

Femteårsoppgave Profesjonsstudiet i Medisin
MED-3950
Det Helsevitenskapelige Fakultet
Universitetet i Tromsø

REDUCTION OF MATERNAL MORTALITY -What really works?

**-A Presentation of The Maternal and Neonatal Intervention
Project at Chiradzulu District Hospital, Malawi**



Picture above: Research nurse Ellen Lekera measuring and registering the blood pressure on a pregnant woman attending focused antenatal care at Chiradzulu District Hospital, Malawi

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Bodø - Våren 2013

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1. ABSTRACT

Background: Every year, around 300 000 women die from causes related to pregnancy and childbirth. 99% of these deaths occur in low and middle-income countries, and are highly preventable. There is a general agreement that access to a skilled provider and emergency obstetric care at birth can have an impact on maternal mortality, but the effect of antenatal care has been debated. A new model of care called Focused Antenatal Care was developed by the WHO to provide better ANC in developing countries. This model requires fewer visits and more focused interventions than what has been used traditionally in the western part of the world. The Maternal and Neonatal Intervention Project commenced by the Kamuzu College of nursing in 2012 aimed on improving the delivery of FANC services in order to hopefully reduce neonatal and maternal deaths in the district.

Method: This is a literature study with available literature from *PubMed*, *Google Scholar* and the *World Wide Web* on the subject maternal mortality and antenatal care. Selected results from the Project at Chiradzulu District Hospital will be presented.

Results: The baseline study showed that only 3,4% of the women attended ANC during their first trimester, and only 12,9% made the required four visits. The quality of care delivered during the baseline study did not meet the WHO standards, but improvements were done before the intervention, and the quality was improved. A review of the maternal deaths at the hospital in the study period showed a need to strengthen both the deliverance of emergency obstetric care and improving the referral system from health centres surrounding the hospital.

Conclusion: Good antenatal care coverage is important in improving women's health and well-being, but does not make a substantial impact on maternal mortality. The most effective means of reducing maternal mortality is good

access to skilled attendance at delivery and that basic emergency obstetric care is made available at primary and secondary level of care.

Norwegian

Bakgrunn: Hvert år dør rundt 300 000 kvinner av årsaker relater til svangerskap og fødsel. 99% av disse dødsfallene skjer i lav- og middelinntektsland, og de fleste kan forebygges. Det er en enighet om at tilgang på faglært personell og grunnleggende obstetrisk akuttberedskap under fødsel kan være med på å redusere mødredødeligheten, men effekten av svangerskapsomsorgen har blitt debattert. En ny modell for å bedre kvaliteten på svangerskapsomsorgen i utviklingsland er utviklet av WHO, og har fått navnet FANC (Focused Antenatal care). På Chiradzulu Distriktssykehus utenfor Blantyre i Malawi ble FANC tatt i bruk allerede i 2002. En undersøkelse viste at kvaliteten på tjenesten ikke holdt mål i forhold til WHO's standard. Kamuzu College of Nursing (Sykepleierhøgskolen) satte i 2012 i gang et intervensjonsprosjekt med hovedmål å forhåpentligvis bedre kvaliteten på svangerskapsomsorgen for å redusere mødre- og spedbarnsdødeligheten.

Metode: Dette er et litteraturstudie basert på tilgjengelig litteratur fra PubMed, Google Scholar og internett med søkeord mødredødelighet og svangerskapsomsorg. Utvalgte resultater fra intervensjonsprosjektet utført på Chiradzulu Distriktssykehus vil bli presentert.

Resultater: Resultater fra baselinestudien viste at kun 3,4 % av kvinnene deltok i svangerskapsomsorg i første trimester, og kun 12,9% kom fire ganger under graviditeten. Kvaliteten på omsorgen under baselinestudien holdt ikke mål i forhold til WHO's standard. Det ble gjort forbedringer før intervensjonsstudien for å levere FANC etter WHO's retningslinjer. Totalt i samme periode ble det rapportert om 18 mødredødsfall på sykehuset. En gjennomgang av disse dødsfallene viste behov for å styrke både den obstetriske akuttbehandlingen og henvisningsrutinene fra helsesentrene rundt distriktssykehuset.

Konklusjon: God svangerskapsomsorg er viktig for å bedre kvinners helse og velvære, men har ikke en betydelig innvirkning på mødredødeligheten. De mest effektive midlene for å redusere mødredødeligheten er å sikre at alle gravide får tilgang på faglært personell under fødselen, og at grunnleggende obstetrisk akuttberedskap er tilgjengelig både på primær- og sekundærnivå i helsevesenet.

2. BACKGROUND

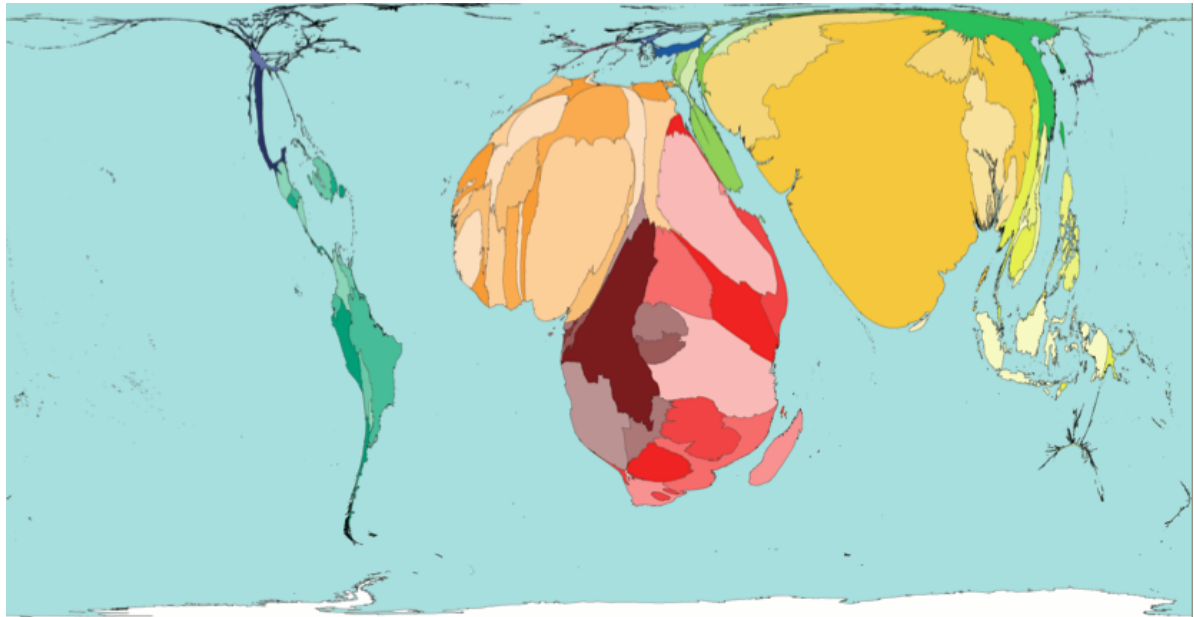
2.1 Why Malawi?

In November/December 2011, I got to visit the Gynaecological and Obstetric department at Queen Elisabeth Hospital in Blantyre, Malawi for four weeks. In June 2012 I went back to Blantyre and met the people behind the Maternal and Neonatal Intervention Project. We went to visit Chiradzulu District Hospital outside Blantyre, and were shown the antenatal ward where the project was conducted. I got to participate during antenatal care, and I got to share my thoughts on the design of the intervention project.

