

**ASSESSMENT OF FOCUSED ANTENATAL CARE PRACTICE IN
DAR ES SALAAM**

By

Dr Charles Stanley Mngale MD (UDSM)

**A Dissertation Submitted in Partial Fulfillment of the Requirements for the
Degree of Master of Medicine in Obstetrics and Gynaecology of the Muhimbili
University of Health and Allied Sciences.**

Muhimbili University of Health and Allied Sciences

November 2007

CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled: **Assessment of focused antenatal care practice in Dar es Salaam**, in fulfillment of the requirements for the degree of Master of Obstetric and Gynaecology of the Muhimbili University of Health and Allied Sciences




Dr Brenda Maria Sequeira

(SUPERVISOR)

Date. NOVEMBER 2007

**DECLARATION
AND
COPYRIGHT**

I Dr Charles Stanley Mngale declare that this dissertation is my own original work and that it has not been presented and will not be presented to any other for a similar or any other degree award.

Signature.....

This dissertation is copyright material protected under the Berne Convention, the copyright Act of 1999 and other international and national enactments, in that behalf, on intellectual property. It may not be reproduced by any means, in full or in part, except for short extract in fair dealing; for research or private study, critical scholarly review or discourse with an acknowledgement, without the written permission of the Directorate of Postgraduate Studies, on behalf of both the author and the Muhimbili University of Health and Allied Sciences

DEDICATION

This book is dedicated to my wife Pendaeli Safieli and my daughter Neema and my
loved parents Mr & Mrs. Stanley Mngale.

ACKNOWLEDGEMENTS

I wish to express my sincere gratitude and appreciation to Dr B. Sequeira for her supervision, constructive criticisms and encouragement during the preparation of the study proposed and this dissertation.

I am also grateful and indebted to all consultants and specialists in the department who gave their assistance and guidance.

My gratitude also goes to Ms. Rose Mpembe.ni and Candida Moshiro from the department of Biostatistics for assisting me in statistical analysis.

I would like to extend my deepest thanks to my family especially my wife Pendaeli Safieli for her encouragement, understanding and acceptance of my absence during the period of preparation of this dissertation.

Lastly, I acknowledge the, National Institute of Medical Research (NIMR) for partially funding this study.

Glory and honor be to GOD and the Lord Almighty who was with me throughout this work and my studies at large. AMEN.

ABSTRACT

Background

In order to promote the health and survival of mothers and newborns, Tanzania has adopted the World Health Organization's new model of antenatal care known as focused antenatal care which is goal oriented. This new system was introduced in Tanzania 2000 and emphasizes more on quality of antenatal care rather than frequent visits. This study was conducted to describe the extent to which basic component of focused antenatal care was being adapted to by antenatal care providers.

Methods

Data was collected through a review of ANC cards and interviews of women after delivery about the services received by them during their antenatal visits.

Results

The study interviewed 510 women at Amana District Hospital, in Dar es Salaam. About 83% of the study population had requisite screening for syphilis and 65% were screened for HIV. Only 24.7% of the study populations had their Haemoglobin level checked at each visit. Among women who tested positive for HIV and syphilis 36% and 33% respectively were not given treatment. Haematenics were given in each visit to 35.8% of the study population. Only 43.1% received the recommended two doses of IPT/SP. The ability to recall pregnancy danger signs and individual birth plans was very low, with some danger signs not recalled at all. The most frequently recalled danger sign was vaginal bleeding (29.2%). For 56.3% of the women creating a birth plan referred to the collection of essential items necessary for safe delivery.

Conclusion

The antenatal care as seen at peripheral clinics does not match the recommended standards in terms of quality, with the screening tests and the provision of beneficial therapeutic intervention. Counseling on the danger signs in pregnancy and the formulation of an individual birth plan was rarely done. The study highlights the limitations of focused antenatal care.

TABLE OF CONTENTS	PAGE
CERTIFICATION.....	ii
DECLARATION AND COPYRIGHT.....	iii
DEDICATION.....	iv
ACKNOWLEDGEMENTS.....	v
ABSTRACT.....	vi
TABLE OF CONTENT.....	viii
ABBREVIATIONS.....	x
LIST OF TABLES AND FIGURE.....	xi
1.0 BACKGROUND INFORMATION.....	1
1.1 Introduction	1
1.2 History of antenatal care.....	2
1.3 Traditional approach of antenatal care.....	3
1.4 New model of antenatal care.....	3
1.5 Goals of focused antenatal care.....	5
1.6 Timing of visits.....	7
2.0 LITERATURE REVIEW.....	9
3.0 STATEMENT OF THE PROBLEM AND RATIONALE.....	16
4.0 RATIONALE OF THE STUDY.....	17
5.0 OBJECTIVES.....	18
5.1 Broad objective.....	18

5.2 Specific objectives.....	18
6.0 METHODOLOGY.....	19
6.1 Study area.....	19
6.2 Study design.....	19
6.3 Study population.....	19
6.4 Sample size.....	20
6.5 Data collection.....	21
6.6 Exclusion criteria.....	23
6.7 Pre testing of the study tools.....	23
6.8 Data analysis.....	23
6.9 Ethical issue and ethical clearance.....	24
7.0 RESULTS.....	25
8.0 DISCUSSION.....	32
9.0 CONCLUSION.....	39
10.0 RECOMMENDATION.....	39
11.0 REFERENCES.....	40
12.0 APPENDICES.....	44
12.1 Consent form.....	49

ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal Care/ Antenatal Clinic
ARV	Antiretroviral
BP	Blood Pressure
FAC	Focused Antenatal Care
HB	Haemoglobin
HIV	Human Immunodeficiency Virus
IPT	Intermittent Presumptive Treatment
ITN	Insecticide Treated bed nets
JHPIEGO	Johns Hopkins Program for International Education in Gynecology and Obstetrics.
MNH	Muhimbili National Hospital
MUCHS	Muhimbili University College of Health Sciences
PMTCT	Prevention of Mother to Child Transmission of HIV
TDHS	Tanzania Demographic Health Survey
PIH	Pregnancy induced hypertension

LIST OF TABLES

Table1. Social demographic characteristics of the study population.

Table2. The proportion of women who were screened for HIV, Syphilis and received treatment.

Table3. The proportion of women who had measurement for blood pressure, weight, fundal height, haemoglobin, as well as recipient of haematenics during antenatal visits.

Table4. Proportion of women given recommended malaria prophylaxis.

Figure I. Proportion of women counseled at least once on pregnancy danger signs.

Figure2. Proportion of counseled women who recalled on pregnancy danger signs.

Figure 3. Proportion of women counseled at least once on individual birth plan

Figure 4. Proportion of counseled women recalled necessary preparation for emergency and birth.

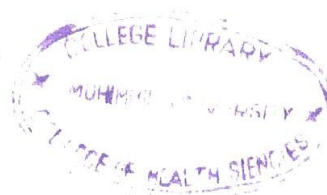
1.0 BACKGROUND INFORMATION

1.1 Introduction.

Pregnancy is one of the most important periods in the life of a woman, a family and a society. The aims of antenatal care are to assist women to remain healthy, finding and correcting any adverse conditions which may be present and thus ensure sound health of the unborn baby. Special attention is therefore given to antenatal care by the health care systems of most countries. Any health care program that intends to improve the health of its population must pay serious attention to the health of the pregnant woman and her fetus. Care for each pregnant woman needs to be individualized.

