the first week of life forms a gap between the maternal health care and the child care. (Kerber 2007) The first week is not included in the IMCI (Integrated management of childhood illness). The IMCI starts at the second week of life when children are brought for treatment to the health facility. The postnatal care is in most countries very neglected. In 35 countries of SSA the postnatal care is not mentioned at all and in the remaining countries Congo mentioned the highest percentage with 24%, the lowest was Ethiopia with 5 % (Countdown of 2015 2008).

In 26 countries the IMCI was adapted to cover newborns 0-1 week, 2 countries had a partial adaptation and 12 countries had no adaptation for newborns.

A newborn with an asphyxia or a serious infection can die within hours if appropriate care is not provided in time.

The three delays model (Thaddeus and Maine 1994), delay in recognition of illness, delay in seeking and accessing care and the delay in the provision of care once at a health facility has helped in understanding maternal deaths. Similar delays have been documented for newborns with severe illness and with the rapid progression of many neonatal illnesses it certainly can play an important role in neonatal deaths.

I have been using this model in my thesis as a role model for the early neonatal deaths.



More attention for neonatal deaths is needed in order to meet the MDG4 in 2015. In Africa the average annual decline in under five mortality was 2 % but since 1990 progress has been much slower at 0.7 %. There is the huge impact of HIV as a reason but another important barrier to progress is the failure to reduce the neonatal deaths (Partnership for MNCH 2006).

Better data than presently available are also needed at service level and national level to manage programmes and achieve maximum effectiveness of often scarce resources. Programme managers cannot manage what they cannot count. Information on causes of neonatal deaths is important for reducing deaths of newborn babies.

Improved epidemiological data are essential but social visibility is also important. Once communities and decision makers perceive high neonatal deaths as an issue public ownership of the problem and progress will be more likely (Lawn 2005).

The aim of this thesis is to determine the risk factors of early neonatal deaths and to identify and compare the best practices and to recommend the effective interventions for reducing the early neonatal deaths in Sub-Saharan Africa.

General Objective

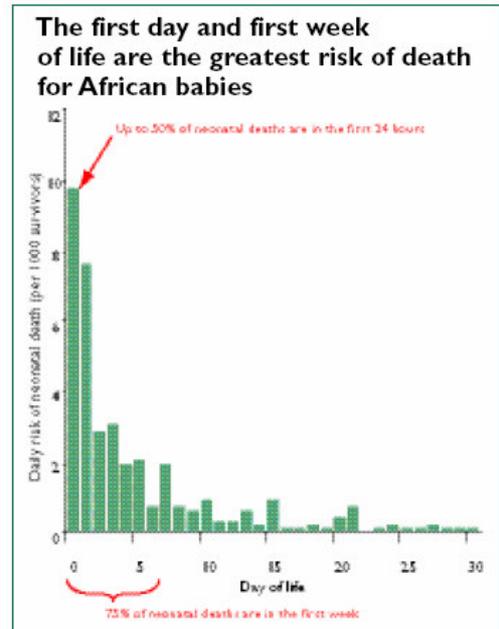
To analyse the risk factors of early neonatal deaths in Sub-Saharan Africa and to investigate which interventions can be recommended in order to improve survival of the newborns.

Specific objectives

1 To determine the factors contributing to neonatal mortality in African countries in the first week of life.

2 To identify and compare the best practices for interventions which are available and feasible for implementation in Sub-Saharan Africa.

3 To recommend which neonatal interventions should be implemented in existing programmes of maternal and child health to the different stake holders involved like Governments, donors, health facilities, community leaders etc.



Methodology

This thesis is based on literature review of documents, scientific articles books and on line publications. In order to obtain the aforementioned documents, various search engines were used. Pub med as a search engine was used to find peer-reviewed articles. Google was very frequently used in order to identify unpublished grey literature. Similarly, the web sites of WHO, The World Bank, UNICEF and USAID were referred to find the current articles and practices. The Lancet Neonatal Survival Steering Team, The Countdown of 2015 and the Partnership for Maternal, Newborn and Child Health resources were frequently consulted.

The literature review was done in order to analyse the risk factors of early neonatal deaths in newborns in Sub-Saharan Africa in order to investigate which interventions can be recommended to improve survival of the newborns. I used as a framework the three delays model of Thaddeus and Maine to analyse and describe the factors. After describing the factors I studied the interventions that are already applied.

I described harmful practices and best practices and gave recommendations in order to try to reduce the early neonatal deaths.

Key words: Neonatal Mortality, Maternal Mortality, Antenatal Care, Skilled Birth Attendant, Postnatal Care, Community, Health facility, Traditional Birth Attendant and Community Health Worker.

Limitations: Mostly estimates were given as data are not always available
Only English literature was reviewed.

Chapter 2: To determine the factors contributing to early neonatal mortality in Sub-Saharan African countries

Some of the factors described to contribute to early neonatal mortality can be described according to the model of the three delay's of Thaddeus and Maine like the socio-economic factors the cultural factors the home delivery, the health facility delivery and the postnatal care factors.

The other factors I will describe separately from this model.

Phase 1 delay includes the decision-making process

Factors that can influence the decision to seek care include the woman herself her husband and her relatives, the availability and the skills of a trained TBA (traditional birth attendant), the ability to recognize high risk pregnancies and to give the right advice, the status of the woman, illness characteristics (recognition and severity), distance from the health facility (accessibility), financial and opportunity costs (affordability), previous experience and perceived quality of care.

Phase 2 delay is the delay to reach a health facility.

Influencing factors are physical accessibility, travel time from home to facility, the availability and cost of transportation and the condition of the roads

Phase 3: delay is the delay before receiving adequate care after arriving at the facility, but also includes substandard care. Influencing factors are the availability of supplies (blood transfusion, intravenous fluids and antibiotics) equipment and trained personnel and the competence of available personnel (wrong diagnosis and/or action), (Stekelenburg 2004)

In addition to the above mentioned factors, in Sub-Saharan Africa a model of 4 delays is used:

Delay one:	Failure or delay in recognition of danger signs	33% of maternal deaths
Delay two:	Delay in deciding to seek care	40% of the cases
Delay three:	Delay reaching appropriate care	19 % of cases
Delay four:	Delay in receiving appropriate care	52% of cases

(Maternal Mortality-Disease and Mortality in Sub-Saharan Africa World Bank 2006)

Various models are used in Public Health

The socio-economic factors, the cultural factors, the home delivery, the health facility delivery and the postnatal care factors can be described according to the model of the three delays. The Maternal and Neonatal factors will also be described according to the model of the three delays.

- 1 Socio-economic factors
- 2 Cultural factors
- 3 Maternal factors
- 4 Neonatal factors
- 5 Home delivery factors
- 6 Health facility delivery factors and Maternity waiting homes
- 7 Postnatal care factors
- 8 Community care factors
- 9 Health care system factors.

Health care seeking behaviour during pregnancy and childbirth influenced by:

1 Socio-economic factors:

1.1 young age of mother due to early marriage if the mother is only 14-16 years old
A young age of the mother due to early marriage plays certainly a role in her health care seeking behaviour. She has no experience in pregnancy, childbirth and postnatal care and is dependant upon her husband and other family members what decisions to take. The decision to deliver at home is mostly taken by the husband and the other family members. The complications that can arise during delivery are not properly explained to her so she will deliver without a skilled birth attendant and seeking care will be delayed for her and also for the child when getting ill during the first week of life (Partnership MNCH 2006).

1.2 Women with an unwanted pregnancy but carried to term and not married can have the same socio-economic problems as described for the very young mother.

1.3 Illiteracy of the mother is a very important factor for the health care seeking behaviour Use of skilled attendance was 18.2% and 74.3% among mothers with no education and with higher education (10 years schooling) (Anwar 2008). The ANC was also visited more by a literate mother and ANC visits increased in general the use of a skilled birth attendant. Progress in the achievement of the MDG 4 and 5 is correlated with education of the mother and the father as well (Anwar 2008).

1.4 Poverty and therefore lack of money for a health facility delivery even if the mother wants to deliver there plays an important role in many countries in Sub-Saharan Africa. There is no money available for transport and to pay for the health facility so the delivery is mostly at home without a skilled birth attendant. There is a user fee to pay in most of the countries and the facility also ask the mother and family sometimes to bring baby clothes, maternity pads, clothes etc. which they cannot afford (Stekelenburg 2004). Poverty plays an important role in the low use of Maternal Health services so we can conclude that poverty and the ill health and deaths of newborns are intimately linked. The newborn health gap between rich and poor is unacceptable high (MNCH2006)

1.5 Inequity: Families in the poorest quintile experience on average a 68% higher neonatal mortality than the richest quintile. The largest disparity is seen in Nigeria with an NMR of 23 among the richest quintile compared to 59 in the poorest quintile, representing a gap of 156%(MNCH 2006). There is a large gap between rich and poor in both access to services and quality of services. The lowest inequity was for the use of ANC services and the highest for delivery by Caesarean section, as a Caesarean section can be very costly for a family (Anwar 2008).