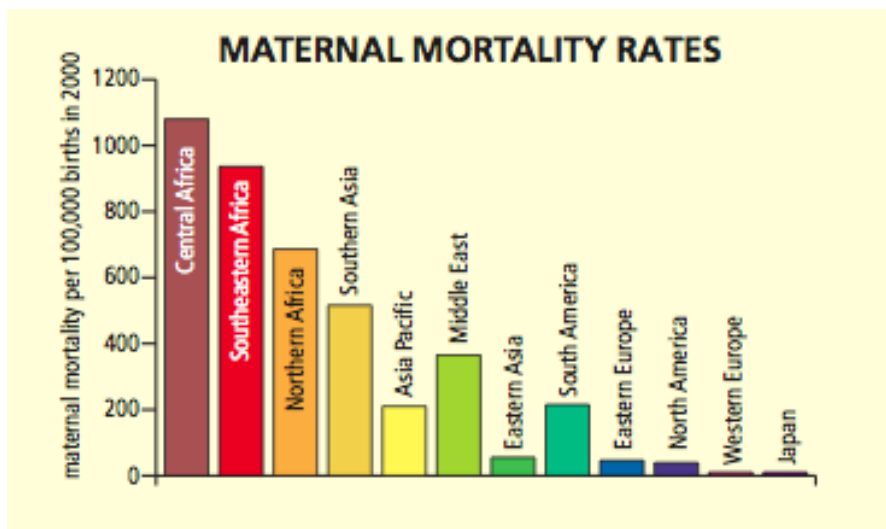
These two visits taught me a lot about the Malawian health care system and the many challenges they face, especially the ones concerning women's health. But it also showed me a beautiful country with welcoming, smiling people, and I can truly understand why Malawi is called the warm heart of Africa.

2.2 Maternal mortality in the world

Maternal mortality is the death of a woman during pregnancy, childbirth or in the 42 days after delivery. Every day, 800 women die from pregnancy- or childbirth-related complications around the world (18). Shockingly 99% of these deaths occur in low and middle-income countries (see picture A and B). The death of a woman is a tragedy for the woman, her family and her child/children, but it is also a great loss to the community and society she belongs to. Most of these approximately 300 000 deaths are highly preventable if good access to basic maternity and emergency obstetric care is available.



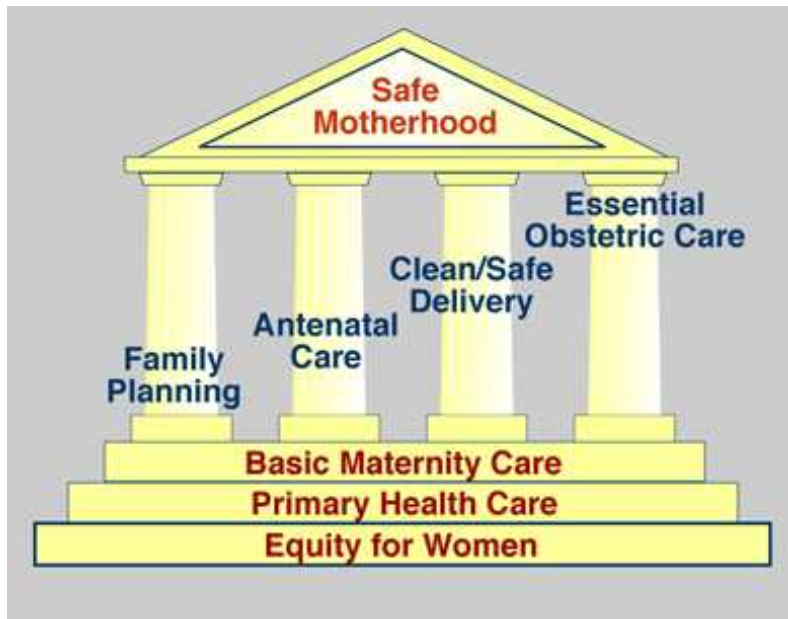
Picture A: Territory size shows the proportion of deaths of women worldwide while pregnant or within 6 weeks of pregnancy and partly due to it, that occur there. This shows that most deaths occur in the developing part of the world.



Picture B: shows maternal mortality per 100.000 births. Colors refer to picture A
Both picture A and B: © Copyright SASI Group (University of Sheffield) and Mark Newman (University of Michigan). (24)

In 1987, the Safe Motherhood initiative was launched by the WHO in response to growing recognition that primary health-care programmes in many developing countries were not satisfactory focused on maternal health. The four pillars of

safe motherhood consist of family planning, antenatal care, clean and safe delivery and essential obstetric care. See picture C.



Picture C: The four pillars of safe motherhood

<http://www.abdn.ac.uk/dugaldbairdcentre/projects/calmatv1/english/programme01.htm>. Accessed 2013-05-01

The focus on maternal mortality was utterly sharpened when reduction of MMR became one of the eight Millennium Development goals instituted by the United Nations at the Millennium Summit in September 2000. The UN Millennium Development Goals are signed by all 191 UN members, and is to be achieved by the year 2015. It is a part of the United Nations Millennium Declaration, and commits world leaders to combat poverty, hunger, disease, illiteracy, environmental degradation, and discrimination against women. The MDGs are derived from this Declaration, and all have specific targets and indicators (19). Goal number five in to improve maternal care. Target 5A is to reduce MMR by three quarters between 1990 and 2015. Target 5B sets out to achieve universal access to reproductive health, hereunder increasing the number of women receiving antenatal care.

But despite this great effort from the international society, many developing countries still experience maternal mortality levels similar to those of industrialized countries in the early 20th century.

2.3 Reduction of MMR in the west

Around 1870, maternal mortality ratios in most of what now is seen as the industrialized world were above 600 per 100 000 (5). History of reducing the MMR in the western part of the world has shown that good statistics is vital. It is very important in order to understand the magnitude of the problem and to make decision makers aware of it. Improved information on patterns of maternal health and the efficacy of investigation and treatment are essential to rational planning of effective health services to reduce maternal mortality and morbidity from their current alarming levels (15). The fact that incidence and mortality rates are higher in developing countries means that the questions are more urgent, but also that sample sizes could be smaller, and benefits more easily seen. The information obtained would be directly relevant to the populations that could benefit from the interventions (15). Research done on maternal mortality in the industrialized part of the world does not necessarily apply to developed settings.

Good systems for data gathering and correct registration have been, and still are, very much incomplete in developing countries. In 1977 only 66 countries of 162 provided (incomplete) data on maternal mortality: in Africa 5 of 52, in Asia 13 of 43 and in Latin America 19 of 31 (5). Most of the information came from hospital studies or statistics. This gave an incorrect number, because most of women who died in pregnancy or in childbirth died at home, not at the hospital. This lack of visibility is quite convenient for decision makers in a context where women's lives are valued poorly and high fertility is culturally rewarded (5).

De Brouwere et.al (5) analyses the conditions under which the industrialized world has managed to reduce maternal mortality over the last 100 years, and how this strategy can be adopted to the developing world. They use Sweden as an example. Here, early recognition of the magnitude of maternal mortality was made possible because from 1749 onwards Sweden had a General Register for the systematic collection of individual health data, building on the pre-existing parish registration of births and deaths (5).

The numbers obtained in the General Register made the authorities aware of the problem, but this alone was not enough to reduce MMR. Results were first of all obtained because there was a strong political will to tackle the problem of maternal mortality. In Sweden this was mainly achieved by the training of professional (i.e. certified) midwives to make sure that qualified personnel would attend all home births. This, along with the introduction of aseptic techniques enabled Sweden to achieve the lowest maternal mortality ratios in Europe (228 /100 000 live births) by the beginning of the 20th century. Ultimately, the causal chain accounting for the reduction involved three factors: political commitment, availability of effective techniques, and assistance to most deliveries provided by trained health professionals able to “culturally” integrate such a technology (5).

2.4 Causes of maternal mortality

In a systematic analysis of progress towards MDG 5, Hogan et.al found that the MMR had decreased globally from 422/100 000 live births (CI 358-505) in 1980 to 320 (CI 272-388) in 2008. This is a positive trend, but it should be taken into account that more than 50 % of these deaths were in only six countries in 2008. These countries were India, Nigeria, Pakistan, Afghanistan, Ethiopia and the DRC of Congo (7). Maternal mortality is the health indicator that shows greatest differentials between developing and industrialized countries (1).

The leading causes of maternal deaths in developing regions are haemorrhage and hypertension, which together account for half of all deaths in expectant or new mothers. See figure 1. Indirect causes, including malaria, HIV/AIDS and heart disease, result in 18 % of maternal deaths. Other direct causes, such as obstructed labour, complications of anaesthesia or caesarean section, and ectopic pregnancy, lead to 11 % of all deaths during pregnancy or childbirth (21).