Although antenatal care services have been shown to have limited effect in reducing maternal mortality in many countries ¹ it has some beneficial effects to pregnant women and fetus. It provides an opportunity for screening for conditions likely to cause adverse effects in the index pregnancy. It provides an opportunity for the provision of beneficial therapeutic interventions such as haematenics, tetanus immunization, intermittent presumptive treatment for malaria and antiretroviral drug to reduce vertical transmission of HIV.

Antenatal care should address both the psychosocial needs of the woman, within the context of the health care delivery system and the culture in which she lives. Periodic health check-ups during the antenatal period are necessary to establish confidence between the woman and her health care provider



It is helpful if the family and the community are educated/counseled on the danger signs that may arise during pregnancy, delivery, and there after. This will provide an opportunity for the mother to seek early help from the most appropriate place. Promoting healthy behavior in women and increasing knowledge about pregnancy complications among women, their families and their communities are always important that may be life-saving. A study in urban Nepal showed that women who received education with their husband were as nearly twice as likely to report making more than three necessary preparations for birth ²

1.2 History of antenatal care

The provision of special care for women during pregnancy through public health services is a relatively late development in modern obstetrics. Not until the late 1930s did the authorities of United Kingdom and Northern Ireland decide that regular check-ups during pregnancy should be an integral part of maternity care. This development was stimulated by the realization that maternal mortality due to puerperal sepsis, hemorrhage and obstructed labor declined substantially during the early 20th century, while this was not the case for deaths associated with eclampsia. If these deaths related to eclampsia were to be averted, it was thought that intervention would be needed earlier during pregnancy. These interventions include blood pressure measurements, identification of women at risk of eclamptic convulsions and institution of measures to reduce blood pressure whenever possible ³. It was suggested that high maternal and perinatal mortality observed reflected inadequate maternity care during pregnancy and lack of supervision of labour. By 1950s a

schedule of monthly visits to 28 weeks, fortnightly visits to 36 and then weekly visits until birth became the standard.

1.3 Traditional approach of antenatal care

The traditional approach to antenatal care, which is based on European models developed in the early 1900's, assumes that more is better in care for pregnant women. Frequent routine visits were then recommended. Women screened during antenatal visits for the presence of risk factor and classified as low or high risk. The aim being to predict problems and take action before they occur. However this risk approach does not distinguish those who will develop complications during labor and delivery and those who will not. As a result many women categorized as "high risk" did not develop complications but consume a scarce resource. Many women categorized as "low risk" do develop complications but were not told how to recognize or respond to these complications.

In the Kasongo Zaire study 71% of women who did develop obstructed labour were classified as low risk while 90% of women identified as high risk did not develop obstructed labour⁴

1.4 New model of antenatal care

Due to deficits in the traditional model of antenatal care a new model was developed. It emphasizes on quality over quantity of visits. This approach is called focused antenatal

care. The need to come to this new model of antenatal care recognizes three key realities. First, frequent visits do not necessarily improve pregnancy outcome. Second in low income countries they impose logistic and financial difficulties for the women and the health care system. Third, women with high risk pregnancy not necessarily develop complications, while women with low risk pregnancies often do hence all women need to be advised how to recognize complications and present themselves to a health provider earlier. When antenatal care is planned using a risk approach, scarce health care resources may be devoted to unnecessary care for high risk women who never develop complications, and “low-risk” women may be unprepared to recognize or respond to signs of complications.

The new WHO antenatal care model separates pregnant women into two groups. Those likely to need only routine antenatal care who are about 75%, and those with specific health conditions or risk factors that necessitate special care who are about twenty five percent ⁵. For the first group, a standard program with a minimum of four antenatal visits is recommended, with additional visits should conditions emerge which require special care depending on individual condition ³. The second group needs special care depending on individual problems.

In the new WHO antenatal care model every pregnant woman is considered as being at risk of developing complication and must have access to quality maternity care. Focused antenatal care includes interventions that are appropriate to the woman's stage of

pregnancy and addresses her overall health, preparation for birth and care of the newborn. The new approach of focused antenatal care was introduced in Tanzania in the year 2000. It started as pilot study in year 2000 by various training programs⁶. It is the policy of the Tanzania Ministry of Health that every antenatal care clinic should practice focused antenatal care⁷. All women with normal pregnancy are supposed to follow the basic components of antenatal care with four visits and those with risk factors or complications should be seen as frequently as necessary depending on their condition.

1.5 Goals of focused antenatal care

The new antenatal care model has three main goals. The first goal of antenatal care addresses preventive measures in which the skilled provider has to interview and examine the woman to detect problems that might affect the woman's pregnancy and require additional care. Screening for underlying conditions such as anaemia, syphilis, HIV, hypertension, worm infestation has to be done. Simple preventive interventions that have proven effective in reducing maternal and neonatal deaths are instituted. These include tetanus toxoid immunization, iron and folate supplementation. In Tanzania where malaria is endemic intermittent presumptive treatment for malaria and use of insecticides treated bed nets are encouraged. Presumptive treatment for hookworm in endemic areas is also advised.

The second goal of antenatal care is counseling and health promotion. Focused antenatal care visits should include time for providers and women to talk about important issues

related to nutrition and health during pregnancy, danger signs and complications during pregnancy and labor. Women are taught how to recognize them, what to do and where to get help. The importance of good nutrition to the health of the mother and baby; how to get enough calories and essential nutrients for a healthy pregnancy, importance of iron intake are discussed. Risks of using tobacco, alcohol, medications and local drugs, rest and avoidance of heavy physical work are discussed. Options for family planning services following the baby's birth, benefits of child spacing to mother and child have also to be discussed. Health and practical benefits of breastfeeding, exclusive breastfeeding and the importance of immediate breastfeeding after birth has to be discussed. The practice of safe sex in the presence of high endemicity of HIV and other sexually transmitted diseases, the use of condoms. Availability and benefits of testing; and specific issues related to mother-to-child transmission and living with AIDS after a positive test result need to be discussed.

The Third goal of antenatal care deals with birth preparedness and complication readiness. This includes attention to a woman's preparations for childbirth, such as getting the support she will need from her provider, family and community, and making arrangements for her newborn. The skilled provider and the woman should plan for early detection of labour, a skilled provider to be present at birth, the site for the birth and how to get there, items needed for the birth, a source of emergency funds, emergency transportation and blood donors.

1.6 Timing of visits

According to WHO the first visit should be in the first trimester, around or preferably before 12 weeks of pregnancy. The first visit is expected to take 30-40 minutes⁹. In this visit the health service provider will take a detailed history, screening, prophylaxis to malaria, anaemia, HIV, syphilis and tetanus. The women are counseled on pregnancy danger signs, development of individual birth plan and where to go in case complications arise.

A second visit is advised between at or close to 26 weeks of pregnancy and expected to take 20 minutes. In this visit the provider is supposed to review medical and obstetric history, examination and tests are restricted to measuring blood pressure, uterine height and tests for haemoglobin and urine albumin. Depending on the symptoms and signs detected referral or a visit sooner than the regular third visit could be arranged for some women⁸. All the advice given in the first visit should be repeated and time should be provided for free communication, questions and answers.

The third visit should be around at or close to 32 weeks of pregnancy. It is expected to take 20 minutes. All activities done during the second visit should be repeated and the individualized birth plan revised. Some women will go in labour before the next scheduled visit; therefore extra attention must be paid on the signs of labour and the importance of a skilled attendant at delivery.