1.6

A low status of a woman and no support of her husband can lead to a denial of the right of every woman to have a delivery with a Skilled Birth Attendant so that good care cannot be given to the mother and her baby She probably is not allowed to take decisions herself (partnership MNCH 2006). In case of complications during of the home delivery there will be a delay in health seeking care, due to the 3 delays (Thaddeus& Maine 1994).

1.7 No Birth-preparedness and Complication readiness explained to the mother and her family.

This should be done at the antenatal clinic visits but is unfortunately not always done. Antenatal care is only sufficient if it is done as a focused 4 visit(WHO 2006). Health education can be given repeatedly then at every visit. There should be a plan for the following:

- 1 A skilled attendant at birth
- 2 The place of birth and how to get there including how to access emergency transportation if needed
- 3 Items needed for the birth
- 4 Money saved to pay the skilled provider and for any needed medications and supplies
- 5 Support during and after the birth from family
- 6 Potential blood donors in case of emergency(WHO focused Antenatal Care 2006)

1.8 Preference of mother and family for a home delivery is inversely related to the education of the mother and father, the lack of support from the husband and other family members and the low status of the woman.

There is also the relation with the area of residence, urban or rural, the distance to the hospital, the transport, the bad roads and the poverty of the family (Anwar et al 2008).

Lack of adequate health education during ANC visits and the poorly staffed and ill equipped health facilities with unfriendly and poorly skilled personnel also plays a role (Stekelenburg et al 2004). There are also the cultural factors leading to a preference to a home delivery (Lefebber 1998).

There is also the unawareness of the possible dangers of the delivery but even if the mother and her family are aware of the dangers they accept that a woman who gives birth has a risk of dying. Childbirth is a woman's battle and maternal mortality is referred to as falling in the battlefield in the line of duty (Stekelenburg 2004).

2. Cultural factors

2.1 Preference of the mother and family for a traditional healer plays a role in delayed care seeking. In some African communities the family decides when the child needs treatment if it is ill. They want to start with traditional medicines even for a whole week before going to a health facility with the child and it is also not always allowed for the mother and her child to leave the house for some time in some countries. If a newborn is ill the first week of life the family sometimes is reluctant to spend much money if they are poor as this is not beneficial for the family as a whole even though they recognize that the baby is very ill and they have more trust in the traditional healer than in the health facility (Bazzano 2008).

2.2 Cultural acceptance of dying of a newborn.

Mothers are encouraged not to grieve for too long if the baby dies. There is the feeling that some children are not meant for this life especially in the first week of life so in some countries people will wait with giving names (Lefebber 1998).

2.3 Cultural beliefs and practices around pregnancy and birth are everywhere in Asia Latin America and Africa. It is very important to have a good knowledge about these beliefs and practices in order to understand the health care seeking behaviour and utilisation of health services in those countries.

I will restrict myself in describing some cultural practices in Sub-Saharan Africa as there are many described (Lefebber 1998).

2.4

Cultural beliefs and practices	Reasons
Talking about the unborn child or making preparation for its arrival is taboo	Can draw attention of witches who may use words or articles as vehicle for evil curses
Taboos on various foods during pregnancy This varies in all countries except eggs. Eggs are forbidden almost every where.	Fear of a miscarriage and fear that the child can grow too big The egg is the unborn child of the chicken which is sometimes a sacred bird
Cultural feeding pattern	The first food can be gin/palm wine/water The colostrums is not always used and the breastfeeding starts only after 2 days sometimes
The child and the mother have to stay inside the house for at least 8 days. The child gets a name after those 8 days	They have to be hidden for fear of visitors having evil thoughts and desires which might harm especially the newborn. There is also the feeling that the child might die the first week so they wait with giving a name
Dressings of the umbilical cords like dung ashes earth herbs etc	To avoid that evil spirits will enter the child
Providing herbal medicines which can be prepared as an infusion and given to the mother	The herbs serve different purposes like preventing abortion enlarging the birth canal or facilitating the placental delivery

2.5 Breastfeeding is not always given within one hour after birth and harmful feeding is first given instead because of cultural practices. The period following birth is often marked by cultural practices. Communities in India gave prelacteal feeds such as ghutti honey sugar and tea though they also started with early feeding and considered colostrum beneficial (Klaushal 2005). But communities also discard sometimes colostrum and give foods other than breast milk. In Sub-Saharan Africa only 30% of the babies are exclusively breastfed (WHO 2002).

2.6. Harmful cultural beliefs and practices (Lefebber 1998).

2.6.1 Taboo on preparation for the arrival of the child .Talking about the child or making preparation for its arrival such as buying clothes or wearing new clothes during pregnancy. This may cause various problems by drawing attention of witches who may use words or articles as vehicle for evil curses. Because of this taboo it will be difficult to achieve successfully birth preparedness and complication readiness as is advocated now by the WHO in order to reduce the neonatal mortality rate. If a mother and her family want a delivery at home or even at the health facility they should know and be prepared for problems that can arise.

2.6.2. Taboo for the pregnant women on various foods

In various countries in Africa, Asia and Latin America taboos for foods are described. In SSA countries eggs are mentioned as eggs are the unborn children of a chicken which is a sacred bird for the Mende in Sierra Leone. But in many other countries eggs are also not eaten. Fish, meat milk and poultry are also mentioned and some vegetables and fruits.

A common reason for restricting foods during pregnancy is the fear that the child may grow too big because of the expected complication of a delayed or obstructed labour. As many pregnant women are having a malnutrition in SSA countries this is a harmful practice as a low weight of the mother can give a low weight of the baby. The mothers are often very anaemic due to nutrition and malaria.(WHO 2007)

2.6.3. When there is a postpartum haemorrhage it is not seen as alarming as they say that the bad blood flows out which is beneficial (Lefebber 1998).

Postpartum haemorrhage is an important cause of maternal mortality in SSA countries. One third of all maternal deaths is due to haemorrhage (Countdown to 2015 2008) so this is harmful practice as there is a delay in health care seeking which can cause the death of the woman. The death of a mother has a very negative influence on the life expectancy of a child (Partnership MNCH 2006).

2.6.4. The dressings of the umbilical cord like dung and earth are dangerous and can give rise to neonatal tetanus and sepsis of the baby.

The unclean delivery and the unclean cutting of the cord are also a factor of importance for neonatal tetanus but the harmful dressings given at home certainly contributes also.

The cord is cut short near the skin and then it is more dangerous than when the cord is kept longer as was the case before (Lefebber 1994).

2.6.5. With the cultural feeding practices harmful substances are given to the child as first symbolic feeding to purify or to learn the taste of adult food. The colostrums are mostly discarded and they contain the immunoglobulin the child needs as a protection for diseases and also a lot of protein and fat. The breastfeeding is often delayed for two days and water is given the first two days instead of feeding which can be very harmful especially for prematures and small for dates(Kaushal 2005)

2.6.6. The child is kept sometimes in the house for eight days in many countries and then a name is given. The mother has to stay for 8-20 days in the house as well and the family does not want to have visitors. This has consequences for the postnatal period as in that period mother and child should be looked at carefully and seen by a health worker who can recognize the danger signals for mother and child. Due to this there will be also a delay in seeking care. The danger signals for the newborn are: The child does not drink, is hypothermic or has a fever, is irritable or drowsy.(Partnership MNCH WHO 2006)

2.6.7. If the newborn gets ill there is a preference for traditional healers of the mother and family. The child is treated with traditional medicines for the first week of life and then they might go to the health facility(Bazzano 2008). This will give a delay in care seeking so the child will be brought late to the hospital if ill.

3 Maternal factors are influencing the neonatal mortality

There are many maternal factors to describe as mother and child are inseparable linked so the outcome of the neonatal mortality and morbidity is closely linked to the maternal mortality and morbidity.

Adjusted odds ratios These odds ratios are from population-based studies and significantly associated with intrapartum stillbirth or neonatal death or perinatal death (Lawn 2005).

Adjusted odds ratios for various risks factors for neonatal or perinatal death due to maternal factors.

Life-cycle factors	Adjusted odds ratio
Maternal age (years)	
<18	1.1-2.3
>35	1.3-3.0
Maternal size	
Height ,150 cm	1.3-4.8
Prepregnancy weight ,47 kg	1.1-2.4
Parity	
Primigravida	1.3-2.2
Parity	61.4-1.5
Poor obstetric history	1.6-3.5
Antenatal factors	
Multiple pregnancy	2.0-6.8
Hypertensive disorders	
Pre-eclampsia	1.7-3.7
Eclampsia	2.9-13.7
Maternal anaemia(pcv=packed cell volume<33%)	1.9-4.2
Maternal malaria(blood test positive)	2.2-3.5
Syphilis(perinatal death)	1.7-5.8
HIV(infant death)	7.2

Intrapartum factors

Malpresentation	
Breech	6.4-14.7
Other	8.3-33.5
Obstructed labour/dystocia	6.7-84.9
Prolonged second stage	2.6-4.8
Maternal fever during labour(>38 C)	9.7-10.2
Rupture of membranes >.24 hours	1.8-6.7
Me conium staining of liquor	11,5

Conclusion: Many known maternal factors give a high risk for neonatal mortality. A good antenatal screening and skilled care at the delivery will reduce this risk.