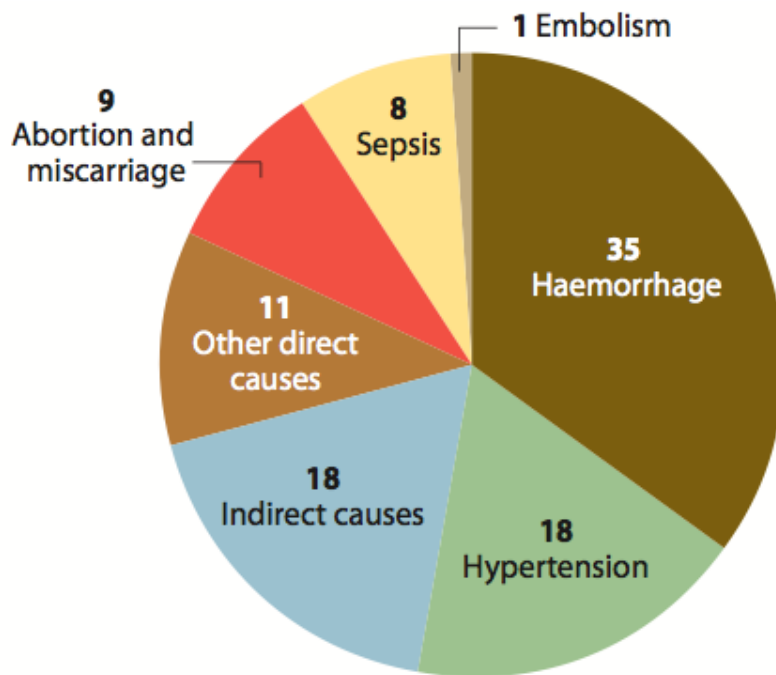


Figure 1: Causes of maternal deaths, developing regions, 1997/2007 (Percentage). From the Millennium Development Report, 2010 (21)

The causes of maternal deaths show some variation amongst different regions of the world. In Africa, haemorrhage is the leading cause of maternal death, contributing to 33.9 % of all deaths. (9). See Figure 2. In this part of the world, HIV/AIDS also contribute to 6,2 % of all deaths. When comparing this to the numbers in developed countries, one will see that HIV/AIDS does not contribute to maternal mortality in the west (9).

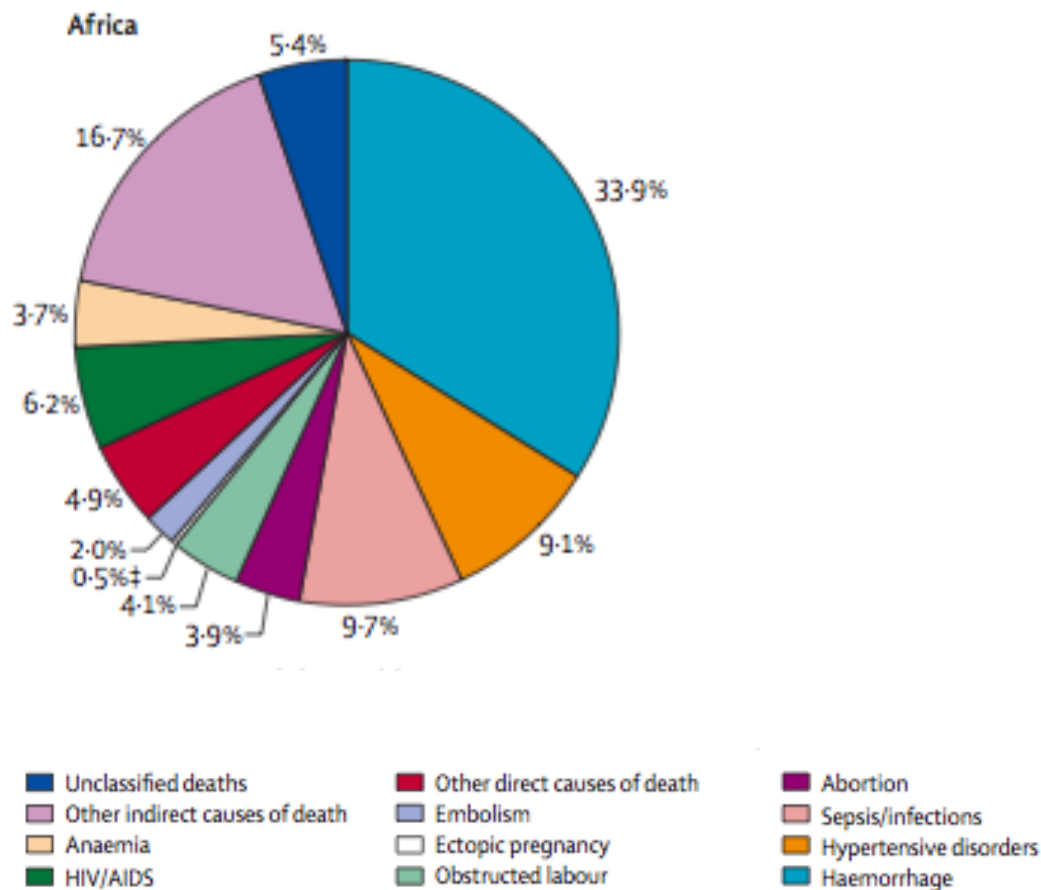


Figure 2: Causes of maternal mortality in Africa (9)

2.5 The four pillars of safe motherhood

2.5.1 Family planning

Family planning services are one of the pillars of safe motherhood, and is important because it prevents pregnancies that are “too early, too closely spaced, too late or too many” (13). It is supposed to enable both men and women to make informed choices, but it has proved especially important for women because a woman’s ability to space and limit her number of pregnancies has a direct impact on her health as well as on the outcome of each pregnancy. The low social and economic status of girls and women is a fundamental determinant of maternal mortality in many countries. Low status limits the access of girls and women to education and good nutrition as well as to the economic resources needed to pay for health care or family planning services (16).

According to the Multiple Indicator Cluster Survey (MICS) from 2006, 41 % of women in Malawi who are married or are in a union report use of any contraceptive method. The most used method is injections, used by 29 % (13). See figure 3. The total fertility rate is 6,3 in Malawi, meaning that a woman would have on average 6,3 children during her reproductive years (13). One problem in Malawi at times has been that the service of family planning is available, but not the equipment and drugs are not (personal notice from a nurse at the family planning clinic at Queen Elisabeth Hospital, Blantyre). This means that at times, the hospital can only educate the women on family planning, but not provide contraceptive pills, implants or injections.

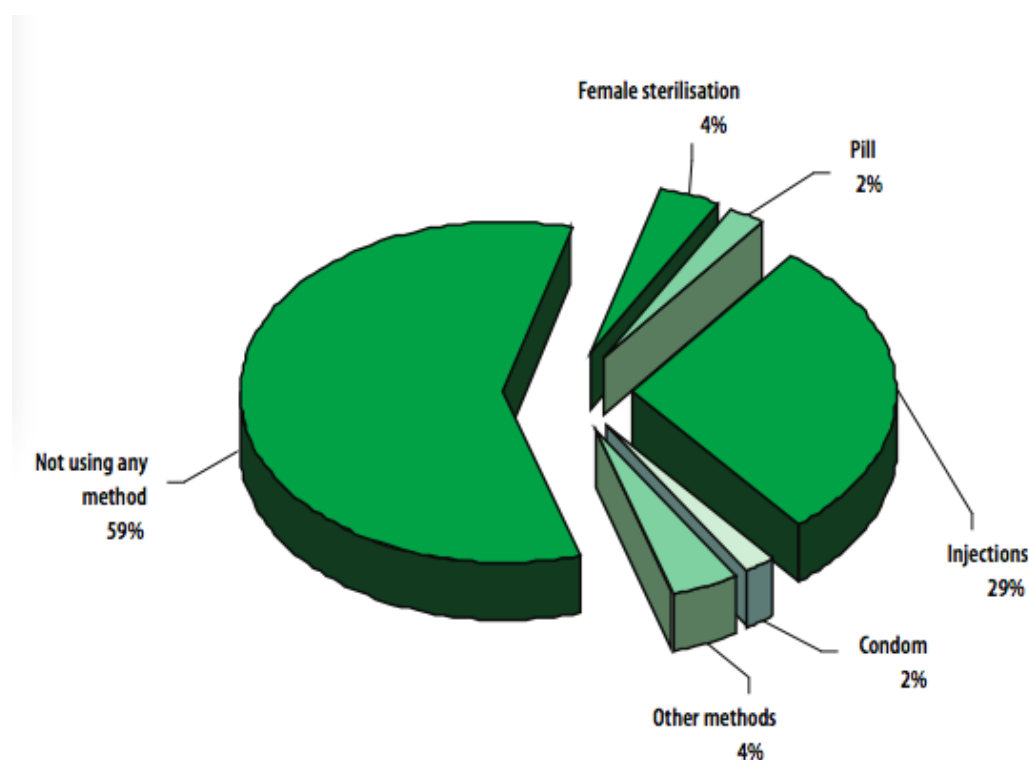


Figure 3: Percentage of women aged 15-49 currently married or in union by type of contraceptive method used, Malawi, 2006 (13).