The fourth visit should take place around the 36th week. The fourth visit is important for confirming the lie of the fetus, the presentation and an individualized birth plan is finalized. Women should be advised that if they have not delivered by the end of 41 week they should go directly to the hospital for evaluation and possible induction of labour by the best method available⁸. During this visit women should be again informed about the benefits of lactation and contraception⁸. Counseling on danger signs is re enforced.

Pregnancy related disorders can begin at any time between visits to the clinics and diseases may occur any time throughout pregnancy. Pregnancy danger signs should be discussed and reinforced at each visit and should any danger sign develop, the woman should be advised to attend a health facility any time. It is considered that asymptomatic disorders occurring between the scheduled visits will not cause harm that could otherwise be alleviated.

2.0 LITERATURE REVIEW

For many years now the antenatal care debate has focused on the frequency of antenatal care, its content, continuity, quality, organization, effectiveness and impact on morbidity and mortality. Established antenatal care schedules have been called into question. Randomized controlled trials comparing reduced schedules with routine antenatal care have shown similar or better outcomes for the reduced protocols ⁹.

In 1996–1998 WHO conducted a multicentre randomized controlled trial in four countries Argentina, Cuba, Saudi Arabia and Thailand to compare the standard "Western" model of antenatal care with a new model that emphasizes actions known to be effective in improving maternal or neonatal outcomes and has fewer clinic visits. The result of this trial showed that there were no significant differences between the new and traditional model in terms of severe anaemia, pre-eclampsia, eclampsia, urinary tract infection, low birth-weight infants, maternal and neonatal deaths. Some dissatisfaction with care was observed with the new model. The cost of the new model was equal to or less than that of the standard model ¹⁰.

A randomized controlled study done in Zimbabwe to determine whether a new program of antenatal care with fewer goal-oriented visits would result in equivalent or better pregnancy and delivery outcomes compared to the standard program. Results showed that, there were significantly fewer referrals for PIH and for severe hypertension or eclampsia during labor. The risk of preterm delivery was also significantly lower for women in the

new program. No significant differences between the programs were found for other indices of pregnancy outcome. The authors concluded that a simpler and reduced-visit program of antenatal care could be introduced without adverse effects on pregnancy outcomes ¹¹.

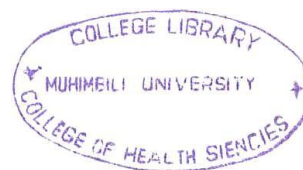
A study done in Ghana to determine acceptability and feasibility of introducing focused antenatal care found that it was well acceptable to both clients and providers. Some services were lacking e.g. testing for syphilis and HIV. The existing system for referral was not fully utilized. Essential drugs, supplies and equipments were also lacking. There were no effects on comprehensive history taking, birth plan, complication readiness and postnatal care. However there were beneficial effects on prevention of malaria, anaemia and counseling on HIV and STD ¹².

A study done in Kenya on acceptability and sustainability of focused antenatal care both clients and provider accept focused antenatal care but it revealed challenges to its full implementation. Challenges include inadequate provider knowledge, training and infrastructure problems. Timing of ANC visits remained unchanged as only small proportion made visits according to schedule. Blood pressure was checked only to 60% of the interaction made. Approximately half of first visit clients were not given opportunity to ask question ¹³.

Unlike Kenya and Ghana situation in similar study done in South Africa the findings were different. Clinics had enough essential drugs supplies. Over 98% of first visit clients received check up for weight, height, blood pressure and abdominal examination. Haemoglobin test was taken for over 90%, 92% their blood was drawn for syphilis test, 90% received iron and folic acid supplement in their first visit ¹⁴.

According to TDHS 2004-2005, Tanzania has a high antenatal care coverage with at least one antenatal visit attendance is 94 percent. This however is lower than TDHS 1999, which showed antenatal coverage of at least one visit of 98 percent. The number of pregnant women making four or more ANC visits is 62% ¹⁵ which appears to have declined slightly from 70% according to the TRCHS 1999.

Antenatal care services are provided in both public and private health facilities at all levels. A study conducted in Dar es Salaam, to compare the quality of antenatal care between private and public providers showed that both public and private providers were reasonably good with regard to the structural and interpersonal aspects of quality of care. However, both were poor when it came to technical aspects of the care. For example, guidelines for dispensing prophylactic drugs against anaemia or malaria were not respected, and diagnostic examinations for the assessment of gestation, anaemia, malaria, and urinary tract infection were not frequently performed. In all aspects, private providers were significantly better than public ones ¹⁶.



Measuring blood pressure is very essential as it can allow early detection and treatment of hypertensive disorders which are a major cause of maternal and perinatal mortality. A study done in Nigeria showed that more than 2/3 of pregnant women received antenatal care without blood pressure surveillance¹⁷. A study done in Rufiji Tanzania 1999 to assess the management of hypertension in pregnancy as quality indicator of antenatal care revealed that, one third of the women were not checked for hypertension. In those checked, measurements were not accurate as health workers were able to pick only four out of twelve women with elevated blood pressure¹⁸.

Antenatal care should facilitate the early diagnosis and treatment of anaemia. If initiated in the first trimester, it allows for treatment at the periphery so that the condition can be corrected before delivery. In Tanzania because anaemia is endemic all pregnant women should receive prophylactic iron and folate starting early in pregnancy. Appropriate dietary advice forms part of basic antenatal care. Anaemia identified in the third trimester or accompanied by symptoms is more severe and needs to be referred for management. A study in Rufiji rural District showed that 58% of pregnant women were not checked for anaemia at all, 10% were clinically examined, and only 37% had a haemoglobin assessed¹⁹.

Another study conducted in Temeke district Dar es Salaam Tanzania showed that antenatal interventions overall reduced the prevalence of anemia from 60% to 47%. There was 57% reduction of proportion of pregnant women with severe anemia²⁰. A study in

Kenya revealed that only 35% of pregnant women were given iron prophylaxis and the main reason of this low provision of iron was unavailability of the drugs¹³.

Malaria in pregnancy increases the risk for maternal anaemia, abortion, stillbirth, preterm birth and low birth weight. Interventions recommended by Tanzania Ministry of Health for prevention/treatment of malaria in pregnancy include intermittent presumptive treatment (IPT/SP) and use of insecticide treated bed nets (ITNs). A study was conducted in Mozambique to see the impact of double dose of sulphadoxine-pyrimethamine to reduce prevalence of malaria in pregnancy as compared to placebo. It was found out that two doses of SP significantly reduced the prevalence of peripheral and placental malaria parasitaemia and significantly increase birth weight among pregnant women in Matola and Boane²¹. Similar finding were observed in Kenya. A study done in Kibaha Tanzania showed that use of both IPT-SP and ITNs was associated with reduced risk of severe anaemia compared to women who used neither of interventions. In logistic regression model it was found that attendance to MCH health education session was the only factor that predicted IPT-SP use²². A study in Malawi revealed that only 36.8% of studied pregnant women received the recommended two dose regime of SP/IPT and the main cause of incomplete IPT was late booking²³.

A study conducted in Dar es Salaam from 1996 to 1998 on pregnant women found the prevalence of HIV to be 13.7%²⁴. Surveillance data from NACP indicate that HIV prevalence among antenatal care clients was about 9.6% by 2002²⁵. In Tanzania, HIV prevalence among women in reproductive age is around 8.7%²⁵.