3.1 Age of mother

A young age of the mother is a risk factor during a delivery because she might have a disproportion of the pelvis due to her young age which can lead to obstructed labour so she needs a skilled birth attendant followed by a referral to a hospital for a Caesarean section.

3.2 Low height

A low height of the mother might indicate a disproportion of the pelvis which can lead to obstructed labour so she also needs a skilled birth attendant who can refer her to the hospital if necessary.

3.3 Low weight of the mother

A low weight of the mother can give a child with a low weight for gestational age and such a child can develop problems like low blood sugars, difficulty in feeding and hypothermia.

Many mothers in Sub-Saharan countries are malnourished so this problem can be encountered frequently(Khama 2006).

3.4 Parity

A primigravida as well as a multipara can be at increased risk of complicated deliveries .They both need a skilled birth attendant who can give Emergency obstetric care and can resuscitate the baby if complications arise.

3.5. Multiple pregnancies

Multiple pregnancies can give serious complications during delivery and a skilled birth attendant should be available for EmOC and resuscitation of the baby if necessary. It is preferable that the delivery take place at the health facility and not at home.

The babies of a multiple pregnancy are often premature born or small for age or both so that the postpartum care should also be given adequate at home as the mothers once discharged from a health facility are not always returning for postnatal visits or are asked to come for a return visit weeks later .Those children should stay for a longer time in the hospital.

3.6 Anaemia

Anaemia in pregnancy is a leading cause of maternal and perinatal deaths in developing countries and affects almost two thirds of the pregnant population. The prevalence of anaemia is estimated between 35% and 75% in Sub-Saharan

countries. Post partum haemorrhage is a risk for a mother who is anaemic because of malnutrition and malaria (Hoque 2007).

3.7 Malaria

Each year about 50 million women living in malaria endemic countries throughout the world become pregnant of whom over half live in tropical areas of Africa with intense transmission of Plasmodium falciparum. An estimated 10,000 of these women and 200,000 of their infants die as a result of malaria infection during pregnancy and severe malaria anaemia contributes to more than half of these deaths.

Except anaemia for the mother malaria also causes small for dates and prematures. Both can have severe problems in the postnatal period (WHO 2007).

3.8 Aids/HIV

At the end of 2003 a total of 40 million people globally were infected with HIV and 67% of these were living in Sub-Saharan Africa. Women and young people from 15 to 24 are disproportionately affected. The prevalence of HIV in pregnancy is estimated to be 15 to 40% in Sub-Saharan Africa (WHO/Afro 2004). Each year over half a million newborns are infected with HIV through MTCT (Mother to child transmission).

Less than 10% of infected pregnant women receive interventions to reduce the MTCT. Even when effective prophylaxis is available to prevent transmission during pregnancy and childbirth there is a gap in service provision in the postnatal period. Few PMTCT programmes reach the mothers and newborns after discharge to provide treatment and support for the infant feeding (UNAIDS 2006).

Aids of the mother is not a major cause of early neonatal deaths but can cause small for date babies and prematurity (WHO/Afro 2004) and the risk of AIDS/HIV for the child. The mother can die as well which has a negative effect on the child as well as the child is then dependant upon family and other people to take care of him or her.

3.9 Malaria and HIV/AIDS

HIV infected people are particularly vulnerable to malaria. Antenatal care needs to address both diseases and their interactions (WHO 2007).

3.10 Syphilis

Most SSC (Sub-Saharan Countries) have high rates of Syphilis infection. It can be identified and treated at the antenatal clinics but many women are not screened because of the lack of supplies for testing Syphilis at the health centres (Partnership MNCH 2006).

Syphilis can cause stillbirth, prematurity, congenital infection or neonatal death depending on the stage of maternal infection and duration of fetal infection before delivery (Gomella 2004).

Harmful practices during pregnancy

Though 4 focused visits are recommended by the WHO, due to various constraints associated with health care delivery systems, most of the pregnant women visit only once the antenatal clinic in SSA countries. Important issues like tetanus toxoid vaccine, treatment of the often severe anaemia, treatment of AIDS/HIV and Syphilis cannot be accomplished. Also the intermittent preventive treatment of malaria and

the insecticide treated nets cannot be given. Counselling about birth preparedness and complication readiness is also not done.

4 Neonatal factors

4.1 Gender: Boys are affected more than girls

The sex ratio at birth is 106 boys to 100 girls. It is well known that mortality rates for boys in the early neonatal period are higher than those for girls. However it is less well known that differences in attitude towards boys and girls affect their future lives. Most societies prefer sons and the strong preference for boys is also reflected in neonatal mortality. Neonatal mortality among girls may be up to one third higher than that registered among boys, thus counteracting the biological differences observed in societies without strong gender preference (Neonatal and perinatal mortality WHO 2006).

4.2 Prematurity

There are twice as many prematures as in European countries in Sub Saharan countries probably related to infections particularly Malaria HIV and STI's like Syphilis (Partnership MNCH2006).

Most preterm babies are born between 33 and 37 weeks and should be able to survive with extra care in the postnatal period (Lawn 2005).

The preterms with premature lungs and serious infections like sepsis/meningitis need a referral to a hospital as soon as possible to survive but that is often not done or too late to save their lives (The three delays). The number of prematures can be reduced by a number of interventions like preventing and treating Malaria HIV/AIDS and Syphilis in pregnancy and antibiotics should be given for a premature rupture of the membranes (Gomella 2004).

4.3 Low birth weight for age: The babies with a low birth weight for age are at risk but low weight as such is not directly related to neonatal death. They might have low blood sugars and it is very important to start with exclusive breastfeeding as soon as possible and give frequent feedings. They might develop hypothermia and are sometimes difficult to feed but if they get extra care they can manage better than the prematures, who are more at risks for lung problems and infections.

Low birth weight for age is related to low weight of the mother, Malaria HIV and STI's (Partnership MNCH 2006).

4.4 Intra-uterine infections like the TORCH Infections (Toxoplasmosis, Rubella, Cytomegalie virus) can give children who are born with a number of congenital anomalies which can lead to neonatal deaths. Chlamydia Listeriosis and Group B streptococcus infections can give a sepsis, pneumonia and conjunctivitis which also can lead to neonatal deaths (Gomella 2004).

4.5 Children can be born with congenital anomalies due to chromosomal disorders. Most common is the DOWN syndrome but there are other chromosomal disorders that will not always survive the first week of life.

There are many other non chromosomal deformations like neurological disorders, endocrine disorders kidney disorders and congenital heart diseases that mostly will survive the first week of life but they will be in need of specialized care that is not always available in Sub-Saharan Africa. Identification and timely interventions for

management are of utmost importance for those children and their parents (Gomella2004).

It is difficult to collect data for congenital anomalies as these deaths are not always reported and infanticide also can play a role as an abnormal child can be considered to be a “witch child” (Lefeber 1994).

5 Home delivery

Most deliveries are at home often without a skilled birth-attendant. About 60 % of the African women give birth without a skilled birth attendant and this has not changed significantly the last ten years(WHO/Africa 2005). EmOC can be required when complications arise which is the case in 15% of the deliveries but it is not always available especially in the home setting. Newborns require sometimes some assistance to initiate breathing but an Ambu bag is not always available. 24% percent of the newborns die of Asphyxia (Countdown to 2015 2008) but not all asphyxiated children need extensive treatment only 1 %.For the rest an Ambu bag can be sufficient (Newton 2006)

Harmful practices during delivery at home:

Most deliveries are at home in the SSA countries but there is no skilled birth attendant available. Only 42% of the mothers have a skilled birth attendant available in SSA ranging from 34.2% to 54.7% There are TBA and sometimes CHW available but they are not trained and not supervised. so they cannot cope with complications during delivery and they also have no training for the resuscitation of the newborns(WHO/Afro 2005).

Most women prefer to deliver at home instead of going to a health facility for the delivery so when complications arise there is going to be a delay in getting care due to the three factors of delays.

No clean home delivery.

If the delivery is not clean infections can be a risk. For the baby there is the danger of sepsis and neonatal tetanus starting in the first week of life or later. If the danger signals of a sick baby are not seen by a trained person the child will be referred to a health facility too late though as we have seen in chapter 2 many others factors like cultural and socio economic factors also play a role in the delay of health care seeking. Lack of hygiene when handling the babies and their mothers like washing hands is also a risk for infections. There are six principles of clean delivery: clean hands, clean delivery surface, clean perineum, clean cord cutting instrument, clean cord ties and clean cord care. Clean delivery practices lead to reduction of neonatal mortality by preventing neonatal tetanus and neonatal sepsis/meningitis(WHO 2001)

Neonatal tetanus.