2.5.2 Clean/safe delivery and essential obstetric care

Providing skilled attendants for delivery care, along with the equipment, drugs and supplies necessary for effective prevention and management of obstetric complications, has been advocated as the most important intervention in preventing maternal deaths (16). Because most maternal deaths can not be

predicted, good access to quality emergency obstetric care is important. Facilities which provide the following medical interventions (known as signal functions) are called Basic Emergency Obstetric Care (EmOC) facilities: administration of parenteral antibiotics, oxytocic and anticonvulsant drugs, manual removal of placenta, removal of retained products of conception and assisted vaginal delivery. Comprehensive EmOC facilities perform all the basic signal functions as well as surgery (caesarean sections) and blood transfusions (4). According to a report from by the Ministry of Health from 2005, very few of the health centres in Malawi provide basic EmOC services (exact number not mentioned) (4). This means that pregnant women in need of these services have to be referred to secondary facilities.

2.5.3 Antenatal care and the development of FANC

After initiation of the Safe Motherhood Initiative and the Millennium Development Goals, the focus on maternal health was utterly reinforced. But it also increased focus on what has been proven effective when trying to reduce maternal mortality. While the use of trained professionals and good access to emergency obstetric care has proved important in the battle against maternal mortality, the effectiveness of antenatal care has been strongly debated.

There has been great focus on ensuring women in developing countries access to maternity care. According to the World Health Organization, 81% of all pregnant women in the developing world attended at least one antenatal care visit in 2009 (20). If considerable resources are to be devoted to providing antenatal care, then it is important to identify which interventions are effective and how best to deliver them (2).

The objective of routine antenatal care is to deliver effective and appropriate screening, preventive, or treatment interventions (2). Most antenatal care programmes in developing countries were established along the lines of those used in developed countries, with little adjustment to local conditions (17). For a long time, the risk approach was the standard when conducting ANC. This was a way of identifying which women are most likely to develop serious

complications based on individual risk factors. Because maternal mortality is a relatively rare event in the population “at risk”, that is all pregnant women, and because the risk factors, which are relatively common in that same population, are poor indicators of outcome, risk screening for maternal mortality suffers from low sensitivity, as well as low specificity (25).

To achieve the full life-saving potential that ANC promises for women and babies, four visits providing essential evidence based interventions – a package often called focused antenatal care – is required (10). This model was defined after The Lancet published a systematic review of randomized controlled trials of antenatal care. The main hypothesis in this review was that a model with a lower number of antenatal visits, with or without goal-oriented components, would be as effective as the standard ANC-model in terms of clinical outcomes, perceived satisfaction, and costs. The interventions compared were the provision of a lower number of antenatal visits (new model) and a standard antenatal-visit program. The selected outcomes were pre- eclampsia, urinary-tract infection, postpartum anemia, maternal mortality, low birth weight, and perinatal mortality (2).

The results showed that reducing the number of antenatal visits was not associated with an increase in adverse maternal and perinatal outcome. This reduction is highly relevant clinically and has public-health implications, especially in countries such as those where resources are scarce and should be allocated in the most efficient way (2). This poses another challenge in that the effect of ANC delivered does not only depend on the number of visits, but the quality of care given at each visits. This again depends on enough available skilled health workers, availability and cost of supply needed and the general access to ANC in the providing country. These are all factors that need to be taken into account when implementing FANC in a developing country.

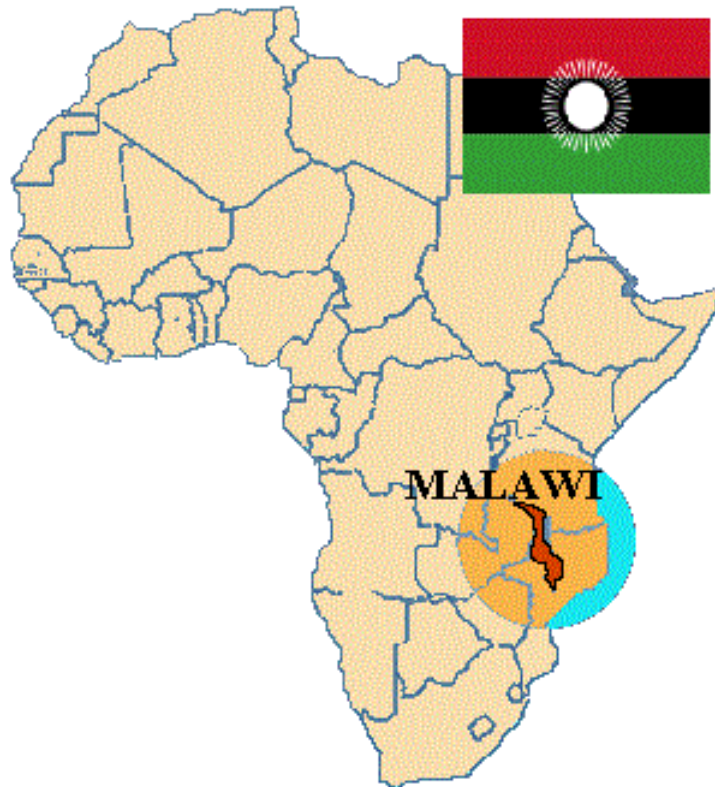
2.6 The content of FANC

FANC provides specific evidence-based interventions for all women carried out at certain critical times in the pregnancy (10). This includes prevention, management and treatment of complications due to the pregnancy itself and pre-existing conditions that can tend to worsen during pregnancy. For many of the essential interventions in ANC, it is crucial to have early identification of underlying conditions – for example, prevention of congenital syphilis, control of anemia, and prevention of malaria complications (10). This is the rationale behind why the first ANC visit should be as early as possible in the pregnancy, preferably in the first trimester. See appendix 1 for an overview of the specific activities and goals in FANC. Most of the interventions recommended in this table are supported by scientific evidence, are low cost, and can be implemented in first level facilities in all countries in Africa. The first visit should also be used to distinguish women who require standard care and those that require special attention and more visits than the recommended four. The last visit should be at around 37 weeks to ensure that proper advice on labor and birth has been given.

2.7 Malawi – “The warm heart of Africa”

2.7.1 Demographics

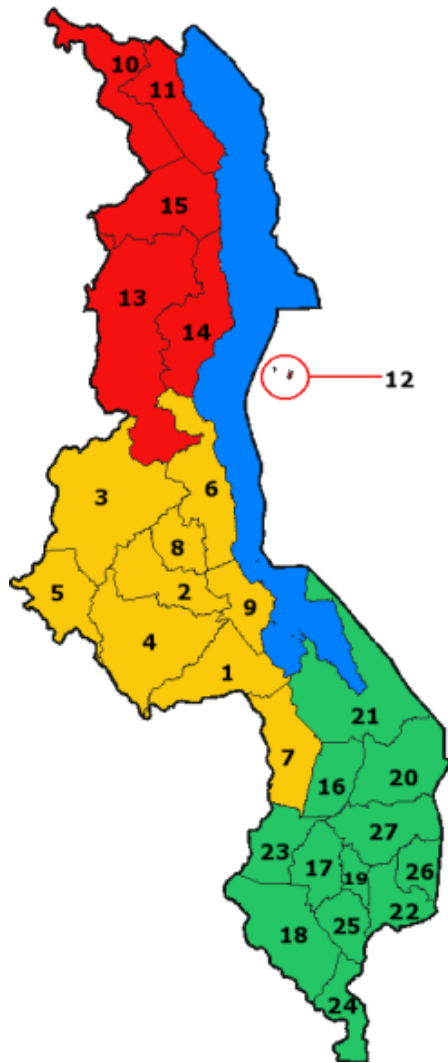
Malawi is a small and land locked country in Sub-Saharan Africa. It is a quite small, but long and narrow country bordered by Tanzania, Zambia and Mozambique. See picture D. The population has passed 16 million people, and it is thus one of the most densely populated countries in Africa. In 2005 there were an estimated 140 people per square km. In comparison Norway has 15,2 per square km (14). The economy is heavily based on agriculture, with a largely rural population. The adult mortality rate (probability of dying between 15 and 60 years) is 347/1000 for females, and the under-five mortality rate is 83/1000 live births for both sexes. The prevalence of HIV in Malawi is 5904/100 000, which is one of the highest in the WHO African Region (includes almost all African countries). (20).



