

Maternal Mortality in the Gambia: Contributing factors and what can be done to reduce them.



Thesis submitted by **Mamady Cham**
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Main Supervisor:
Dr. Johanne Sundby

Co-supervisors:
Professor Benedicte Ingstad
Dr. Gijs Walraven



**Department of General Practice and Community Medicine
Faculty of Medicine, University of Oslo NORWAY**

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TABLE OF CONTENTS

ABSTRACT.....	3
ABBREVIATIONS.....	5
DEDICATION.....	6
ACKNOWLEDGEMENT.....	7
CHAPTER 1: INTRODUCTION.....	8
1.1. INTRODUCTION.....	8
1.2. PROFILE OF THE GAMBIA.....	9
1.2.1. Geography.....	9
1.2.2. Population and Demographic Characteristics.....	9
1.2.3. Economy.....	11
1.2.4. Health Services.....	11
1.2.4.1. Organization and Administration.....	11
1.2.4.2. Health Human Resources.....	13
1.2.4.3. Maternal Health Care Services.....	14
1.2.4.4. User Fees.....	15
1.2.4.5. Referral System.....	16
1.2.4.6. Emergency Obstetric Care Services.....	16
CHAPTER 2: BACKGROUND.....	18
2.1. EPIDEMIOLOGY AND BURDEN.....	18
2.2. DEFINITION, CAUSES AND MEASURES OF MATERNAL MORTALITY.....	19
2.3. IMPACT OF A MATERNAL DEATH.....	20
2.4. SAFE MOTHERHOOD INITIATIVE.....	21
2.4.1. <i>Why the Slow Progress in the SMI</i>	22
2.4.1.1. Lack of Clear Strategic Focus.....	22
2.4.1.2. Misconceptions in Safe Motherhood.....	23
2.4.1.3. Prenatal Care and Risk Screening not Optional.....	23
2.4.1.4. The Traditional Birth Attendants' failed.....	24
2.4.1.5. Role of Family Planning.....	24
2.4.1.6. Lack Political Will and Commitment.....	25
2.4.1.7. Unsafe Abortions and Lack of Access to Safe Abortion Services.....	25
2.4.1.8. Lack of Availability of and Accessibility to Emergency Obstetric Care (EOC).....	26
2.4.1.9. Health Systems Failure.....	26
2.5. MEASURING MATERNAL MORTALITY.....	27
2.5.1. <i>Vital Registration</i>	27
2.5.2. <i>House-Hold Surveys</i>	28
2.5.3. <i>The Sisterhood Method</i>	28
2.5.4. <i>Reproductive Age Mortality Studies (RAMOS)</i>	28
2.6. MATERNAL MORTALITY IN THE GAMBIA.....	28
2.7. MATERNAL DEATH REVIEW/AUDIT.....	29
2.7.1. <i>Maternal Death Review in the Gambia</i>	31
2.8. RATIONALE FOR THE STUDY.....	31
CHAPTER 3: AIMS OF THE STUDY.....	33
3.1. PURPOSE OF THE STUDY.....	33
3.2. OBJECTIVES OF THE STUDY.....	33
3.3. STUDY AREA.....	33
3.3.1. <i>Population and Demographic Characteristics</i>	33
3.3.2. <i>River Crossings</i>	34
3.3.3. <i>Health Facilities</i>	34
3.3.4. <i>Obstetric Care Services in Central and Upper River Divisions</i>	34
3.3.5. <i>Selection of Study Area</i>	35
CHAPTER 4: METHODOLOGY.....	37
4.1. STUDY DESIGN.....	37
4.2. STUDY POPULATION.....	37
4.3. SAMPLE SIZE AND SELECTION.....	37
4.4. CASE IDENTIFICATION AND REPORTING.....	38

4.4.1. <i>Research Assistants</i>	39
4.5. DATA COLLECTION.....	39
4.5.1. <i>Approaches Used</i>	39
4.5.2. <i>Data Collection Tools</i>	40
4.5.2.1. <i>Verbal Autopsy Questionnaire</i>	40
4.5.2.2. <i>Classification Form</i>	41
4.5.3. <i>Data Collection Process</i>	41
4.5.4. <i>Classification by Reviewers</i>	44
4.6. DATA HANDLING.....	45
4.7. DATA ANALYSIS.....	45
4.8. PILOTING.....	46
4.9. ETHICAL CONSIDERATION.....	46
CHAPTER 5: SUMMARY OF MAIN RESULTS AND LESSONS LEARNT	48
5.1. PAPER I.....	48
5.2. PAPER II.....	49
5.3. LESSONS LEARNT.....	49
5.3.1. <i>Challenges in Maternal death auditing in The Gambia</i>	49
5.3.2. <i>Transfusion service in Bansang hospital</i>	53
CHAPTER 6: LIMITATIONS, VALIDITY AND RELIABILITY OF THE STUDY	56
6.1. LIMITATIONS.....	56
6.2. VALIDITY.....	56
6.3. RELIABILITY.....	57
CHAPTER 7: GENERAL CONCLUSION AND RECOMMENDATIONS.....	58
7.1. CONCLUSION.....	58
7.2. RECOMMENDATIONS.....	58
REFERENCES:.....	63
PAPER I AND PAPER II.....	69
PAPER I.....	70
PAPER II.....	98
APPENDICES.....	121
<i>Appendix 1: Verbal autopsy and contributing factors questionnaire of Maternal Deaths</i>	121
<i>Appendix 2: Classification form Verbal Autopsy –Maternal Deaths</i>	130
<i>Appendix 3: Antenatal care record</i>	132
<i>Appendix 4: Characteristics of the maternal deaths identified</i>	133
<i>Appendix 5: Delivery outcome</i>	135
<i>Appendix 6: Delays experienced among the 32 cases autopsied</i>	136
<i>Appendix 7: Case Studies</i>	138

ABSTRACT

Rationale for the Study: The Gambia is a small West African state of about 10,680 square kilometers with a population of just over 1.2 million inhabitants. It is a densely populated country with approximately 97 people per square kilometer. The Gambia depends largely on agriculture, trade and tourism for her economy. It is ranked among the poorest countries in the world with a Gross Domestic Product (GDP) of US \$340.

The Gambian government considers health as a key pillar to development and spending on the health sector has increased substantially over the years. The health share of the recurrent expenditure rose from 11.5% in 1998 to 13.6% in 2001 and in the same period public health expenditure as a proportion of GDP also rose from 1.7% to 3.3%. Access to health facilities is good with over 85% of the population living within 3 kilometers of a primary health care or outreach health post and 97% of the population within 5 kilometers.

Levels of maternal mortality in the Gambia are unacceptably high estimated at 1,050 per 100,000 live births. Medical causes of maternal deaths are well documented. However, little attention is paid on the contributing factors to maternal deaths in the country. In an effort to prevent maternal deaths in the Gambia it is necessary to look at contributing factors, also known as “avoidable factors”.

Objectives: To identify and describe the socio-cultural, economic and health service factors contributing to maternal deaths.

Materials and Methods: A retrospective population-based study combining both qualitative and quantitative methods was used. Verbal autopsy and confidential inquiry techniques were utilized reviewing all maternal death cases that occurred in Upper and Central River Divisions of the Gambia between January to September 2002. Each case was reviewed following the “road to maternal death” concept. In all the cases the health records were retrieved and reviewed. Verbal autopsy was also performed on the majority of maternal deaths identified. Three reviewers performed independent classification of cause of death and contributing factors to these deaths. A descriptive analysis of the data was made and was presented in two separate papers: quantitative and qualitative.

Results: A total of 42 maternal deaths were identified. Of these, 39 died at the referral hospital, one at a major health center, one on the road to the hospital and another one at home. In the same corresponding period a total of 876 live births were recorded at the hospital. This gives a hospital-based maternal mortality ratio of 4,452 per 100,000 live births. Direct obstetrical deaths accounted for 28 (67%) of the cases. Hemorrhage was the most prominent cause of death accounting for 10 of the

cases. Fourteen of the cases were indirect obstetric deaths. Anemia accounted for 12 out of those 14 deaths. All the cases identified contacted or were in contact with the health system when the obstetrical complication developed.

Substandard health care for obstetrical referrals, low quality primary health care, obstructions in receiving urgent care and delay in reaching a medical facility were identified as contributing factors to these deaths.

Verbal autopsy was performed in 32 cases. Applying the Three Delay Model in the analysis of the qualitative data generated from the key informants indicated a delayed decision to seek medical care in 7 of the cases. Twenty-seven in 32 of the women had delay in reaching an appropriate obstetric care facility once the decision to seek care was made. However, even after reaching an appropriate obstetric care facility, 31 out of the 32 cases had not received the obstetric care services they needed. Looking at the phases of delay cases, 7 of the 32 cases had all three delays; 21 in 32 experienced two phases of delays and 3 experienced only one type of delay. In only one case no delay could be associated with the death.

Conclusion: Health service factors were the most frequently identified contributing factors to maternal deaths in this study. It is therefore believed that improving the quality of and accessibility to emergency obstetrical care services will significantly contribute to the reduction of maternal deaths in the area.

Keywords: Maternal mortality, Three Delay Model, Emergency obstetric care, Verbal autopsy, contributing factors, Underlying causes, Road to death, The Gambia.

ABBREVIATIONS

CHN:	Community Health Nurse
CHW:	Community Health Worker
CRD:	Central River Division
DALY:	Disability Adjusted Life Years
DHT:	Divisional Health Team
DOSH:	Department of State for Health
EOC:	Emergency Obstetric Care
GDP:	Gross Domestic Product
GNP:	Gross National Product
MMR:	Maternal Mortality Ratio
NHPS:	National Household Poverty Survey
PHC:	Primary Health Care
SMI:	Safe Motherhood Initiative
TBA:	Traditional Birth Attendant
UNFPA:	United Nations Fund for Population Affairs
UNICEF:	United Nations Children's Fund
VA:	Verbal Autopsy
VAQ:	Verbal Autopsy Questionnaire
VHS:	Village Health Services
VHW:	Village Health Worker
WHO:	World Health Organization

Picture on cover page:

A Baby with a tumor causing an obstructed labor that led to the death of the mother. Tumor detected only after baby was extracted when mother had already died. Scanning could have been helpful in identifying the tumor.

DEDICATION

A particular medical condition kills and maims millions each year. It attacks the most vulnerable: women, the poor, the disadvantaged and those denied access to health care.

This is not a disease; it is the means by which the human race is propagated – pregnancy and child birth.

This study was exclusively on women who died as a result of pregnancy and child birth, and is hereby dedicated to all those women in the Gambia who gave their lives and health in undertaking this social and physiological duty – pregnancy and child birth.

They have gone but there are people trying to determine “*what have happened to them but should not have happened*” or “*what should have been done to save their lives but not done*”.

My heart goes to them, their families and loved ones!

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CHAPTER 1: INTRODUCTION

1.1. INTRODUCTION

Pregnancy and childbirth are natural processes in a woman's life. Motherhood should be a time of expectation and joy for a woman, her family and her community but they are by no means risk-free. For some women in certain parts of the globe particularly in developing countries the reality of motherhood is often grim. For those women, motherhood is often marred by unforeseen complications or even a loss. Some women loss the fetus even before being born or shortly after birth; whiles some loss both their live and that of the baby.

“A deep, dark continuous stream of mortality..... How long is this sacrifice to go on?” William Farr, the first register general of England and Wales, asked this question about maternal mortality in England in 1838 (1); 165 years now this question has still not been answered. Whiles the risk of dying in pregnancy, childbirth or shortly after delivery is now very rare in industrialized countries, in large parts of Africa, Asia and Latin America maternal mortality is still an everyday event. According to World Health Organization (WHO), United Nations Children's Funds (UNICEF) and United Nations Funds for Population Affairs (UNFPA) joint estimates, 515 000 women die each year of pregnancy related causes. Of these over half takes place in Africa, 42% in Asia, 4% in Latin America and Caribbean, and less than 1% in the more developed countries. In other words over 99% of maternal deaths take place in developing countries (2). This extraordinary difference in maternal mortality rates between the industrialized and the developing countries is the most striking fact in the world today about maternal health and furthermore, the difference in levels of maternal mortality between developed and developing countries show the greatest disparity than any other public health indicator monitored by WHO.

The call for the reduction of maternal mortality is an international development goal and has been adopted by the United Nations, the Organization of Economic Cooperation and Development, the International Monetary Fund and the World Bank (3) and endorsed by 149 heads of states at the Millennium Summit in 2000 (4). Furthermore, the reduction of maternal mortality was a common goal to several international conferences including, in particular, the Nairobi Safe Motherhood Conference in 1987, the World Summit for Children in 1990, the International Conference on Population and Development in 1994 and the Fourth World Conference on Women in 1995 (5).

1.2. PROFILE OF THE GAMBIA

1.2.1. Geography

The Gambia is a small country located on the West African coast of the Atlantic Ocean. It has a land area of about 10,680 square kilometers, and extends about 400 kilometers inland. The Gambia shares borders with the republic of Senegal on the north, south and east, and on the west with the Atlantic Ocean.

It has a river (the river Gambia) that divides the country into two parts, north and south bank, as it runs through the length of the country. The Gambia is further divided into five administrative divisions and municipalities namely: Western Division, Lower River Division, Central River Division, Upper River Division and North Bank Division; and Banjul City Council and Kanifing Municipal Council. Figure 1 shows the map of The Gambia.

The climate in the Gambia is tropical: characterized by a cooler dry season between November to May and a hot rainy season between June to October. However, rainfall dropped considerably (by 30%) over the past thirty years.

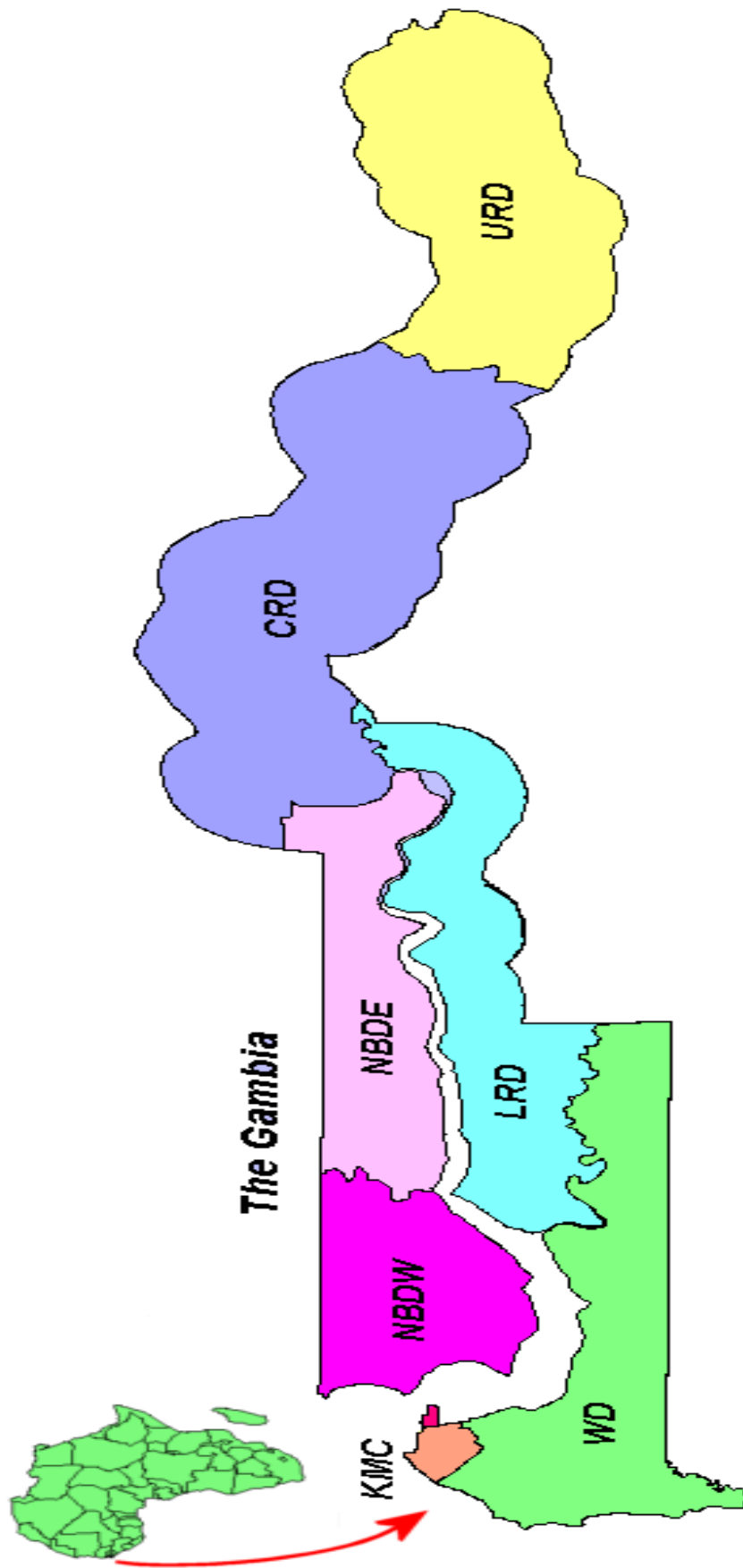
1.2.2. Population and Demographic Characteristics

The population of the Gambia according to the 1993 Population and Housing Census was 1,038,145; an increase of 51% from 1983 – 1993. However, recent population projections put the population at 1.4 million in 2001. It has a population density of 97 persons per square kilometer and 63% of the population is rural dwellers. Over the years rural-urban migration is steadily increasing. The annual population growth rate is 4.2% (2.9% natural increase and 1.3% net migrations) per annum (6). Due to its relative peace in a turbulent region it is witnessing high in migration (refugees and economic migrants).

The population of the Gambia is characterized by its youthful and feminine nature as 44% are below the age of 15 years and females comprises of 51% of the total population. Women of reproductive-age (15 – 49 years) represent 23.3% of the total population or 46.7% of the female population. Just over 9% of the population is above the age of 50 years (6, 7).

Life expectancy at birth pegged at 55 years; 57 and 54 years for females and males respectively. It has high fertility rates as Total Fertility Rate (TFR) estimated at 6. Contraceptive prevalence rate is 12%. Mean age at first birth estimated at 16.5 years nationally but lower in rural than urban women; also lower among women not schooled than their counterparts who have gone up to secondary school level. Marriage is a social norm and polygamy is widely practiced as 34.3% of males and 50.2% of females married are in a polygamous marriage. Crude birth and death rates estimated at 46.2 and 19.2 per 1,000 populations respectively. All these indicators have divisional variations.

Figure 1: Map of the Gambia



The majority of Gambians, 95%, are Muslims. There are seven different ethnic groups and the major ones are Mandinka, Fulla, Wollof, Jola and Sarahulle which accounts for 39.5%, 18.8%, 14.6%, 10.6% and 8.9% of the country's inhabitants respectively (6).

1.2.3. Economy

The Gambia with an annual population growth rate of 4.2% and a Gross National Product (GNP) per capita of US \$340 is regarded as one of the least developed countries in the world (6, 8). It has no important mineral or natural resources and has a limited agricultural base. It has a liberal market-based economy characterized by traditional subsistence agriculture, a historic reliance on peanuts or groundnuts for export earnings re-export trade and have a significant tourism industry. It is estimated that about 75% of the population depends on crops and livestock for its livelihood.

Agriculture, trade and tourism account for 23%, 16% and 6% of its Gross Domestic Product (GDP) respectively. Despite the annual increase in GDP, per capita GDP has been reducing largely because of its high population growth rate (8). The Gambia is a heavily indebted country; debt servicing alone accounted for 31.6% of its recurrent budget for the year 2003 (9).

According to the National Household Poverty Survey (NHPS) report on the poverty situation in the Gambia, 69% of the total population were classified as poor and of these 51% are extremely poor. Only 31% of the population classified as not poor (10).

The Government of the Gambia considers health as a key pillar of development. Over the years it has increased spending on health. The health share of government recurrent expenditure rose from 11.5% in 1998 to 13.6% in 2001 and in the same period public health expenditure as a proportion of GDP also rose steadily from 1.7% to 3.3% (11). A substantial proportion of annual development budget over the years was spent on the health sector. However, even though there has been substantial spending on the health sector there has never been a time so far when a budget specifically allocated for Maternal and Child health or the improvement of women's health issues. Currently the national Maternal and Child Health (MCH) program is mainly funded through donor funds mostly UNFPA.

1.2.4. Health Services

1.2.4.1. Organization and Administration

The Gambia adopted the Primary Health Care (PHC) strategy in the delivery of health services since its inception in 1979. Health services in the Gambia are organized into three-tier system comprising of primary, secondary and tertiary levels.

The primary level or locally called Village Health Services (VHS) is the first point of contact with the health system at community level. It provides mainly preventive care and treatment of minor ailments. A

network of village health posts are linked to a key village staffed with a Community Health Nurse (CHN). He/she is in most cases mobile and supervises health services and Community Health Workers (CHW) – Traditional Birth Attendants (TBA) and Village Health Workers (VHW) in a circuit.

The secondary level or basic health facilities include health facilities such as clinics, dispensaries, minor and major health centers. They are staffed with professional nurses and midwives, and other health professionals. In 1998 each health facility has at least one resident doctor. The services provided are preventive, curative and inpatient services. In this category the major health centers are the highest level as they are envisage to providing more advanced care and services particularly to manage obstetric emergencies or complications. They also serve as referral facility to the clinics, dispensaries and minor health centers nearby.

The tertiary level comprise of the hospitals which provide all services including specialist care and/or services. They also serve as referral facility to the secondary level facilities. Even though the hospitals are not of the same level (some are more advanced than the other in terms of services provided) they are all in the same category.

In the Gambia there are a total of 10 hospitals (3 public), 7 major health centers (6 public), 20 minor health centers (12 public), 39 dispensaries (16 public), and 18 other special health institutions all of which are privately or Non Government Organization (NGO) run. Distribution wise 29.7% of public facilities and 72.9% of private/NGO run facilities are located within the urban area, only two of the hospitals are in the rural Gambia (11). All private/NGO run hospitals are within the Greater Banjul Area specifically in the largest settlement in the urban area.

In a quest to ensure an effective and efficient management and functioning of the public health sector, The Gambia government through the Department of State for Health (DOSH) in 1993 divided the country into six health divisions (corresponding with the existing administrative divisions) called Divisional Health Teams (DHT) replacing the then existing three Regional Health Teams. These DHTs are responsible for the day to day administration, management and supervision of the secondary and primary level facilities in their respective health divisions. In the same period each public hospital has a management board with a semi-autonomous status in managing the affairs of the hospital. Table 1 shows the major reforms taken by the health ministry in recent period.