In the African region about 164.000 neonatal tetanus cases and 110,000 mortalities are reported each year Of 28 countries in the world accounting for 90% of neonatal cases 16 of those countries are in the African Region. In addition of the already mentioned factors in many countries and communities people apply potentially harmful substances like mud, cow dung etc on the cord-stump(CDC 2006) which can aggravate the risk of neonatal tetanus. The clostridium tetani is found mainly in dust and dirty un-sterilized surfaces. The toxin produced by the bacteria is responsible for the clinical manifestations. The child who is born normally suddenly at age 3 to 9

days stops sucking and starts to have spasms and convulsions. The case fatality rate is very high with ranges between 70-100%. Lack of effective coverage of tetanus toxoid vaccination by the mother which can be done for instance at the ante natal clinic contributes to the severity of the problem. Also the mothers who have not been immunised and who give birth in unhygienic circumstances can become affected. There is a grossly underreporting globally but most especially in the African Region about maternal and neonatal tetanus (WHO 2007)

Neonatal sepsis/meningitis

Neonatal sepsis can be classified according to the time of onset of the disease: early onset and late onset. Early onset disease is mainly due to bacteria acquired before and during delivery and late onset disease to bacteria acquired after delivery due to community sources. However there is little consensus as to what age limits apply, with early onset ranging from 48 hours to 6 days after delivery. In developing countries Gram negative organisms are more common while Group B streptococcus infections are rare compared to developed countries. The data however are not reliable as most babies will die at home unnoticed and will not appear in the statistics (Vergnano S 2004)

For early onset meningitis the Gram negative organisms are the most frequent as well. Clinical symptoms for neonatal sepsis/meningitis are many: They are not able to suck, they become lethargic or irritable, they get convulsions and fever or become hypothermic. There is a high case-mortality of 33-48% and proper antibiotics and treatment are not always available even if they reach the health facilities in time, which is often not the case due to delay in health-seeking care. The case mortality is probably several times higher than mentioned taken in consideration that this is a hospital case mortality. If the children stay alive they can be severely handicapped. Proper treatment for those handicapped children is unfortunately often not enough available in Sub-Saharan Africa (Vergnano 2004)

Eye and skin care

If there is no good eye-care the danger of severe eye infections due to Chlamydia and Gonorrhoea arise and the children can be threatened by blindness and sepsis as well (Gomella 2004).

Every woman should have a skilled birth attendant when she delivers and there should be an availability for Emergency Obstetric Care and Neonatal Care if needed (Making pregnancy safer Annual Report 2006 WHO). Only 42% of women have a skilled birth attendant in Sub-Saharan Africa ranging from 34.2% to 54.7%.

When having a home delivery there should be Emergency Care available for mother and child in case of complications when needed. A newborn is not highly dependent on equipment and drugs but an Ambu-bag (bag and mask) and a mucus-extractor should be available and properly used for the asphyxiated child. A clean birth kit for home births should also be provided with an Ambu bag (MNCH 2006) and a mucus-extractor but there is a training necessary in order to use it properly (Opiyo 2008). 24% of the neonatal mortality is due to asphyxia. (Count down to 2015 2008). Current resuscitation practices are often poor but neonatal outcomes can be improved.

through promotion of the effective use of an Ambu bag(a bag-valve-mask)(Newton 2006) in the home-setting. and in the hospitals(Opiyo 2008)

The quality of obstetric care can only be guaranteed by a skilled birth attendant .This can be a midwife a nurse with midwife skills or a community midwife so a TBA or a CHW should be available during a home delivery in order to get help in case of complications from the skilled birth attendant

Health facility delivery factors

6.1 Emergency Obstetric Care and Emergency Neonatal Care are not always available at the rural health centres. in S.S.A countries(Stekelenburg 2004)

Essential (or emergency) obstetric care is the term used to describe the elements of obstetric care needed for the management of normal and complicated pregnancy delivery and the postpartum period. Basic essential obstetric care services should include at least the following:

- To administer antibiotics, oxytocics and anticonvulsants per injection.
- Manual removal of placenta
- Manual removal of retained products following miscarriage or abortion
- Assisted vaginal delivery with forceps or vacuum extractor

EmOC can be done by the midwives and not only by the doctors who are not enough available in SSA 21 SSA countries are authorising their midwives to administer a set of life saving interventions. It is partially allowed by 15 countries and not done by 6 countries.(Countdown to 2015 2008)

Comprehensive EmOC includes

blood transfusions Anaesthesia and Caesarean sections but unfortunately these are not always available in the hospitals especially the safe blood transfusions . In some countries like Mozambique, Zambia and Congo medical assistants are trained to perform Caesarean sections((Dileep 2003)

Current coverage of effective neonatal resuscitation within facilities is very low in Sub-Saharan Africa. The facilities often lack adequate emergency newborn care or even protocols for managing neonatal infections or care of preterm babies (Partnership MNCH 2006) so proper training of health care workers is necessary including nurses midwives and doctors for Emergency Neonatal Care.(Opiyo 2008)

6.2 There is a lack of basic equipment drugs and supplies for maternal and newborn care in the health centres There should be essential newborn kits for health centres made available (Partnership MNCH 2006).

6.3

There are many inadequate service providers who need training and supervision. Treatment guidelines and protocols in the health facilities are sometimes inappropriate and are not used well (Khama 2006).

6.4

There is a severe lack of service providers due to many factors such as too low salaries inappropriate working conditions and the enormous burden of the HIV/Aids that causes more work for less people in the facilities.

The mothers and families complain about the negative and unfriendly behaviour of some service providers. (Khama 2006)

6.5

There is often a poor referral system from the community to the health centre and from the health centre to the hospitals such as a lack of ambulances or other transport. and no proper communication between the community, the health centre and the hospital (Khama 2006)

Maternity waiting homes

Maternity waiting homes are residential facilities where women with “high risk” pregnancies can await birth. within easy reach of a facility with comprehensive emergency obstetric care.

This can bridge the geographical gap in the rural areas. I will describe the MWH's more in detail at the chapter of the best practices.

7 Postnatal care for the neonate after home delivery.

The postnatal period defined as the first six weeks after birth is critical for the survival of the mothers and their babies. The first day and the first week they are at the greatest risk. Up to 50% of the neonatal deaths are in the first day and 75% are in the first week. Yet birth and the first days of life is the very point along the continuum of care when coverage of interventions are lowest It is the most neglected period. of the continuum of care (Lawn 2005) There is no coverage for the first week of life in the IMCI (Integrated management of childhood illnesses).

It is often assumed that babies born at a health facility automatically get postnatal care but this is not always the case. Sometimes the mother and her child are discharged after a couple of hours and are not coming back to the health facility for a control visit or are given a postnatal visit 6 weeks later.

The period following birth is often marked by cultural practices.

Understanding these beliefs and practices is an important part of ensuring effective and timely care.

7.1 No clean cord care and lack of hygiene during and after the delivery give rise to neonatal tetanus and neonatal sepsis/meningitis Neonatal tetanus and neonatal sepsis/meningitis have already been described when discussing the home delivery.

7.2 Lack of thermal care. Keeping the baby dry and warm is very important for all babies but especially for the preterm babies and the small for date babies.

Skin to skin contact should be advised and for the preterm babies the Kangaroo method is advised and applied(24 hours skin contact for mother and child)This an old way of keeping a small and underweight baby warm by placing it upright inside the clothing of the mother against her skin and between her breasts which has been rediscovered in Columbia as a good practice It is a good alternative if you have no incubator and is done in Western countries very often. nowadays also for very premature babies to promote contact between newborn and parents

7.3 Lack of extra care for prematures and small for date babies. Prematures and small for date babies should be given extra support and care as they often have difficulties in keeping their temperature and have feeding problems as well. Infections and respiratory problems are also frequent for prematures.Early identification and rapid referral should be given for them but there is often a delay in recognizing the danger signs for the baby like not feeding well, fever or hypothermia,lethargie or being irritable. Even if the danger signals are recognized there is a delay in seeking health care due to the already mentioned 3 factors delay.Partnership MNCH 2006)

7.4 Breastfeeding

Exclusive breastfeeding for 6 months is the optimal way of feeding infants. The breastfeeding should start in the first hour of life.(WHO 2002)

It reduces infant mortality ,protects the child against infectious and chronic diseases and provides up to half or more of the nutritional needs during the second half of the first year and up to one third during the second year of life

WHO and UNICEF launched the Baby-friendly Hospital Initiative in 1992 to strengthen maternity practices to support breastfeeding.

However in SSA only 30% of the babies are exclusively breastfed (WHO/Africa 2005)

7.5 Postnatal visits

No regular control for the neonate at day 1,2,3 and no extra visits for the at risk children like the prematures and the small for date babies are the rule in most countries . The coverage for postnatal visits is very low between 2-24% .(Countdown to 2015 2008)

The first 6 hours after birth are crucial for mother and child as well as the following 3 days. after the birth. It is therefore important that there are visits planned to the homes as the mothers will not go to the health facilities with their babies for a follow-up in the first week of life(MNCH 2006) Due to cultural customs the mothers and children are not always allowed in some countries to leave the house in the first week so visits are very important and can be life saving.