Surveillance data from the NACP indicates that the prevalence of syphilis ranged from 3%-12.3%. The overall syphilis prevalence is 8.2%²⁵. A study done in Botswana showed the prevalence of active syphilis to be 5%. It also revealed that among women who came for repeated visit 87% were not screened for syphilis²⁶. This indicates that there was poor screening for syphilis in the first antenatal visit. A study done in Mwanza Tanzania showed that even when a positive RPR prevalence is low as 2%, antenatal syphilis screening and treatment remain cost effective²⁷.

The antenatal period is used to inform women about pregnancy danger signs and encourage early reporting to health facility in case any are noted. A study done in Blantyre Malawi to explore knowledge of obstetric complications in pregnancy, during labour and after delivery and actions taken when complications arose, amongst primigravidae attending urban health center. The findings showed that participants were more aware of obstetric complications that could occur in pregnancy than complications that may occur during and after delivery. Sixty percent of the participants were knowledgeable about obstetric complications in pregnancy. The majority of the participants, 73% and 82.2% did not know of any problems that could occur during and after the birth of the baby respectively²⁸. These findings suggest a critical need for provision of information on obstetric complications especially those that may occur during and after birth with emphasis on those obstetric complications that require immediate treatment. The TDHS 2004 show that only 47.3 of pregnant women received antenatal care were counseled on pregnancy danger signs¹⁵. A study done 2004 in four of eight government dispensaries in

Mtwara Urban district to assess the time health worker spend on providing ANC services, showed that the average time used for a first ANC visit was 12:20 minutes while for revisit they used 6:30 Minutes. Specific individual counseling was performed only in 30% of first visit ANC clients. The counseling took on average 1:30 minutes. For revisit specific counseling and preparation of individual birth plan did not take place at all during the period of the study²⁹.

A study done in Kenya 2004 to assess acceptability and sustainability of the WHO focused antenatal care package showed that over 75% of clients received partial information on birth preparation and potential complications of pregnancy. The provider consistently provided selective information, thus undermining the comprehensiveness of focused ANC. The frequency in which clients received birth plans in revisits was not high (<50%) and in most cases they were only advised to use skilled health workers during delivery. Among studied women 53% were asked about their financial arrangements regarding basic expenses and additional funds if need arise¹³.

3.0 STATEMENT OF THE PROBLEM

In Tanzania attendance at antenatal clinics is high with about 94% of all pregnant women making at least one visit¹⁵. However the quality of it has always been poor^{18, 19, 20}. Lack of essential services such as syphilis screening, testing for haemoglobin, blood pressure measurement, privacy and skilled service providers at clinics and at delivery is still a challenge to the ministry of health⁷. Six years ago focused antenatal care was introduced in Tanzania. Its introduction allowed for retraining of antenatal care providers in order to provide quality goal oriented visits. There is a specific output stipulated for each visit. More emphasis is put on recognition of pregnancy danger signs and development of individual birth plan. The impact of this change on the antenatal care provided has not been assessed.

The clinical observation does not suggest that there is improvement of antenatal care services. Very often women are seen at delivery with no investigation done during antenatal period and no appropriate action taken to women who encountered problems during antenatal visits. If the care is of poor quality, with reduced frequency of visits, there could be a danger of the system being operational with deleterious effects for the pregnant woman.

4.0 RATIONALE OF THE STUDY

The study aims at looking to what extent are the goals of focused antenatal care being met, six years after its introduction. It is time to assess if quality of antenatal care has improved, and to assess if in the current system being practiced, the specific outputs expectations of each visit are being achieved. This may aid in formulating recommendations to improve the care for pregnant women.

Research question

To what extent are the goals of focused antenatal care being met?

5.0 OBJECTIVES

5.1 Broad objective

To assess the practice of focused antenatal care provided to women delivering at Amana hospital.

5.2 Specific objectives

1. To determine the proportion of women in the study population who had been tested for HIV, syphilis and haemoglobin during antenatal visits.
2. To determine the proportion of pregnant women who had measurements for blood pressure, weight and fundal height during antenatal visits.
3. To determine the proportion of women in the study population who received appropriate prophylactic or therapeutic interventions for anaemia, HIV, syphilis and intermittent presumptive treatment for malaria.
4. To determine the proportion of pregnant women who were counseled on pregnancy danger signs and individual birth preparedness as well as their recall.

6.0 METHODOLOGY

6.1 Study area

The study was conducted at Amana hospital in Ilala Municipality Dar es Salaam. Ilala Municipal council is one of three local Government Authorities in Dar es Salaam. It has estimated population of 840,224 as projected from 2002 census with an annual increase rate of 4.6%. Ilala Municipality is bordered by Indian Ocean to the East, Coast Region to the West, Kinondoni Municipal to the North and Temeke Municipality to the South. In Ilala district both public and private health facilities provide antenatal care services. Public facilities provide free services while in private facilities clients pay for the services. Ilala district was randomly selected by ballot method among three districts in Dar es Salaam region all having the similar life standard and economic status, therefore women delivering at Amana will reflect pregnant mothers for Dar es Salaam as a whole. Amana hospital is a secondary level of health provision. According to 2006 hospital annual report average hospital delivery per day is 59. Because there is no restriction for admission to hospital majority of the pregnant women delivering at Amana hospital are self referral, and receive their antenatal care services from primary health facilities.

6.2 Study design.

Descriptive cross-sectional study

6.3 Study population

Women who received antenatal care at primary health facilities were recruited

immediately after delivery. The study was done after delivery in order to study all antenatal care services received throughout the antenatal period.

In Dar es Salaam region about 90% of pregnant women deliver at hospital ¹⁴.

6.4 Sample Size

$$n = \frac{Nz^2pq}{d^2(N-1) + z^2pq}$$

$$d^2(N-1) + z^2pq$$

n= Minimum required sample size

N= Total population of women who delivered at Amana hospital in two month (about 3200 women were estimated to deliver at Amana in two month)

p= Prevalence of the condition of interest in the population, taken to be percentage of women who received counseling on signs of pregnancy complications is 47.3% ¹⁵.

Counseling on signs of pregnancy complication was selected because it is the parameter with lowest coverage.

$$q = 1 - p$$

d= Maximum likely error (marginal of error) taken to be 4%

z= Is the percentage point of the normal distribution corresponding to the significance. For = 5% level of significance $z = 1.96$

The sample size was 505.

Sampling technique.

During the study period eligible mothers were selected by systematic sampling. Sampling interval $k = N/n = 3200/505 = 6$

Where k = Sampling interval

N = Number of women expected to deliver in two months.

n = Sample size.

The first case was selected randomly then after every five admission of eligible women the sixth one was selected after delivery till the sample size was reached.

Study duration

The study was conducted in a period of two months from 1st November to 31st December 2006.

6.5 Data collection:

Data were collected in two ways, reviews of ANC cards and women interviews after delivery using a pre tested questionnaire. One day training of three research assistants (nurse midwives) on data collection was conducted by principal investigator. Women were recruited after delivery and their ANC cards reviewed, followed by interviews. The principal investigator collected data together with research assistants during day time for one week in order to more orient them on data collection.