Picture D: Map of Malawi. Borderd by Mosambique in the south, Zambia in the west and Tanzania in the east.

<http://www.yocevim.org/malawi.php>. Accessed 2013-05-01

Malawi is divided into three administrative regions: the Northern, Central and Southern and further into 28 administrative districts. Six districts are in the Northern Region, nine are in the Central Region and 13 are in the Southern Region. Chiradzulu, the district where the Maternal and Neonatal project has been conducted, lies in the southern part of the country and has a population of about 290.000. This makes it the second most heavily populated district based on people pr. square km. See picture E.



Picture E: Map of Malawi showing the division into three administrative districts and its regions. Chiradzulu district numbered 19.

<http://www.kadale.com/overview.htm>. Accessed 2013-05-01

2.7.2 The health care system in Malawi

Nearly all health services in Malawi are provided by three main agencies. The Ministry of Health provides 60 %, the Christian Association of Malawi (CHAM) 37 % and the Ministry of Local Governments provides 1 % (4). The services provided by the government are free and the private CHAM services are not. Health services are provided at three levels: primary, secondary and tertiary. At a primary level, the services include rural hospitals, health centres, health posts, outreach clinics and community initiatives. District and CHAM hospitals provide secondary level health care services to back up the activities of the primary level

while tertiary hospitals provide services with a range of specialist surgical and medical interventions (4).

2.7.3 The MMR in Malawi

The MMR in Malawi is estimated to be 807/100 000 live births (CI 696-918). This number is from the The Malawi Multiple Indicator Cluster Survey (MICS) carried out by the National Statistics Office in collaboration with the United Nations Children's Fund (UNICEF). It refers to the period from 2001-2006 (13). Measuring MMR is difficult because good report system to base statistical analysis on has been lacking, especially in developing countries like Malawi. Another estimate indicates an MMR of 1140 (CI 675-1813) in 2008 (7). However accuracy of this number, the estimated MMR is too high. With antenatal coverage in Malawi being as high as 93 % the opportunity to reach pregnant women with important interventions is very good (11).

3. METHOD

3.1 Presentation of the Maternal and Neonatal Intervention Project

The maternal and neonatal intervention project at Chiradzulu District Hospital is initiated by Kamuzu College of Nursing in Blantyre, Malawi in collaboration with the University of Tromsø. It is funded by NORAD. The project rationale is based on the fact that despite the high antenatal care coverage in Malawi, the quality of care is not sufficient. FANC was officially introduced to the health care service of Malawi in 2002. In 2010, the Ministry of Health made an assessment that revealed several gaps on implementation of FANC at Chiradzulu District Hospital. This showed that there was a need to intervene in order to reduce the gaps, so that the health facility can meet the WHO FANC standards and in turn hopefully reduce the neonatal and maternal deaths (11).

One of the most concerning gaps revealed during this assessment was that the average antenatal care visits was two, which is less than the four recommended by the WHO. The average time of the first visit was at six months pregnant. Percentage of those coming at four months or less were 11 % and those coming

at six months were 14 %. The rest came later in their pregnancy (11). Because of late initiation of antenatal care, the women miss out on the specific interventions targeted for each visit. This can consequently affect the outcome of the pregnancy. The reason why women initiate FANC late is partly due to the lack of equipment to detect pregnancies during the first trimester, and partly because the use of FANC is not properly embedded in the community surrounding the pregnant women.

The assessment also revealed that the documentation of activities done to mothers was poor because of lack of knowledge amongst the nurses working there. Most of the nurses were not conversant with delivery of FANC, and therefore failed to provide proper antenatal care.

The main objective of the study was to improve the delivery of FANC services at Chiradzulu District hospital to reduce neonatal and maternal deaths (11).

The specific objectives of the study:

- 1) Improve documentation of FANC activities
- 2) Provide on-job training to new health staff on FANC
- 3) Create awareness in the communities surrounding the health facilities and its health centers on FANC services
- 4) Collaborate with the District Health Office in the provision of essential equipment, drugs, chemicals and supplies needed for FANC

3.1.1 The baseline study

To verify the gaps found in the 2010 assessment, and to incorporate recently emerging issues, a baseline study was performed. Baseline data on the quality of antenatal care given to pregnant women at Chiradzulu District hospital was collected for three months from January till March 2012. A total of 300 women were enrolled as they presented themselves for antenatal care at the hospital. The study used the three components of quality maternal care; structure, process, and outcome. Structure examined the characteristics of the setting in which the care was provided. Process examined how care was provided and

received, and outcome examined the effects of care on the health status and welfare of mothers and neonates (11).

The research nurses interviewed pregnant women who attended ANC during the baseline period face-to-face. The women were interviewed with a form that was divided into three sections. Section A contained demographic data like marital status, level of education, occupation, gestational age and number of ANC visits the woman had attended during her pregnancy. In section B, the women were asked to recall the components of care that they received during ANC. These components included comprehensive history taking, observations and laboratory investigations, physical and obstetric examination, drugs and immunizations, management of obstetric complications and health education (11). Section C was how the clients perceived the quality of antenatal care services.

Quality of FANC services given was then assessed using a checklist with 23 criteria derived from the reproductive health standards. The facility was expected to score at least 80 % on the standards to show that it is providing quality FANC. After this assessment the project aimed to implement activities to fill all the gaps identified during the baseline study.

3.1.2 The intervention project

The design of the intervention project was longitudinal. During the period from April 2012 to June 2012, the women that came for ANC were asked to join the study. 600 women were recruited and divided into two groups. The ones that presented themselves ≥ 16 weeks of gestation were the control group, while the ones coming ≤ 16 weeks were the case group. See figure 3. The women in both groups were given ANC services according to FANC guidelines, and they were followed up until delivery. During labor and delivery the maternity staff at the facility attended the women. Then the research staff recorded the maternal and neonatal outcome afterwards.



Figure 3: The design of the maternal and neonatal intervention project.

With the main purposes of increasing the quality of FANC services at Chiradzulu district hospital, the service providers (midwives and nurses at the ANC clinic) were taught how to better deliver FANC. The project also provided the clinic with the supplies, equipment and drugs required to provide FANC according to the WHO guidelines.

The project also organized core groups in 25 of the villages surrounding the hospital. This was done through the Baptist Convention of Malawi. At least two from each group was oriented on the need for initiation of antenatal care early in the pregnancy and the importance of delivering at a health facility. In addition, eight Health Surveillance Assistants (HSAs) were taught how to detect pregnancy early and to advocate for early initiation of ANC and facility delivery. HSAs are paramedical people at the village level, employed by the Ministry of Health (Personal notice from Alfred Maluwa). This is meant to reduce the number of maternal and neonatal deaths on a community level.

The data was analyzed using SPSS (Statistical Package for Social Scientists) version 16. Descriptive statistics were made for the demographic data to understand the demographic characteristics of the participants in both groups. Comparisons of indicators for maternal and neonatal outcomes has been made using student's "t" test at 5% level of significance (12).

4. RESULTS

Only selected parts of the results from both the baseline and the intervention study will be presented in this paper. They will be presented schematically to better outline the focus of the paper; if focused antenatal care can be a contributing factor when trying to reduce maternal mortality.

4.1 Time of initiation and number of ANC visits during pregnancy

Results from the baseline study confirmed many of the same things found during the assessment conducted by the Ministry of Health in 2010. During the period of the baseline study only 3,4 % (n=10) of the women attended ANC in the first trimester. In the second trimester 28 % (n=103) had initiated ANC, but the majority (53 %, n=183) presented themselves in the third trimester, with the highest frequencies at seven and eight months (11). See figure 3. The percentage of women who met the required four ANC visits was only 12,9 % (n=44). The earliest gestation period for meeting the required 4 visits was 7 months but only 7.6% (n=5) of the women that were in the 7th month of gestation had made the required 4 visits (11). The majority of women in the baseline study were multiparas, and despite the late initiation of ANC more than 50 % knew they were supposed to make at least 4 ANC visits during their pregnancy (11).