The WHO has the rule of 6 for postpartum care: Observe 6 hours after delivery then 6 days postpartum then 6 weeks postpartum then 6 months postpartum for the mothers. This does not seem enough to me as more frequent controls are necessary to prevent the Mortality and Morbidity of the mothers and the babies in the first week after delivery.

7.6 Aids

Aids is an important cause of mortality and morbidity after the first months of life in many SSA countries HIV/Aids however is not a major direct cause of neonatal death

Newborns of HIV positive women are more likely to have a low weight for age and to be born premature which also give them greater risks for a neonatal death Integrating PMTCT during birth and in the postnatal period together with breastfeeding advice for the AIDS positive mother is not always done There is a severe gap postpartum at many levels including the AIDS/HIV care.

The advice of the WHO is to give exclusive breastfeeding the first 6 months unless a good replacement can be sought for the breastfeeding. But diarrhoea is a danger when the feeding is not well prepared and it is a stigma for the mother not to feed her own baby. The transmission rate of the infants who are breastfed is 5-20%.The transmission rate during pregnancy and delivery is about 20-25% When the mother is on antiretroviral treatment the HIV transmission is likely to be reduced. but this is not always the case.(WHO 2008)(UNAIDS 2006)

7.7 Family planning

Family planning is an important part of the postnatal care and should be discussed at depth with the parents as this certainly influence the future health of the mother and her newborn Early neonatal deaths are not directly related to family planning but it is a very important part of the continuum of care of pregnancy childbirth and postpartum period but the contraceptive prevalence rate is low in general in the SSA countries(Countdown 2015 2008)

Harmful practices at home due to lack of postnatal care

No regular visits to observe mother and child so the danger signals are not seen by a trained and supervised TBA or a CHW who can help referring the baby to the hospital if the child gets ill

Sometimes babies are not kept warm and dry and due to wrong advice of the family members, breast feeding is not initiated in time thereby exposing the premature and the small for date babies to danger and sometimes, the mothers also don't receive any support for starting the breastfeeding.

No help for the AIDS/HIV mothers and babies with the feeding and the treatment There is an important gap in the postnatal period for AIDS-HIV treatment for the mothers and the babies. Because of the stigma associated with HIV-AIDS the mothers often receive the minimal social, family and nutritional support.(WHO/Africa 2004)

Community care factors:

- lack of community involvement
- lack of trained and supervised community health workers and traditional birth attendants
- lack of drugs and supplies in the community
- no linkages from the community services to the health facilities

8.1 Involvement of community care in the continuum of care for mother and child is very important as there are severe shortcomings at the health facility level so the community care can attribute in more care for the mother and her child.

8.2 There has been a revival of interest in involvement of community care for the mothers and their children(Koblinsky 2005)

8.3

Lack of drugs and supplies in the community should be avoided at all cost.

The health facilities should be kept responsible for providing the community with enough drugs and supplies. Unfortunately the situation is such that the weak health system in Sub-Saharan Africa also does not provide the health facilities with sufficient drugs and supplies so it is important first to improve the bad health structure.(Khama 2006)

8.4

No proper linkages from the community services to the health facilities makes a proper community participation difficult if not impossible. Evidence is there that community based interventions are effective in reducing neonatal mortality but only if the health system works properly. The community midwives, the TBA`s and CHW`s must have a good access to the health system. Without a good access they cannot do their work Due to the long distances and bad roads it is necessary to provide transport to the hospitals and the hospitals should be equipped properly as well (Khama 2006)

Health care system factors

- inadequate distribution of health services
- Poor referral system to the district hospitals
- Lack of supplies and drugs
- No properly training and supervision of the health workers
- Shortage of health workers

The distribution of health services is very inadequate in most Sub-Saharan Countries. There is an uneven distribution of district hospitals, regional hospitals and the geographical terrain and poor roads make the problems even worse.(Stekelenburg 2004) for the rural areas.

The Health systems in Sub-Saharan Africa are mostly poorly financed and unaccountable. There is no good supportive health system for the skilled birth providers and there are not enough of them due to the Human Resources crisis in Sub Saharan Africa. Lack of or poorly functioning of the health management information systems also influence the quality. In most Sub Saharan Countries high

level support for maternal and newborn health is weak. In most countries the money spent on health care is not enough and the number of health personnel which are trained is not enough. Once they are trained they work in private clinics or they go to other countries where the work conditions are better(khama 2006)

Chapter 3: To identify and compare the best practices for interventions which are available and feasible for implementation in SSA.

In order to improve the early neonatal survival numerous steps and intervention strategies have been designed and recommended.

These strategies are further elaborated as good practices.

In this chapter various practices contributing to improved neonatal survival from various countries are identified and analysed

Best Practices

A 4 focused ANC visits as described by the WHO

69% of all pregnant African women visit at least once a ANC clinic. In order to achieve the full life saving potential of ANC visits there should be 4 focused ANC visits as outlined in the WHO guidelines(WHO 2006). However this is unfortunately not always possible in SSA countries The focused ANC visits cost far more time than the previous ANC visits the way they were done before They are more going into details and there is more counselling planned like a plan for birth preparedness and complication readiness. The lack of finances and the lack of human resources in Sub Saharan Africa will make it difficult to achieve that all pregnant women will have 4 ANC visits in the near future. ANC visits are important for treating the often severe anaemia due to malnutrition and malaria, to give the tetanus vaccination twice, to start and give the intermittent preventive malaria treatment and the treatment for AIDS/HIV with the prevention of mother to child transmission. treatment included(WHO 2006)

Four focused ANC visits

<p>First visit 8-12 weeks</p>	<p>Blood pressure checked, Tetanustoxoid iron and foliate given Haemoglobin checked. Screening for AIDS/HIV and STI`.Counselling for Malaria: The use of ITN and the intermittent preventive treatment. of malaria should be discussed(IPT) The expected date of birth and the birth and emergency plan are discussed. The nutrition of the mother can be discussed and counselling of breastfeeding should be given</p>
<p>Second visit 24-26 weeks</p>	<p>BP checked Tetanustoxoid for second time given, iron and folate given.Hb checked. The IPT is started and ITN should be given if not already there If HIV/AIDS are positive treatment can be started. If Syphilis is positive treatment can be started. Counselling about Aids and Syphilis is given and the birth and emergency plan</p>

	is discussed again and the nutrition and breastfeeding
Third visit at 32 weeks and fourth visit at 36-38 weeks	Multiple pregnancy and malpresentations can be detected and advice given to have a delivery at the health facility as a home delivery is too risky. BP is checked and if anaemic the Hb as well. The AIDS/HIV treatment is continued and explained and again the birth and emergency plan is discussed The PMNCT is discussed as well. (Prevention mother to child transmission of HIV/AIDS) The IPT for malaria prophylaxis is given again and effective case management for malaria illness and anaemia in low endemic areas should be done as well

Sri Lanka

Sri Lanka is a low-income country which has achieved remarkable results in reducing maternal mortality Starting already in 1931 health services for rural communities received special attention. Midwives were posted to the rural areas to provide both home and institutional care. By 1996 there was one midwife per 300-5000- population. In 1996 86% of the deliveries were in government hospitals where services are free attended by skilled hospital midwives There is easy access to health care facilities throughout Sri Lanka. There is free antenatal care (home visits and clinics and the average of 5 visits) The literacy rate is 92% in 1992 with a gap for women of only 2.5%.

The Neonatal Mortality rate in Sri Lanka is 12/1000 in 1990 compared to 50/1000 in 1950 so this is a remarkable achievement of a low-income country due to the commitment of the policy makers, health care providers and educators (Martines 2005) due to the policy of providing enough midwives in the rural areas. At first they did deliveries at home but now nearly every delivery is at a health centre This approach can be recommended to all countries with high neonatal mortality rates (Investing in maternal health; learning from Malaysia and Sri Lanka World bank 2003).

Nepal

In Nepal the birth outcomes in a poor rural population improved greatly through a low cost potentially sustainable and scalable participatory intervention with women's groups. In a rural mountainous area in Nepal a cluster-randomised controlled trial was done with women's groups. The meeting aim was problem identification about maternal and neonatal problems and to discuss strategies and activities. There were monthly meetings .There were discussions about community generated funds,

stretcher schemes, production and delivery of clean delivery kits, and home visits to newly pregnant mothers.

The outcomes showed healthier behaviours in the intervention clusters such as more ante natal care ,delivery in a health facility with a trained birth attendant , the use of a clean delivery kit or a boiled blade to cut the umbilical cord and more washing the hands. Delayed wrapping the baby, early bathing and breastfeeding like discarding the colostrums was the same as in the control clusters. A visit to the health facility was done more. by the intervention group

The neonatal mortality was reduced by 30 % in the intervention group(Manandhar 2004).

India

In India a package of home based neonatal care and management of sepsis was developed in order to see the effect on the neonatal mortality rate.