Table 1: Major reforms effected in the Department Of State for Health

Year	Reform	Rationale
1988	<ul style="list-style-type: none"> ▪ Introduction of User fees in public health sector. 	<ul style="list-style-type: none"> ▪ For cost recovery to compliment government's health financing efforts.
1993	<ul style="list-style-type: none"> ▪ Hospital management boards established in public hospitals, ▪ Six DHTs formed to replace the three Regional Health Teams ▪ Bamako Initiative (BI) a strategy meant to strengthen PHC in public health facilities. 	<ul style="list-style-type: none"> ▪ To improve management in health service delivery and administration for effectiveness and efficiency.
1994	<ul style="list-style-type: none"> ▪ First National Health Policy of the country formulated – "Improving Access and Quality 1994 – 2001". ▪ Departmentalization of the Directorate of Health services into three divisions: namely Family Health, Disease Control and Health Protection and Promotion. Each headed by an assistant director. 	<ul style="list-style-type: none"> ▪ To improve coordination in health service delivery; and to ensure equitable distribution of scare health resources.
1998	<ul style="list-style-type: none"> ▪ First National Health Action Plan developed (4 years after policy was formulated). 	<ul style="list-style-type: none"> ▪ To pave the way forward for the attainment of the objectives of the health policy.
2001	<ul style="list-style-type: none"> ▪ Second National Health Policy – "Changing for Good", 200 – 2005, launched. 	<ul style="list-style-type: none"> ▪ To address the growing health care needs of the population and regulate the unregulated health system.
2002	<ul style="list-style-type: none"> ▪ A second position of Deputy Permanent Secretary created and filled. 	<ul style="list-style-type: none"> ▪ To assist the permanent secretary of health in the monitoring of programs and projects within the health sector.

1.2.4.2. Health Human Resources

The national health human resource base of the Gambia is far from being satisfactory as generally the ratio between service-providers to the population continue to be unacceptably high. Rapid expansion of the health care delivery services (as a result of increased demand) coupled with the high attrition rate of health staff particularly nurses and midwives contributed to this undesirable scenario.

According to the Public Expenditure Review of 2001 (11), the ratio of doctors per population was 1:5679; and that of nurses and midwives per population was 1:1964 and 1:5614 respectively. The figures also indicate gross divisional variation as the situation is worse in the rural areas. To cite an example, of the 263 available midwives in the country, 58.4% are working within the urban or peri-urban area. Looking at the attrition rate, it is highest among the nursing cadre (nurses and midwives) as between 1997 – 2001, three year period; a decline of 16.5% in the number of nurses in general has been registered in the public sector. This had contributed to poor staffing pattern in public health facilities which also have some unprecedented effects such as the waiting time at public health facilities. The NHPS revealed that the average waiting time at public health facilities is estimated at 68 minutes much higher than in private or with even the traditional healers (12). Table 2 shows the basic health indicators of The Gambia.

Table 2: Health Indicators

Indicator	Measure
Maternal mortality Ratio (13)	1,050 per 100,000 LB
Antenatal Care Coverage (14)	96%
Skilled Birth Attendant (15)	44%
Contraceptive Prevalence Rate (16)	12% (all methods) 7% (modern methods)
HIV prevalence (11)	2.2% (among total population) 1.7% (among pregnant women)
Infant Mortality Rate (6)	92 per 1000 births
Under Five Mortality Rate (6)	137 per 1000 LB
Immunization Coverage (11)	68.6% (less than 1 year of age) 76% (up to 2 years of age)

1.2.4.3. Maternal Health Care Services

It was after the adoption of PHC in The Gambia that brought about the introduction of an organized maternal health care program in the country. The program included prenatal care, screening for high-risk pregnancies, a referral system for high-risk pregnancies and delivery complications; and identification and training of TBA in each PHC village (with at least 400 inhabitants). The aim of the program is to reduce the high levels of maternal and perinatal mortality and morbidity. Maternal health care and services are mainly provided by government health facilities at base (fixed) clinics and outreach (mobile) trekking clinics mainly by the secondary level health facilities. The main focus of these clinics is on screening for high-risk pregnancies, making appropriate referrals, and providing preventative care and treatment of minor ailments. Postpartum care services are also meant to be provided during postpartum visits. Table 3 shows the guidelines for maternity care in The Gambia.

Table 3: Maternal Health Care Guidelines

A. Antenatal Care		
Examinations to be Performed	First visit	Subsequent visits
Personal and obstetric history	Yes	
Health education	Yes	Yes
Delivery referral	Yes	Yes
Weight measurement	Yes	Yes
Height measurement	Yes	
Blood pressure	Yes	Yes
Check for oedema	Yes	Yes
Hemoglobin testing	Yes	If necessary
Abdominal palpation	Yes	Yes
Abdominal auscultation	Yes	Yes
Urine testing	Yes	If necessary
Tetanus toxoid immunization	According to schedule	
Syphilis screening	Yes	

B. Referral for Place of Delivery	
Pregnancy History	Pregnancy Examination
Age < 17 or > 35 years	Height < 148 cm or pelvic deformity
First pregnancy	Anemia (HB 8 g/dl or less)
Last delivery < 1 year or > 5 years	Albumin urea > ++ or glycosuria
Medical disorders: Tuberculosis, Cardiovascular disorders, Sickle cell	Multiple pregnancy
Previous caesarian section or assisted vaginal delivery	
Still births or repeated abortions	
Ante partum or post partum hemorrhage	

NB: if a woman meets 1 or more of these under B she is to be referred

1.2.4.4. User Fees

In 1988 user fees was introduced in the Gambia's public health sector and a fee is levied on all users of the health system except military officers and their families (wife or wives and children). All pregnant Gambian women pay a registration fee of five Dalasis (equivalent to US\$0.25 currently) to obtain a client held antenatal care record card. This card entitles the owner (pregnant woman) free consultation or medication throughout the pregnancy until six weeks after delivery for all conditions related to the pregnancy. However, it is not unusual for a patient to buy medication in a local drug store when not available in a public health facility. The card also entitles the woman free laboratory services during the stated period. However, a delivery fee is levied on all deliveries taking place in public health facilities. The fees are D12.50 for deliveries taking place at a minor health centre or dispensary and D25.00 for those at hospital or major health centre level but no charge on those deliveries conducted by a TBA in the community. An operation such as caesarean section has a fee of D50.00 attached. Weekly inpatient fee of D25.00 is charge on maternity cases admitted. Ultra-Sound Scanning (USS) service is charged

D50.00 by hospitals even though this is not among the scheduled fees issued by the DOSH. Non-Gambian women pay between 15 – 30 times higher than those of their Gambian counterparts (17). However, despite these scheduled fees widely circulated in all public health facilities in the country, practically it is not unusual for women to be over-charged or asked to pay for services which in theory are free. In Bansang Hospital for example, pregnant women are asked to pay for all laboratory services. Maternity cases who deliver in the hospital pay a combined admission fee of D50.00 and a delivery fee of D25.00 when they are suppose to pay for only the latter. They are also asked to pay for each laboratory test carried out while admitted in addition to the combined fees mentioned above. However, an investigation was carried out to verify what prevail in other public hospitals, Royal Victoria Hospital (main referral hospital in the capital city) and AFPRC Hospital. In these two hospitals pregnant women are not charged laboratory services. Maternity cases only pay a delivery fee of D25.00 when delivered in those hospitals. These “*illegal charges*” (over and unnecessary charges) may be a product of misinterpretation of the scheduled fees or a deliberate act to create unnecessary obstructions in getting care.

1.2.4.5. Referral System

In The Gambia, ideally patients should be referred from the primary to the secondary level; and then from the secondary to the tertiary level but in reality this is not what always happens. Each public health facility is provided with a vehicle serving as an ambulance (for the evacuation of patients from one facility to another) and trekking vehicle (use to transport nurses to carryout mobile MCH clinics) among other functions. The fueling and maintenance of these vehicles is the responsibility of the DOSH. All health emergencies, particularly obstetric emergencies, are to be provided ambulance services promptly when needed at no cost to the patient or her relatives. Practically, it is not unusual for the referral system to be shunted by the patients and even by the health system. It is also not uncommon for an obstetric emergency or any other case needing ambulance services to resort to using other means of transportation from one facility to another because the ambulance at the facility of contact is not available. This may be due to the ambulance is away on other errands, ran out of fuel; or has a mechanical breakdown. These are some of the practical issues faced by the referral system in the Gambia.

1.2.4.6. Emergency Obstetric Care Services

Obstetric emergencies are complications that affect women during pregnancy, labor or shortly after delivery and when a woman develops it (obstetric complication) she needs emergency obstetric care (EOC) for her problem to be adequately managed. It is an emergency because the care needed should

be provided adequately and promptly without delay. The United Nations guidelines (18) – developed jointly by WHO, UNICEF and UNFPA – listed the following conditions as obstetric emergencies: Hemorrhage (ante partum and postpartum), Prolonged or obstructed labor, Postpartum sepsis, Abortion complications, Pre-eclampsia or eclampsia and Ectopic pregnancy; Ruptured uterus. It has also classified EOC into two distinct groups: Basic and Comprehensive. Table 4 shows the signal functions of the UN guidelines on obstetric care.

Table 4: UN (UNICEF, WHO & UNFPA) Guidelines on Obstetric Care

SIGNAL FUNCTIONS USED TO IDENTIFY BASIC AND COMPREHENSIVE EOC
<p>Basic EOC Services</p> <ol style="list-style-type: none"> 1. Administer parenteral antibiotic 2. Administer parenteral oxytocic drugs 3. Administer parenteral anticonvulsants for pre-eclampsia and eclampsia 4. Perform manual removal of placenta 5. Perform removal of retained products (e.g. manual vacuum aspiration) 6. Perform assisted vaginal breech delivery <p>Comprehensive EOC Services</p> <p>All of those included in Basic EOC (1 – 6)</p> <ol style="list-style-type: none"> 7. Perform Caesarean section 8. Perform safe blood transfusion <p>NB:</p> <p><i>A Basic EOC facility is one that is performing all of functions 1 – 6</i></p> <p><i>A Comprehensive EOC facility is one that is performing all of functions 1 – 8</i></p>

In The Gambia according to these guidelines it is only the hospitals that qualified to be classified as facilities capable of providing Comprehensive EOC. None of the seven major health centers in the country have the capacity to providing Comprehensive EOC. Consequently women who develop obstetrical complication and needing Comprehensive EOC must be taken to a hospital.

CHAPTER 2: BACKGROUND

2.1. EPIDEMIOLOGY AND BURDEN

Every minute somewhere in the world at least one woman dies from complications of pregnancy and childbirth, and everyday at least 1,600 women die from the same mysterious circumstances, that is over half a million women at a minimum, dying every year (5). The majority of these deaths are avoidable. World wide there are 400 maternal deaths for every 100,000 live births. In least developed countries the figure is 1,000 for every 100,000 live births; in more developed countries there are 21 maternal deaths for every 100,000 live births (2). Evidence shows that 15% of all pregnant women will develop sudden serious complications and require life-saving access to quality obstetric services (18-21). Furthermore, 53% of women in developing countries have the assistance of a skilled attendant at birth and only 40% give birth in health institutions (15). It is also estimated that the majority of maternal deaths (61%) takes place during the postpartum period yet less than 30% of women in developing countries receive postpartum care (15). Strikingly, the levels of maternal mortality differ greatly among the major regions of the developing world. Africa has far more its fair share of maternal deaths as 11% of women globally live in Africa but an estimated 30% of maternal deaths take place there – 173% more than would be expected on the basis of population alone (22). The highest maternal mortality rates are found in Sub-Saharan Africa where in some countries more than 1,100 women die from every 100,000 live births. In Africa, according to WHO estimates, 42% of women have a skilled attendant during delivery but only 36% of the women actually gave birth in health institutions (15). In absolute terms, the largest number of maternal deaths is in Asia. However, African women of reproductive age have a much higher risk. Women's life-time risk of maternal death is over 150 times higher in least developed than in the more developed countries. The life-time risk for African women is 1 in 16 compared to 1 in 110, 1 in 2,000 and 1 in 3,500 for Asian, European and North American women respectively (2).

In addition to maternal mortality, there are almost 8 million early neonatal deaths and stillbirths each year (23). These deaths are largely the result of the same factors that causes the deaths and disability of mothers. According to World Bank report 1993, Investing in Health, deaths and disability related to maternal causes account for at least 18% of the burden of disease among women of reproductive age in developing countries (24). Furthermore, maternal conditions are responsible for 2.2% lost of Disability Adjusted Life Years (DALYs) globally. DALYs lost due to maternal conditions in developed countries in 1990 was 0.6%, 2.4% for developing countries but 3.2% in Sub Saharan Africa (25). The DALY concept is challenged for underestimating the burden of women's health problems (26). Morbidity rates are rare but for every woman who dies, an estimated one hundred women survive childbearing

but suffer from serious diseases, disability, or physical damage caused by pregnancy-related complications, which includes uterine prolapse, pelvic inflammatory disease, fistula, incontinence, infertility, and pain during sexual intercourse (20, 27).

2.2. DEFINITION, CAUSES AND MEASURES OF MATERNAL MORTALITY

According to the tenth revision of the International Classification of Diseases and Health Related conditions (28), a maternal death is defined as the death of a woman whiles 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. Medical causes of maternal deaths are sub-divided into two categories: direct and indirect obstetric deaths. Direct obstetric deaths are those arising from obstetric complications of pregnant state (pregnancy, labor and the post partum period), from any interventions, omissions, incorrect treatment, or from a chain of events resulting to any of the above. Indirect obstetric deaths are those resulting from previously existing disease or disease that developed during pregnancy and which was not due to direct obstetric causes, but was aggravated by physiological effects of pregnancy.

Medical causes of maternal death are remarkably similar in developed and developing countries, although the distribution of causes differs somewhat from region to region. Globally, around 80% of all maternal deaths are the direct result of complications arising during pregnancy, delivery or the puerperium. The single most common cause – accounting for a quarter of all maternal deaths – is severe bleeding. The other direct causes of maternal deaths are sepsis, eclampsia, obstructed labor and unsafe abortion complications accounting for 15%, 12%, 8% and 13% respectively whiles other direct causes account for 8% of the deaths. Indirect causes of death such as anemia, malaria, cardiovascular diseases, and diabetes and HIV/AIDS accounts for about 20% of global maternal deaths (5, 19, 20, 22, 29). This statistics indicates that globally the largest proportion of maternal deaths is due to hemorrhage.

Measures most commonly used in the measurement of maternal mortality are maternal mortality ratio, maternal mortality rates and life-time risk of maternal death (5, 19, 21). Maternal mortality ratio (MMR) is the number of maternal deaths per 100,000 live births. It is calculated as the number of maternal deaths during a given year per 100,000 live births in the same period. This measure indicates the risk of maternal deaths among pregnant women and recently pregnant women.

Maternal mortality rate is the number of maternal deaths per 100,000 women aged 15 – 49 per year. It is calculated as the number of maternal deaths in a given period per 100,000 women of reproductive

age (15 – 49 years). It measures both the obstetric risk and the frequency with which women are exposed to this risk. This statistic is influenced by a number of forces, including the risk associated with pregnancy (MMR) and the proportion of women of reproductive age who give birth in a year (fertility rate). Consequently, the maternal mortality rate can be lowered either by making childbirth safer or by reducing the fertility rate in a population. Proportionate maternal mortality is the number of maternal deaths as a proportion of all deaths among women of reproductive age. This figure represents how important maternal mortality is as a cause of death among women of reproductive age. Lifetime-risk is a measure that reflects the probability of maternal death faced by an average woman over her entire reproductive life-span. Influenced by the risk associated with pregnancy and by the number of times she becomes pregnant. Each time a woman becomes pregnant she runs the risk of maternal death again. Unlike infant mortality – each person runs the risk of infant death only once.

Low economic and social status of women and lack of access to and use of essential obstetric services are strong determinants of maternal mortality (19). Low social status of women limits their access to economic resources and basic education and thus their ability to make decisions related to their health and nutrition. Maternal mortality is a particularly sensitive indicator of inequality; WHO and UNICEF have called it a litmus test of the status of women, their access to health care and the adequacy of the health care system in responding adequately to their health care needs (5, 30, 31) Information about the levels and trends of maternal mortality is needed not only for what it tells us about the risk of pregnancy and childbirth but also for what it implies about women's health in general, their social and economic status. Thus maternal mortality is not merely a *“health disadvantage”* it is also a *“social disadvantage”*.

2.3. IMPACT OF A MATERNAL DEATH

One of the defects of modern society that is most damaging and impossible to justify or rationalize is the persisting death of women as a result of pregnancy and childbirth. The costs in human, social and economic terms are enormous. Pregnancy is not a disease but a means by which human race is propagated. The hazards of childbirth cannot be avoided by simply preventing pregnancy. Society depends on future generations and women should not be required to give their lives and health in undertaking this social and physiological duty. Safe motherhood is not only a health issue – it is also a moral issue.

Women are invaluable resource to their family, community and society. Women plant and harvest much of the food; they process and preserve it, women always cook the food, they carry the fuel, and in general caring for the children. They nurse those of the family (old or young) who need such care. They

make, in short, an indispensable contribution to the national, local and domestic economy, and they are the main providers of comfort and care to every family member.

The loss of a woman in pregnancy or childbirth has devastating or brutal effects on the family she leaves behind. When a woman dies in childbirth, the death sentence of the child she carries is almost certainly written. Often the children she leaves behind suffer the same fate, and the family stands a good chance of disintegration (32). The death of a mother does not only affect the fetus she carries but also other siblings. Studies have shown that the fetus with which she was pregnant in over 90% of cases either does not survive the mother's death or is dead within a year. A mother's death will have a profound effect on the chances of survival of the other surviving children (33). In a prospective survey to assess pregnancy outcomes conducted in the Gambia by *Greenwood*, has found that of all nine children born to mothers who died none reach the age of one year (34). This indicates that maternal death is thus, almost inevitably, "*a double tragedy*". A death of a mother means loss of income, often a significant proportion of total family revenue. Furthermore, her death rub off her family, community and nation the work she does in the care of children, the elderly and the sick, in food production and preparation, and other household chores.

2.4. SAFE MOTHERHOOD INITIATIVE

The Safe Motherhood Initiative (SMI) is a global initiative sponsored by a group of international agencies that includes UNICEF, UNFPA, the World Bank, WHO, International Planned Parenthood Federation and the Population Council. This group is called the Safe Motherhood Inter-Agency Group (IAG). The aim of the initiative was to draw attention to the dimensions on consequences of poor maternal health in developing countries, and to mobilize action to address the high rates of deaths and disability caused by the complications of pregnancy and childbirth. Safe Motherhood aims to ensure that all women receive the care they need to be safe and healthy throughout pregnancy and childbirth.

The four basic principles or pillars of safe motherhood are (20):

1. **Family planning:** to ensure that individuals and couples have the information and services to plan the timing, number and spacing of pregnancies;
2. **Prenatal care:** to prevent complications where possible and ensure that those of pregnancy are detected early and treated appropriately;
3. **Clean and safe delivery:** to ensure that all birth attendants have knowledge, skills and equipment to perform a clean and safe delivery and provide postpartum care to the mother and baby;
4. **Emergency obstetric care:** to ensure that essential care for high-risk pregnancies and those who develop complications is made available to all women who need it.

The tragedy of maternal deaths has multiple causes and must be confronted with a multiple strategy. These interventions stated above are needed to save and preserve the health of mothers and babies. They cannot be implemented in a vertical or in an uncoordinated fashion but must form part of a broad strategy to improve reproductive health through primary health care. Each of these pillars is equally important and a maternal health program lacking one of these would be as wobbly as a table with three legs. This implies that safe motherhood interventions should be applied holistically within a general health context that promotes equity in access to, and quality of, care. The “*Arch of safe motherhood*” is built with many stones, among them prenatal care, nutrition, education, transport, identification of mothers at high risk for complications of pregnancy, skilled attendants, and home birth kits. But the arch will fall down – meaning that women will die – without prompt, adequate treatment when they suffer life-threatening complications during pregnancy, delivery or in the puerperium (35).

2.4.1. Why the Slow Progress in the SMI

Over a decade ago i.e. before the Safe Motherhood Initiative conference, there was lack of knowledge on the levels and causes of maternal mortality, and also lack of agreement internationally, on which interventions were the most important and should be carried out first. Today, more than a decade after the conference, there is both more information on the levels and causes of maternal mortality and also there is greater consensus on what needs to be done. The medical community, the politicians and the international agencies all knew what interventions are required to prevent maternal mortality but yet still there is failure to achieve much progress. One wonders why there is slow progress despite the wealth of knowledge accumulated. Most of these deaths are amendable to health intervention of lowest technology, yet maternal mortality remains to be a source of human suffering and carnage. *Dr. Halfdan Mahler*, former Director General of WHO, puzzled by this state of affairs, in his opening speech at the SMI conference expressed that “*maternal mortality has been a neglected tragedy; and it has been neglected because those who suffer it are neglected people, with the least power and influence on how national resources shall be spent; they are the poor, the rural peasants, and above all, women*” (32)

The lack of progress in achieving the goals of the SMI is multifaceted and can be attributed to many factors ranging from misconceptions about how maternal mortality could be reduced to lack of political will and commitment and to the health system’s general failure.

2.4.1.1. Lack of Clear Strategic Focus

Maine and *Rosenfield* in their article “*The Safe Motherhood Initiative: Why has it stalled*”, argued that one of the reasons for the lack of progress in reducing maternal mortality is the absence of a clear strategic

focus in the SMI (36). They further argued that one of the keys to the success of the Child Survival Initiative was that it gave governments and agencies a recipe of actions required to prevent death among children from the most common causes. UNICEF used the acronym GOBI to remind people of the four main activities necessary to reduce child mortality: *growth monitoring, oral rehydration for diarrhoeal diseases, breast-feeding and immunization*. In contrast, the SMI is much broader and the lack of concise focus has led to the tendency to search for magic bullet solutions. Various options have been tried but none has proved to be as effective as had been hoped.

2.4.1.2. Misconceptions in Safe Motherhood

The lack of focus has led to a lot of misconceptions about how to slay the dragon, maternal mortality. One common misconception is that governments and health planners react that reduction of maternal mortality requires large-scale investment. It is true that safe motherhood implies a range of interventions and that no one approaches can achieve success; nonetheless, two arguments can counter such unfounded thinking. First, safe motherhood interventions involve the introduction of appropriate technologies that do not require large-scale investment in expensive drugs or equipment. Second, it does not mean the total overhaul of existing programs and creating new ones but strengthening existing ones to make them more functional and to be able to address the health care needs of all women. Safe motherhood programs are among the most cost effective interventions available in public health. Such critics are totally blind of the economic and social gains and benefits attached to investing on safe motherhood. Literature has indicated that the cost of the entire package in low income countries is about US \$3 (£2) per person year and the cost per live saved is US \$230 (£153) (37, 38). Furthermore, it also contributes to the alleviation of 7% of the burden of disease in such countries (24).