Review of ANC cards was done to see if basic physical examination had been done. In this study only weight of the mother, blood pressure and fundal height estimation were the physical examination recorded



Investigations such as HIV, syphilis tests and haemoglobin estimation done during antenatal visits were recorded from the antenatal cards. Those tested positive for HIV and syphilis were further interviewed to see whether appropriate interventions were given. Antenatal cards were used to check whether iron and folic acid as well as intermittent presumptive treatment for malaria were given. This was confirmed by interview as well. To assess the counseling on danger signs in pregnancy and individual birth plan, women were asked whether they were counseled. Those counseled were further requested to recall the pregnancy danger signs and necessary preparation for delivery. Using specific questionnaires recalled danger signs and birth plan were recorded

Definition of operational terms

1. **Focused antenatal care** – Is providing goal oriented care that is timely, friendly, simple, beneficial and safe to pregnant women. It includes client assessment, health education and provision of care to pregnant women. It is divided in two parts, basic component with four visits in low risk pregnancies and specialized care for high risk pregnancies or those who develop complication from low risk group.
2. **A pregnancy danger sign** is a symptom of any life threatening complication of pregnancy that requires immediate attention. The woman should know how to recognize these, what to do and where to get help, The signs include vaginal bleeding, severe headache or blurred vision, swollen hands and face, excessive tiredness and breathlessness that could indicate anaemia, fever, loss of fetal

movements, a sudden gush of water in vagina, foul smelling discharge during the postpartum period, fever and lower abdominal pain in the postpartum period.

3. **Individual birth plan includes:-** Preferred birth location, preferred birth attendants, obtaining funds for birth related expenses, identifying compatible donors, arranging transport fare in case of obstetric complication, arranging means of transport, collection of essential necessary items for safe delivery e.g. khanga and kitenge.

6.6 Exclusion criteria:

Pregnant women who received antenatal care services at, municipal hospitals and private hospitals were excluded. Hospitals provide specialized care.

6.7 Pre testing of tools

Data collection tools were pre-tested before the actual fieldwork to assess whether the questions were clear, understandable and relevant.

6.8 Data analysis:

Each questionnaire was assigned with an identification number. The data were coded and entered into the computer by using EPI INFO 6 programme. Data cleaning was done by running frequencies. Analysis was done using the same programme. Relevant frequencies and cross tabulation tables, were constructed. Chi square test was used for significance differences

Study limitations:

1. The study picked out only some components of antenatal care. Other activities like history taking were not assessed.
2. Women who were admitted for delivery and referred to tertiary level before delivery were not assessed.
3. Actual method of client's examinations e.g. fundal height was not assessed.

6.9 Ethical issue and ethical clearance

The ethical clearance was obtained from MUCHS research and publication committee. Permission for data collection was obtained from the Ilala Municipal council officer and the Amana hospital doctor in charge. The aim of the study was explained to the participant whose informed consent was sought. Only women who consented to the study were included. For women who were positive to syphilis and were not treated during antenatal, they were treated together with their baby and partner tracing and treatment was done. HIV positive women who were not provided ARV during ANC were given prophylaxis ARV during labour together with their baby after delivery. HIV positive women were further referred to HIV clinic for CD4 count and treatment.

7.0 RESULT.

During the study period there were 3354 deliveries and among them 510 women were recruited for the study. Their age ranged from 12 years to 47 years with a median age of 25 years, mean parity was 2 and average number of antenatal visits was 3

Table1. Social demographic characteristics of the study population (N=510)

Variable	n	%
Age group		
< 20 yrs	95	18.6
20-35 yrs	379	74.3
> 35 yrs	36	7.1
Level of education		
No formal education	47	9.2
Primary school	395	77.5
Secondary school	64	12.5
Post secondary	4	0.8
Occupation		
Housewife	418	82.0
Peasant	11	2.2
Petty trader	45	8.8
Employed	26	5.1
Student	8	1.6
House girl	2	0.4
Marital status		
Single	100	19.6
Married	395	77.5
Divorced	2	0.4
Cohabiting	13	2.5
Parity		
1	211	41.4
2-4	256	50.2
5+	43	8.4
Gestation age at booking(weeks)		
≤ 13	46	9.0
14 - 19	145	28.4
20 -27	298	58.4
≥ 28	21	4.1
Number of visits		
1	23	4.5
2	112	22
3	169	33.1
4	122	23.9
5+	84	16.5

Most women in study population were in the age group of 20 – 35, 379(74.3%). About 77% of study population had primary school education. Majority of the women 418(82.0%) were house wives. About 298(58.4%) of the women made their first visit in the second trimester between 20 – 27 gestation weeks. Very few 46(9.0%) booked in the first trimester as recommended by WHO. Mean gestation age at booking was 20 weeks. Only about 24 of women made at least four visits and the mean number of visits was three.

Table2. The proportion of women who were screened for HIV, Syphilis and received treatment.

Tests done	Screened	Tested positive	Prophylactics for PMTCT & Treatment for syphilis
	N=510		N=25
HIV	332 (65.1%)	25 (7.5%)	16 (64.0%)
	N=510		N=9
Syphilis	425 (83.3%)	9 (2.1%)	6 (66.7%)

Of those who tested positive only 16(64%) received antiretroviral drug for reduction of vertical transmission of HIV. Among women who tested positive for syphilis only 6 (66.7%) were treated.

Table3. The proportion of women who had measurement for blood pressure, weight, fundal height, haemoglobin, as well as recipient of haematenics during antenatal visits.

Variables	N=510	%
Blood pressure		
Each visit	332	65.1
Some visit	161	31.6
Not done at all	17	3.3
Weight		
Each visit	305	59.8
Some visit	135	26.5
Not done in all	70	13.7
Fundal height		
Each visit	495	97.1
Some visit	12	2.3
Not done all	3	0.6
Haemoglobin estimation.		
Each visit	126	24.7
Some visit	319	62.5
Not done in all visit	65	12.7
Received haematenics		
Each visit	182	35.8
Some visit	227	44.5
Not given in all	101	19.9

Blood pressure was measured in each visit to 332(65%) women. Body weight was measured in each visit to 305(59.8%) women. The overall haemoglobin check up was

very poor as 74% had either checked in some visit made or not checked at all. About 44.5% of women received haematenics in some visit and 19.9% did not receive haematenics in all visits.

Table4. Proportion of women given recommended malaria prophylaxis (IPT).

Gestation age	IPT doses given			TOTAL
	None	One	Two	
At booking(wks)				
-12	6(7.9%)	17(7.9%)	20(9.1%)	43
13-26	61(80.3%)	165(77.1%)	188(85.5%)	414
27+	9(11.8%)	32(15.0%)	12(5.4%)	53
TOTAL	76(14.9%)	214(42.0%)	220(43.1%)	510

Chi square = 10.74, df=4 p = 0.03.

About 57% of the women had either incomplete malaria prophylaxis or were not given at all. The difference of provision of IPT according to gestation age at booking was significant.

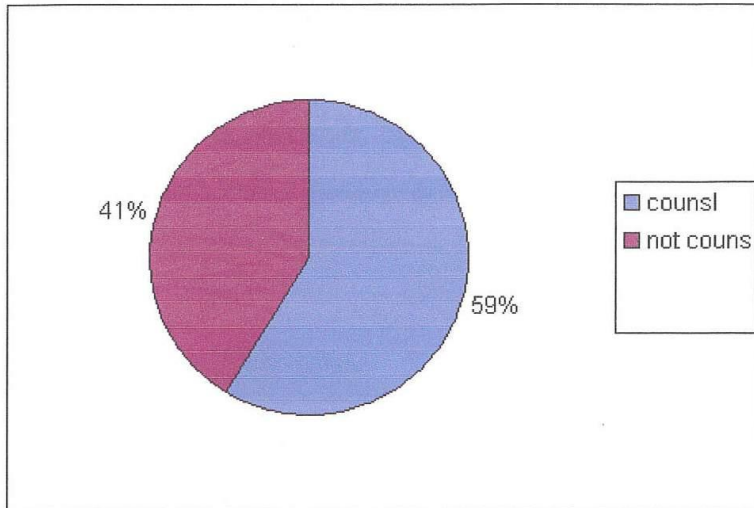


Figure I. Proportion of women counseled at least once on pregnancy danger signs.