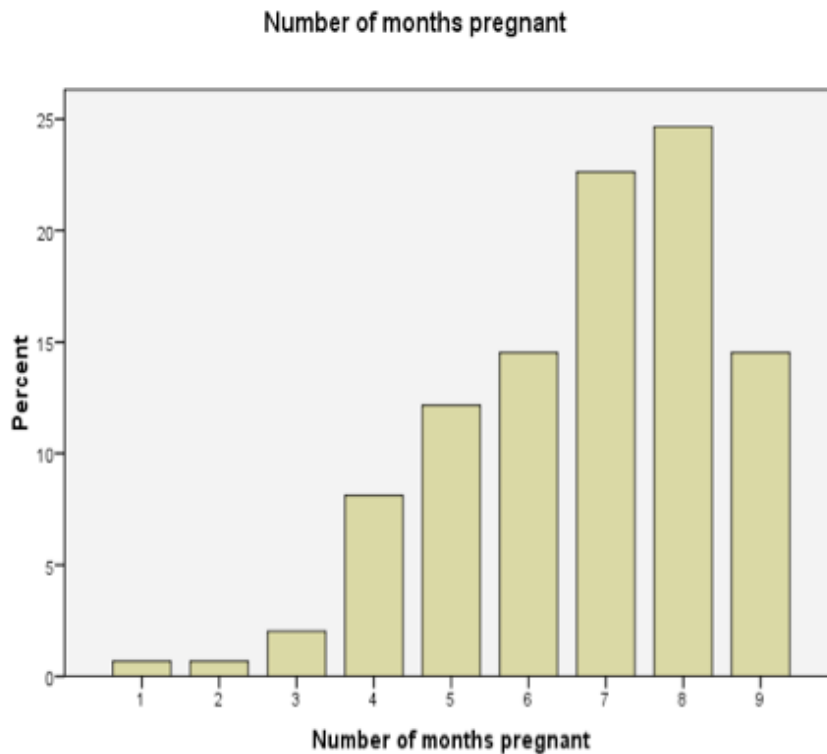


Figure 3: Gestational period of the participants who presented to ANC at Chiradzulu District Hospital between January and March 2012 (the baseline study). The majority of women presented themselves in the third trimester, with the highest frequencies at seven and eight months. (11).

Results from the intervention study show that statistically significant number of young women (15-29 years old) initiated ANC on time. In the 30-34 age group there is no difference when the two groups are compared. See figure 4. From this, one might draw the conclusion that older and more experienced women initiate ANC later than younger mothers. This presumption was also made stronger by the fact that the number of multipara women in the intervention group was significantly smaller ($p < 0,05$) than that in the control group. This may indicate that more experienced women with giving birth initiate ANC later than those that are less experienced. This is a positive trend, and if it continues the problem of late initiation of ANC might be resolved in the future (12).

Age group (years)	Control group (n=300)	Intervention group (n=223)
15–19	16.7	26.0*
20-24	33.4	38.1*
25-29	24.3	18.8*
30-34	16.1	14.3
Above 35	8.8	2.2*

Figure 4: Age of the women attending ANC during the intervention project.

*The two figures are significantly different at 5 %. (12).

4.2 Quality of FANC services provided

During the baseline study the facility scored only 67,7 % on quality of care. This is below the recommended 80% to qualify that the hospital is providing FANC according to the guidelines of the WHO. When it comes to blood tests, the facility met the standards on the number of women tested for HIV (98,6 %, n=283) during the baseline study. The other recommended blood tests were done on very few participants. Despite being the major determinants of positive perinatal outcome, drugs and immunization were given below WHO standards. Iron tablets were given to 27,1 % (n=68), SP (sulfadoxine-pyrimethamine, drug given to prevent malaria) to 73,4 % (n=182) and TTV (tetanus toxoid vaccine to prevent tetanus in both mother and baby) to 62,3 % (n=153) (11).

In the intervention drugs and supplies to give during ANC had been provided through the project. This means that the staff was trained of what tests to take during ANC, and that test-kits and medications were made available. During the intervention, all women were tested for HIV and syphilis, and their Hb was measured. Ferrous sulphate (iron supplement to treat iron deficiency), abendazole (to treat infections caused by worms), fansidar (to prevent and treat malaria) and ART (to treat those that are HIV-positive) were all made available. All the women were also given tetanus toxoid vaccine during the first or second visit. After the intervention, all the women who attended the project were given FANC services that met the WHO standards.

4.3 Maternal outcome

In the control group, 88,8 % delivered at the facility (n=213). Only 240 women are recorded in this group. 63 women are missing because their place of birth is unknown. In the intervention group 93,3 % (n=280) delivered at the health facility. In the intervention group there were 13 % who needed a cesarean section. This number is high, but the exact reason to why this has been done has not been recorded by the Intervention project. It has not been noted if the CS was planned, or if it was done because of complications arising during labor. From figure 5 it can be noted that in the intervention group, post partum hemorrhage and CS was the most frequent complication.

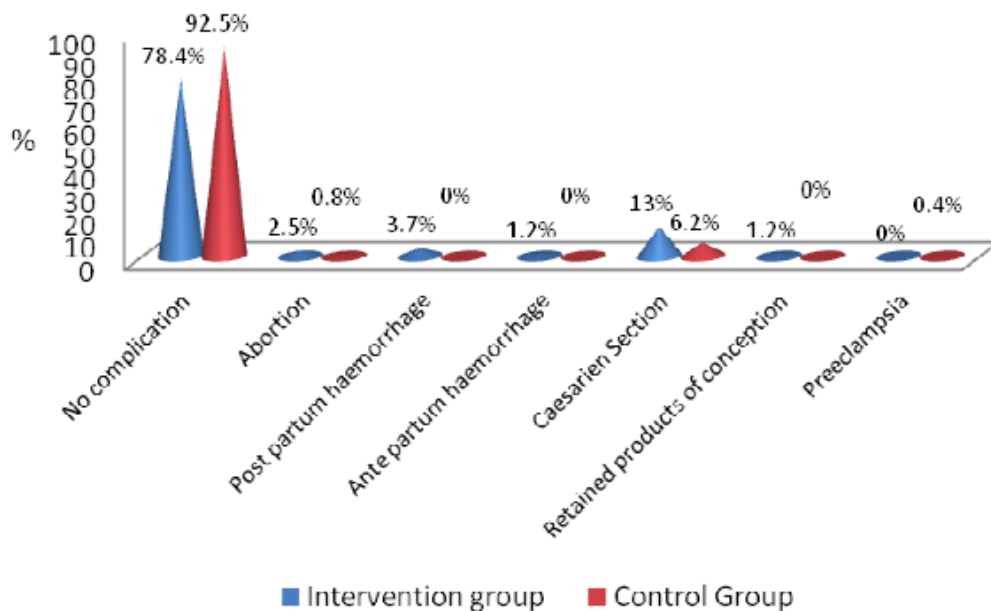


Figure 5: Overview of complications experienced by the mothers who gave birth at Chiradzulu district hospital (12).

No maternal deaths were recorded for the women delivering at the hospital in any of the two groups. However, one woman from the intervention group who gave birth at home died. She chose to deliver at home, despite completing four ANC visits. The fetus was in breech position, and she had a retained placenta and severe bleeding. She was taken to the nearest health center, but because of lack of emergency obstetric care facilities they failed to remove the placenta. She was then referred to Chiradzulu district hospital where she was pronounced dead upon arrival due to excessive bleeding (12).

During the study period (April 2012-March 2013), a total of 18 women died at the hospital. These women were all referred cases from health centers. A maternal death audit was done, and results show that all of these women needed emergency obstetric care. Because most of the health centers lack emergency obstetric care facilities, and also has a shortage of staff, these complications were managed inadequately and had a negative outcome.