Another misconception implicated in this slow progress is the belief that maternal mortality cannot be reduced without general socioeconomic development. Again literature has totally refuted this. A study conducted in Indiana, USA among women in extremist religious communities, although well nourished, well educated and financially secure, have maternal mortality rates hundred times higher than the national figures (39). The reason is that members of that religion do not make use of modern medical care even in emergency situations.

2.4.1.3. Prenatal Care and Risk screening not Optional

A common adage in health is "*prevention is better than cure*"; this has led to the belief that putting in place prenatal care programs using the risk approach in which obstetric complications can either be detected early and treated or at least predicted. Maternal mortality is perhaps unique among public health

problems, in that its reduction depends on treatment rather than the prevention of illness (35, 40). Although one can identify *groups of women* at high risk – those at two extremes of their fertile years, women who already had many children and who have prior complication – but this does not mean one can identify the *individual women* who will develop complications. The great majority of obstetric deaths are caused by five conditions: hemorrhage, unsafe abortion, eclampsia, infection and obstructed labor (20, 22, 29, 41) and of these, the only one we can prevent is complications of unsafe abortion (42). Hemorrhage and obstructed labor while common in some groups, can happen to any woman. Eclampsia while preceded by pre-eclampsia, in some cases arise without warning (43). Even though this approach was one of the primary actions proposed in the Nairobi conference, studies conducted in Africa and Asia has now challenged it. One such study was conducted in the rural Gambia in which pregnant women received high quality antenatal care and screened twice against risk conditions during the pregnancy. However, there was no medical facility nearby at which obstetric complications could be treated. In assessing the outcome of the project maternal mortality in area was extremely high, more than 2000 per 100,000 births (34).

2.4.1.4. The Traditional Birth Attendants' failed

Training of Traditional Birth Attendants (TBA) in reducing maternal mortality has received much attention and criticism. It was thought that training of TBA can contribute to the reduction of maternal mortality; however, evidence has indicated that this is not the case. TBA training is only effective when there is high quality emergency obstetric care which is available, accessible and affordable. Anything short of it will render TBA training ineffective. A study in the Gambia by Greenwood have revealed that training of TBAs has not reduced maternal mortality as three years after the start of an effective program of TBA training, maternal mortality remained at around 700 per 100,000 births (34). TBAs are not trained to deal with complications and cannot prevent or treat most of the life-threatening obstetric complications. Of the five main causes of maternal death TBAs can have a direct impact on preventing only infection (through proper hygiene) and post partum hemorrhage (through proper management of placenta) which has even been challenged recently (43).

2.4.1.5. Role of Family Planning

The role of family planning in the reduction of maternal mortality has also received much attention and debate. As it was observed that pregnancies at the extremes of age (too early and too old), too many and too frequent pregnancies are very important pathways for maternal deaths, it was believed that widespread use of contraceptives could considerably reduce maternal mortality. It has been accepted that contraceptive use can also reduce unwanted and undesirable pregnancies and indeed the number

of possible complications and thus the number of maternal deaths. It has been documented that family planning can reduce maternal mortality by some 20% (41, 44), however, more recent analyses has questioned such results (45, 46). The fact of the matter is once pregnant family planning cannot modify a woman's risk of dying. A study conducted in *Matlab*, Bangladesh by *Ronsmans* has proven the complexity of nature. The results of that study do not support the frequently made assertion that closely spaced births increase the risk of maternal death (47).

2.4.1.6. Lack Political Will and Commitment

Deficiency in political will and commitment has been blamed for some of the slow progress at least in developing countries. With the mere fact that maternal mortality has been reduced drastically in industrialized countries to levels which is no longer a public health concern goes on to mean that with the strong political will and commitment the same could happen in developing countries. Sadly, in developing countries political commitment is mostly equated to the signing of international charters and treaties and not committing resources. *Dr. Mahmoud Fathalla* in his opening speech at the Colombo meeting in 1997 said "*the road ahead is a road of will*" adding that "*will without the wallet will not be possible*" (48). Which ever angle one looks at will it must entail committing adequate resources. The lack of commitment has also been manifested in the implementation of only one or few of the components of safe motherhood or at most implemented in piecemeal fashion in developing countries assuming that it will pay dividend. Despite the fact that safe motherhood proved to be one of the most cost effective and indeed an economic investment, little resources is allocated to it in most developing countries.

2.4.1.7. Unsafe Abortions and Lack of Access to Safe Abortion Services

WHO estimates that each year about 25% of all pregnancies worldwide end in an induced abortion, approximately 50 million. Of these abortions, approximately 20 million are being performed under dangerous conditions, either by untrained abortion providers or using unsafe procedure, or both (49). They result in nearly 80,000 maternal deaths – 13% of all maternal deaths globally – and hundreds of thousands of disabilities. Ninety-nine percent of these unsafe abortions are performed in developing countries (50).

Deaths as a result of unsafe abortion in developing countries are estimated at 400 per 100,000 abortions. This figure hides substantial regional variation, as unsafe abortions in Africa being at least 700 times more likely to lead to death than in developed countries (51). In Africa, abortion is illegal or very restricted, making it extremely difficult to estimate the number of procedures performed or the frequency of associated complications including deaths. A study conducted in three West African

countries shows an extremely high proportion of deaths as a result of complications of induced abortion within the first trimester of pregnancy (52). Safe abortion services may be beyond the reach of many women in developing countries because it may not be available as it is illegal; or even when it is not prohibited by legislation the services are practically unavailable. Unsafe abortion procedures, untrained abortion providers, restrictive abortion laws and high mortality and morbidity from abortion tend to occur in one and the same countries. In countries where women have access to safe abortion services, deaths from abortion are virtually eradicated (42). Putting in place an enabling abortion laws i.e. legalizing abortion and making services available, like in Romania has remarkably contributed to maternal mortality reduction by 40% (24).

2.4.1.8. Lack of Availability of and Accessibility to Emergency Obstetric Care

Another factor that has contributed to the slow progress in maternal mortality reduction is the lack of access to and availability of emergency obstetric services. Of all the interventions laid down to combat maternal mortality, access to emergency obstetric care is the one that can substantially reduce maternal mortality. As most obstetric complications cannot be predicted nor prevented but nearly all can be successfully treated (36). Furthermore, even if obstetric complications could be predicted those women identified would certainly need emergency obstetric services for their problem to be successfully managed. Thus, EOC is the key stones (pillar) that holds all these other blocks (pillars) in place. However, with all the potentials and benefits of access to essential obstetric services in the global efforts to combat maternal mortality, it has unfortunately received little attention. It is hard to understand why this component has received such a poor reception among health planners and politicians even though several studies have shown its effectiveness. In a seven year clinical control trial carried out in Bangladesh, maternal mortality has been reduced by 50% mainly because women have a reliable access to emergency obstetric services (45, 46). Furthermore, the dramatic reduction of maternal mortality in Europe particularly in Sweden (1751-1920) and England and Wales (1934 – 1960) to levels that commands no public health attention was largely due to increased access to emergency obstetric services and advances in medical technology (36, 53, 54). These are testimonies that signify the superiority of EOC to all other interventions in the fight to reduce maternal mortality.

2.4.1.9 Health Systems Failure

Health systems' failure in addressing the health care needs of women with obstetric complications is also blamed for the slow progress in addressing the problem of maternal mortality. If a woman does develop a life-threatening complication, her survival depends exclusively on getting prompt and adequate emergency obstetric care. It must be noted that even though a multitude of factors come into

play for maternal death to occur, in reality it is often logistics or health service factors that determine whether a woman with pregnancy-related complications lives or dies (55). There has been much talk from among health workers about women dying in childbirth because in their opinion those women did not come to a health facility. It is high time to acknowledge the large proportion of women who die despite reaching a health facility for care. In most instances the services that should save the life of those women with complication are not available or accessible or even if available it will be in a poor quality or standards. In other words the effectiveness and efficiency of the health system in addressing the health care needs of women with obstetrical complication is questionable.

Health system failure manifest itself in different forms but its most common exposures are operational difficulties such as lack of or intermittent shortages of essential drugs and other medical supplies; lack of equipment, lack of competent or well motivated work force; professional delays and errors in diagnosis. Other manifestations of health system failure are lack of reliable water and/or electricity supply. Under the leadership of committed physicians and midwives, better management of resources, improvements in staff skills through on-the-job training, systematic reviews of all maternal deaths and adherence to standards and protocols, and promotion of professional responsibility can achieve a great deal in a space of years (51, 56, 57). A health system's efficacy depends on the efficacy of its different components (first-level health services and hospitals). It also depends on the system's ability to ensure the continuity of care among the various levels of the system (58).

2.5. MEASURING MATERNAL MORTALITY

Measuring maternal mortality is notoriously difficult for both conceptual and practical reasons. Maternal deaths are hard to identify precisely and a maternal death is a relatively rare events. The currently available approaches are complex, resource intensive and imprecise; and the results they yield are often misleading (5, 59). The methods currently used in measuring maternal mortality are:

2.5.1. Vital Registration

In developed countries and few developing countries they have a system of registration of all births and deaths. In such instances information about maternal mortality are retrieved from the system of vital registration of deaths by cause. However, it must be noted that few developing countries have a vital registration system in place and where it exist it is often complete only for the urban proportion of the population. Furthermore, as most deaths in developing countries takes place out of the health care facilities most of them would not be identified and even if they are the cause of death may not be known (59). In developed countries which are also statistically developed, maternal deaths are grossly under-reported even when they occur in health facilities (60, 61).

2.5.2. House-Hold Surveys

House-hold surveys or community-based studies are used as an alternative in maternal mortality studies. It has serious weaknesses in that since a maternal death is a relatively rare event a large sample size is needed to provide a statistically reliable result. This makes it complex, time consuming and extremely cost prohibitive (2, 5, 59). A household survey carried out in Addis Ababa, Ethiopia, in which 45 maternal deaths were identified, it was necessary to interview at least 32,300 households (62).

2.5.3. The Sisterhood Method

The large sample size and the prohibitive cost involve in carrying out household surveys has led researchers to develop a more cost-effective alternative – the sisterhood method – first piloted in The Gambia. The sisterhood method is an indirect technique for deriving population-based estimates of maternal mortality. It obtains information by interviewing respondents about the survival of all their adult sisters (63, 64). Though less expensive, as it uses lesser sample-size, its drawback is that it cannot be used where fertility is low (total fertility rate below 3). It is not suitable for use in places where migration is high. Furthermore, the result it yields is for 10 – 12 years before the study period (64).

2.5.4. Reproductive Age Mortality Studies (RAMOS)

RAMOS involves identifying and investigating the causes of all deaths among women within the reproductive age. This method uses multiple sources of information – civil registration, health facility records, and community leaders, cemetery officials – to identify all deaths (2). RAMOS is considered to be the “gold standard” for measuring and estimating maternal mortality. However, it proves to be expensive, complex and time consuming. Though it uses multiple sources of information yet some deaths will occur unrecorded particularly those associated with early pregnancy or illicit abortion.

One common pitfall to all the above methods is that they only provide information on the level and cause of death which cannot be put in effective use. For example, if the maternal mortality ratio is 400 per 100,000 live births or more, it only tells us that it is high. It does not tell where the focus of the program should be or what should be done now and later. It also does not indicate what is working well in the system or what is not working.

2.6. MATERNAL MORTALITY IN THE GAMBIA

Levels of maternal mortality in The Gambia are unacceptably high and pose a tough public health challenge to the Department of State for Health and the country at large. According to the 1990

maternal mortality survey, the biggest ever to be conducted in the Gambia, the maternal mortality ratio was estimated at 1,050 per 100,000 live births (13) and similar studies carried out in the country shows similar results (34, 64-66). The levels are higher in non-Primary Health Care villages compared to urban or Primary Health Care villages. The common causes of obstetric deaths in the Gambia are hemorrhage, sepsis, ruptured uterus, anemia and eclampsia. It was also found that over two-thirds of the deaths take place during labor or shortly after delivery (13). A recent survey carried out in the country in 2001 shows a national estimate of 730 deaths per 100,000 live births. However, this survey in question had serious methodological weaknesses that render its findings questionable (67).

Reduction of maternal deaths is a priority area for the government of The Gambia and its development partners notably WHO, UNFPA and UNICEF. In the quest to address this scourge, certain health sector interventions has been implemented most notably; The training of midwives in advanced midwifery to be able to provide adequate and appropriate care to obstetric emergencies; upgrading of minor health centers to the status of major health centers by improving equipment and personnel to facilitate the provision of essential obstetric care and to be able to handle obstetric emergencies within the health district. Ambulances, both road and river, were provided to facilitate the evacuation of patients needing care to a higher level of the health system. Radio links was established to facilitate communication between health facilities. Access to family planning services and information has been an area that has received much attention and improvement (68). Despite all these interventions little progress has been registered in maternal mortality reduction in the Gambia. Recent WHO estimates on the global picture on maternal mortality indicate that the level in The Gambia is 1,100 per 100,000 live births nearly the “*natural*” maternal mortality magnitude (2).

2.7. MATERNAL DEATH REVIEW/AUDIT

Analysis of maternal deaths is more likely to yield the answers to why maternal deaths continue to occur rather than investing on ratios or rates. Answering the “*why*” questions is more important for program planners than answering the “how much” question. *Finagel's Laws* states that “*The data we have are not the data we want. The data we want are not the data we need. The data we need are not available*” (69). An awful lot of time, energy and money are invested on measuring levels of maternal mortality than focusing on those factors contributing to maternal deaths. Answering the “*why*” question will require a review or audit of maternal deaths. An audit is a systematic and critical analysis of the quality of care provided mostly in cases of adverse outcomes such as neonatal or maternal deaths. In recent years the demand for quality in health care delivery has received much attention because of the growing demand

for health care, rising costs, constrained resources, growing number and types of health care providers and evidence of variations in clinical practice (70).

Avedis Donabedian's framework for assessing quality of care outlined three areas of focus in auditing: structure, process and outcome (71). Structure refers to the organizational factors that define the health system under which care is provided. It includes physical and staff characteristics. Process is the actual delivery and receipt of care. It involves interaction between users and the health care structure. Two key processes of care have often been identified: technical intervention and interpersonal interaction between users and members of a health care system. Outcomes are consequences or product of the care. Structure as well as processes may influence outcome; indirectly or directly. Of these three dimensions of health care which may be audited, process, is the most relevant to the prevention of maternal deaths provided that what is involved is known to improve outcome (31).

Maternal death review or audit is a qualitative, in depth investigation of the causes and circumstances surrounding maternal deaths (72). In maternal deaths auditing, mismanagement and inadequate routines are discussed and methods to counter and correct them established so that improved clinical norms can be achieved. The aim of audits is to identify errors or omissions in practice, known as “*avoidable factors*” or cases of “*sub-optimal care*”, which have contributed to adverse outcomes. It must be stated that “*avoidability*” depends on the context and on the resources available. For example failure to detect congenital abnormalities during prenatal care may not be classified as avoidable in rural developing country hospital, whereas it represented a large proportion of avoidable factors in an audit in Singapore (73).

Instituting routine auditing system of maternal deaths will not only identify avoidable factors but will also highlight situations where care was below standard. This implies that the starting point in the audit process is to have standards and guidelines against which care will be compared with.

Literature has shown that auditing has a significant effect in the reduction of perinatal mortality. *Wilkinson's* ten months routine and internal perinatal audits in South Africa recorded a statistically significant reduction in perinatal mortality. It was concluded that perinatal mortality auditing is an effective method of detecting preventable deaths and can increase efficiency (74). The benefits of auditing goes beyond reducing mortality, it also has positive effect on staff performance and morale. In a health division in the Gambia where maternal deaths auditing has been instituted in 1997, involving local staff in the process, it was realized that there was increased knowledge and awareness among staff on the avoidable factors of maternal deaths. Staffs were more open to discussing issues

surrounding these individual cases of deaths. Furthermore, they were willing to report deaths when they occur and most importantly very committed to the auditing of maternal deaths (75).

2.7.1. Maternal Death Review in the Gambia

In the Gambia, women who died as a result of pregnancy or childbirth essentially remain invisible to the government and agencies that need to see them. This is because there is no system put in place to review maternal deaths that occurred. This makes events or circumstances surrounding such deaths unknown.

Classification of maternal deaths by medical causes may conceal what happened. A maternal death is usually preceded by a series of events, each of them deserving attention in their own right and in combination. It is therefore time to shift the focus from measurement to analysis of the problem; from determining the size of the problem to seeking to understand its underlying causes and determinants following the “*road to death concept*”. Medical cause of maternal deaths represents only the most visible dimension of a multilayered problem. It is easy to say that a woman has died from fatal hemorrhage or from sepsis, but analysis of such causes of death should comprise a more holistic approach. Tracing the route taken by the deceased woman prior to arrival at the health facility offers clues about possible physical, socio-cultural and economic barriers that impede access to appropriate care in a timely manner. Such a practical and an action-oriented means of gathering information on how and why maternal deaths occur can lead directly to improvements in service delivery. It may also effort to remove barriers to care. Such an undertaken will raise awareness among health professionals about those factors in the facilities and the community which if avoided, the death may not have occurred. It may stimulate actions to address those avoidable factors so as to prevent future maternal deaths

This present study was to identify, and describe the events and circumstances surrounding maternal deaths that have occurred in Central and Upper River Divisions in The Gambia.

2.8. RATIONALE FOR THE STUDY

In the Gambia the value for having many children is very high. Fertility rates are also comparatively high (6, 76, 77), total fertility rate estimated at 6. The levels of maternal mortality like many other countries in Sub-Saharan Africa are unacceptably high. This high level in maternal mortality – 1050 per 100,000 LB – is a cause for concern to the government of the Gambia and its development partners, the Department of State for Health and Social Welfare, civil society and to women in The Gambia in particularly. This makes such an undertaking in the Gambia very essential.

Another reason is that of the numerous studies on maternal mortality carried out in the Gambia, only one looked at underlying factors – health service and community related factors – that are fundamentally contributing to these excess in maternal deaths. It is felt necessary to explore this very important aspect of maternal mortality.

Thirdly, since the inception of the safe Motherhood strategy in the Gambia, over a decade ago, many strategies and interventions were and continue to be implemented. No study so far has been conducted to find out which of those interventions are working well and which ones are not working as expected. It is therefore time to take a look at the effectiveness of those interventions implemented.

The last and by no means the least reason is my personal involvement in working on women's health and reproductive health. Over a decade now, I have been working exclusively in this field. This has motivated and ushered me to select such an important topic. It is also my conviction that working to prevent maternal deaths is not an act of benevolence towards women because they are mothers, but is the moral duty of all who respect human rights, which of course includes the right of women to life.

The results of this present study will provide valuable information on the underlying causes of maternal deaths to the Department of State for Health and Social Welfare of the Gambia. It is envisaged that the findings of this study will be used to address gaps identified and also in the subsequent planning and implementation of maternal health programs in the country.

CHAPTER 3: AIMS OF THE STUDY

3.1. PURPOSE OF THE STUDY

The purpose of the study is to explore and describe the events and circumstances surrounding cases of maternal deaths that have occurred within Central and Upper River Divisions in The Gambia.

3.2. OBJECTIVES OF THE STUDY

1. To identify and describe the characteristics of the maternal deaths identified;
2. To explore and describe the socio-cultural and economic factors surrounding maternal deaths;
3. To investigate and illuminate health service factors associated with maternal death cases identified;
4. To explore the feasibility of instituting mechanisms for audit/review of maternal deaths in The Gambia.

3.3. STUDY AREA

The study was carried out in Bansang Hospital and its main catchment area – Central River and Upper River Administrative Divisions (CRD & URD). Bansang Hospital is one of the three public hospitals and is located in the rural area. It is situated in CRD on the south bank of the river Gambia approximately 300 kilometers away from the capital city – Banjul. It is the second largest hospital and one of the oldest in the country. It serves as a referral hospital to 16 health centers and dispensaries within its health area but also receives referrals from Lower River Division. This is usually at night when the ferry services at the trans-Gambia crossing point closes or has a breakdown. It also receives considerable number of patients from the border villages or settlements in neighboring Senegal.

3.3.1. Population and Demographic Characteristics

According to the 1993 population and housing census (6), the total population of the two divisions was 311,080 – representing 30% of the country's population. The average number of people per household ranges between 10 to 14 and total fertility rate was the highest in the country estimated at 7. Crude birth rate is 50.1 in CRD and 51.9 for URD. Polygamous marriages are very common in these two divisions as over 37% of males and 52% of females married are in such a relationship. Looking at poverty classification in the country, over 74% of the total population in these divisions is classified as very poor. From the same data source it was also revealed that the average traveling time to a medical facility is 147 minutes and 26 minutes for residents of CRD and URD respectively (12). This illuminates the communication difficulties in these two divisions.

3.3.2. River Crossings

The river Gambia traverses through the length of the country so also dividing each of these two administrative divisions further into north and the south bank. Meaning that movement from the north to the south banks or vice versa in each of these divisions involves river crossing. In total there are four river crossing points to the hospital within the two divisions: two at Janjangbureh (an island), one at Bansang and another at Basse. Each of these crossing points has a stationed ferry services operational during the day.

3.3.3. Health Facilities

Ten of the sixteen medical facilities within the hospital's health area are located in CRD. Furthermore out of the total health facilities eight (five in CRD and three in URD) are located at the north bank of the river. Meaning that patients referred from those facilities to the hospital particularly obstetrical referrals must cross a river.

Looking at distance of the health facilities to the hospital it ranges from 17 to 115 kilometers. Only five of the health facilities are located near the main tarred road while the majority of facilities use gravel roads. Most are dirt and bumpy roads. Figure 2 shows the location of health facilities and the geography of the study area.

During the period of data collection three of the health facilities (Kudang, Dankunku and Janjangbureh) were without an ambulance; and two others (Kuntaur and Sami Karantaba) the ambulance was packed awaiting for maintenance. Kuntaur health centre ambulance had an electrical problem so the headlights are not functional. This vehicle was not use during the night. All the health facilities with ambulance problem were in CRD.