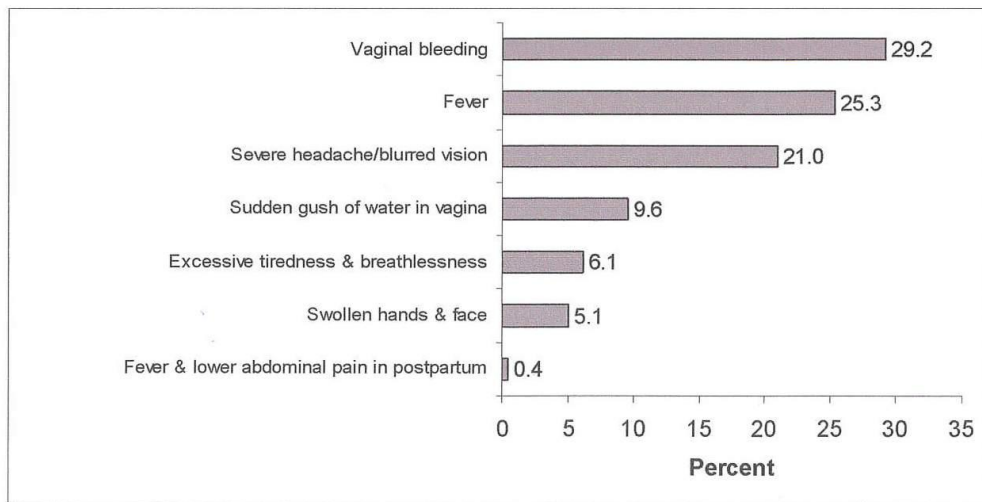


Figure2. Proportion of counseled women who recalled on pregnancy danger signs.

Generally recalling of pregnancy danger signs was very poor. About 149(29.2%) recalled vaginal bleeding as a danger sign. Least recalled pregnancy danger sign was fever and lower abdominal pain during postpartum, 2(0.4%). Some danger sign were not counseled at all such as foul smelling vaginal discharge during postpartum.

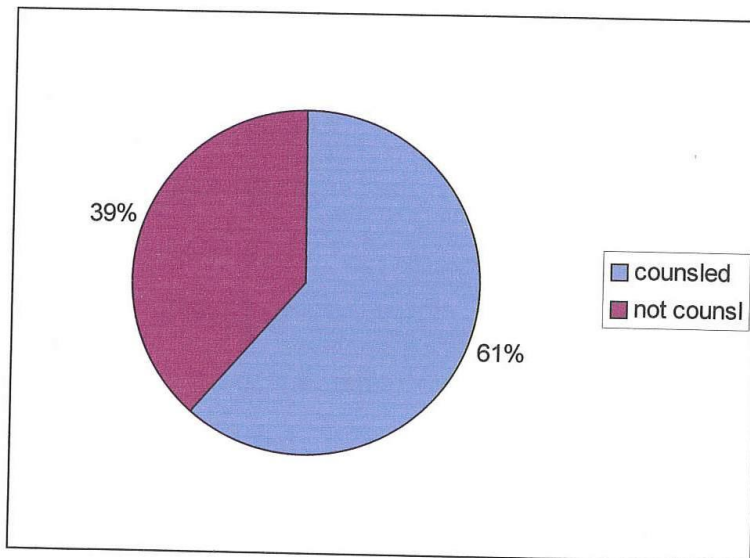


Figure 3. Proportion of women counseled at least once on individual birth plan.

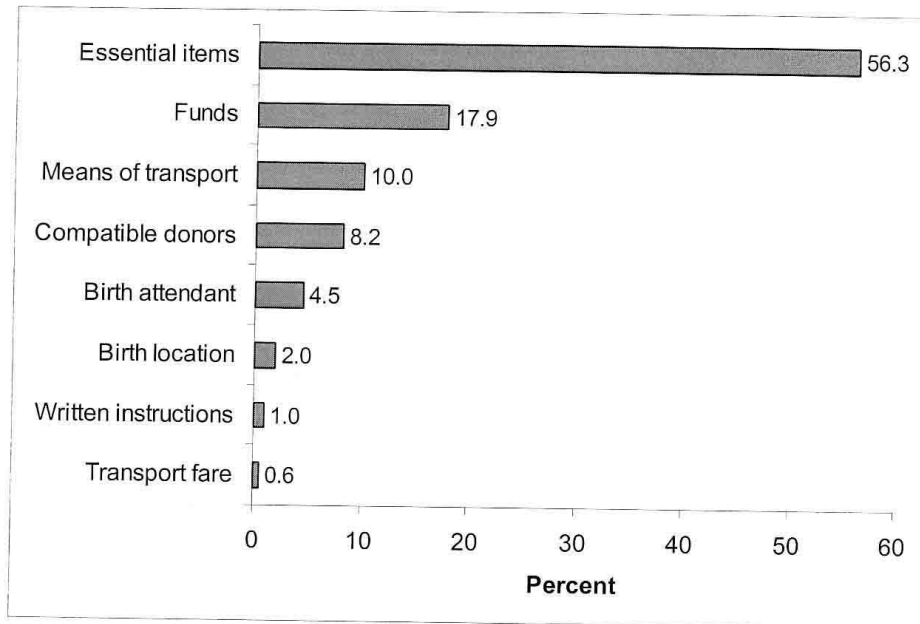


Figure 4. Proportion of counseled women recalled necessary preparation for emergency and birth.

Recalling for necessary preparation needed in case of emergency and individual birth plan was also very poor except for collection of essential items needed during delivery 287(56.3%). The least recalled birth preparation was arranging transport fare in case of emergency. Only 1% of the study population was given written instruction of the advice given to aid verbal counsel done on pregnancy danger signs, emergency readiness and individual birth plan.

8.0 DISCUSSION

The current study aimed at describing antenatal care services received at primary health facilities also termed as focused antenatal care. This was introduced in Tanzania six years ago, and it was time to assess if our current practices are in accordance to requirements of focused antenatal care.

The social demographic characteristic of the study population is that 82% are house wife, 77.5% had primary education. This reflects that most women attending at public clinic in Dar es Salaam are from low social economic status. Generally women attending antenatal care at public centers receive services free of charge and most of them are from low social economic class. In low income countries where public health services are poor, women with higher level of education and economic class are more likely to seek antenatal care from private sources³⁰.

In the current study very few women (9.0%) booked in the first trimester as recommended by WHO. Early booking helps to establish the correct gestational age, enables problems to be identified as early as possible, and enables women to get the information they need during pregnancy. Late booking may hinder these women from full benefits of antenatal care preventive strategies. As it was shown in this study late booking was associated with incomplete IPT. Late booking could be due to poor knowledge by clients of importance of early booking or long standing culture of only booking when the pregnancy is visible.