39 intervention and 47 control villages were chosen and for two years neonatal care was introduced in the intervention villages Village health workers trained in neonatal care made home visits and managed birth asphyxia premature and small for date children , hypothermia and breastfeeding problems. They diagnosed and treated neonatal sepsis. Assistance by TBA`s and health education workers and fortnightly supervisory visits were also provided. Other workers recorded all births and deaths in the intervention and the control-area(1993-1998) to estimate mortality rates.

Results: Home based neonatal care including management of sepsis is acceptable, feasible and reduced neonatal and infant mortality by nearly 50% among the malnourished illiterate rural study population This approach can reduce neonatal mortality in low-resource countries(Bang 1999)

Maternity waiting homes

The use of maternity waiting homes was suggested to be an adequate answer to poor access to hospitals.

The purpose is to provide a shelter near a hospital with essential obstetric facilities where women can be accommodated during the final weeks of their pregnancy

The WHO identified four elements which are essential for a well functioning MWH (WHO1996)

- 1 definition of antenatal risk factors and selection of women staying at a MWH
- 2 The availability of a viable community health service for identifying women in need of referral and community awareness in compliance with the referral indication
- 3 Skilled obstetric services including emergency care
- 4 Community and cultural support

The African studies on MWH are from Ethiopia, Zimbabwe and Zambia and show better pregnancy outcomes but in Ghana there was a failure because the MWH was too far from the hospital and emergency transport was needed to travel to the main hospital

There should be also food provision proper accommodation free service regular medical attention and privacy.

Separation from children and leaving home for a long time will lead to loss of earnings. But in a utilisation study in Zambia 97% of 323 respondents were ready to stay in a MWH(Stekelenburg 2004).

Another best practice is described in Burundi.

The Mabanda Health Centre with support from the UNFPA has improved care for mothers and newborns. For a population of 13000 13 nurses with midwifery skills are available All pregnant women receive focused care 4 visits including health education. The centre provides all basic EmOC except vacuum extraction which is part of the EmOC normally but not done everywhere .

Essential newborn care is given but EmNC is not mentioned.

Mothers and babies are kept for 24 hours and maternal and newborn danger signals are clearly displayed in the labour ward.

If there is an emergency an ambulance can be called from the provincial hospital.

All low birth weight newborns are referred to provincial hospitals(Partnership MNCH WHO 2006)

The role of the cultural beliefs and practices are very important in understanding health care seeking behaviour and low utilisation of the health care services.

If they are better understood then interventions aimed at improving the neonatal health can have a better outcome.(Lefeber 1994) Care given in the hospitals should not be only clinically safe but also culturally sensitive.(Maimbolwa 2004).Maternity care routines during normal childbirth in Zambian maternities were described as not culturally appropriate and advice is given to pay more attention to this. There should be extra social support to labouring women and also the fathers should see their babies earlier and not at discharge only

Continuous emotional support for women during childbirth has been shown in a Cochrane Review to be effective in reducing operative vaginal birth and caesarean section(Hodnett 2004).International safe motherhood programmes have forgotten to pay attention to this important part of obstetric careTBA's can give this emotional support(Roosmalen 2005)

Discussion

When we talk about Sub-Saharan Africa we talk about many different countries. The total population is 697,561,000 million with a number of annual births of 28,263,000 million. The average neonatal mortality rate(NMR) per 1000 is 41 but there are big differences. amongst the countries. The NMR of Liberia is 66 and of Eritrea 24.The NMR reflects the death of the first four weeks of life. The early neonatal deaths are in the first week of life including deaths during childbirth. There has been little progress in reducing neonatal deaths and no measurable progress in reducing the early neonatal deaths in SSA Countries.

However to achieve the MDG4 goal the newborn deaths must be reduced. as the progress of most countries for the under five mortality rate is not improving if the neonatal deaths are not reduced(Countdown 2015 2008)

Some countries have been doing well in reducing the NMR with a low GNI per capita(less than 500\$ per year)Samples are Eritrea, Malawi Burkina Faso

Tanzania, Uganda and Madagascar The mentioned countries made progress towards spending more money of the general budget on health and scaling up of essential interventions as is described by the continuum of care necessary to achieve the goal of reducing the NMR(Darmstadt 2008).

Prevention of neonatal deaths in the first week of life can possibly be achieved through a continuum of care(Kerber 2007).

Antenatal care in pregnancy, a skilled birth attendant during delivery and postnatal care must form a continuum of care (Tinker 2005)Antenatal care visits are showing different numbers in different countries in SSA.

In Ghana, Zambia and Burkina Faso the numbers are high with in Ghana and Zambia 92%(with 4 or more visits 69% and 72%)while in Burkina Faso it is 85% (with only 18% 4 or more visits) (Countdown 2015 2008)

The 4 focused ANC visits as outlined in the WHO guidelines are costing far more time and service providers than the ANC visits the way they were done before The implementation, feasibility and sustainability of the 4 focused visits will be difficult due to the lack of finances and lack of Human Resources in SSA countries.

Ante natal care however is important for screening the Blood pressure the anaemia ,HIV/AIDS STI`s,for giving twice tetanus toxoid, for intermittent preventive malaria treatment and the use of bednets,counselling and treatment of Aids/HIV STI`s and the prevention of mother to child transmission of Aids /HIV After 32 week multiple pregnancy and malpresentations can be detected and dealt with.(WHO2006) Also the birth preparedness and the complication readiness must be discussed with the mother and her family

A Skilled birth attendant should be available for every delivery but in SSA countries this is only for about 40% of the deliveries.

The range is wide:92% in South Africa, 83% in Congo ,Burkina Faso 54%,Eritrea 28% and only 6% in Ethiopia.(Countdown to 2015 2008)

There are not enough midwives available so community midwives can be the answer (Making pregnancy safer WHO 2006) They can be trained in a shorter time.

This has been proven already in the past by a country like Sri Lanka who posted to the rural areas midwives to provide both home and institutional care already since 1931(Investing in Maternal Health).

Emergency Obstetric Care and Emergency Neonatal Care should always be available during a delivery as 15% of the deliveries can have complications.

Midwives can be authorised to administer a core set of life saving interventions.

This is already done by 21 of the SSA countries ,partial by 15 and not by 6.of them.(Countdown to 2015 2008)

Emergency Neonatal Care should not only be practiced by a skilled birth attendant but every health worker involved in deliveries should be trained for resuscitation of newborns, as 24% of the newborns die of Asphyxia(Countdown to 2015 2008)For the newborns properly use of an Ambu bag and drying and keeping the baby warm is often enough in the home setting and at the hospitals(Newton2006)

Postnatal care is a severe gap in the continuum of care but is critical for the survival of the mothers and the babies.(Lagroo 2007)

35 SSA countries did not mention any postnatal care, some mentioned a low percentage like Liberia 2% Ethiopia 5% and the highest was Congo 24%(Countdown to2015 2008)

The babies might die in the postnatal period due to lack of basic care like keeping the baby dry and warm, starting breastfeeding immediately and good hygiene like washing the hands and giving extra care for the prematures and small for date babies. There is a role for the community workers and the TBAs to visit the mothers and children at home the first week regularly at day 1,2,3. and not only 6 hours after delivery. They can be trained to recognize the danger signals of mother and child and take care for an early and timely referral to the Health facility. They can do the basic care and start breastfeeding immediately and help with feeding problems (Boogaard 2007). There is also a severe gap postpartum for the AIDS/HIV care (WHO/Africa 2004).

Community involvement has been referred to in a number of publications. Hospitals are too far away and traditional treatment is given as first treatment by the families. Home based neonatal care including management of sepsis is described including the use of antibiotics at home (Bang 1999). Female village health workers were trained to recognize the danger signals and if the families were not willing to go to the health facilities treatment was given at home. The results showed a 74% reduction in neonatal mortality due to management of the neonatal sepsis specially of prematures and low-birth weight babies.

There is also described a community based-participatory intervention for reducing the neonatal mortality rate (Amanda 2004) by women's groups in Nepal. The neonatal mortality was reduced by 30%. The intervention brought changes in home-care practices and health care seeking both for the neonates and their mothers.

A pilot study in rural Pakistan showed that community based interventions decreased the neonatal mortality rates and also leads to improved home care practices by families, increased care-seeking behaviour and greater utilization of skilled care providers. (Bhutta 2008)

We can identify three models of community based post partum care:

- 1 Home visits by professional health care providers
- 2 Home visits by community workers
- 3 Home visits by community workers with referral or health facility support

- 1 is probably not feasible now in most developing countries
- 2 House hold visits for providing home care or facilitate women's groups
This is the general pattern of newborn care home visits programs and has been successful so far (India and Nepal)
- 3 This is a community based outreach system with emergency referral support to a health facility for management of complications.
Referral links remain a weak point in this model (Koblinsky 2005)

Training of TBAs and community health workers

There has been a revival of interest in involvement of community care for the mothers and their children.

In the nineties international health organizations were interested in training the Traditional birth attendants but as there was no effect on the pregnancies outcomes it was seen as a failing investment.