3.3.4. Obstetric Care Services in Central and Upper River Divisions

Bansang Hospital is the only facility providing comprehensive EOC for the two divisions. Women within the area who develop life threatening obstetrical complications must be taken to the hospital for prompt, appropriate and adequate management. Many of the other health facilities (health centers and dispensaries) provide some, but not all of the Basic EOC functions. Most of these facilities provide functions 1 to 3, many had function 4, but very few had functions 5 or 6 mentioned above. Considering the UN guidelines for minimum acceptable levels for obstetric care what prevails in this area is within acceptable limits. The guidelines recommended one comprehensive EOC facility and four basic EOC for every 500,000 people (18); in the study area with a population of less than 500,000, there is one comprehensive and over ten basic EOC facilities.

3.3.5. Selection of Study Area

The site for the present study was selected for various reasons:

Firstly, the results of the nationwide survey on maternal mortality (13) revealed that maternal mortality is higher in these two regions combined than in any other part of the country. Furthermore, according to the NHPS (12), these regions are ranked the poorest among all the others in the country. Therefore conducting such a study in this area will provide information on the underlying factors contributing to the high levels of maternal mortality in the area. The information generated from this present study could be useful in combating the problem.

The second reason for selecting this site for the present study is the fact that the area fits very well the UN proposed guidelines for monitoring availability, access to and utilization of EOC (18). Carrying such a study in this area gives a very good opportunity to test the guidelines in the area and in the country that has never done so.

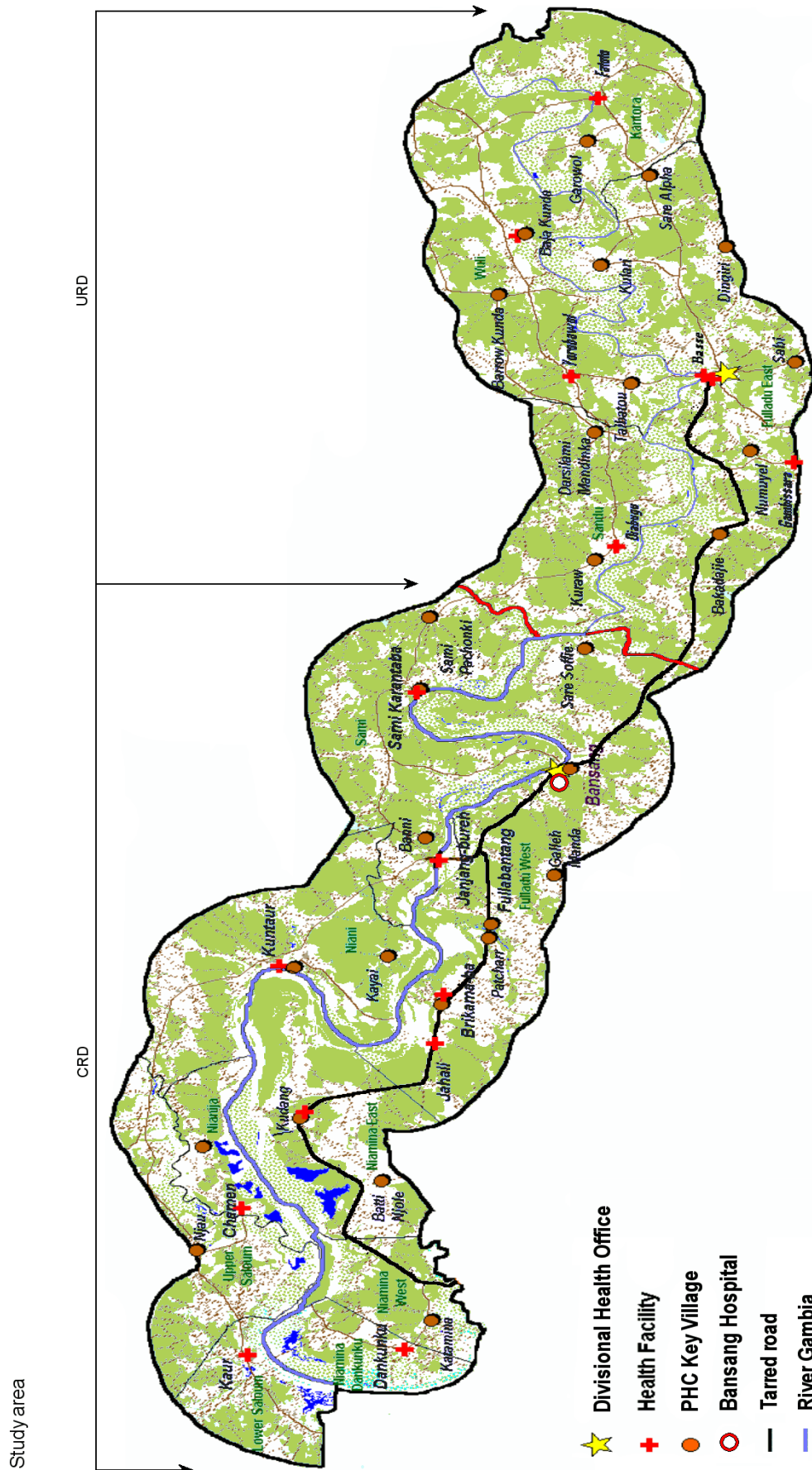
Another very important reason for choosing this area is its peculiar characteristic in that river crossing is involved in virtually all the patients referred from facilities on the north bank of the river to the hospital. This study stands to assess the role played by the river in the utilization of prompt emergency obstetric care.

The fourth reason for opting for this area is the ease in identifying and subsequent follow up of maternal deaths. It may be easier to follow up cases in the rural area where the people are more connected and tend to know each other more. The villages though remotely located may be easier to identify. Conducting this study in the main referral hospital in the capital city will not only be cost prohibitive or time consuming but would even be unmanageable due to its large health area. Follow up of maternal deaths in the community may be impossible because there is no proper addressing system.

The last and by no means the least reason is the fact that of the over forty years existence of this hospital (Bansang), never has a maternal mortality study been carried out there. All the studies on maternal mortality in the country are either confined to the main referral hospital in the capital city or in the North Bank Division of the country where the British Medical Research Council's reproductive health research program is mainly focusing (64-66, 78).

Carrying out a study of this nature in this part of the country is long overdue. I am with the belief that the findings will arm the Divisional Health Management Teams and the Hospital authorities with the necessary ammunitions to put in place evidence based strategies and interventions to tackle the problem of maternal mortality in The Gambia.

Figure 2: Map of the Study area



CHAPTER 4: METHODOLOGY

4.1. STUDY DESIGN

A retrospective study design combining both qualitative and quantitative methods was used to make an in depth investigation and analysis of the circumstances and events surrounding individual cases of maternal deaths. The “road to death” concept was followed in a quest to generate more information on events preceding the death (72).

4.2. STUDY POPULATION

The study population was women who were pregnant or have been recently pregnant or delivered. These are women living within Bansang Hospital health area. They are women of any age or nationality but were resident in either CRD or URD.

4.3. SAMPLE SIZE AND SELECTION

A total of between 10 – 15 individual cases of maternal death was planned to be studied. Due to the overwhelming number of maternal death cases recorded during the study period, instead a total of 42 cases were reviewed. All the maternal deaths that occurred during the study period and met the inclusion criteria were included.

The cases eligible for inclusion were those which:

- Qualified to be classified as a maternal death or suspected maternal death according to the WHO ICD 10 definition;
- The deceased must have been resident in either CRD or URD before her death;
- The death must have occurred within Bansang Hospital health area i.e. CRD and URD;
- The death occurred in a health facility (hospital, health centre, dispensary), in the community or en route to a health facility;
- Death must have occurred between the time intervals of 1st January to 30th September 2002.

The exclusion criteria used were:

- The death do not meet the WHO definition of a “maternal death”;
- Death occurred out of the study area – CRD and URD; and
- Death of women not a resident of either CRD or URD.

Deaths of women not resident within the study area were excluded from the study mainly because including them will mean expanding the study area which would in turn demand extensive traveling for follow up. This will be labor intensive, costly and may make the study unmanageable. Women resident

in the surrounding border villages or settlements in the neighboring Senegal were also excluded because of the current political upheaval there. Including them may not only be demanding in terms of time and cost but may also be very risky.

4.4. CASE IDENTIFICATION AND REPORTING

It was planned and envisaged that maternal deaths occurring in the community (villages) or during transportation to a health facility would be reported by the TBA or VHW to the CHN who would in turn notify the Divisional Public Health Nurse (DPHN) or the principal investigator. Deaths occurring at a health centre or dispensary will be identified and reported by the midwife or head of that particular health facility; while for deaths in the hospital (maternity unit, female ward or at the outpatients) would be traced and identified mainly by the head midwife of the maternity unit, head of the female ward and the principal investigator. A similar approach was used in Indonesia (79).

In practice identification and reporting of deaths in the community was not as expected. Deaths that have occurred in the hospital were not reported by the TBA, VHW or the CHN responsible for that particular village where the deceased woman comes from. It was only during follow up when they are asked about that particular case by mentioning her name and address they would acknowledge it. This could be a product of many factors. It could be that as the death occurred at the hospital they are with the opinion that it is the hospital that should report such cases or may be a deliberate act to concealed the death, or most importantly, they were trying to notify the principal investigator but because of poor communication facilities that exist in the rural areas they could not even if they intend to.

Identification and notification of deaths that have occurred in a health centre or dispensary was relatively better as the only death that occurred there was reported instantly. However, in one of the major health centre, in an informal discussion with a junior staff, it was revealed that three maternal deaths or suspected maternal deaths occurred in the facility in around the months of February and March 2002. This was disputed by the head midwife and as there were no available records or a system of recording deaths in that particular facility it was difficult to verify. However, one thing noted during the process of data collection was that other health facilities in one of the divisions did mentioned of maternal deaths happened in that particular major health centre. There may be an element of deliberate concealing of cases for fear of insecurity. A maternal death is a reportable incident according to the national health information system in the Gambia but none of these two DHT (URD or CRD) has in place a systematic recording of maternal deaths. Consequently none had records of maternal deaths occurring in their respective divisions.

Identifying and reporting of cases of maternal deaths at the maternity unit of the hospital was satisfactory in that most if not all were captured. This was as a result of many factors. One reason was that the unit has in place a death register where all deaths that have occurred in the unit are recorded. This has been in operation since 2000. Another reason is the fairly good filing system. Other than the maternity unit no other maternal death case was identified or reported in the hospital not even from the female ward.

4.4.1. Research Assistants

Three research assistants were recruited prior to the commencement of data collection; one from each DHT (CRD and URD) and one from the hospital. All were nurses by background, and two of them also had additional midwifery training; gender wise two were males. They were independently sensitized on the purpose and objectives of the study. Their roles in the project clearly explained. This included the identification and reporting of maternal death cases that have occurred in their respective areas to the principal investigator and to assist in data collection or interviews. They were also introduced to the data collection tool and methods, and were given the opportunity to ask questions in case they needed any clarification. After this sensitization the research assistants particularly those in the DHT (CRD and URD) in turn went on to sensitize the CHN in their respective health division during their regular monthly in-service meetings. The aim was to inform the health workers about the study and its objectives. It was also done to secure their cooperation and to ensure case reporting by the community health workers.

4.5. DATA COLLECTION

4.5.1. Approaches Used

Literature has shown that it is difficult to obtain comprehensive information about maternal deaths (2, 59). Thus it became clear that obtaining such information will require the use of a variety of sources of information. Due to this reason a combination of approaches were used in this present study. The two main approaches used were: confidential enquiry and verbal autopsy as outlined in the WHO guidelines on Maternal Death Review (72).

Confidential enquiry: This was used to investigate what had happened in the health facility or facilities where the deceased sought care and where she finally died. It involved the review of client's health records and also the interviewing of key people who are knowledgeable about the case in question. Usually these were health care providers who had participated in providing care to that client and had knowledge about the death. This approach helps to illuminate health service factors related to the

death. This information was used by the independent reviewers to determine to what extent it could have been avoided. Another reason for opting for this approach is that health records have valuable information about the deceased woman which may be missed using another data source.

Verbal autopsy: This involves interviews in the community with family members, relatives (husband, co-wife, sister, in-laws, and parent), neighbors, TBA or CHN, and other people who are knowledgeable about the case such as the captain of the ferry or canoe if the deceased crossed a river or local taxi driver who evacuated her. In other words, we tried to interview as many people as possible among those who were involved in this case. These interviews help to reconstruct events prior to death in order to reach a cause of death and also in assigning contributing factors to a death.

Use of combined approaches was felt necessary because often a maternal death is preceded by a multitude of factors and no one single factor could be responsible for the death. These could be community or health service factors or both. It was therefore felt essential to make a description of all the events surrounding maternal deaths. It serves as the basis for the development of more comprehensive strategies for prevention. The non-medical circumstances, in which the woman dies, help in identifying departures from accepted standards of care and include failure of the patient to use or cooperate with the services, as well as failure of the services to provide or offer adequate and prompt care.

4.5.2. Data Collection Tools

4.5.2.1. Verbal Autopsy Questionnaire

A standard Verbal Autopsy Questionnaire (VAQ) developed by the British Medical Research Council (MRC) in the Gambia, was used. The questionnaire is both quantitative and qualitative in nature and has sections on: background characteristics of the deceased, relatives' account of events around the woman's illness and death (open-ended); symptoms developed during her final illness and a section during pregnancy, labor, or within six weeks after delivery. The questionnaire incorporated a verbal autopsy (VA) and a section on health seeking behavior or contributing factors. The relatives' of the deceased were interviewed using the VA questionnaire and technique which included open-ended questions to prompt the relatives to narrate all the events that led to the death. The aim of these open-ended questions was to elicit the relatives' perception of the conditions surrounding the death of the women. This encourages them to freely reconstruct the process that led to the event and to describe its most relevant aspects. The questionnaire included an open section to record the respondent or respondents' verbatim account of the deceased's final illness and up to her death. The VAQ also

included closed sections to probe for specific signs and symptoms. This questionnaire was chosen mainly because it fits to achieving the aim of the present study. Secondly, it has found appropriate and applicable in The Gambia. However, some questions in the tool that were found not necessary for this study were deleted and some new ones added. It was adapted to fit the present study. The tool was in English language (see appendix 1).

The qualitative approach incorporated in a technique that has been used to obtain quantitative results is a very good initiative in that it produces the collection of valuable information that otherwise would be impossible to generate in the course of health research. This approach has been used in similar studies carried out in developing countries (66, 80, 81).

4.5.2.2. Classification Form

A separate tool used was a standard classification form for verbal autopsy also developed by the MRC in the Gambia. This tool was used in the classification or assigning medical cause of death and contributing factors. This tool has two main components: one on cause of death to assign the categories (either direct or indirect cause of maternal death) as well as the underlying cause or causes of death. The other component is a checklist on contributing factors structured in pre-defined categories organized into two levels and further in the order “probably” or “possibly” contributed to the death (see appendix 2). This tool was used by the reviewers when reviewing cases.

4.5.3. Data Collection Process

Data collection commenced at the hospital, where most women with obstetric complication came and finally died, then traces the case back into the community. All the places the deceased visited to seek for care was visited to collect information. All those who provided care and well knowledgeable about the case were interviewed. The woman’s “road to maternal death” was followed.

No interview guide was use when conducting interviews with health staff. The interviewee was asked open-ended questions basically on the arrival time of the deceased to the facility; assessment of her condition and what happened. In his/her opinion what contributed to the death, and if the death was preventable how it could have been. The interviewee was also asked probing questions about what he/she think “should have been done but not done” or better still “what have happened but should not have happened”. The aim was to elicit deficiencies in care provided and to determine operational factors that in their opinion might have been implicated in the death of the woman. Questions asked were mainly dictated by the case – circumstances surrounding the death.

The health staff interviewed included doctors, midwives and nurses, and laboratory officer if there was an issue concerning the laboratory. Other paramedical staff interviewed included ambulance drivers if the deceased was evacuated to another facility; generator operators if electricity was an issue mentioned in a case. Also interviewed was the theatre nurse if an operation was done or planned but not done.

Identification of health staff who provided care were done through the verification of their writings and signatures on the case notes with the assistance of the ward staff; or at times looking through the delivery register to verify who actually attended to the deceased during delivery if she actually delivered. In very few cases there were no writings or signatures of a nurse or midwife on the case notes and the deceased had not delivered. In such cases the death register was consulted to determine the date and time of death then the duty roster for that week was retrieved to identify the particular staff or staffs who were on duty. It was a really labor intensive task but that the head midwife of the unit (a research assistant) was very instrumental in identifying the staff concern. If the deceased visited more than one health facility all those facilities were also visited by the research team to interview the staff concern applying the same process.

Interviews with health staff, particularly those in the hospital, were done more often in the interviewee's room during his/her off-duty or at the ward in their coffee room whiles at work. Interviews were carried out separately in a quiet place with the minimum of distraction. During interviews with health staff (nurses and midwives) at the hospital the research assistant selected from the hospital is never in the audience. This was found necessary to reduce any undue pressure or Hawthorne effect. Accessing health staff for interview was easy as those at the hospital are all living within the hospital camp. In the peripheral health facilities the majority of health staffs were also residing within the health facility. Those who reside in the village spent most of their time within the facility. However, in one health facility, poor recording and record keeping coupled with chaotically stored available records made it impossible to retrieve a single case note. It was also not possible to identify the main care providers.

In carrying out VA for a single case sometimes as many as five different health care providers were interviewed. On average three health workers were interviewed per case. All interviews with health staff were recorded on tape and interviewees were kept anonymous as even their names were not recorded.

During the process of data collection, while at a health facility, the health facility kept records of the deceased was reviewed. The health records reviewed were mainly inpatient case notes, delivery register (if delivered), referral in or out register, daily ward report or diary book. All case notes retrieved were photocopied. Retrieving of case notes from the hospital's records office was very efficient and satisfactory. Once the name or the admission number is known the records clerks will immediately get

the folder from the shelves. The situation was totally different in the health centre or dispensary level; where in most instances what they can provide you with is after consulting the referral register (if there is any) is her identification (name), the day she reported to the facility and the day she was referred out. The specific times the deceased reported and was referred out are usually not stated. In one Health Centre, where twenty-one of the forty-two cases transited, no record of the cases could be found.

After collecting data from the health facility or facilities to which deceased sought care, data collection was then continued at the community. The relatives interviewed were principally the one most knowledgeable about the case. This was the person who was taking care of the deceased from the onset of her final illness; or the person who accompanied her to the health facility and was with her at the hospital during her death. These were mostly women – co-wife, aunt, granny, TBA or an in-law. In very few cases it was a man and was the husband. In the community as many as four people were involved in the interview and on average it was two informants involved per case.

Interviews with these key informants were carried out using the VA questionnaire and the interviews were conducted in a group at the deceased's home in the presence of a man. Accessing the interviewees at community level was not very difficult because rural people live in small villages and it does not take much time to mobilize the key informants. However, in one case the husband was the key informant but was residing in a village near the border with Senegal (60 km away from deceased home). We had to drive up there to interview him.

In the Gambia, men usually make major family decisions and an issue like death which is a significant family event, a man has to sanction the interview before it is carried out. In one particular case there was no man in the home but the lady (co-wife) had to call another man in the next compound to authorize and witness the interview process. The open-ended questions i.e. the section on events surrounding the death, responses were recorded on tape. All families approached consented to the interviews and accepted being recorded. However their identity such as name was not recorded.

Data collection at family level was commenced at least one week but not more than twenty-five weeks after the death. To approach a bereaved family too soon after a death may be considered culturally insensitive or offensive in some cultures in the Gambia. However, waiting too long on the other hand might result in the lost of valuable information as key persons for possible interviews may be hard to trace. All interviews were conducted in the period from 1st August to 8th October 2002.

The interviews were conducted in the local language spoken and understood by the respondents. The principal investigator is fluent in two of the four main languages spoken in this area and can understand the third as well. However in all the places visited there was usually a person who is fluent in all the languages spoken in the area. In such cases that person acted as a translator during the interview. The driver of the team was also fluent on three of the four languages and occasionally he was used. All interviews were carried out by the principal investigator assisted by the research assistant. Research assistant at the hospital do not participate in the review of cases that he provided care.

Data collection at family level was not carried out on a Saturday as it is culturally believed that if a bereaved family is approached on this particular day on anything related to the death another person in the family may die. Visiting families for interviews was also not done on a day in which there was a weekly market day (locally called *Lumo*) at a nearby village. It is difficult to find people in their homes on such a day as most of them go to the market for petty trading, and it is not wise to meet them there for an interview. Friday was the best day to find people at their homes as it is a traditionally assigned rest day for farmers in the rural areas of The Gambia. Nobody goes to the farms or rice fields on Fridays.

One very important observation was that family members or people in the community feel more comfortable to talk if the interviewers are accompanied by someone whom they knew. For that reason during interviews at family or community level the research team was escorted by a health staff (nurse or midwife) from the health facility nearby, or by the TBA or VHW, or in some instances by a village elder. Health staff who escort the team after doing the necessary introduction moves away from the interview as their presence can exert undue influence.

During the verbal autopsy, families were asked to produce any health card or records, for example the antenatal card, or other cards.

4.5.4. Classification by Reviewers

Three public health physicians and specialist obstetricians reviewed the cases independently to assign medical cause of death and contributing factors to each case. The reviews were based on the information collected through the verbal autopsy questionnaire as well as the deceased's hospital records (case notes) for 32 of the cases identified; and for the other 10 cases the review was based only on the hospital records.

Dual causes of death classification were used. The main reason is that death is usually preceded by a series of events, each of them deserving attention in their own right and in combination. A single cause of death classification misses the important combinations. For example sepsis alone may indicate the

need for case management whereas if the majority of sepsis cases follow obstructed labor, primary prevention and detection of women at risk for developing prolonged labor may be a higher priority. The classification of cause of death was considered satisfactory if at least two of the three reviewers are in agreement. Classifying the contributing factors to each death is essential for identifying priorities for interventions which implies identifying “avoidable factors” – factors which if avoided could have prevented the maternal death.

4.6. DATA HANDLING

Data collected through verbal autopsy were all cross-checked at night after every day’s field work to assess if all information intended to be collected has actually been collected. Cross checking was also done to assess for accuracy and clarity in recording. Furthermore, all data for the same case (verbal autopsy and case notes) were given the same case review number assigned for that particular case. They were then collated for easy sorting and to avoiding mixing up the many papers being handled. In one occasion certain information was found missing so the principal investigator had to revisit the family concern to collect the missing information. The VAQ was pre-coded, so the quantitative sections contained in it were inputted into Software Package for Social Sciences (SPSS) version 11.0.