Only about 24% of study population had the minimum four visits as recommended by WHO. The number of pregnant mother making four or more antenatal care visits have been progressively declining from 70% according to 1999 TRCHS, 62% in TDHS 2004¹⁴ and about 24% in the current study. This could be due to impact of introduction of focused antenatal care which recommends reduction of number of visit to four visits for pregnant women with no complication.

Screening against syphilis among study population was found to be high (83.3%). The observed prevalence was 2.1%. Even with this low prevalence, study in Mwanza Tanzania showed that screening is still cost effective²⁷. However among nine women who tested positive only six received treatment. Syphilis screening is only beneficial to pregnant women if it is accompanied with treatment and partner tracing for those who test positive. Some of those tested positive were not given treatment may be because of unavailability of drugs or low knowledge of health provider on treatment to be given. Screening for HIV was not as high as for syphilis. The HIV prevalence among women who tested was found to be 7.5% similar to another study done in Tanzania³². Despite counseling and testing offered during antenatal clinic visits, 36% of those who tested positive were not given ARV drug for reduction of mother to child transmission. Poor provision could be due to drug unavailability, denial of results or because of poor counseling. Those who did not test for HIV and those tested positive but were not given ARV were counseled, tested and provided with ARV accordingly during labour and delivery. This shows the failure in full utilization of antenatal HIV screening programs for

prevention of vertical transmission. Without intervention mother to child transmission is about 40%⁷. Antenatal care play an important role in prevention of vertical transmission through counseling and testing for HIV, use of antiretroviral drug, advice on safe sex, discussions on infant feeding options for HIV positive mothers. Antiretroviral drugs reduces viral load and are thus associated with reduced HIV transmission.

Haemoglobin estimation was found to be low with only 24.7% of women tested in each visit. Some women were not checked for haemoglobin at all throughout antenatal period. Routine haemoglobin estimation helps in early diagnosis of anaemia, assessing whether referral is necessary fore more detailed investigation and treatment. It also helps in monitoring treatment response. Because prevalence of anaemia in Tanzania is high¹⁸, Ministry of health recommends Haemoglobin check up in each visit. The reason for low haemoglobin check up was not assessed but other studies done in rural health clinics in Tanzania showed that half of them had no instruments to measure haemoglobin¹⁹. Concurrently with poor haemoglobin checkup, provision of prophylaxis iron and folate was also poor with only 35.8% of the study population given prophylaxis in each visit and 20% of the women not given at all visits. Reason for low provision of haematenics may be due to unavailability of drug at the clinic as was shown in study done in Kenya¹³. Provision of haematenics has been shown to be one of an effective way of reducing anaemia in pregnancy. A study conducted in Temeke district Dar es Salaam Tanzania showed that antenatal interventions overall reduced the prevalence of anaemia from 60% to 47%. There was 57% reduction of proportion of pregnant women with severe anaemia²⁰.

With poor haemoglobin checkup and provision of iron and folate we see the failure of the government to address the issue of anaemia in pregnancy which is among the leading causes of maternal mortality in Tanzania. This is cheap and can easily be addressed at low cost.

Measurements of blood pressure, weight and fundal height were generally good. Fundal height and weight measurement is necessary for monitoring fetal growth. Although WHO dropped off weight measurement during the antenatal period ³¹, Ministry of Health of Tanzania still find it as important parameter to be monitored during antenatal visits. Blood pressure measurements were also better than the findings in Rufiji district Southern part of Tanzania in which one third of pregnant women, their blood pressure were not measured ¹⁸. The major aim of routine regular blood pressure checkup is early diagnosis of hypertension in pregnancy, its complications, early treatment and plan for delivery. But still there were about 35% of women who had blood pressure measurements in some visits or not checked at all visits. Since blood pressure can change at any time then it is obvious that even those measured in some visits were at increased risk of having undiagnosed hypertension and bad morbidity and mortality associated with it. A study conducted in Nigeria showed that more than two thirds of pregnant women received antenatal care without blood pressure surveillance ¹⁸. The above studies were done before the introduction of focused antenatal care.

The recommended two dose of SP/IPT were given to 43.1% of the study population and about 14.9% did not receive any dose of IPT. Although malaria accounts for over 30% of national disease burden and, 20% of maternal death in Tanzania are due to malaria ⁷, the provision of intermittent presumptive treatment for malaria has been low. In the current study late booking had significant association with incomplete IPT use. This is the failure of health system to ensure that established guidelines are followed. IPT has proven to reduce morbidity and mortality due to malaria to pregnant women and their fetus ²¹. A study done Kibaha Tanzania showed that use of both IPT and ITNs was associated with reduced risk of severe anaemia compared to women who used neither of interventions ²². Study done in Malawi showed similar result in which only 36.8% received the recommended two dose regime of SP/IPT and main cause of incomplete IPT was late booking ²³.

Generally counseling on pregnancy danger signs was very poor. Among the study population about 60% did not recall even one danger sign. This was also reflected by poor recalling observed in this study. The most frequently mentioned danger sign was vaginal bleeding (29.2%). Some of the danger sign were not mentioned at all such as foul smelling vaginal discharge during puerperium. Poor recalling may reflect that the counseling was either not given, inadequate or it was just giving information instead of counseling. It could also be due to low knowledge of health provider on pregnancy danger signs or due to the low education level of the study population leading to low recall. Counseling on pregnancy danger signs and development of individual birth plan is supposed to be

initiated in the first visit and revised/re-enforced during revisits. In this study the description of the actual process by which women were counseled on danger signs was not done. In a study done in Kenya in which the health provider did not inquire at all into the danger signs in pregnancy for 60% of the client in first, second and third visits. In Kenya the provider consistently provided selective information thus undermining the comprehensiveness of focused antenatal care²⁰. In the study done in Ghana the proportion of women who received counseling on danger signs during pregnancy was far less than half during all visits. Although certain obstetric emergency can not be predicted through antenatal screening, women can at least be educated to recognize symptoms leading to potentially serious conditions and take immediate action.

In birth preparedness/ birth planning, 61% of study populations were counseled on at least one of the required birth plan. But with exceptional of collection of essential items needed during delivery such as khanga which was recalled by 56.3% of the study population, other birth plan preparation were recalled in less than 20% of the study population. Very important birth preparation like arranging means of transport, birth location and arranging transport fare in case of emergency were almost not recalled. Majority of maternal mortality occurs during time of delivery. Each pregnant woman should be assisted by health provider to prepare individual birth plan and prepare for emergency.

WHO recommend that simple written instructions should accompany all verbal advice since even for illiterate woman family members or neighbors can often read for them. The

poor counseling on pregnancy danger signs and individual birth plan correlate with study done in Mtwara Southern region of Tanzania to assess the time health worker spend on providing antenatal care services. They found that average time used for counseling in first visit was 1:30 minutes while during revisit specific counseling and preparation of individual birth plan did not take place at all²⁹.

The counseling on what to do if pregnancy exceeds expected date of delivery was almost not done. Even the few who were counseled 20(8.0%) were given incomplete information. They were only told to wait till labour start without considering gestation age at which it will commence. The counseling was poor possibly because health providers were not aware about it. The ministry of health does not say anything about advice to be given during antenatal visits on timing for delivery. This may cause some women to go beyond term and encounter complication associated with post term.