It is now the intention to give every mother a Skilled birth attendant(MPS report 2006) This is however not feasible in the near future due to lack of Human Resources and financial constraints of most countries in Sub-Saharan Africa. It might be practical to try not only to get more Skilled Birth Attendants but also to find more feasible solutions which can be easier to implement while awaiting more Skilled Birth Attendants. Trained and supervised TBA`s and Community Health workers can work under the supervision of the Skilled Birth Attendant and share the workload(Boogaard 2007)

The TBA`s can be trained and supervised by community midwives and nurses from the health centres to help with the deliveries and in trying to help to reduce the delays(Thaddeus Maine) in receiving adequate care(v.d.Boogaard2007)

They can be trained in educating the mothers and their families about the risks of pregnancy and delivery. They know the communities and their social and cultural behaviour and they can form a link between the Skilled birth attendant and the families. They can try to convince the families to give birth at the Health centre and if this fails they can escort the mother if complications are arising. They can also advice the mothers to go to the antenatal clinic 4 times(WHO Focused Antenatal Clinic visits) and it is shown in a study that this was successful (Anwar 2008)

The TBA`s can be very helpful in organising post natal care as this is a very neglected area. The TBA`s can become a continuous supportive care giver in this way There is however disagreement that training programs of TBA`s are really effective on pregnancy outcomes. In a review of four studies the conclusion was that the training of TBA`s can be promising to decrease the newborn deaths. The number of studies in this article is however insufficient to provide the necessary evidence for TBA training effectiveness.(Sibley2008)

The TBA`s should however be well trained and supervised by the Skilled Birth Attendant and there should be always a Skilled Birth Attendant available at the health centre. The TBA`s should be provided with a delivery kit, a mode of transport like a bicycle and should be given a small salary(v.d Boogaard 2007)

What has been said for the TBA`s can also apply to the community health worker`s. They can be trained and supervised by the midwives and nurses and perform in the same way as is described for the TBA`s.

The conditions should be the same as for the TBA`s(Knippenberg 2005).

The training of medical assistants to perform all Comprehensive Emergency Obstetric Care as defined by the WHO is done by several countries in SSA. as there is a severe shortage of doctors due to the Human Resource crises Medical officers can become surgical technicians after a 3 year training and they can also be trained for 1 to 2 years in anaesthesia(Dileep 2003) Countries like Mozambique and the Congo have established in this way safe and effective services as women in rural and remote areas must often travel for hours to a District Hospital and the availability of qualified personnel at health facilities closer to home can help in reducing the three delays and lives can be saved

In India however there are policy barriers created by the physicians. They create significant influence through their associations to restrict the provision of care to fully qualified members of the profession and specialty ((Dileep 2003)

Socio-economic factors and cultural factors play an important role concerning early neonatal deaths as they influence the health care seeking behaviour and the low utilisation of the health care services

Illiteracy of the mother and her husband is the most important factor and poverty as well.(Anwar 2008) The use of a skilled birth attendant was 4 times higher when the mothers were educated. Education of the girls has always been a very important factor everywhere for utilisation of health care services

Poverty and the early neonatal deaths are intimately linked. The newborn health gap between rich and poor is unacceptable high(MNCH 2006).It leads to inequity as the families in the poorest quintile experience on average a 68% higher neonatal mortality than the richest quintile. The largest disparity in the SSA countries is in Nigeria with an NMR of 23 among the richest Quintile compared to 59 in the poorest quintile(MNCH 2006)

There is a large gap between the rich and poor in both access to services and quality of services. The reduction of socio-economic inequities in maternal health can be achieved by interventions that benefit the poor such as community-based midwives. Government services were provided free but often people have to pay unofficially for services(Anwar 2008)

The role of the community therefore is very important as already mentioned before in the discussion.TBA`s and Community health workers can form a link between the mothers and their families and the health system in order to achieve a better guidance and understanding which will favour the pregnancy outcomes

The Health systems in the SSA countries are mostly .poorly financed and there is the lack of Human Resources and the burden of the AIDS/HIV as well which leads to a lack of skilled health providers. They sometimes also have a negative attitude towards the mothers and their families There is often a lack of essential drugs equipment and supplies. A low health personnel to population ratio is a chronic issue in the SSA countries. It is difficult for the community midwives, the TBA`s and the community health workers to work in these failing health systems as there is not enough support for them to do their work(Khama 2006)

Chapter 4

Conclusion

The focus of this thesis is about the possibilities of reducing the number of early neonatal deaths in the rural areas of SSA countries. Of all the neonatal deaths 50% take place in the first day of life and 75% in the first week of life.

We should realise that there are 47 SSA countries with a total population 697.561,000 million people with a number of annual births of 28,263,000 million

The average neonatal mortality rate per 1000 live births is 41 but it ranges from 66 in Liberia to 24 in Eritrea

Reducing the number can only be achieved by a continuum of care like care in pregnancy, care during delivery and postnatal care.

A skilled birth attendant should be available for every delivery as an important factor for pregnancy outcomes. The average in SSA countries is 40% within a wide range of 92% in South Africa to only 6% in Ethiopia.

How can we get more skilled birth attendants? The answer is to increase the number of midwives by training and improving their status and their income. This however will take time and we need to consider more possibilities to decrease the neonatal mortality.

Training of community-midwives who have a shorter training than the midwives in general can be a possibility. This has been done in the past by low-income countries like Sri-Lanka and was very successful and is done now in more countries.

Bangladesh implemented a home-based SBA programme between 1992 and 1997 training local community women for 6 months in midwifery. Midwives can also be authorised to administer a core set of life-saving interventions which is already done by 21 countries and partial by 6 countries of SSA.

Training of medical assistants to perform all comprehensive emergency obstetric care is done by a number of SSA countries like Congo, Mozambique and Zambia as there is a severe shortage of obstetricians and other doctors due to the Human Resource crisis in the SSA countries.

Training and supervision of Traditional birth attendants and Community Health workers by the community midwives and the nurses with midwifery skills can also be accomplished in order to work together with the midwives during pregnancy, delivery and the postnatal period.

Postnatal care is a severe gap in the continuum of care. Newborns might die in that period due to lack of basic care. The trained and supervised TBAs and CHWs can play an important role as they can see the newborns regularly and can recognize the danger signals if the newborns get ill and can give support for the basic care including breastfeeding and the care for HIV/AIDS mothers and newborns

If the health systems are not functioning well as is often the case in SSA countries it is difficult for the community workers to do their work in an appropriate way.

There should be a strong commitment of all governments involved to improve the outcome of the early neonatal deaths.

The three gaps in providing a continuum of care are:

Providing adequate antenatal care

Providing a skilled birth attendant for every delivery or a trained and supervised TBA or CHW to work together with the skilled birth attendant if not available at the delivery.

Providing adequate postnatal care by a trained and supervised TBA or CHW.

Only then in my opinion is improvement of the early neonatal mortality possible

Recommendations:

To recommend which neonatal interventions should be implemented in existing programmes of maternal and child health to the different stake holders involved.

Having read and referred a lot of available literature and the progress made so far by countries to reduce the early neonatal mortality various stakeholders are identified and hereby recommendations are provided in order to reduce the early neonatal mortality.

The Government

To create favourable policies ,health care structures, training and resource generation to collaborate with the national regional and international organisations and funding agencies to identify and establish protocols, good practices and resource generation.

The Ministry of Health

Incorporating the N into the IMCI

The generic IMCI(Integrated management of childhood illness of the WHO/Unicef did not include the early neonatal period (0-6 days).This is now integrated in 26 SSA countries partial by 2 and not by 12 countries (Countdown to 2015 2008).

IMNCI has to incorporate postnatal care of all neonates through home contact and appropriate treatment of illness of the newborns either at home or through a referral to the hospital. All newborns should be visited at home within the first 10 days starting soon after birth and training should be given for the CHW in newborn care

Adequate post natal care must be made available as soon as possible by the Ministry of Health. by promoting community care and training of community workers.

The Ministry should provide regular Emergency medication like Oxytocin and anticonvulsants for eclampsia, regular supply of Tetanustoxoid vaccines . Diagnostic tools for Syphilis AIDS/HIV and Malaria should be made available and the medication for treatment of Syphilis,AIDS/HIV and Malaria should be available at all times

Equipment for blood transfusions in the hospitals should be provided.

The ministry should coordinate to provide trainings for skilled birth attendants.

Health education should be promoted via the Mass media(radio and television) and via the Health centres and Hospitals for the pregnant women and their families

The international NGO's and the local NGO's

They need to establish a network in order to generate Funds and they have to work to develop and implement guidelines and provide expert consultation to the Governments and implementing partners like local organisations of churches and mosques.

International NGO`s should also assist the Governments wherever needed to develop the policies

Local NGO`s can assist in awareness raising activities like encouraging women to seek antenatal care promoting clean deliveries promoting delivery at the health facilities promoting postnatal care visits etc.