Interviews recorded on tapes were recorded on a separate cassette for each case and then given again the same case review number for that particular case. At night after every day’s work a summary of the recorded interviews were made and transferred to section two (family or relative’s account on event surrounding the death) on the questionnaire. This information was used during the review process by reviewers. Subsequent to that exercise the interviews were transcribed in full to record the respondents’ verbatim account of the deceased’s final illness up to her death. The transcribed materials were transformed into plain text files prior to being inputted into a software package QSR NUD*IST. Numbering was used for the identification of the deceased instead of their names for confidential reasons.

All data collected and generated were handled by the principal investigator and was not made accessible to any other person except the reviewers during the review process.

4.7. DATA ANALYSIS

As two different sets of data were collected – quantitative and qualitative – they were also analyzed differently.

The quantitative data was analyzed using SPSS version 11.0 to make simple descriptive analysis of the data.

The qualitative data whiles in QSR NUD*IST was coded according to different categories in the “Three Phase Delay” model used in the analysis of this data. The data was organized and reorganized into these categories and print outs made.

It must be mentioned that the analytic process of the qualitative data began even during data collection as data gathered were shaped into the different categories of the model. The categories were derived deductively as a framework was used for the analysis, however, categories were also derived inductively as reading through the text new issues and concepts were identified.

Non-conventional method of analysis was utilized for rigorous and systematic analysis of the data. This was felt necessary in that high quality qualitative data depends on the skills, vision and integrity of the researcher and not through the use of software package. The steps used in the analysis of the qualitative data can be summarized into:

1. Familiarization to the data by listening to the tapes and reading through the transcribed materials in order to list the key ideas,
2. Identifying the key ideas, issues and concepts according to the model,
3. Indexed systematically to all the data by coloring with the use of varied colors into the different categories of the model,
4. Rearranging the data according to the appropriate components in the model to which it relates, and
5. Interpretation of data with a view to providing possible explanations for the finding.

4.8. PILOTING

Prior to data collection, the verbal autopsy questionnaire was pre-tested in Lower River Division, one of the divisions nearby the study site, on two separate families that had suffered a maternal loss in less than a year. This exercise was essential in that even though this tool has been used in the Gambia for sometime now the principal investigator has never used it before. It was therefore necessary to acquaint him with it. The tool was also given to health authorities particularly those at the ministry and at the DHT level for comments. All these combined had helped in checking for clarity, applicability, and the length of time it may take to administer. Through this the acceptability of the tool was assessed. Rehearsals on interviews with health care providers was done to assess how it would be like so as to prepare for surprises that may occur during the process of data collection with health workers.

4.9. ETHICAL CONSIDERATION

Participation to the study was completely voluntary and free from any form of coercion. Individuals or families approached to participate in the study were first fully briefed on the purpose of the study and as well as their roles. It was also explained to them that should they decide not to participate or decide to

withdraw during the process no penalty will be levied against them. All the explanations were done comprehensively in a language that the individual or family can speak or understand.

It was upon this that a verbal consent was sought. A verbal consent was used in this study as in the Gambia generally people feel reluctant to sign or thumb print even among literates for various reasons. They are more comfortable with giving verbal consent.

Ethical clearance to undertake this study was sought from and granted by the Ethical Review Committee in Norway and also from the Gambia Government/Medical Research Council Laboratories Joint Ethical Committee. Permission to access health facility kept records was granted by the Director of Medical Services of the Gambia.

CHAPTER 5: SUMMARY OF MAIN RESULTS AND LESSONS LEARNT

5.1. PAPER I

Maternal mortality in Bansang Hospital, the Gambia: levels, causes and contributing factors.

Mamady Cham, Johanne Sundby, Gijs Walraven and Siri Vangen

This paper provides a descriptive analysis of a health facility and community based study on maternal mortality carried out in rural Gambia. The aim of the study was to identify and describe the socioeconomic and health service factors contributing to maternal deaths.

During a nine months period a total of 42 maternal deaths were identified. Thirty-nine of these occurred at the obstetric referral hospital, one at a major health center, one on the road to the hospital and one at home (two days after discharge from the hospital). In the same corresponding period a total of 876 live births were recorded in the hospital. This gives a hospital-based maternal mortality ratio of 4,452 per 100,000 live births.

Direct obstetric deaths accounted for 28 of the cases, of which hemorrhage was responsible for 10 of them. All the obstetric hemorrhage cases were ante partum. Indirect obstetric deaths were 14, of which anemia accounted for 12 of the cases. Looking at the period of death, 4 of the cases died during the ante partum period, 7 during labor before the delivery of the baby and 31 died after delivery. Of the post partum deaths 21 occurred at least 24 hours after delivery.

Substandard health care for obstetric referrals, low quality of primary health care, obstruction in receiving urgent medical care and delay in reaching an appropriate medical facility were identified as the main contributing factors to these maternal deaths.

5.2. PAPER II

Maternal mortality in the Gambia: contributing factors and what can be done to reduce it.

Mamady Cham, Johanne Sundby, Benedicte Ingstad, Siri Vangen and Gijs Walraven

Presented in this paper are the qualitative results of verbal autopsies performed on 32 out of 42 maternal deaths identified. The aim was to identify and describe the avoidable factors associated with these deaths.

Of the 32 maternal deaths autopsied, 7 delayed decision to seek medical care after the recognition of the complication. The reasons for the delay were due to underestimation of the severity of the complication, cultural reasons and health service related factors. Lack of transport, prolonged transportation or seeking care from more than two medical facilities resulted in 27 (84%) of the cases experienced delay in reaching an appropriate medical facility once the decision to seek care was made. Thirty-one of the women experienced delay in receiving prompt and required care even after reaching an appropriate medical facility. Operational difficulties at the obstetric care facility were the main reason causing delay in receiving prompt and adequate care for obstetric emergencies.

Furthermore, of the 32 cases, 7 experienced all three phases of delay, 21 two phases of delay, 3 had only one phase of delay and in one case no delay was associated with the death.

5.3. LESSONS LEARNT

5.3.1. Challenges in Maternal death auditing in The Gambia

The need for instituting routine maternal death auditing in the Gambia is still an important issue largely because of concern on the unacceptable high rate of maternal deaths in the country. The positive effects beginning to surface in maternal death reviews currently in operation in a rural hospital in the northern part of the country has also added impetus to such thinking. A maternal death is a reportable incident in the country however, in reality most of them occur neither recorded nor reported. Putting in place a system of routine reviews of maternal deaths in The Gambia has to overcome certain practical challenges. During the course of fieldwork for this present study, obstacles and organizational issues were identified, which also poses a big challenge to routine auditing of maternal deaths in the Gambia. Such factors include the following:

Case identification and reporting

It is generally believed that deaths that have occurred in health facilities are easy to identify and report. This may be true for maternal deaths that occurred in a maternity unit but not the case for those taking place in other units. Quite a few women die in the female wards or outpatient units particularly in hospitals. Some of these are maternal deaths, but go unrecorded or misclassified. During the course of this study, a lot of female deaths within reproductive age were recorded at the female ward of the hospital. However, none of them could be classified or suspected as a maternal death because their pregnancy status was not known during the time of admission. Currently in the Gambia's health information system there is nowhere in the admission records where the pregnancy status of women admitted is stated.

Outpatient deaths observed to have occurred at the hospital during the study were generally not documented within the hospital recording system. In effect none had case notes so consequently were nowhere in the hospital's information system.

Identification and reporting of abortion related deaths are generally difficult particularly in places where abortion is restricted. In The Gambia such deaths stand a high chance of not being reported for punitive reasons as it is unlawful. Furthermore, in a society such as The Gambia where illegitimate pregnancies are socially unacceptable for religious and other social reasons such deaths will be hard if not impossible to identify. In this present study no abortion related death was reported nor identified. This does not signify that such deaths did not happen in the study area. Considering the high fertility rate in an area, documented early sexual debut among young girls and coupled with low contraceptive utilization, theoretical there may be pregnancies which might have been aborted, and some of these are most likely unsafe.

Reporting of maternal deaths who are residents of PHC villages was not satisfactory even with the existence of a TBA, VHW or CHN in such villages. The situation may even be worse in non-PHC villages which are virtually cut-off from the present health system. Such villages have neither a trained TBA nor a VHW. In this study 16 (38%) of the deaths were resident of a non-PHC village but even the CHN in the nearest key village was not aware of the incident. Community Health Nurses were not effective in identifying or reporting maternal deaths in their circuits. As it could be seen in this study, 26 out of the 42 maternal deaths identified were women resident in a PHC village but only three of them were actually reported by a CHN. These were the CHN at Bati Njole and Sare Soffie in CRD.

Skepticism

Relatives or family of the deceased were generally open and willing to be interviewed on events surrounding the death only if they trust you and are confident that the information being generated will not be used to punish or reprimand anybody. A lot of deaths including maternal deaths occur in Gambian communities but none is audited. Therefore auditing maternal deaths now will naturally cause undue skepticism moreover if the interviewer is not familiar to interviewees. In most instances the interviewer may even be viewed as an intelligence agent. Gambians are socially interconnected, very interactive and generally people know each other. They very much mind *“who said what”* and *“who did what”*. They generally don't like to offend each other or to be known to hurt or implicate another person particularly the one you know. The Culture of silence is deep rooted among Gambians. People don't like to be quoted especially on issues viewed as negative. It must be recalled that during the early days of the military regime in 1994 in the country a commission of enquiry was set up to probe into the activities of the previous government and its top officials. This commission has instilled a sense of fear among Gambian people and made them to be extra careful with whom to talk and on what topic. During the course of data collection in the present study, there were instances in which families felt reluctant to be interviewed.

Health care providers also seem to be threatened by the investigative approach to deaths they may be involved in providing care or at least knew about the case. While at the hospital, trying to interview health care providers who actually provided care to a case, some of the staff pretends not to remember that particular case just to avoid the interview. During informal discussions with some of the staff it was realized that their behavior were understandable and justified. They feared being reprimanded by the hospital management for revealing what happened within the hospital as what happened in the hospital is generally believed to be kept confidential. They also feared being punished by the higher authorities at ministry level if deficiency in care was highlighted. In effect they were confronted with “double fear”. This illustrates that in many instances, *“supervision”* is not really an enabling activity, rather a control mechanism to ensure that things don't go wrong.

Health records

Incomplete health data, missing records or lack of clarity in such records remains a big issue. Tracing and retrieving of health facility kept records could be labor intensive and time consuming. In situations where they exist, most of the time they are chaotically stored. Generally record keeping was satisfactory at the hospital. At the peripheral health facilities the situation was totally different. The recording system in these facilities was not uniform and very inconsistent, with key features of the recording (such as column headings) varying in different facilities and even at different times or with

different staff in the same facility. Chronic lack of reliable stationery supply at peripheral health care facilities also makes matters worse. What contributed to the deplorable situation is the virtually non-existent supportive supervision in these health divisions. Past monthly returns may be available but in none of the health facilities were service statistics in the form of picture diagrams displayed. This implies that peripheral health staffs do not make simple analysis of the data collected to observe trends.

Focus for review

Maternal deaths auditing may focus only at what happened at the health facility or facilities, where care was sought. This may provide valuable but not sufficient information as it may be deficit of community factors which are equally important. It is often better to assess both levels to have a holistic picture of the “road to maternal death”. This latter approach is labor intensive and could be very expensive. It means spending longer time in reviewing a case because different places and often many people need to be interviewed. It may also require long distance trekking often on dirt terrain roads. The poor road network and conditions in the Gambia, worse in the rainy season, may make it the more difficult. During data collection sometimes the research team had to trek for over 200 kilometers just to follow-up a case. Sometimes the key informant for that case is away in the farm or rice field. Data collectors end up walking to meet him/her at the farms as the road was too muddy for a vehicle. On the other hand, these difficult access issues are also relevant in the reverse direction – when a client needs to seek health care urgently.

Data collector

The data collector or collectors either male or female; health worker or a lay person does not matter. What is essential is that the data collector must win the confidence of the informants, should exercise high degree of confidentiality and patience. The interviewer must be one who has detective skills, non-dominant and considerate. Above all he/she should be aware of local customs and traditions and be sensitive to them. On several occasions families were visited for an interview but seem not prepared as the head of the house hold was not in. They are usually men, who must authorize family members be interviewed. Families refuse interviews of Saturdays. In such situations a revisit was arranged and done just to show respect to local customs and traditions. Revisits could be both time consuming and expensive.

Protocols and guidelines

An audit is only effective if care provided is compared with explicit standards. This implies that service standards, protocols or guidelines must first be in place before instituting an audit system. In the

Gambia one of the biggest challenges is having effective maternal health care guidelines with which care will be compared. During the course of data collection certain aspects of substandard care were noted but there were no written guidelines in the maternal health services in the Gambia addressing most of those issues. In such instances internationally agreed standards were used to compare with current care practices. This may not be appropriate as guidelines and protocols should be adapted to meet local situations.

5.3.2 Transfusion service in Bansang hospital

One of the factors responsible for the dramatic reduction in maternal mortality in developed countries has been the readily availability of blood for obstetric emergencies. In developing countries where the majority of maternal deaths occur, only few have a well-organized transfusion services (82).

In this study anemia was identified as a very important cause of death (12 out of 42); obstetrical hemorrhage was also high among the cases (10 out of 42) and a significant proportion of the cases had undergone a caesarean section (5 out of 42). What is common among these cases (27 out of 42) is that all needed blood for transfusion. Some were transfused and others not. Even among those transfused delay in receiving prompt and adequate blood was an issue. Bansang hospital like many peripheral hospitals in developing countries blood is not readily available. During the course of data collection for this study I effort to explore blood transfusion services in the hospital. I interviewed health care providers including nurses, midwives, doctors and laboratory personnel. Also interviewed were pregnant, laboring or newly delivered women who needed blood, so also their escorts or relatives were interviewed. I did also utilized observation methods to see issues surrounding transfusion services in the hospital. Factors identified to have contributed to the problems in the transfusion services particularly shortages of blood for transfusion are:

Reluctance for blood donation: People in these two divisions are generally reluctant to donate blood even to a relative or a loved one. Donating blood is viewed dangerous. It is believed to undermine the health of the donor. There is a particular local tribe that is very reluctant to donate blood so do everything to evade it.

High incidence of anemia: The proportion of patients particularly women reporting to the hospital needing blood transfusion is overwhelming compared to the availability of blood in the hospital. In other words the demand is higher than the supply so leading to disequilibrium. Anemia is very common in the area especially among women of reproductive age. The possible reasons for this high incidence of

anemia may be due to the high fertility rate, too many, too frequent and too early pregnancies; inadequate nutrition, and the endemic malaria situation in the area.

Low male involvement: In the Gambia patients going to health institutions for care are generally escorted by older women. This is more common in the rural areas and particularly for maternity cases as pregnancy and childbirth are regarded entirely a female entity. This strains the transfusion services at the hospital. These women escorts are unfit to donate blood and very few males escort patients to a health facility.

However, the shortage of blood at Bansang hospital cannot be entirely blamed on the above factors. Certain operational issues in the hospital may be the main contributing factors and should be the speaking point. The World Health Assembly (83) endorsed the application of the principle of voluntary unremunerated blood donation in all communities. *Fleming* (82) argued in favor of unremunerated blood donation for four reasons that it increases the supply of blood because society will donate as being a donor will be prestigious; the donated blood will be safer for the recipient as potential donors who realize that they have risk behavior are generally willing to exclude themselves unlike the paid blood donors who will conceal their sexual risk behavior rather than forfeit payment; paid blood donors are at higher risk of developing anemia themselves as they may be poorly nourished; and fourthly unremunerated blood donation is cheaper for both health service users and health institutions.

In Bansang hospital a passive strategy in the management of the transfusion services is adopted as the function of ensuring blood availability is relegated to the patients or their relatives. “*Directed*” blood donation where blood is collected, usually from relatives, to designated patients; “*replacement*” donation where relatives of patients who received transfusion are asked to repay the units of blood to the bank; and “*remunerated*”, “*professional*” or “*commercialized*” donation in which blood is donated on cash and carry basis. Relatives of the patient pay the cost of the blood donated. All these are practiced and encouraged in the hospital. Voluntary blood donation is virtually non-existent in Bansang hospital. Unlike the other public hospitals (RVH and AFPRC hospitals) where a more active and aggressive approach are being employed in assuring blood availability. New donors are recruited and at the same time maintaining current donors. In these hospitals “*commercialized*” blood donations are not entertain. In Bansang hospital there is no systematic recruitment of blood donors so consequently commercial blood donation is the predominant way blood is acquired.

From the testimonies in the data collected the following are constant issues mentioned with regards to blood and blood transfusion.

- Relatives or escorts of patients needing blood “told” by the staff in the ward (nurses, midwives or doctors) to find blood for *“their patient”*;
- When relatives or escorts go to the laboratory for blood they are reportedly told blood was not available and that they should either donate or get a donor for *“their patient”*;
- Laboratory staff allegedly said to be the ones who identify professional or paid donors;
- Relatives mentioned that money for the blood is paid to the alleged donor but in some instances to the laboratory officer;
- At times the number of blood units paid for was not made available to the individual patient it was designated;
- Blood paid for and not used by the individual patient is demanded back by the relatives or alternatively the amount of money paid requested;
- Unused blood by the designated patient is at times marketed to relatives of other patients’ in need of blood by the relatives that bought it; and
- Laboratory personnel accused by local communities of selling or reselling blood.

The above testimonies could be useful in addressing the transfusion services at Bansang hospital.

CHAPTER 6: LIMITATIONS, VALIDITY AND RELIABILITY OF THE STUDY

6.1. LIMITATIONS

Highlighted below are some general methodological limitations of the present study. Specific limitations are discussed in the respective papers. The limitations include:

Health facility-based studies may be easier to carryout however; the results generated may not be representative of the entire population. There may be a group of people in the population that does not utilize the health system for one reason or another. They may be different from the group of people that utilize the services.

Health facility data contained very important information that could potentially be used to measure and monitor progress in safe motherhood. However, the records and registers in such institutions are in most instances incomplete – missing records or the writings are illegible beyond comprehension. At times medical records may even lack standardization as found in this study.

Another limitation of this study is that maternal mortality is a very sensitive issue so generating correct information on events surrounding the death may at times be difficult. Furthermore, people can tell stories which may be complete, incomplete or often over complete. After a fatal outcome, such as a maternal death, people's stories may be formed by a wish to blame someone, or at least someone else.

Verbal autopsy technique in the classification of obstetric causes of death is increasing gaining popularity at least in developing countries. However, literature has criticized the method for misclassifying maternal deaths (84, 85). In developing countries conventional analysis of death certificates may not be feasible as many deaths occur without prior contact with the health system. Furthermore, at times operational problems such as lack of reliable stationery supplies in health institutions may make this method the only possible alternative.

6.2. VALIDITY

Assessing the extend of what was intended to be measured was actually measured it was realized that the lack of a national language which is written or understood virtually by all in The Gambia can have some effect on the validity of the study. The use of a translator in instances when the researcher or his assistant cannot speak the language spoken by a particular family; or when the family tried to speak the language spoken by the researcher to compromise the language problem may have caused distortion

of information. For example a *Wolof* speaking *Mandinka* (local languages spoken in study area) or vice versa may have different meaning than a *Mandinka* speaking *Mandinka* or *Wolof* speaking *Wolof*. All these can bring undue language or interpretation problems and can affect validity. As the VAQ was in English language it was also noted that there are some English words which do not have a word for it in either *Wolof* or *Mandinka*. In such cases the most similar word is used as a compromise too.

However, the piloting of the VAQ has to a large extent addressed these concerns as it illuminates such issues and made the principal investigator continually sensitive to them. Whenever a translator was used in the interview process the same question was asked repeated but differently just to check for validity. It must be remembered that this study had utilized two different approaches to collect data and furthermore it has also used multiple sources of data all these heightened the validity of the study.

6.3. RELIABILITY

Assessing the extent to which the measurement yields the same answer each time it is repeated, the pre-testing carried out has put into surface issues that effort to improve both validity as well as reliability. Using one main interviewer at all times tends to fasten consistency and by so doing improves reliability.

The use of two different approaches combined with the used of multiple sources of information in this present study has also contributed to the reliability in this study. The recall period was appropriate (between one to twenty-five weeks) within approved range of not more than five years (86). It must be noted that the quality of recall may not even decline over period since a maternal death is an unforgettable event.

CHAPTER 7: GENERAL CONCLUSION AND RECOMMENDATIONS

7.1. CONCLUSION

Maternal deaths are the consequence of a long and complex chain of events. Prevention of maternal deaths therefore requires far-reaching social and economic changes beyond the premises of the health care delivery system. However, for a significant reduction in maternal mortality to be realized the health care system in the Gambia must assume its responsibilities to institute essential changes in both the structure and process of health care delivery services particularly maternal health care.

The Department of State for Health should ensure that maternal health care particularly emergency obstetric care services are made available close to the women who are in greatest need of it. These are: the rural women, the uneducated, the poor, the least powerful and the neglected women. This therefore means that the peripheral and referral health facilities should be equipped with the required supplies, equipment and personnel.

The Department of State for Health should also assure that maternal health services and emergency obstetric care services are of high quality, provided promptly and adequately. This calls for continuous monitoring and evaluation of maternal health care and emergency obstetrical care services. It also involves the scrutiny of all maternal deaths and if possible “*near-missed*” cases in a quest to prevent the recurrence of the “*avoidable factors*”.

7.2. RECOMMENDATIONS

It is felt that the recommendations below if implemented would be an important step in the reduction of maternal mortality in the Gambia.

Antenatal care registration

To improve early antenatal care registration a well structured community health education strategy should be put in place. The strategy should target men and women, and reaching out people in the community and not focusing only on pregnant women during prenatal clinics. This will require the involvement of community leaders such as religious, women and youth leaders.

Quality of antenatal care services

Urgent action is needed to uplift the quality of prenatal care being provided. Basic equipment and supplies such as weighing scales, blood pressure machines, hemoglobin meters, urine testing kits and reagents to screen blood for syphilis must be made available in all health facilities. The poor staffing

pattern observed particularly on the side of nurses and midwives deserves urgent action. A state registered midwife and if possible an additional second level midwife (an enrolled or community health midwife) should be in each health facility.

Another possible way to improve the quality of prenatal care services is to pilot the new WHO model for antenatal care (87). This model recommends fewer numbers of antenatal care visits and that investigations are performed on designated visits. This can facilitate the provision of a more focused care.

Obstetric care services at peripheral health facilities

To improve access to essential obstetric care services major health centers should be fully operational and have the capacity to adequately provide all the functions of comprehensive obstetric care services. This will require putting in place the needed essential equipment, personnel and ensuring that both the theatre and the laboratory are fully operational. This if done will reduce the referrals and counter referrals that exists currently.