5. DISCUSSION:

As already mentioned, 81 % of pregnant women in the developing world attended ANC at least once in 2009 (20). There has, however been a notable lack of comprehensive and critical reviews of the effectiveness of antenatal care programs and/or of individual interventions during pregnancy to avert maternal death or severe morbidity (2). Today, there is better evidence about what works when trying to reduce maternal mortality, and the role that antenatal care can play. This has led to a shift in thinking from the high-risk approach to focused ANC.

Even though FANC was implemented in Malawi already in 2002, the pilot study showed that the quality of the service delivered was below the WHO standards. It is known that the effectiveness of antenatal care programs to reduce maternal mortality can be directly related to the quality of care, access and its coverage (1). By teaching the staff how to deliver FANC, the project has increased the quality of the service delivered, but unfortunately, antenatal care interventions alone do not address the main causes of maternal deaths that result from complications arising during labour, delivery and the immediate postpartum period. The majority of maternal deaths have direct causes and occur post partum (6). It has therefore become clear that antenatal care interventions, in and of themselves, cannot be expected to have significant impact on maternal mortality (17).

When this is said, antenatal care is an important mean when trying to improve maternal health and wellbeing. Antenatal visits offer entry points for a range of other programmes concerning women's health. For four programme areas in particular, namely malaria, TB, nutrition and HIV/AIDS and other STIs, the antenatal period represents an important opportunity yet it currently appears to be underexploited. These opportunities need to be seized if antenatal care is to avoid being a period of missed opportunities (17).

The antenatal care visits should also be used to teach the woman about danger signs and the risk associated with labor and delivery. This is to ensure that the woman seeks facility care and delivers with the assistance of a skilled health care provider. The women are taught to come in proper time before their due date, especially those living farthest away from the facility. This is challenging for the woman who might have to leave her family behind. If the health facility does not provide a place to stay while the woman is waiting to go into labor, she has to pay for accommodation elsewhere, or if she is lucky she might have family to stay with (Personal report from research nurse Ellen Lekera).

In a study conducted in southern Malawi, one woman expressed that "People are going late to the hospital because they need to source and accumulate a number of items to use during delivery as demanded by the hospitals, as well as food and money to use while at the hospital. This may not be feasible because, one considers the time she is going to stay there, the resources needed and who is going to look after other small children left behind?" (8). In rural Malawi, assistance at delivery by a skilled attendant is found to be less likely as the distance to the health facility increases (23).

As the intervention project succeeded in improving the quality of FANC delivered, it also showed that there is a need to improve the routines for referral to higher level of care, and to strengthen the health centers so that they can provide emergency obstetric care (12). This shows that even high quality ANC cannot be a substitute for adequate emergency access to obstetric services. Antenatal surveillance can have little impact if services do not exist to manage

the clinical problems identified (1). The continuation of the project therefore aims to strengthen the labor and delivery ward, including the postnatal services at the health facility, and to improve the referral system between Chiradzulu district hospital and its 13 health centers. A study done in the district hospital of Thyolo, Malawi between September 2007 and 2009 also concluded that the referral system between health centers and hospital was substandard. Late referral gave a delay in starting correct treatment at hospital level, but they also showed a delay at hospital level in assessing emergency cases by nurses and clinicians and late arrival of hospital theatre staff for emergency procedures (22).

In the district of Chiradzulu, according to the MICS of 2006, only 50 % of the women aged 15-49 who gave birth in the two years preceding the survey were delivered by a skilled attendant. 46, 1 % were attended by a nurse/midwife and 3,9 % by a doctor (13). This is below the national average of 54 %. By creating a link between the woman and the health care system, antenatal care does appear to serve as a way of increasing use of skilled attendance at delivery, though this relationship is weakest in sub-Saharan Africa, where levels of maternal mortality are highest. Skilled attendants can help ensure provision of basic comprehensive emergency obstetric care if they have the necessary back-up, equipment and supplies to function effectively (17). According to UNICEF, the single most critical intervention for safe motherhood is to ensure a competent health worker with midwifery skills is present at every birth and that immediate referral to a capable emergency obstetric unit is possible (13).

6. CONCLUSION

If resources are to be used on providing antenatal care, it needs to meet the WHO standards of quality care. ANC staff has to be trained, the supplies and drugs needed must be made available and there has to be good routines for referral to higher level of care if complications should occur. Good antenatal care coverage has proven important in improving women's health and well-being, but does not make a substantial impact on maternal mortality. The most effective means of

reducing maternal mortality is good access to skilled attendance at delivery and that basic emergency obstetric care is made available at primary and secondary level of care. The Maternal and Neonatal intervention project succeeded in improving the quality of FANC at Chiradzulu District Hospital during the study time. They also discovered a need to improve the routines for referral of pregnant women who require emergency obstetric care between the hospital and the surrounding health centers. This will serve as a base for further research, and a new project has been proposed to implement changes necessary.

7. WORDLIST

7.1 Definitions

Direct cause of maternal death: those resulting from obstetric complications of the pregnancy, childbirth and the puerperium to 42 days (ICD-10)

Indirect cause of maternal death: those resulting from previous existing disease that developed during the pregnancy which was not a result of direct obstetric, but which was aggravated by the physiologic effects of pregnancy (ICD-10)

Maternal mortality: is the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes (WHO Definition).

Multipara: A woman that has had two or more pregnancies resulting in viable offspring

Oxytocic drugs: Drug that stimulates the uterus to contract. Used both to induce labor and to reduce postpartum hemorrhage

Parenteral: Administration of a drug by other route than the digestive tract

Sensitivity: the probability that a person having a disease will be correctly identified by a clinical test.

Specificity: the probability that a person who does not have a disease will be correctly identified by a clinical test.

Skilled attendant at birth: Defined by the WHO in 1990 as “an accredited health professional-such as midwife, doctor or nurse-who has been educated and

trained to proficiency in the skills needed to manage normal (uncomplicated) pregnancies, childbirth and the immediate postnatal period and in the identification, management and referral of complication in women and newborns

7.2 Abbreviations

ANC – Antenatal care

ARV - Anti retroviral (drugs used when treating HIV)

ART –Anti retroviral therapy

CI – Confidence interval

ECV – External cephalic version (to manually turn a baby in breech position)

EDD – Estimated date of delivery

FANC – Focused antenatal care

Hb – Hemoglobin

ICD 10 – International classification of Diseases

IPTp – Intermittent preventive treatment (drugs used to prevent malaria)

ITN – Insecticide-treated bed nets (to prevent malaria)

MDG – Millennium development goals

MICS - Multiple Indicator Cluster Survey

MMR – Maternal mortality ratio

NMR – Neonatal mortality ratio

NORAD – The Norwegian Agency for Development Cooperation.

PIH – Pregnancy induced hypertension

RH – Regional health

STI – Sexually transmitted infection

TB – Tuberculosis

UNICEF – United Nations Children’s Fund

8. APPENDICES

9.1.1 Appendix 1: Activities and goals in FANC

Overview of the interventions at each ANC visit based on the four-visit model as applied in focused ANC

Goals				
	First visit 8-12 weeks	Second visit 24-26 weeks	Third visit 32 weeks	Fourth visit 36-38 weeks
	Confirm pregnancy and EDD, classify women for basic ANC (four visits) or more specialized care. Screen, treat and give preventive measures. Develop a birth and emergency plan. Advise and counsel.	Assess maternal and fetal well-being. Exclude PIH and anaemia. Give preventive measures. Review and modify birth and emergency plan. Advise and counsel.	Assess maternal and fetal well-being. Exclude PIH, anaemia, multiple pregnancies. Give preventive measures. Review and modify birth and emergency plan. Advise and counsel.	Assess maternal and fetal well-being. Exclude PIH, anaemia, multiple pregnancy, malpresentation. Give preventive measures. Review and modify birth and emergency plan. Advise and counsel.