They can also play a role in assisting the existing community groups and /or establishments of similar groups

Local Health institutions

They can help in creating women's groups

In collaboration with the community health workers they can organise regular programmes for the pregnant women and their families about health promotion like Danger signals for mothers and children Birth preparedness and Complication readiness

In order to combat delay in care seeking and inaccessibility the local health institutions should organise outreach activities or collaborate with the organisations who are organising outreach programmes

Delay in health care seeking has been addressed by outreach programmes as seen in many countries, This is also applicable in the SSA countries

Community organisations

Women groups should be formed who can assist in encouraging the pregnant women in using the antenatal care, to go to the health facility for a delivery and to use postnatal care

Traditional healers should be oriented and encouraged to recommend the pregnant women to deliver at the health facility

Religious institutions like churches and mosques should cooperate with the community organisations to encourage the pregnant women to deliver at the health facility

Family members of the pregnant women need to be informed about pregnancy and availability of services and the family members should be encouraged to take the women to the health care facility for antenatal care and delivery

References

- Anwar I,Sami,M,Akhtar NChowdhury ME,Salma U,Rahman M Koblinsky
Inequity in Maternal Health care services evidence from home based skilled birth attendants programmes in Bangla Desh Bulletin of the WHO Volume 86: number 4 April 2008 241-320
- Bang AT, Bang RA,Sanjay B,Baitule DHMS Hanani M,Reddy PHD, Mahesh D Deshmukh MSCA
Effect of home-based neonatal care and management of sepsis on neonatal mortality field trial in rural India
Search(Society for education, action and research in Community Health.
The Lancet Volume 354 issue9194 December 1999 pages 1955-1961
- Bazzano Alessandra N,Kirkwood Betty R,Tawiah –Agyemang Charlotte,Owuso-Agyei Seth,Baba Adongo Philip
Beyond symptom recognition:care seeking for ill newborns in rural Ghana Tropical medicine and International Health volume 13 no 1 pp 123-128 January 2008
- Bhutto Zulfiqar A,Memon Zahid A,Soofi Sajd,Salat Muhammad ,Suhail,Cousens Simon,Martines Jose.
Implementing community based perinatal care: results from a pilot study in rural Pakistan. Bulletin of the WHO 2008:86:452-459.
- Boogaard v d Jossy:Improving maternal health in developing countries Still a role to play for traditional birth attendants.Medicus Tropicus volume 46/4 July 2007
- Countdown to 2015 Maternal Newborn & child survival. Tracking progress the 2008 report(Unicef WHO UNFPA The World Bank, The partnership for Maternal Newborn& Child Health Family Care International Save the children,USAID,The Lancet)
- Darmstadt Gary L,Bhutta Zulfiqar A,Cousens Smon,Adam Taghreed ,Walker Neff,Bernis de Luc Evidence based cost effective interventions:How many newborns can we save March 2005 Lancet
- Darmstadt Gary L,Walker Neff, Lawn Joy E,Bhutta Zulfiqar A, Haws Rachel A Cousens Saving newborn lives in Asia and Africa Cost of impact of phased scale up of interventions within the continuum of care The London school of Hygiene and Tropical Medicine Feb.11 2008(Health Policy and Planning)
- Department of making pregnancy safer report 2006 WHO recommended interventions for improving Maternal and Newborn Health
- Dileep V,Mavalankar MD,Rosenfields Allan, Maternal mortality in Resource Poor Settings. Policy barriers to Care American Journal of Public Health 200-2003 2005
- Gomella Tricia Lacy Neonatology management Procedures On Call Problems Diseases and Drugs 2004 Lange clinical manual

Hoque M, Kader SB, Hoque E, Prevalence of anaemia in pregnancy in the Uthungulu Health district of Kwazulu-Natal South Africa South African Family Practice 2007 Jul 49(6):16

Kaushal Monika, Aggarwal Raji, Ashwani Singal, Shukla Hemant, Suresh K, Kapoor Vinod Paul Breastfeeding practices and Health seeking behaviours for neonatal sickness in a rural community Department of paediatrics and community medicine ALL India Institute of Medical Sciences New Delhi India 31 May 2005.

Kerber Kate, Johnson Joseph, Bhutta Zulfiqar, Okong Pius, Stars Anne, Lawn Joy E Continuum of care for maternal newborn and child health. From slogan to service delivery Lancet 2007;370:1358-69.

Khama O, Oucho Rogo John, Mwalali Philip Maternal Mortality in Sub-Saharan Africa Disease and mortality in Sub-Saharan Africa World bank 2006

Knippenberg Rudolf, Lawn Joy E, Darmstadt Gary L, Begkoyian Genevieve, Fogstad Helga, Walegn Netsanet, Vinod K Paul. Systematic scaling up of neonatal care in countries The Lancet March 3 2005

Koblinsky Marjorie A. Community based Postpartum Care an urgent unmet need May 2005 USAID Catalyst

Lagro Marieke, Stekelenburg Jelle The role of postpartum care in the reduction of maternal and neonatal mortality worldwide Medicus Tropicus volume 45/2/3 May 2007

Lawn Joy E, Cousens Simon, Zupan Jelka. 4 million neonatal deaths When Where Why? The Lancet March 2005.

Lawn Joy E, Hidden deaths of the world's newborn babies. Bulletin of the WHO April 2008.

Lefebvre Yvonne, Voorhoeve Henk, Indigenous customs in childbirth and childcare van Gorcum 1998

Making pregnancy safer department WHO 2006 Annual report

Manandhar Dharma S, Osrin David, Bhim Prasad Shrestha, Natasha Mesko, Joanna Morrison, Kirti Man Tumba-Hangphe, Suresh Tamang, Sushma Thapa, Deji Shrestha, Bidur Thapa, Jyoti Rai Shrestha, Angie Wade, Josephine Borghi, Hilary Standing, Madan Manandhar, Anthony M de L Costello and members of the Mira Makwanpur trial team.
Effect of a participatory intervention with women's groups on birth outcomes in Nepal a cluster randomised controlled trial The Lancet 2004 364:970-79

Mailbolwa Margaret C Maternity care in Zambia .With special reference to social support. Karolinska institute Sweden Journal ADV Nursing Jan 2004

Martines Jose, Vinod k Paul, Zulfiqar A Bhutto Marjorie Koblinsky, Agnes Soucat Neff Walker Rajiv Bahl Helga Fogstad Anthony Costello. Neonatal Survival: A call for action The Lancet March 3 2005

Neonatal and Perinatal Mortality WHO Department of making pregnancy safer 2006 Country Regional and Global Estimates

Newton O English M Newborn resuscitation: defining best practice for low income settings. Trans R SOC TROP MED HYG 2006 Oct. 100(10):899-908

Opportunities for Africa's newborns The Partnership Maternal Newborn and Childhealth A continuum of care WHO 2006(WHO, UNICEF, USAID UNFPA Save the Children)

Pathmanathan Indra, Jerker Liljestrand, Jo.M. Martins Lalini C Rajapaksa, Craig Lissner, Amala de Silva, Swarna Selyaraju, Prabha Joginder Singh. Investing in Maternal Health Learning from Malaysia and Sri Lanka. Human Development Network. Health Nutrition and Population series . The World bank 2003

Pregnancy, Childbirth, Postpartum and Newborn Care a guide for essential practice WHO Department of making pregnancy safer 2006 in collaboration with UNICEF UNFPA and the World bank

Roosmalen Jos van, Gijs Walraven, Jelle Stekelenburg, Siriel Massawe, Integrating continuous support of the traditional birth attendant into obstetric care by skilled midwives and doctors. A cost effective strategy to reduce perinatal mortality and unnecessary obstetric interventions. Tropical medicine and International Health Volume 10 nr 5 pp 393-394 May 2005

Sibley LM Sipeta Brown CM Diallo MM mac Natt k Habarta N Traditional birth Attendants Training for improving Health behaviours and pregnancies outcomes A Cochrane Review Cochrane library 2008 issue 2

Stekelenburg Jelle Health Care Seeking Behaviour and Utilisation of Health Services in Kalabo district Zambia Thesis Vrije Universiteit Amsterdam 2004

Stekelenburg Jelle S Kyanamina M Mukelabai i. Wolffers J. van Roosmalen. Waiting too long low use of maternal health services in Kalabo Zambia Journal of Tropical Medicine and International Health volume 9 nr 3 pp 390-398

UNAIDS Report on the global Aids epidemic 2006. Joint United Nations Programme on HIV/AIDS

Vergnano S M Sharland P kazembe C Mwansambo PT Heath Neonatal sepsis: an international perspective Arch DIS Child/Fetal Neonatal ED 2005 90 F 220-224

WHO/Africa Division of Family and Reproductive Health Making Pregnancy Safer Annual report 2005

WHO/Africa Outlines how to improve access to HIV/AIDS care and treatment in Africa

WHO Exclusive breastfeeding bulletin 2002

WHO HIV/AIDS and infant feeding bulletin 2008

WHO Clean delivery practices bulletin 2001

WHO Maternal and Neonatal tetanus elimination report 2007

WHO Global Malaria in pregnant women and infants