Transporting obstetric emergencies

The need for a road network that is in fairly good condition cannot be overemphasized. In an effort to improve transport situation at community level, local commercial transport owners and community members need to be mobilized. Communities may require putting in place a system of transporting emergencies by establishing community funds to pay for emergency referrals to facilitate prompt evacuation of cases. In a particular community in URD, a businessman made available his private car to any patient needing urgent medical attention.

The Department of State for Health should effort to ensure that each health facility has an ambulance that is in good road condition, adequately fueled and made accessible to patients who urgently need it. In the same vein, the Department of State for Health should think of the need for river ambulances at the river crossing points to facilitate quick access to obstetric referral facilities.

Quality of emergency obstetric care services

Provision of quality obstetric care services is a fundamental pillar in the reduction of maternal mortality. However, the quality of obstetric care services being provided at the Bansang hospital requires urgent intervention. In that effect standard guidelines and protocols for the management of emergency cases need to be develop; essential supplies such as magnesium sulphate, gloves, intravenous fluids, blood bags, delivery sets to name but a few must be made available; transfusion services improve by ensuring blood availability; electricity supply assured and above all medical doctors be readily available

and accessible. Doctors of the maternity unit at the hospital should have a duty roster in place and when on call should be resident in the hospital rather, than in their houses.

Transfusion service at Bansang hospital

To improve blood availability at the hospital a well organized system of transfusion services must to be adopted. This will require having a system in which active methods of recruiting new donors are devised and at the same time maintaining old and current donors. However, for blood to be readily available, “commercial blood donation” at the hospital must totally be discouraged or prohibited.

Danger signs

Community health education on danger signs of pregnancy, labor and after delivery should be carried out to reach as many people in the community as possible. It should target both men and women and specifically those significant figures in the family who make decisions on when and where to seek medical care such as family heads and mother in-laws. The information provided should also highlight where care is available.

User fees

Women should have access to free obstetric and emergency obstetric care not only for a matter of good public health policy and practice but to promote human rights – pregnancy and childbirth is the means by which the human race is propagated. User fees on diagnostic investigations such as ultra sound scanning need to be abolished as it act as an obstacle in getting care.

Urgent action should also be taken to address the disparity in charges that exist among public health facilities. The “*illegal*” charges levied on rural women in Central and Upper River Divisions must be address urgently.

Relationship between health personnel and users of the services

To assure continued utilization and prompt reporting to medical facilities action is needed to improve providers’ attitudes towards patients and their relatives. Care providers should treat patients and their relatives with respect, understanding and dignity. Men should be enabled rather than restricted in participating in women’s health issues.

Monitoring and evaluation

Routine review of all maternal deaths and if possible near-missed cases should be instituted in an effort to identify the avoidable factors to maternal deaths. This is necessary in putting in place evidence-

based interventions in addressing maternal deaths. The involvement and active participation of well focused; committed and technically competent people experienced in this field cannot be overemphasized. The availability and willingness of the senior health management to listen to the information revealed without taking judgment or punitive attitude must be ensured.

To have an ongoing monitoring of progress in the safe motherhood program in the Gambia, indicators that can register changes in a relatively short period of time (e.g. 3 to 5 years) is needed. The process indicators outlined by the United Nations agencies are the most appropriate as they can be obtained from data that are relatively inexpensive to gather.

Resource allocation

A call for reallocation of national resources is needed for the above mentioned strategies and interventions to be effectively and efficiently implemented. A larger share of the national budget should be allocated to the health sector and a high proportion of that be directed towards women's health and maternal health care services.

Future Research

There is growing concern that Gambians are reluctant to donate blood. It is therefore necessary to carryout a qualitative study to assess or explore the public's perception surrounding blood transfusion and blood donation.

Another important area for research is the application of the United Nations guidelines on obstetric care to assess the availability, utilization and quality of care for women with obstetric complications.

Antenatal care research to evaluate the current prenatal care services in the country is necessary. For over two decades now the same antenatal care strategy is being used in the Gambia yet no significant gains has been registered. It is therefore time to carryout a thorough assessment of the antenatal care services. This is essential in improving the quality of the services.

Others

In the long term it would be necessary to invest on girls' education and improving the economic status of women in the Gambia. The Department of State for Health should effort to ensure contraceptives are readily availability and accessibility and to promote use by women. Improving the road conditions and putting in place an effective and sustainable public transport system in the rural areas is needed. Inter-

sectoral collaboration and action will be needed if any meaningful success is to be realized in maternal mortality reduction.

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PAPER I AND PAPER II

PAPER I

Maternal Mortality in Bansang Hospital, the Gambia: Levels, Causes and Contributing Factors.

Mamady Cham¹, Johanne Sundby², Gijs Walraven³ and Siri Vangen⁴

¹Department of state for Health and Social Welfare
Medical and Health Headquarters
Quadrangle, Banjul
The Gambia

²Department of General Practice and Community Medicine
University of Oslo, Postbox 1130 Blindern
0318 Oslo, Norway

³Medical Research Council Laboratories
Farafenni Field Station
Banjul, the Gambia.

⁴Norwegian Institute of Public Health
Division of Epidemiology
Oslo, Norway

MATERNAL MORTALITY IN BANSANG HOSPITAL, THE GAMBIA: LEVELS, CAUSES AND CONTRIBUTING FACTORS.

ABSTRACT

Objectives: To assess and describe the socio-cultural, economic and health service factors contributing to maternal deaths in rural Gambia.

Methods: A retrospective study combining both qualitative and quantitative methods was used. Verbal autopsy and confidential inquiry techniques were utilized in reviewing maternal death cases that have occurred in Upper and Central River Divisions of the Gambia between January and September 2002. The “road to death” concept was followed in data collection through the interview of people knowledgeable about the case. Classification of cause of death and contributing factors to these deaths were performed by three reviewers independently.

Results: Forty-two maternal deaths were identified, 40 of them took place in a health institution (39 in the referral hospital). During the same period a total of 876 live births were recorded in the hospital. This gives a hospital-based maternal mortality ratio of 4,452 per 100,000 live births. All the cases identified had contacted or were in contact with the health system after the complication developed. Of these 42 deaths, 28 (67%) were direct obstetric deaths of which hemorrhage was the leading cause accounting for 10 cases. Indirect obstetric deaths were 14 (33%) and anemia accounted for 12 of the deaths. In this study anemia was the leading cause of death.

Substandard health care for obstetrical referrals, low quality primary health care, obstructions in receiving urgent care and delay in reaching a medical facility were identified as probable or possible contributing factors to these deaths.

Conclusion: Improving the quality of emergency obstetrical care services at the obstetrical referral hospital could be an important step in the reduction of maternal deaths in the area.

Key words: Maternal mortality, Emergency obstetric care, Verbal autopsy, contributing factors, The Gambia

INTRODUCTION

Pregnancy and childbirth are natural processes in a woman's life. Motherhood should be a time of expectation and joy for a woman, her family and her community but they are by no means risk-free. For some women in certain parts of the globe, particularly in developing countries, the reality of motherhood is often grim. For many of those women, motherhood is often marred by unforeseen complications or even a loss. Some of those women lose the fetus while others lose their lives and that of the baby.

WHO estimated that every year over half a million women die, more than one each minute, of pregnancy related causes (1). Of these over 99% takes place in developing countries and less than 1% in industrialized countries. Levels of maternal mortality differ greatly among the major regions of the developing world as well. Africa has far more its fair share as 11% of women live in Africa but an estimated 30% of maternal deaths takes place there – 173% more than would be expected on the basis of population alone (2). The highest maternal mortality rates are found in Sub-Saharan Africa where levels as high as 1,100 per 100,000 live births are reported. The life-time risk of maternal death for African women is over 200 times higher compared to their counterparts in North America (3). This difference in maternal mortality between the developed and the developing countries shows the greatest disparity than any other public health indicator monitored by WHO. Deaths and disability related to maternal causes account for at least 18% of the burden of diseases among women of reproductive age in developing countries (4), and DALY (Disability Adjusted Life Years) lost due to maternal conditions in Sub-Saharan Africa is 3.2% (5).

Reduction of maternal mortality is an international development goal and has been adopted by the United Nations (3) and endorsed by 149 heads of states at the Millennium Summit (6). It has also been a common goal to several international conferences including, in particular, the Nairobi Safe Motherhood Conference held over a decade ago. This conference has prescribed interventions known as pillars to safe motherhood – access to contraceptives; prenatal care; clean and safe delivery and emergency obstetric care (EOC) (7). Among all the pillars laid down to combat maternal mortality, access to EOC is the one that can substantially reduce maternal mortality (8-10). According to literature 15% of all pregnant women will develop sudden serious obstetric complications that will require life-saving access to quality obstetric services (7, 11). Most obstetric complications cannot be predicted nor prevented, but nearly all complications can be successfully treated (12, 13). Furthermore, we know that even if obstetric complications could be predicted those women identified would certainly need EOC for their problems to be successfully managed. Thus, EOC is the key pillar that holds all these other blocks in place.

Low economic and social status of women and lack of access to and use of EOC are strong determinants of maternal mortality (14). Low status of women limits their access to economic resources

and basic education and thus their ability to make decisions related to their health and nutrition. Maternal mortality is a particular sensitive indicator of inequality; a litmus test of the status of women, their access to health care and the adequacy of the health care system responding adequately to their health care needs (15, 16). Information about the levels and trends of maternal mortality is needed not only to tell us about the risk of pregnancy and child birth but also about women's health in general, their social and economic status. Knowledge about the major causes of death is essential to policy-makers in determining priorities and health-care providers in evaluating the quality of services, even though maternal mortality rates are difficult to use in practice, especially to demonstrate program impact (17).

Levels of maternal mortality are unacceptably high in The Gambia estimated 1,050 per 100,000 live births (18). A more recent survey conducted in 2001 using the sisterhood method pegged it at 730 per 100,000 live births (19). The results further identified that maternal mortality is higher in rural than in the urban areas; and also higher in non-primary health care villages than primary health care settlements. Recent WHO estimates stated that life-time risk of maternal death for Gambian women is 250 times higher than North American women (3). In the Gambia prenatal care coverage is very high estimated at 96% (20) but only few deliveries takes place at health facilities. Skilled attendant at deliveries is estimated at 44%. In the Gambia comprehensive EOC is only provided by the hospitals. Furthermore, majority of the deliveries take place at home attended by a traditional birth attendant or a relative. It is therefore necessary to assess what is working well and what is not working as expected in these institutions to focus and refocus programs and interventions.

A maternal death is usually preceded by a multitude of events both community and health service related factors and no one factor can be singled out to be responsible for the death. However, if a woman developed a life-threatening complication it is often health service factors that determine whether she lives or dies. Most maternal mortality studies carried out in the Gambia concentrated mainly in the main referral hospital in the capital or in the northern part of the country.

This present study was carried out in rural Gambia to identify and describe the events and circumstances surrounding maternal deaths. The aims of the study were: a) to describe the characteristics of the maternal deaths identified; b) to explore and describe the socio-cultural and economic factors surrounding maternal deaths identified; c) to investigate and illuminate health service factors contributing to maternal deaths in the study area.

BACKGROUND

Study Area

The study was conducted in Bansang Hospital and its main catchment area – Central River Division (CRD) and Upper River Division (URD), two of the five administrative divisions in the Gambia. Bansang Hospital is located in the rural area approximately 300 kilometers inland away from the capital city.

The population of the two divisions according to the last census (21) was estimated at 311,080 representing 30% of the country's population. Fertility rates higher in these two divisions than other parts of the country as total fertility rate is estimated at 7. Crude birth rate is 50.1 and 51.9 for CRD and URD respectively, higher in these divisions than any other division. Marriage is a social norm in the Gambia and people marry very early. Polygamous marriages are socially accepted and over 37% of males and 52% of females married within the study area are in such a relationship. People in these two divisions generally depend on farming for their living. They are generally poor as over 70% of the inhabitants are classified as very poor (22).

In total there are sixteen other health facilities (health centers and dispensaries) within the study area. Of these two are major health centers (one in either division), fourteen minor health centers and dispensaries. A total of thirteen of the health facilities are located in CRD including the hospital and the rest in URD. Bansang hospital is the only facility providing comprehensive emergency obstetric care (EOC) among all these health facilities. In other words it is providing all the eight signal functions outlined in the guidelines for minimum acceptable obstetric care services (11). The distance of other health facilities to the hospital ranges from 17 to 115 kilometers. Usually each health facility is provided with an ambulance for patient evacuation. Patients needing referral to another higher level facility should be ambulated at no cost to the patient or his/her relatives. However, during the course of data collection three of the health facilities were without an ambulance and another two health facilities the ambulance had a breakdown and were grounded. Table 1 gives a situational analysis of Bansang Hospital for the year 2001.

The river Gambia traverses right through the length of the country dividing the country further into north and south bank. The hospital is located on the south bank and some eight of the health facilities in the study area are located on the north bank of the river meaning that patients referred from those facilities to the hospital must cross the river. There are four different river crossing points to the hospital and at each point there is a stationed ferry operational most of the day.

Table 5: Situational Analysis of Bansang Hospital 2001

Indicator	No.	Calculated indicators
No of Deliveries	1339	
No of referrals in to maternity unit	451	
No of caesarian sections performed	144	Caesarean section rate = 10.8%
No of instrumental deliveries conducted	79	
No of live births	1070	
No of still births	177	Perinatal mortality rate = 13.2%
No of maternal deaths	50	Maternal mortality ratio = 3,734/100,000 LB
No of case of multiple births	Not available	

METHODS AND MATERIALS

Definitions

Maternal mortality is defined in accord with WHO definition (23) and a maternal death is defined as the death of a woman whiles pregnant or within 42 days of termination of pregnancy, irrespective of the duration or site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes. Maternal deaths are divided into direct and indirect obstetric deaths. Direct obstetric deaths are those arising from obstetric complications of pregnancy state (pregnancy, labor, and the post partum period), from any interventions, omissions, incorrect treatment, or from a chain of events resulting to any of the above. Indirect obstetric deaths are those resulting from previously existing diseases or diseases that developed during pregnancy and which was not due to direct obstetric causes, but was aggravated by physiological effects of pregnancy.

Data Collection

This was a comprehensive health facility and community based study carried out in Bansang hospital and its main health area to review all maternal deaths identified that in the area between January to September 2002. A retrospective design combining both quantitative and qualitative methods; was utilized in this study. Confidential inquiry to investigate what happened in the health facility through the interview of health care provider and review of health records; and verbal autopsy (VA) to collect data at the community or family level. To make an in depth investigation and analysis of events surrounding maternal deaths the *“road to maternal death concept”* was followed (24). People knowledgeable about the death were interviewed.

The community health nurses identified and reported maternal deaths in the village or community. Deaths that occurred in the health facilities or hospital were reported by the head midwives in the facilities. The hospital maternity unit has a very satisfactory record of all maternal deaths in the unit dating back since 2000.

The maternal mortality questionnaire used was a standard VA tool developed and currently used by the British Medical Research Council in The Gambia (25). It has sections on: background characteristics of the deceased; relatives' account of events around the woman's illness and death (open-ended). The questionnaire also included closed sections to probe for specific signs and symptoms. The VA section incorporated is on health care seeking behavior or contributing factors. This section is structured in pre-defined categories, for the reviewers to determine if the listed factors had either "*probably*" or "*possibly*" contributed to the death. The open-ended section in the questionnaire is to record the respondent or respondents' verbatim account of the deceased's final illness and up to her death. The aim was to elicit the relative's perception of the conditions surrounding the death of the woman by encouraging them to freely reconstruct the process that led to that event and to describe its most relevant aspects.

Data collection began at health facility level, mostly at the hospital, where most deaths occurred following them into the community. At the hospital health staffs knowledgeable about the case were interviewed independently. No questionnaire was used during interviews with health staff. They were all asked open-ended and probing questions. The aim was to elicit information on the factors contributing to the death and assess their opinion on the preventability of the death. The approach intent to explore the preventability of the maternal deaths identified. Asking such questions was believed to bring into light deficiencies in care provided and operational factors within the health service that might have contributed to the death. At the health facility, the deceased's health facility kept records (case notes) were traced and photocopied. If the deceased visited more than one health facility all of them were visited and the procedure mentioned above was applied. Health staffs interviewed were mainly doctors, midwives, nurses, laboratory staff (if an issue concerning the laboratory was mentioned), and theatre nurses (if the case had an operation or was planned but not done). Other health staff interviewed was ambulance drivers and generator operators. On average in a single case during review three health staffs were interviewed. All interviews with health staffs were recorded on tape.

After collecting data from all the health facilities, data collection was carried out in the community or family level. The VA questionnaire was administered to persons who were present from the time the deceased developed the illness up to her death or to the persons (always more than one) who accompanied her to the health facilities and stayed with her until she died. In most cases these were women (co-wife, aunt, granny, TBA) and in very few case the husband. All interviews were conducted in the deceased home in a group interview in the presence of a man who usually sanctioned the interview before it started. Interview at family level was carried out at least one week after the death because to approach a bereaved family earlier may be culturally offensive. This period is the mourning time. If she is a Muslim the family is preparing for the seventh day charity in honor for the dead. Data

collection in the community was mostly carried out on Fridays, traditionally assigned as a rest day in rural Gambian communities. It is easy to find people at their home on such a day. However, data collection at family level was not carried out on a Saturday as it is culturally believed that if a bereaved family is approached on this particular day on anything related to the death another person in the family may die. Other significant people in the community interviewed were the driver who drove the deceased to the health facility; and the ferry captain or canoe owner who ferried her if she did cross the river with an incident mentioned. During VA, families were asked to produce the antenatal card that was photocopied and returned when available.

All interviews were conducted by the author (M.C.) in the local language spoken and understood by the respondents. Data collection was between the periods from 1st August to 8th October 2002. The recall period range from one to twenty-five weeks.

Classifications by Reviewers

Three public health physicians, being specialists obstetricians, reviewed all the cases independently to assign medical cause of death and contributing factors to each case in accordance with WHO guidelines (26). Two of the reviewers have worked in the Gambia for over ten years and are currently working in the country. The review of cases was based on the VA information and case notes for 32 of the identified cases. For the other 10 cases no VA was carried out and review was based on the case notes alone. The classification of cause of death was satisfactory if at least two of the three reviewers were in agreement. Classifying the contributing factors to each death was essential for identifying the “avoidable factors” to prevent the maternal death.

Data Management and Analysis

All data collected were cross-checked for accuracy, completeness and clarity. The pre-coded quantitative data contained in the VA questionnaire was imputed in Software Package for Social Sciences (SPSS) version 11.0 to make simple descriptive analysis.

The qualitative data were transcribed in full to record the respondent’s verbatim account of the deceased’s final illness until her death. The transcribed data were put into a software package NUD*IST then analyzed (see paper II for more detailed explanation).

Ethical Issues

Ethical clearance to undertake this study was sought and granted by the Ethical Review Committee in Norway and also from the Gambia Government/Medical Research Council Laboratories Joint Ethical

Committee in the Gambia. Permission to access health facility kept records was granted by the Director of Medical Services in The Gambia.

RESULTS

Reviewers' agreement

All the 42 cases were confirmed as maternal deaths by all three reviewers. All three agreed on a single cause of death in 28 (67%) of the cases. The agreement among the reviewers was higher in the classification of the 32 cases in which both VA and case notes were available, 23 (72%) compared to 50% for the 10 cases in which only case notes was available.

Cause of death

Twenty-eight (67%) of the deaths were as a result of direct obstetric causes of which hemorrhage was the leading cause accounting for 10 of the cases. All these 10 deaths were ante partum hemorrhage and 9 of them were due to abruption placenta. Two of the direct obstetric deaths were caused by sepsis and both were home deliveries conducted by a TBA and a relative respectively. Indirect obstetric deaths accounted for 14 (33%) of the deaths and the predominant indirect deaths was due to anemia in 12 of the cases. Table 6 shows a tabulation of medical causes of death.

Four (10%) of the deaths occurred during the ante partum period, 7 (17%) during labor and 31 (74%) during the postpartum period. Furthermore, of the postpartum deaths 10 (32%) occurred less than 24 hours after delivery, 9 (29%) between one to two days after delivery, 12 (38%) occurred at least more than two days after delivery.

Further analysis of deaths by specific causes revealed that of the deaths due to hemorrhage 6 out of 10 occurred in the postpartum period – 4 in 6 occurred less than 24 hours after delivery and 2 took place between one to two days after delivery. Of the 9 deaths due to hemorrhage whose hemoglobin (HB) level was checked during prenatal care visits, 7 of them HB was 8 g/dl or less and in only one was her HB above 8 g/dl. In the same subgroup HB results after the complication developed was below 8 g/dl in 7 (70%) of the cases.

Analysis of the deaths due to anemia also indicated striking results in that of the 8 cases that were fortunate to have their HB level checked during prenatal care visits, 5 in 8 HB was 8 g/dl or less and in 3 cases HB was above 8 g/dl. However among the same cases that died due to anemia, 9 out of 12 HB level was below 8 g/dl after the complication developed. HB level as low as 2.2 g/dl was recorded in this subgroup. Appendix 4 shows the characteristics of cases.

Social and demographic characteristics of the women

The deceased women were equally divided between CRD and URD by residence, 26 (62%) were resident of a PHC village. Four (10%) were aged less than 17 years, 35 (83%) aged between 17 to 35 years and 3 (7%) were above the age of 35 years. The youngest among the deceased was aged 14 years while the oldest was 43 years old giving an age range of 29 years. The mean age of the entire cases was 26.4 years. Out of the 42 cases, 10 (24%) were first pregnancies, 14 (33%) second to fifth pregnancy and 18 (43%) sixth or higher pregnancy. The average number of pregnancies was 5. The highest number of pregnancies recorded among the cases was 12. Figure 3 shows the number of pregnancies of the case.

Of the 32 autopsied cases, only 3 had attended formal schooling. One of them reached secondary school level. Of the 39 of the cases with information on marital status, all were married. Among them, 16 had no co-wife, 7 had one co-wife, 7 had two co-wives and 2 had three co-wives.

Antenatal care card

Clients' antenatal care record card was retrieved in 37 of the cases. 32 were found in the hospital and the other five with the deceased's family. Among those retrieved within the hospital, 22 were found filed in the deceased's case notes. The other seven were extensively searched and later found in a pool of many antenatal cards abandoned in a drawer at the maternity ward.

Assessing the consistency in filling the card by the care providers none was found to be consistently filled. Medical and obstetrical history has not been taken or even if taken valuable information was missing or was not accurate. In one case the previous pregnancy was by caesarean section but on the card it was written a normal home delivery. In another case the previous birth was a twin delivery but on the record it was not mentioned at all. Recommended place of delivery was left unattended in a substantial number of cases. In ten of the cases the urine test results were too vaguely written to be understood.