9.0 CONCLUSION

The study showed that there was a deficiency in the counseling on pregnancy danger signs and individual birth preparations as reflected by women's ability to recall them. Counseling on pregnancy danger signs and individual birth preparation are major components of focused antenatal care, and they are associated with reduced first level of delay. There were deficiencies in antenatal screening and provisional of beneficial therapeutic interventions. The finding indicates that the full potential of focused antenatal care is not being realized.

10.0 Recommendations

1. Increase screening for conditions likely to have adverse effect to index pregnancy. This will help to know whether to put the woman to basic component of antenatal care or to refer for specialized care. It also helps in provision of therapeutic interventions.
2. With reduced number of visits we should increase awareness on pregnancy danger signs and individual birth preparations to pregnant and community in general. This is one of the major strategies to improve maternal health and increase proportion of skilled deliveries.
3. Steps should be taken to close the gaps identified in the quality of care provided in focused antenatal care.

11.0 REFERENCE

1. Bull World Health Organ, 2003; vol. 81, no.2, ISSN 0042-9686.
2. Mullany BC, Becker S, Hindin M. The impact of including husbands in antenatal health education services on maternal health practices in urban Nepal: results from a randomized controlled trial. *Health Educ Res* 2007; 22:166-76.
3. WHO, UNICEF. Antenatal Care in Developing Countries; Promises, achievements and missed opportunities. An Analysis of trends, level and differentials, 1990-2001.
4. Antenatal screening for fetopelvic dystocias. A cost-effectiveness approach to the choice of simple indicators for use by auxiliary personnel. The Kasongo Project Team. *J Trop Med Hyg* 1984, 87:173-83
5. WHO, UNICEF. Antenatal Care in Developing Countries; Promises, achievements and missed opportunities. An Analysis of trends, level and differentials, 1990-2001.
6. United Republic of Tanzania Ministry of Health-Reproductive and Child Health Strategy 2005-2010
7. Tanzania Ministry of Health/RCHS: Focused antenatal care, malaria and syphilis during pregnancy: Orientation Package for Service Providers. October 2004.
8. WHO; Antenatal Care Randomized Trial: Manual for the Implementation of the New Model. Department of Reproductive Health and Research, WHO, Geneva 2002.
9. Baldo MH: The antenatal care debate. *Eastern Mediterranean Health Journal* 2001 Nov; 7:1046-55.
10. Carroli G, Villar J, Piacqio G, Khan-Neelofur D, Gulmezoqlu M, Muqford M, et al; WHO Antenatal care trial Research Group. WHO systematic review of randomised

- controlled trials of routine antenatal care. *Lancet* 2001 May 19; 357:1565-70.
11. Munjanja, S. P. et al. Randomised controlled trial of a reduced-visits programme of antenatal care in Harare, Zimbabwe. *Lancet* August 1996; 348:364–369.
 12. Nyarko P, Birungi H, Klemesu MA, Arhinful D, Deganus S, Agyarko H et al. Acceptability and feasibility of introducing the WHO focused antenatal care package in Ghana. *Frontiers in Reproductive Health Program, Population Council*, 2006.
 13. Birungi H & Onyango OW: Acceptability and sustainability of the WHO Focused antenatal care package in Kenya .June 2006. *Frontier in Reproductive Health Program, Population Council, Institute on African Studies, University of Nairobi* 2006.
 14. Chege J, Askew I, Mosery N, Nxumalo MN, Kunene B, Beksinska M, Feasibility of introducing a comprehensive integrated package of antenatal care services in rural public clinics in South Africa, *Frontiers in Reproductive Health Program, Population Council, Johannesburg, South Africa*. 2005.
 15. Boller C, Wyss K, Mtasiwa D, Tanners M; Quality and comparison of antenatal care in public and private providers in the United Republic of Tanzania. *Bull World Health Organ*. 2003; 81:116-22.
 16. Tanzania/Bereau of Statistics. *Demographic and health survey 2004*.
 17. Sagay AS, Ekwepu C, Kabiru M, Daru PC, Aoslani A. Auditing of Antenatal services in primary health centres in Jos Nigeria. *Trop J Obstet and Gynaecol* 2005; 22:2.
 18. Urassa DP, Carlstedt A, Nystrom L, Msamanga GI, Lindmark G. Management of hypertension in pregnancy as quality indicator of antenatal care in rural Tanzania. *Afr J Reprod Health* 2003;7:69-76.

19. Urassa DP, Carlstedt A, Nystrom L, Massawe SN & Landmark G; Quality assessment of the antenatal program for anaemia in rural Tanzania, *Intl J Qual Health Care*.2002; 14:441-8.
20. Masawe SN, Urassa EN, Nystrom L, Effectiveness of primary level antenatal care in decreasing anaemia at term in Tanzania. *Acta Obstet Gynecol Scand* 1999;78:573-9.
21. Challis K, Osman NB, Cotiro M, Nordahl G, Dgedge M, Bergstrom S. Impact of a double dose of sulphadoxine-pyrimethamine to reduce prevalence of pregnancy malaria in southern Mozambique. *Trop Med Int Health* 2004; 9: 1066-73.
22. Nganda RY, Drakeley C, Reyburn H, Marchant T: Knowledge of malaria influences the use of insecticide treated nets but not intermittent presumptive treatment by pregnant women in Tanzania. *Malar J*. 2004; 3: 42.
23. Holtz TH, Kachur SP, Roberts JM, Marum LH, Mkandala C, Clizan N, et al. Use of antenatal care services and intermittent preventive treatment for malaria among pregnant women in Blantyre District, Malawi. *Trop Med Int Health* 2004.; 9:77-82
24. Kilewo C, Massawe A, Lyamuya E, Semali I, Kalokola F, Urassa E, et al. HIV counseling and testing of pregnant women in sub-Saharan Africa: experiences from a study on prevention of mother-to-child HIV-1 transmission in Dar es Salaam, Tanzania. *J Acquir Immune Defic Syndr* 2001; 28(5): 458-62.
25. NACP Surveillance Report No.17, 2002
26. Romoren M, Rahman M; Syphilis screening in antenatal care: a cross sectional study from Botswana. *BMC Int Health Rights*.2006; 6:8

27. Terris-Prestholt F, Watson-Jones D, Mugeye K, Kumaranayake L, Ndeki L, Weiss H et al: Is antenatal syphilis screening still cost effective in Sub-Saharan Africa: Sex Transm Infect 2003; 79: 375-81.
28. Kumbani LC, Mchernerney P: Primigravidae's knowledge about obstetric complications in an urban health centre in Malawi. Curations. 2006; 29:41-9.
29. Von Both C, Flebetaa S, Makuwani A, Mpembeni R, Jahn A: How much time do health services spend on antenatal care? Implication for introduction of the focused antenatal care model in Tanzania: BMC Pregnancy Childbirth. 2006; 6:22.
30. Manandhar DS, Osrin D, Shrestha BP, Mesko N, Morrison J, Tumbahangphe KM et al. Effect of a participatory intervention with women's groups on birth outcome in Nepal. Cluster randomized trial. Lancet, 2004; 364: 970-979.
31. WHO. ANTENATAL CARE: Report of a Technical Working Group Geneva, 31 October -4 November 1994.
32. Swai RO, Somi G GR, Matee MI, Kilewo J, Lyamuya EF, Kwesigabo G et al. Surveillance of HIV and syphilis infection among antenatal clinic in Tanzania 2003/2004. BMC Public Health 2006; 6:9