Activities				
Rapid assessment and management for emergency signs, give appropriate treatment, and refer to hospital if needed				
History (ask, check records)	Assess significant symptoms. Take psychosocial, medical and obstetric history. Confirm pregnancy and calculate EDD. Classify all women (in some cases after test results)	Assess significant symptoms. Check record for previous complications and treatments during the pregnancy. Re-classification if needed	Assess significant symptoms. Check record for previous complications and treatments during the pregnancy. Re-classification if needed	Assess significant symptoms. Check record for previous complications and treatments during the pregnancy. Re-classification if needed
Examination (look, listen, feel)	Complete general, and obstetrical examination, BP	Anaemia, BP, fetal growth, and movements	Anaemia, BP, fetal growth, multiple pregnancy	Anaemia, BP, fetal growth and movements, multiple pregnancy, malpresentation
Screening and tests	Haemoglobin Syphilis HIV Proteinuria Blood/Rh group* Bacteriuria*	Bacteriuria*	Bacteriuria*	Bacteriuria*
Treatments	Syphilis ARV if eligible Treat bacteriuria if indicated*	Anthelmintic**, ARV if eligible Treat bacteriuria if indicated*	ARV if eligible Treat bacteriuria if indicated*	ARV if eligible If breech, ECV or referral for ECV Treat bacteriuria if indicated*
Preventive measures	Tetanus toxoid Iron and folate+	Tetanus toxoid, Iron and folate IPT _p ARV	Iron and folate IPT _p ARV	Iron and folate ARV
Health education, advice, and counselling	Self-care, alcohol and tobacco use, nutrition, safe sex, rest, sleeping under ITN, birth and emergency plan	Birth and emergency plan, reinforcement of previous advice	Birth and emergency plan, infant feeding, postpartum/postnatal care, pregnancy spacing, reinforcement of previous advice	Birth and emergency plan, infant feeding, postpartum/postnatal care, pregnancy spacing, reinforcement of previous advice

***Additional intervention for use in referral centers but not recommended as routine for resource-limited settings**

****should not be given in first trimester, but if first visit occurs after 16 weeks, it can be given at first visit**

9.1.2 Appendix 2

Pictures from Chiradzulu District Hospital, June 2012. All pictures taken with consent from the women photographed.



The main entrance of Chiradzulu District Hospital outside Blantyre, Malawi



The view from the hospital towards the closest village



**Research nurse
(and midwife) Ellen
Lekera conducting
FANC on a woman
who is a participant
in the intervention
project**




**A pregnant woman
waiting to have
antenatal care. She is
expecting her second
child.**



**Blood tests
being done
during antenatal
care**

HMIS-10 Version 3 (Jan 2009)


MALAWI

NOT FOR SALE

**HEALTH PASSPORT
WOMAN HEALTH PROFILE**

NAME _____
Dzina / Zina

DATE OF BIRTH _____
Tsiku Lobadwira Day / Month / Year

VILLAGE _____
Mudzi / Kukaya

Please bring this book each time you come to see the nurse or doctor
Chonde bweretsani kabukuka podzaonana ndi dotolo kapena namwino
Chonde yeghani kabuku aka pakuzakonana na dokotala panyake wa nesi

Issuing person: _____

Issued date: _____

All women attending ANC in Malawi receives this health passport. It is used in subsequent pregnancies also. During the intervention study this was marked with a special symbol so that the ANC personnel knew witch women were participants in the project if they were in the intervention or control group.



Ellen Lekera teaching pregnant women about dangersigns in pregnancy and during labor

9. REFERENCES

1. Acharya S. (1995). How effective is antenatal care to promote maternal and neonatal health? *International journal of gynecology & obstetrics*, 50, supplement 2, S53-S42.
2. Carroli G., Rooney C., & Villar J. (2001). How effective is antenatal care in preventing maternal mortality and serious morbidity? An overview of the evidence. Accessed April 28th 2013
<http://onlinelibrary.wiley.com/store/10.1046/j.1365-3016.2001.0150s1001.x/asset/j.1365-3016.2001.0150s1001.x.pdf?v=1&t=hg24xwtf&s=d21b638b9d58b0ecdc0e72cd8aab0e22b39bc85e>
3. Carroli G., Villar J., Piaggio G., Khan-Neelofur D., Gülmezoglu M., Mugford M., Lumbiganon P., Farnot U., Bersgjø P. (2001). WHO systematic review of randomised controlled trials of routine antenatal care. *The Lancet*, Vol 357.
4. Chifuniro Chodzaza E. (2008). Quality of care rendered to women with major obstetric complications in Mwanza District, Southern Malawi. Master of Philosophy Degree in International Community Health. Oslo.
5. De Brouwere V., Tonglet R., & Van Lerberghe W. (1998). Strategies for reducing maternal mortality in developing countries: what can we learn from the history of the industrialized West? *Tropical Medicine & International Health*, 3(10), 771-782.
6. Geubbels E. (2006). Epidemiology on MMR in Malawi. *Malawi medical journal*, 18 (Special edition on the burden of disease II), 208-228.
7. Hogan C.M., Foreman K.J., Naghavi M., Ahn S.Y., Wang M., Makela S.M., Lopez A.d., Lozano R., Murray C.J.L. (2010). Maternal mortality for 181 countries, 1980–2008: a systematic analysis of progress towards Millennium Development Goal 5. *The Lancet*, 375, 1609-1623.
8. Kambala C., Morse T., Masangwi S., & Mitunda P. (2011). Barriers to maternal health service use in Chikhwawa, Southern Malawi. *Malawi medical journal* 23 (1). www.mmj.medcol.mw
9. Khan K.S., Wojdyla D., Say L., Gülmezoglu A.M., & Van Look P.F.A. (2006). WHO analysis of causes of maternal death: a systematic review. *The Lancet*, 367, 1066-1074.
10. Lincetto O., Mothebesoane-Anoh S., Gomez P., & Munjanja S. (2006). Opportunities for Africa's Newborns. In S. t. C. Joy Lawn, and Kate Kerber, Save the Children and BASICS (Ed.): WHO.

11. Maluwa A. (2012). Results of Pilot Study on the Maternal and Neonatal Intervention Project at Chiradzulu District Hospital. Malawi. Blantyre, Malawi: Kamuzu College of Nursing.
12. Maluwa A. (2013). Implementations of interventions to improve maternal and neonatal outcomes at chiradzulu district hospital. Final pilot project report. Blantyre, Malawi: Kamuzu College of Nursing.
13. National Statistical office and UNICEF. (2008). Malawi Multiple Indicator Cluster Survey 2006, Final Report.
14. Nationmaster.com. (2005). Geography statistics > population density > people per sq.km (most recent) by country Accessed 08.12.2012, 2012, from http://www.nationmaster.com/graph/geo_pop_den_peo_per_sq_km-density-people-per-sq-km
15. Rooney C. (1993). Antenatal care and maternal health: How effective is it? A review of the evidence. Maternal health and safe motherhood programme. Division of family health, WHO.
16. The World Health Organization. (1999). Reduction of maternal mortality: a joint WHO/UNFPA/UNICEF/World Bank statement: WHO.
17. The World Health Organization. (2003). Antenatal care in developing countries. Promises, achievements and missed opportunities. An analysis of trends, levels and differentials, 1990-2001: Department of Reproductive Health and Research, WHO.
18. The World Health Organization. (2012a). Fact Sheet accessed 23.May 2013, from <http://www.who.int/mediacentre/factsheets/fs348/en/>
19. The World Health Organization. (2012b). Health topics: Millennium Development Goals Accessed 08.12.2012, 2012, from http://www.who.int/topics/millennium_development_goals/en/
20. The World Health Organization. (2013). Global Health Observatory (GHO) Accessed April 28th 2013, from http://www.who.int/gho/maternal_health/reproductive_health/antenatal_care_text/en/
21. United Nations. (2010). The Millennium Development Goals Report. In L. Jensen (Ed.).
22. Van den Akker T., van Rhenen J., Mwangomba B., Lommerse K., Vinkhumbo S., & van Roosmalen J. (2011). Reduction of severe acute maternal morbidity and maternal mortality in Thyolo District, Malawi: the impact of obstetric audit. *PLoS One*, 6(6), e20776.

23. Van der Broek N.R., White S.A., Ntonya C., Ngwale M., Cullinan T.R., Molyneux M.E., & Nelson J.P. (2003). Reproductive health in rural Malawi: a population based survey. *BJOG: an international Journal of Obstetrics and Gynecology*, 110(10), 902-908.
24. Worldmapper.org. (2006). Maternal Mortality accessed 08.12.2012, 2012, from http://www.worldmapper.org/posters/worldmapper_map258_ver5.pdf
25. Yuster E.A. (1995). Rethinking the role of the risk approach and antenatal care in maternal mortality reduction. *International journal of gynecology & obstetrics, Volume 50, Supplement 2*, S59-S61.