Basic indicators

Of the identified maternal deaths, 39 took place in Bansang hospital and the other 3 died outside the hospital – one at a major health centre, another during transportation (to a major health centre after visiting a dispensary) and the third died at home (two days after discharged from Bansang hospital). All the cases identified had contact with the health system and 40 reached the obstetric referral hospital. In the same corresponding period there had been a total of 1058 deliveries in the hospital of which 876 were live births, 175 stillbirths and 94 caesarean sections. This gives a hospital based maternal mortality ratio of 4,452 per 100,000 live births, perinatal mortality and caesarean sections rates of

16.5% and 8.9% respectively for the hospital. The minimum expected births in the area for the nine months period was estimated at 15,064 (population estimated at 400,917 in 2002 with crude birth rate of 50.1). This means during the study period the proportion of caesarean sections performed of all the births in the population was 0.6%.

Antenatal care

All but one woman attended prenatal care clinic at least once. Of those who attended prenatal care and their pregnancy card were traced, five (14%) of the women were registered during the first trimester, 14 (38%) in the second trimester and 18 (49%) registered during the third trimester of pregnancy. (Calculations based on the women who attended antenatal care and the card available number = 37).

According to the prescribed guidelines for antenatal care in the Gambia an awful lot of investigations had not been performed despite antenatal clinic attendance. Table 7 shows the investigations performed during routine prenatal care visits. Furthermore in the same group, only 17 (46%) had their medical and obstetric history documented leaving a substantial number of the cases had their history not taken during prenatal care registration. Assessing the classification of the pregnancy at the prenatal clinic and comparing them with the guidelines, the care providers at the prenatal clinic classified seven of the cases as high risk, one low risk, and 29 of the cases were not classified at all. Using the guidelines on maternity care of the country, 29 of the cases were high risk pregnancies. Furthermore, of the 29 cases not classified by the care providers, 19 (66%) were high risk pregnancies according to the guidelines. Even among the 29 cases identified as high risk pregnancies by the guidelines, 19 (66%) of them failed to be classified during prenatal clinic attendance. See appendix 3 for the antenatal care records.

Looking at the recommended place of delivery among the 37 cases, it was realized that even though 7 cases were classified as high risk by the care providers only 6 were recommended to deliver in a hospital. In 15 (41%) of the cases no place of delivery was recommended.

Figure 3: Number of pregnancies

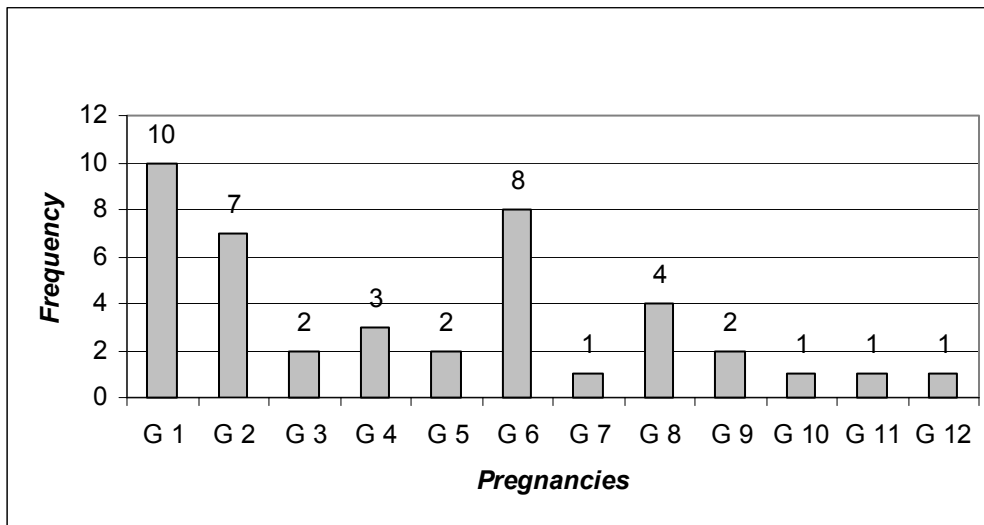


Table 6: Causes of maternal death

Cause of Death	n	Total
Direct Obstetric Deaths		
Hemorrhage	10	(23.8%)
Ante partum		
Abruptio placenta	9	(90.0%)
Placenta previa	1	(10.0%)
Eclampsia	8	(19.0%)
Obstructed labor/Ruptured Uterus	8	(19.0%)
Mal-presentation	4	(50.0%)
Cephalo pelvic disproportion	3	(37.5%)
Iatrogenic factors	1	(12.5%)
Sepsis	2	(4.8%)
Subtotal	28	(66.7%)
Indirect Obstetric Deaths		
Anemia	12	(28.6%)
HIV/AIDS	1	(2.4%)
Unknown	1	(2.4%)
Subtotal	14	(33.3%)
Total	42	(100%)

Table 7: Antenatal Care screening and investigations

Investigation	N(37)	%
Height Measurement		
Measured	0	(0.0%)
Not Measured	37	(100.0%)
Urine Testing		
Tested	20	(54.1%)
Not Tested	17	(45.9%)
Number of times:		
1	19	(95.0%)
2	1	(5.0%)
Syphilis Screening		
Performed	2	(5.4%)
Not Performed	35	(94.6%)
Blood Pressure Checking		
Checked on all ANC visits	31	(73.8%)
Not checked at least on a visit	6	(14.3%)
Number of visits B/P not checked:		
1	5	(83.3%)
4	1	(16.7%)
Weight Checking		
WT checked on all ANC visits	18	(48.6%)
WT not checked on at least an ANC visit	19	(51.4%)
Number of visits for which WT was not checked:		
1	8	(42.1%)
2	3	(15.8%)
3	5	(26.3%)
4	3	(15.8%)
Weight Checking of Eclampsia Cases (8)		
Number of visits on which weight was not checked:		
1	2	
3	1	
Checked on all visits	5	
Hemoglobin Checking		
Checked	30	(81.1%)
Not checked	7	(18.9%)
HB estimation if checked:		
< 8 g/dl	7	(23.3%)
8.1 or more g/dl	23	(76.7%)
Statistics of HB Results:		
Mean	9.9 g/dl	
Median	10.0 g/dl	
Lowest Result	5.7 g/dl	
Highest Result	16.0 g/dl	

¹Cases in which pregnancy card cannot be traced

Pregnancy outcome

Out of the 31 cases that had delivered, 7 were multiple pregnancies. However, only one was the diagnosed made during the prenatal period by ultra-sound scan while the others it was detected during delivery. One of the cases did not attend prenatal clinic. Among the other five cases one was referred for scanning at the hospital but did not go. The reason for not going was lack of funds as revealed during the autopsy. She stayed approximately 76 kilometers away from the hospital. The average number of prenatal care visits for the five women with multiple pregnancies not diagnosed was 3.

Of the 25 single births, 10 were live births and 14 ended as stillbirths. Among the multiple pregnancies, in 3 out of 7 cases twins were still births; in another 3 women the outcome of delivery was a live birth and stillbirth twin. In only one case twins' were live births. Appendix 5 shows the pregnancy outcomes.

28 out of the 31 deliveries took place in a medical facility. Of these 26 took place in the hospital. Only 8 of the women were recommended for hospital delivery at the prenatal care clinic. Seven (23%) of the deliveries were by instrumental (five by vacuum and two by forceps) and 5 (16%) through caesarean section. Seventeen (55%) were attended by a nurse/midwife and 12 (39%) by a doctor.

Road to death

The results herein are based on the 32 cases in which verbal autopsy were performed on them. A detailed description of the qualitative data of this study is in paper two.

Health care seeking process

The first place to seek care was from a traditional birth attendant in 9 (28%) of the cases, dispensary in another 9 (28%) cases, and at a health center or hospital in 11 (34%) and 3 (9%) of cases respectively. The mode of transportation to the first medical facility care was sought was a cart (donkey, ox or horse) in 15 (47%) of the cases, walked in 6 (19%) of cases and by a motorized vehicle in 11 (34%) of the cases.

The number of people who accompanied the deceased to the medical facilities was maximally as much as five. On average the number was two and in most cases they were women.

The average time for the women to reach the first health facility was 43 minutes while the longest time elapsed was three hours. Twenty-seven (84%) of the women had difficulty in reaching a medical facility promptly. In 22 (69%) of the cases it took them over an hour before reaching a medical facility. The average distance to the first medical facility of contact was 8 kilometers while the longest distance trekked was 32 kilometers.

Thirteen (41%) of the cases in the process of seeking care had crossed a river; 10 (77%) crossed one river crossing point and 3 crossed two different crossing points. In only one case the crossing was marred by an incident. The ferry service was closed at that point in time so she resorted to local canoes during the night. The other twelve cases that crossed a river experienced no delay at the ferry crossing point.

Reaching a medical facility does not always mean that a woman will receive the treatment necessary to save her life. In this study 8 (25%) of the cases visited as many as three medical facilities, 18 (56%) visited two health facilities and the rest contacted only one facility. This indicates that 26 (81%) of the women went to a facility where the required services was not available and were further referred to another facility.

Ambulance services was not available to 15 (58%) of these 26 women. The patient and her relatives had to find their own means of transportation. In 3 out of the 15 cases the relatives had to hire a vehicle to take them to two different facilities they were referred to. The average distance from the deceased's place of residence to the hospital (where most cases died) is 56 kilometers. The shortest distance trekked was 7 kilometers while the furthest was up to 110 kilometers.

Reaching the hospital, obstetric referral facility, does not automatically mean receiving the care required. Eighteen of the cases actually needed urgent blood transfusion but three of them were unable to be transfused because blood bags were not available in the hospital at that time. Among those transfused, 11 (73%) had to pay money before blood was made available. Obstructions in receiving care at the hospital were more prominent among anemia cases or those cases needing blood transfusion because money is needed before blood could be available.

Funds to purchase medical care

In 22 (69%) of the cases money was not readily at hand when the complication developed. Twenty-one of them resorted to loaning money from within or outside the family. Of the 10 cases that money was readily available, the husband was the funds provider in 4 of the cases; in-laws of the deceased in another 4 cases and in 2 cases the deceased herself were the provider. In one case, money was not sought due to the urgency of the situation.

The range of expenditure on medical care was between zero and D650.00 (US\$1 equivalent to D20.00). This expenditure covered transportation, things asked to buy at the medical facilities and fees. The average expenditure was D184.00. The average amount spent on transportation i.e. from home to all the health facilities visited was D30.00 representing 16% of the average total spending. The average total expenditure on things asked to buy at health facilities including the hospital was D130.00, which is 70.6% of the total expenditure in seeking care. The highest amount of money spent at the hospital was D650.00 which excludes transportation cost.

Analysis of expenditure at the hospital by cases and further by specific cause of death was performed and it indicated gross dissimilarities. The highest expenditure was incurred by cases that died of

anemia, as they spent on average D272.00. In one case the highest amount of money the deceased or her relatives had to part with was D650.00. Hemorrhage cases spent 2.7 times lower than the former; expenditure was 6.8 times lower among eclampsia cases and 2.3 times lower among those who died of obstructed labor compared to anemia victims.

Among the 15 cases transfused 11 (73%) paid money for the blood. In the other 4 cases that did not pay money for blood relatives donated the blood. The average amount of money spent on blood was D363.60; while the highest amount spent was D650.00. General analysis of expenditure on blood revealed that a pint of blood costs D150.00.

Contributing factors

Aggregate information on contributing factors according to the three independent reviewers revealed that substandard care for obstetric referrals, low standard primary care, and obstruction in getting care and delay in reaching medical facility was very prominent and identified as probable or possible contributing factors to these 32 deaths. Among the most common aspects of poor quality of care identified were lack of available blood at the hospital, inadequate care and provision of care that did not conform to local guidelines. None of the 15 women transfused had their vital observations monitored before or during the process of transfusion. Table 8 is a tabulation of the contributing factors identified by the reviewers.

Table 8: Frequency of contributing factors as per Reviewer

Contributing Factors	Reviewer		
	1	2	3
Substandard obstetric referral care	24	32	18
Substandard primary care	16	24	21
Obstruction in getting care	8	14	11
Delay in reaching medical facility	0	8	16
Not recognizing severity of the problem	5	8	11
Delay in decision making process	2	8	2
Lack of knowledge of treatment possibilities	4	2	1
Lack of transport	3	2	1
Lack of money	0	3	2
Disagreement in decision making	0	3	0
Essential people in making decision making not available	0	1	1
Delay in getting to see professional health staff	0	0	2

Making an analysis of specific cases will illuminate the reality experienced by individual women. For example one of the women came to the hospital at around 1 O'clock in the morning with retained second twin which was due to transverse lie. Caesarean section was planned but was only possible six hours later as there was no electricity in the entire hospital. Another woman was in second stage of labor for over 48 hours yet no active management was instituted until she eventually died. Another

woman who needed caesarean section because she had an abnormal lie of the baby, the doctor who saw her decided to perform the operation 24 hours later. The woman was taken to theatre and wheeled back dead. Table 9 below highlights the common substandard care issues identified.

Table 9: Common issues identified

Obstetric referral hospital	Primary care facilities
Lack of readily available blood for necessary transfusion.	Condition of patient not detected early.
Paying money for blood “commercialized blood donation”.	Low standard of prenatal care services.
Shortages of blood bags.	Delay in evacuating patients.
Intermittent blackout or erratic electricity supply.	Unavailability of ambulance to evacuate a patient.
Shortage of drug e.g. magnesium sulphate.	Lack of reliable electricity supply.
Under the table charges.	Lack of drugs e.g. magnesium sulphate.
Vacuum extraction performed by all cadres of midwives.	Medical supplies shortage: intravenous fluid, gloves, cannula, blood bags etc
Delay in deciding to institute active management by the doctor providing care.	Oxytocic drugs prescribed by junior nurses.
Partograph not systematically used and even if used only the post partum section is attended.	Partograph not systematically used and even if used only the post partum section is attended.
None of the cases transfused was monitored before or during the process of transfusion.	Delivery conducted by untrained nurse.
	Under the table charges.

DISCUSSION

Verbal autopsy technique

The reliability and sensitivity of verbal autopsy technique in maternal mortality studies has been challenged (27-29), however, in this study the 100% agreement among reviewers in classifying all cases as maternal deaths and the satisfactory level of agreement registered in the subsequent classification into medical cause of death suggest that the technique is worth using in places where a system of vital registration is not in situ or where medical certification of death is not a common practice. The higher rate of agreement observed in the classification of those cases in which verbal autopsy was performed in addition to case notes compared to those in which no verbal autopsy was performed (23 out of 32 or 72% versus 5 out of 10 or 50%) suggests that verbal autopsy provides useful information. It provides information about the deceased, which may be missed by health records for one reason or another. Similar degree of agreement was recorded in another study carried out in the Gambia (25).

Maternal mortality ratio

The maternal mortality ratio of 4452 per 100,000 live births obtained from this study confirmed the findings of previous surveys carried out in the Gambia (19, 25, 30). Maternal mortality is unacceptably

high in the country. This figure may even be regarded as a minimum level for the hospital as some maternal deaths might have been missed as is common with hospital-based studies (31, 32). Health facility-based studies on maternal mortality tend to over-estimate maternal mortality (30, 33) as a disproportionate number of deaths occur in health facilities because women who developed obstetric complication go there for help. A recent maternal death review report from a rural hospital in the country also indicated high level, 1540 per 100,000 (34) live births, much lower than this study's results but still in the excess.

In this study the high maternal mortality ratio recorded in the hospital may be a result of many factors such as the geographical accessibility to health facilities, and the local population's trust and willingness to utilize health care services. The "*referral effect*" may have contributed to this scenario as only hospitals provide comprehensive EOC in the Gambia. The hospital serves as referral facility for many health facilities in a large coverage area. Women within these two divisions who develop obstetric complication must visit this hospital for their condition to be managed. In this study only 16 of the cases were recommended for health facility delivery during prenatal care registration. In reality 31 gave birth in a health institution. This indicates their willingness to utilize health services. All the cases identified in this study contacted the health system when the complication developed and 40 managed to reach the obstetric referral hospital. Similar findings were observed in the Farafenni study (25) as well as in Tanzania (35, 36).

Medical cause of death

Direct obstetric deaths accounted for the majority of cases. Hemorrhage was the major cause of direct obstetric death. This is in consonant with findings of other studies (25, 30, 46) and WHO estimates (1). All but one of the deaths due to hemorrhage was as a result of abruption placenta. Gambian women particularly the rural women, work in the fields throughout the year even during pregnancy. In the rainy season they are in the rice fields or in the farms or both. In the dry season they are involved in vegetable gardening. This is in addition to their domestic chores as women are not relieved off their domestic roles even during pregnancy in the rural areas of the Gambia. This hard and continuous string of labor might have been the possible triggering factor for the recorded high incidence of abruption found in this study. Of the nine cases with abruption placenta, six occurred during the peak of the rainy season (July – September). Sepsis usually follows hemorrhage in the order of occurrence in cause of death for maternal deaths (1). In this study sepsis was the less frequent among the direct obstetric deaths. The finding could be a result of the fact that most of the postpartum deaths identified in this study the women delivered in a medical facility (hospital) attended by skilled personnel and presumably in a more hygienic environment than the homes. The systematic prescribed antibiotics in the hospital

(even though there is no systematic sterilization of delivery trays due to erratic electricity supply) may have contributed to the low incidence of sepsis. The two sepsis cases identified were both home deliveries. The role of TBAs in the prevention of postpartum sepsis is challenged elsewhere (47).

In this study no abortion related death was identified as was the case in other studies carried out in developing countries (25, 48). In Gambian society abortion is illegal. It is performed unreported and undocumented even in medical facilities. In rural Gambia particularly in the area of this present study, early marriage and childbearing is common. In Gambian societies having many children in a marriage is a pride as it serves as a form of social security for women. Furthermore, in a Muslim society such as the Gambia, illegitimate pregnancy is a social taboo and abortion will not be reported nor documented. These may be the reasons why this study failed to capture any abortion related death.

Anemia is the leading cause of death in this study, higher than hemorrhage. Fertility rates are high in the Gambia and too close and/or too early pregnancies are common. Contraceptive use is lower in the rural areas (19). Such a situation tends to undermine the health of the woman as her body doesn't get enough time to fully recover from the previous pregnancy. Malaria is an endemic public health problem in the country. In certain parts of the study area it is a problem all year around. Poor and inadequate nutrition may also complicate the matter. Malnutrition is higher in the study area than any part of the Gambia (22). Literature has indicated that anemia directly or indirectly contributes to a significant proportion of maternal deaths. Severe anemia can lead to cardiac failure in pregnancy, while lesser grades of severity are associated with decreased maternal wellbeing and contribute to maternal deaths from hemorrhage or infection (49). In this study 5 of the 12 women who died of anemia had a hemoglobin level, measured during the prenatal period, below 8.1 g/dl. However, 10 of these women had hemoglobin below 8.1 g/dl when complication developed respectively.

Emergency obstetric care needs

The proportion of caesarean section performed of all the expected births in the population was 0.6%, far short of the minimum 5% that the UN guidelines recommended. This result signifies that there is gross inadequacy and unmet need for EOC for women in the area. Such lows were also found in studies carried out in Morocco (37) and in India (38).

Characteristics of the women

The high proportion of maternal deaths among women resident in PHC villages found in this study is not a new finding in the Gambia. A recently conducted nationwide survey in the country found the same

(19). The size of these PHC villages is bigger compared to non-PHC villages, both in terms of total population and population of women within reproductive age, so more pregnant women are expected from these settlements. With the estimated 15% of pregnant women who will develop obstetric complications at a time (11) it is natural that more fatalities may occur among pregnant women from PHC villages because they are in the majority. However, this is not the only explanation. Another possible explanation could be the presence of TBA in these villages. Women who developed complication may first try to seek help from the TBA before going to a medical facility. This may add to the delay in reaching a medical facility and in effect deterioration in the woman's condition. Literature has indicated that TBAs practice what they have learnt during their subsequent work (39, 40). During the course of 2002 an extensive retraining exercise of all TBAs in the country was embarked on to augment their knowledge and skills. Among the 26 deaths of women resident in PHC village eight first sought help from a TBA. The others visited a medical facility first because their village has a medical facility as well. In the Gambia the majority of the deliveries takes place in the community and are conducted by TBAs who commands a high degree of respect and authority in their communities. Their decision during labor and delivery is hardly challenged by the families they serve, because of cultural, social or other reasons. In contrast women in non-PHC villages do not have access to the services of the trained TBAs and consequently if a complication developed they mostly go straight to a medical facility. They are less likely to be subjected to a delay that may be experienced in the use of the services of a TBA.

Risk factors such as lack of education, first pregnancy and having too many past pregnancies were common among the cases in this study. Ninety percent of the cases had no formal education and 67% of the cases was either in their first pregnancy or had too many (more than five) past pregnancies. This finding supports the notion that lack of education, primigravida and high parity are risk factors to maternal mortality (41). The socioeconomic status of the families of the deceased has not been extensively assessed in this study, but considering the poverty classification for this area and the high proportion of cases in which funds to seek care was not readily available, is ample evidence illuminating the poor economic status of these families. The high rate of maternal deaths among the age-group, 17 – 35 years, traditionally classified as the "safe age interval reiterates the ineffectiveness of the risk approach in maternal mortality reduction. It also signifies that one can identify groups of women at risk but not the individual women who will develop obstetric complication (12, 13). The specificity and sensitivity of the risk approach has been challenged and questioned (42).

Antenatal care

Antenatal care cannot save the life of a woman once a complication develop but there is overwhelming evidence that lack of antenatal care increases the risk of maternal death. Risks over ten times higher among none antenatal care attendants have been documented (43). In the Gambia antenatal care coverage is universal and coverage over 96% has been recorded (20). Antenatal care attendance is very high as indicated in this study. The reason for this high coverage may be a result of geographical accessibility to health facilities or mobile outreach clinic; low cost of services and most importantly women's value for prenatal care. The only case of non-prenatal care attendant in this study was a Gambian but married and residing in a border village in Senegal. She was brought home (Gambia) by her visiting mother a week before her death.

Attending prenatal clinic is advisable. Early prenatal care is important too as it avails the opportunity for early identification of a preventable cause like anemia, an important indirect cause of death in this study. Maternal mortality rates are associated with the period of registration at prenatal clinic and are lowest among those who register early in their first trimester (44). This theory is supported by this present study as among the 37 whose time of antenatal care registration was known, 32 (86%) registered after the first trimester of pregnancy. The majority, 18 (49%) registered in the third trimester of pregnancy. Late prenatal care registration is common in the Gambia despite efforts by the Ministry of Health to avert the situation. Cultural factors may explain some element of it. Going to a prenatal clinic early is tantamount to "*announcing*" pregnancy to family members, which is not welcome in most Gambian cultures. Family members are expected to discover the pregnancy themselves. Announcing pregnancy or going to prenatal care clinic before family members discovers the pregnancy is believed to lead to poor pregnancy outcomes.

Early antenatal care and making several prenatal care visits are equally important and are mostly influenced by the same factors. The average number of prenatal visits recorded in this study is within the WHO model proposed (45) as 57% made four or more visits. A significant proportion made less than four visits mostly among women in their first pregnancy or those who had more than five previous pregnancies. First time pregnant women generally feel shy to attend clinics for fear of the unknown. High parity women often register late in pregnancy and make limited number of visits to prenatal clinics. This may be because their previous pregnancies were problem free so they don't see the need for it. Other social factors may also contribute to the lesser number of visits by high parity women. Attending the same prenatal clinic together with their pregnant daughters or other women who are far younger deter other women from frequently attending clinic. The age and sex of the care providers also matters to them. A young or what they called "child health" care providers or being a male may not be their wish.

Substandard antenatal care can be a major factor contributing to both low utilization of prenatal care services and/or none attendance of antenatal clinic. Prenatal care is effective if the services provided are of high quality – i.e. in conformity with standard guidelines or if perceived by the user as satisfactory. Despite very good antenatal care attendance and satisfactory number of prenatal care visits, in a significant number visits various observations or investigations – weight, height, blood pressure, and hemoglobin measurements were not performed. Lack of basic equipment such as weighing scales, sphygmomanometers, hemoglobin meters, and inadequate number of trained staff in health facilities are the main reasons for this. The poor quality of prenatal care may be a product of the way and manner clinics are conducted. Tasks such as history taking and screening (blood pressure, weight measure) are mostly performed by untrained personnel who often perform them wrongly, and even if assessed accurately, they cannot interpret the findings. Low morale among staff and the virtually non-existent supervision of peripheral health staff in these divisions may also have played a role in the poor quality of antenatal care services.

Prenatal clinics are chaotically organized as there are usually too many patients to be seen by very few staff. They do not have the time to extensively provide individualized care to the women. In a case that died of eclampsia, she had six regular prenatal care visits but had her blood pressure checked only twice. A high proportion of cases (78%) failed to be classified by risk status of their pregnancy at the prenatal clinic and a significant proportion of these (66%) were at-risk according to the maternal health guidelines. Furthermore, in 41% of the cases recommended place of delivery was not stated during prenatal care visit. All these are exposes of the degree of the poor quality of prenatal care being provided.

Antenatal care card

Recovery of the antenatal care card was satisfactory, but the multiple places where they were kept should be a cause for concern. Antenatal care cards provide valuable information to the woman and her relatives, to the health care providers and to the health system including health researchers. Among those cards recovered from the hospital, some were in the patient's case notes kept at the records office and others in the maternity ward. This shows the confusion among care providers on who should keep the card when the woman dies. What is clear is that during prenatal care period the card is client held.

The inconsistency in the filling of the cards should also be a concern. The possible reasons for the poor filling of cards may be the inadequate staffing situation, time constraint on the part of the available staff or their lack of concern for records or record keeping.

Road to death

Decision to seek medical attention when an obstetric complication developed is affected by numerous factors including actors involved in the decision making process, status of women, illness factors such as its perceived etiology and severity; distance to health facility, cost of care and previous experience with the health system (50). These factors are classified as “*patient factors*” as the health care system deemed is not responsible. In this study none of the cases with hemorrhaged delayed seeking medical help. Among the Gambian population generally bleeding of any kind or magnitude is regarded as a severe event that merits urgent medical attention. Another possible explanation is that bleeding is something one can see and feel.

Unlike other studies (50) economic factors, did not play an important role in the road to death in the present study. In the Gambia men usually decide when and where to seek care and often provide the funds. In this study, in fifteen of the thirty-two cases autopsied, the husband was not around to make the decision to seek care when complication developed. Furthermore, in a substantial number of cases they were without available funds when the complication developed. None of these cases delayed the care seeking process. This is a sign of the increasing value for women’s health and the improving status of women in the country.

Difficulty in reaching a medical facility promptly was common in most of the cases. This was due to a combination of many factors each deserving attention in their own right and in combination. Long distance, poor road conditions, lack of transport, mode of transportation used, and time of the year were the hindering factors. In rural areas of the Gambia transportation is extremely difficult for various factors: they are limited and the available ones are often in poor condition. During the rainy season with torrent rains certain roads are washed away. Some of the roads are abandoned and others too muddy or impassable. Road condition is not the only reason for transport difficulties in rural areas. Commercial transports plying between commercial towns and smaller villages usually departs for its destination in the morning and return late evening. When they leave it is extremely difficult to get another transport.

River crossing can be a potential source of delay in reaching a health facility, and more so if several crossing points are involved. In this study river crossing has not been identified as an issue except for one of the cases. From the testimonies of the relatives interviewed the ferry services were praised for what they termed as very responsive to the sick and they experienced no delay.

Emergency obstetric care

Once a woman reaches a medical facility the promptness with which she receives care and treatment is determined by the capacity and quality of the services available. Her chances of survival depend on the preparedness of the health facility. Maternal mortality reduction depends largely on assuring the availability, access and utilization of EOC (12). The transferring of patients from one facility to another and in some cases up to three different medical facilities is a clear indication of the inadequacy of those facilities. Lack of basic equipment, shortage of trained health care personnel or both were common in these facilities. All peripheral health facilities have at least two resident medical doctors to strengthen the capacity of the team in providing medical services. Of the 32 cases autopsied 29 sought care from a peripheral health facility but only 5 were seen by a medical doctor. The reason for not attended to by a doctor was that the doctors were away.

Substandard obstetric cares, lack of access to EOC and high maternal mortality rates are closely related (8, 51). The most common contributing factors identified in this study were substandard obstetrical care, substandard primary care and obstructions in receiving care. These are all factors related to the structure and functioning of the health care services. This clearly shows that improvement of the health care services are needed to avert maternal deaths. Deaths due to hemorrhage and anemia, or those needing blood transfusion (22 out of 42) waited longer before receiving care. Lack of blood in the blood bank and relatives resorted to paying money for blood was common.

Operational problems such as erratic electricity supply or shortage of doctors contributed the death of women. During the course of data collection, only one doctor was available at the maternity unit. The other three were all on vacation. This one doctor conducts ward rounds, run the outpatients clinic, on call 24 hours round the clock. He performed all caesarean sections.

All the deaths identified were in contact with the health system and 40 of them reached the hospital. For those cases that reached the hospital on average they spent at least 78 hours in the hospital before they died. This means that the health care system and indeed the hospital had the opportunity to prevent the death of some of these cases.

The urgent need for improvement in the transfusion services at Bansang hospital is evident from this study. The frequent shortage or in most instances total lack of blood at the blood bank should be a cause for concern. Not having a well organized transfusion services in place is the main reason. This has led to the proliferation of blood donation for money. The provision of accessible and readily available comprehensive EOC includes providing blood transfusion services which of course means

blood is available and safe. Provision of EOC is a health service function and cannot be relegated to the patient or her relatives just because the health system cannot find a lasting solution.

Cost of medical care and services has not been identified as an obstacle to service utilization. All the cases paid whatever they were asked to pay or buy. However, "willingness to pay" should not be in any way equated as "ability to pay". Relatives paid the money because they were desperate and wanted to save the life of a loved one. Most of these cases loaned money to pay for the services. The willingness to pay for services observed in this study is a sign of concern for the health of a loved one.

CONCLUSION

Utilization of health care services in Central and Upper River Divisions of the Gambia is generally satisfactory particularly maternal health services. Pregnant or laboring women who developed obstetric complication effort to reach medical facilities and in the process they overcome an array of difficulties. They trek long distances on dirty and rough roads often using an uncomfortable means of transportation; they at times cross rivers and often visit more than one medical facility all in the quest to have the health care needs be address.

However, even after reaching the obstetrical referral hospital these women do not receive prompt, adequate or appropriate obstetrical care. They are often subjected to unnecessary delays or obstructions before receiving care because of operational problems. Often the care provided is of poor quality and standard.

It is therefore felt that improving the quality of obstetrical care services at Bansang hospital would not only improve safe motherhood but would be an important step in the reduction of maternal deaths in the area.

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PAPER II

Maternal Mortality in rural Gambia: What do we need to know to prevent it?

Mamady Cham¹, Jobanne Sundby², Benedicte Ingstad², Siri Vangen³ and Gijs Walraven⁴

¹Department of state for Health and Social Welfare
Medical and Health Headquarters
Quadrangle, Banjul
The Gambia

²Department of General Practice and Community Medicine
University of Oslo, Postbox 1130 Blindern
0318 Oslo, Norway

⁴Norwegian Institute of Public Health
Division of Epidemiology
Oslo, Norway

⁴Medical Research Council Laboratories
Farafenni Field Station
Banjul, The Gambia.

MATERNAL MORTALITY IN RURAL GAMBIA: WHAT DO WE NEED TO KNOW TO PREVENT IT?

ABSTRACT

Background: Presented here are the analyses of verbal autopsies performed on 32 maternal deaths in a study carried out in the rural Gambia. The aim was to identify and describe the contributing factors to maternal deaths. In other words it is to identify the “avoidable factors” that could have prevented the deaths.

Methods: A verbal autopsy technique was used to generate information from informants most knowledgeable about the death. These were mostly relatives who were present during the time of the death, and also from health care personnel in health facilities where the woman sought care. They were asked open-ended questions contained in a verbal autopsy questionnaire to explore health care seeking process when the complication developed. The interviewees were encouraged to freely reconstruct the process that led to the death and to describe its most relevant aspects.

Results: The Three Delay framework was utilized in the analysis of the data. A delay in the decision to seek medical care was identified in 7 (22%) of cases, delay in reaching an appropriate medical facility was associated with 27 (84%) and 31 (97%) experienced delay in receiving the required care even after reaching an appropriate medical facility.

Furthermore, 7 (22%) had all three phases of delay, 21 (66%) were subjected to two phases of delay and 3 (9%) had only one phase of delay. In only one case no phase of delay could be associated with the death.

Conclusion: Delay in receiving prompt, adequate or the required medical care was a common problem encountered even after reaching an appropriate medical facility.

Key words: Maternal mortality, Verbal autopsy, Three Delay Model, The Gambia.

INTRODUCTION

It is estimated that some 515,000 women die annually as a result of complications of pregnancy and childbirth. Of these over 99% occur in developing countries and less than 1% takes place in the developed world (1). It has also been noted that maternal mortality ratio is the vital indicator with the greatest disparity between developed countries (maternal mortality ratio of 4 per 100,000 live births) and developing countries (maternal mortality ratio of 582 per 100,000 live births) (2). Although levels of maternal mortality vary between developed and developing countries, causes of maternal deaths are remarkably similar in these countries, however the distribution of causes differs somewhat from region to region (3).

Measuring maternal mortality is notoriously difficult for both conceptual and practical reasons. Maternal deaths are hard to identify precisely and they are relatively rare events. The currently available approaches are complex, resource intensive and imprecise; and the results they yield are often misleading (4). This challenging nature of measuring maternal mortality discouraged impact evaluation and therefore an action-oriented means of gathering information on where, how and why deaths are occurring; what kinds of action are needed and have been taken, are now being advocated (5). Answering the “why” question is more important for program planners than answering the “how much” question. Answering the “why” question requires a review or audit of maternal deaths and provides more information on events surrounding the death. A maternal death review/audit is a qualitative, in depth investigation of the causes and circumstances surrounding maternal deaths (6). In this process, mismanagement and inadequate routines are identified and discussed and ways to counter and correct them may improve clinical practices. The aim of audits is to identify errors or omissions in practice or cases of substandard care, which have contributed to adverse outcomes. These factors are known as “avoidable factors”.

Levels of maternal mortality in the Gambia is unacceptably high and is ranked among the highest in Africa, estimated at 1,050 per 100, 000 live births, higher in the rural than in urban settlements (7). Obstetrical causes of maternal deaths in the Gambia are well documented (7-11) but little attention is paid on the contributing factors.

Presented here are the main qualitative findings of a maternal mortality study carried out in rural Gambia on deaths that have occurred between January to September 2002. The objectives of this study were to describe the socio-cultural and health service factors contributing to maternal deaths and identify factors if avoided could have prevented maternal deaths.

BACKGROUND

Study Area

This study was carried out in two divisions, Central and Upper River Divisions, in the Gambia. According to the last population and housing census (12) the two divisions has a population of 311,080 representing 30% of the country's total population. It has a crude birth rate of 50.1 and was ranked the highest in fertility in the country, estimated at 7. The inhabitants are mainly subsistent farmers and are generally poor with over 70% below the national poverty line (13).

There are seventeen medical facilities scattered in the area, one of which is a hospital. This hospital is the only facility that provides comprehensive emergency obstetric care (EOC) services (14) to women with obstetric complications in these two divisions. The other health facilities provide some but not all functions of basic EOC services even though each has at least one resident doctor in addition to a number of trained nurses and midwives. Access to health care facilities in the country is good with over 85% of the population living within 3 kilometers of a primary health care or outreach health post and over 97% of the population within 5 kilometers (15). Antenatal care coverage is exceptionally high as 96% of pregnant women attend a prenatal clinic (16). However, levels of maternal deaths are highest in this part of country (7).

Each health facility is provided with a vehicle used for supervision in the field and outreach services, and evacuation of patients referred to a higher level. Referral services are free to the patient once the need is determined by the care providers. Transportation is not easy in some parts of the area because it is extremely difficult in the bush roads. It is much easier to get transport on the main tarred highway. The situation is worse during the rainy season (July – November) when the rains have washed away some roads and makes others muddy and impassable. During the rains some transports plying the bushy roads stop either because the driver is involved in farming or the transport cannot resist the road condition.

Model

A maternal death is defined as 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 (17).

In maternal mortality, like most health problems, the cause can be viewed either narrowly or broadly. A narrow view would be to focus only on the medical causes of death, while a broader view would take into consideration both community and health service factors that contribute to maternal deaths. Looking at maternal deaths in a broad context is a key part of safe motherhood initiative.

Complications that can lead to death occur in nearly 15% of all pregnancies worldwide (18). Even though many women who develop complications have one or more detectable risk factors, the majority do not go on to have serious problems (19). Screening procedures are thus of limited value for predicting complications. However, while the risk of developing complications is similar around the world, the risk of death is not – as the majority of maternal deaths occur in developing countries (1). *Thaddens and Maine* (20) have argued that not getting adequate care in time is the overwhelming factor leading to death among women in developing countries.

This lack of care, they argued, can be related to three factors: *a delay in making decision to seek care when experiencing an obstetric complication; a delay in reaching an appropriate obstetric facility once the decision to seek care has been made; and a delay in receiving adequate and appropriate care once the facility has been reached.* These three factors are collectively called the “Three Phases of Delay Model”. The model also has the premise based on the literature that about 75% of maternal deaths are as a result of direct causes – hemorrhage, obstructed labor, sepsis, eclampsia or abortion complication (3) – and that most if not all of these deaths are amendable to prompt and adequate medical interventions. Delay, therefore, is a pertinent factor contributing to maternal deaths.

In this study the Three Delay Model is used in the classification of the factors associated with the maternal deaths. It was selected because it is deemed most appropriate. It stands to provide a coherent and holistic picture of all the major factors that affected or contributed to a maternal death from the period a woman develops an obstetric complication up to the time of death. The model will help in the identification of interventions and strategies necessary to overcome those factors.

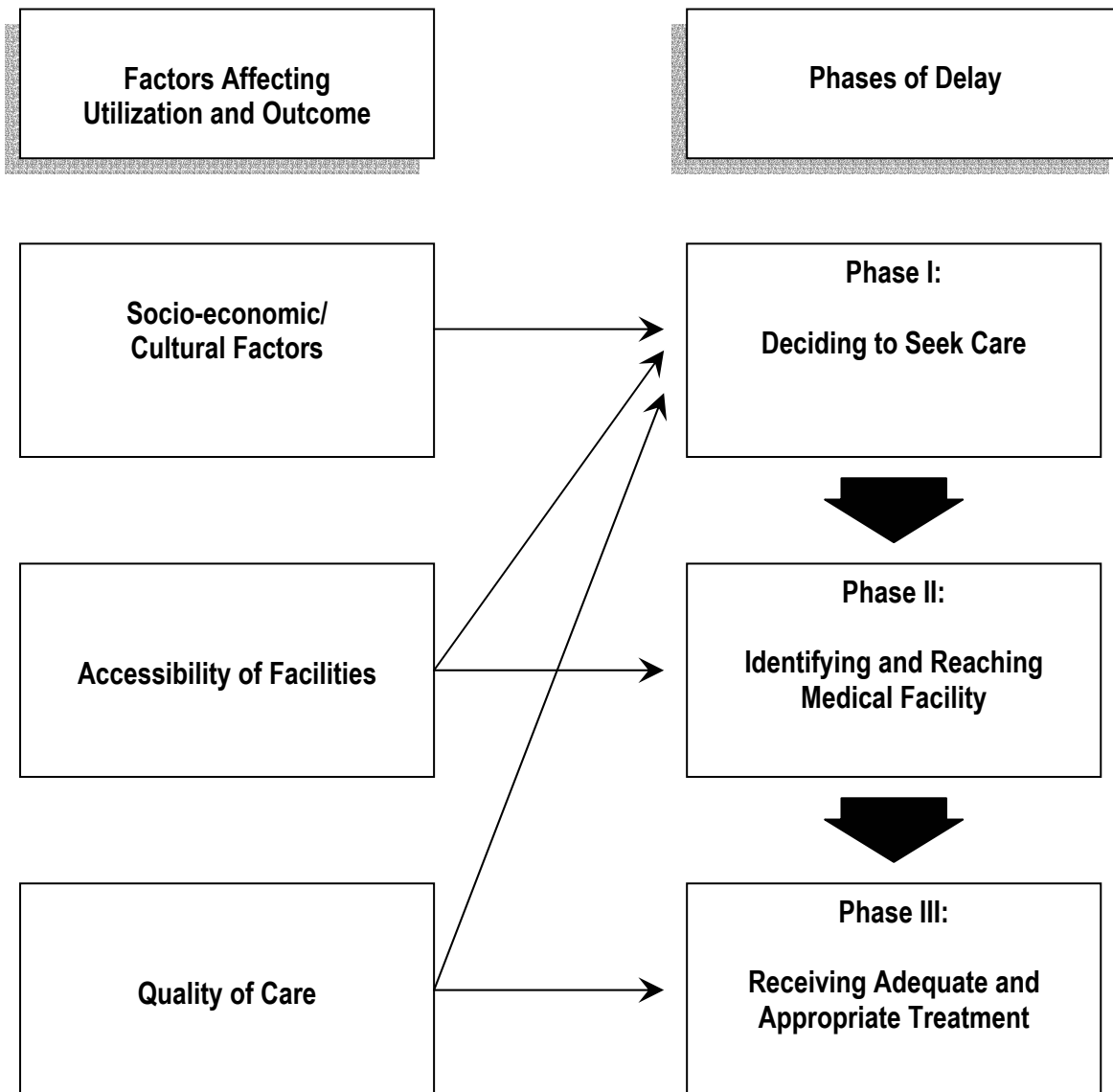
Delay in deciding to seek care when experiencing an obstetric complication may be influenced by various issues and actors involved in the decision-making process; illness characteristics (recognition of the complication, its perceived etiology, or severity); lack of trust on the health system or negative attitude towards care providers; perceived quality of care or distance to a medical facility. Delay in reaching an appropriate health care facility is affected generally by physical accessibility factors such as the distribution of facilities; availability of a means of transportation; road condition or cost of transportation. Delay in receiving adequate and appropriate care once the facility has been reached is mainly due to operational factors and inadequacy in the health care delivery system. Such inadequacies may be characterized by shortages in supplies, equipment, and lack of trained personnel; and incompetence of the available staff. Figure 4 is an illustration of the model.

It is acknowledged that a proportion of maternal deaths is a result of all three phases of delay but any one delay can prove fatal. The model focuses mainly on the interval between the onset of an obstetric complication and its outcome as it is the most crucial period in reducing maternal mortality (11, 21, 22).

This model does not focus specifically on background factors such as nutritional status or educational level because of the fact that even among the well nourished or well educated women a sizable number of them develops obstetric complications and would certainly need prompt and adequate EOC to survive (22).

The strengths in using the Three Delay Model include the following: it acknowledges the “avoidability” of certain maternal deaths; puts the woman in the centre of focus as it preserves the processing character of the problem. The model also emphasizes the importance of the availability of and access to EOC; it efforts to identify obstacles in the provision and utilization of high quality, timely obstetrics care. Above all it is universal can be used in almost all settings.

Figure 4: The Three Phases of Delay Model



MATERIALS AND METHODS

Data collection

The verbal autopsy technique (23) was performed on 32 maternal deaths identified in rural Gambia during a comprehensive health facility and population-based study. Most maternal deaths are preventable (24, 25), therefore identifying the circumstances (at family, community and health facility levels) that contribute to the risk of maternal death when studying maternal mortality is essential. To that end, each case's "road to death" was followed. This involves visiting the homes of the deceased and all the health facilities where she sought care to interview key people most knowledgeable about the death.

In the community Interviews were performed with family members or other persons, usually the person or persons present during the time the deceased developed the illness; or who accompanied her to the health facilities and was with her at the time of death. A verbal autopsy questionnaire (VAQ) that included an open-ended section and health seeking behavior was administered to these people in a group interview. This interview prompts them to narrate all the events that led to the death. It also allows for a verbatim account on the deceased's final illness up to her death. During the course of the interview information on specific issues such as: the time taken to decide to seek care; places care was sought; any financial constraint; cultural factors influencing care seeking; means of transport and time taken to reach a medical facility were all recorded. If transportation was an issue during the process of seeking care other people interviewed in the community were: drivers or ferry captain. Interviews with the relatives were conducted in the deceased's home at least one week but not more than twenty-five weeks after the death.

To interview care providers most knowledgeable about the case all the medical facilities the deceased sought care and the health facility where she finally died were visited. These were usually the staff that participated in the provision of care in the ward the deceased was admitted. They were interviewed to illicit information on operational factors affecting the provision of care in individual cases being reviewed. The interviewees were nurses, midwives or doctors. Other health staffs interviewed were the ambulance driver if patient evacuation was a problem; or a generator operator if electricity was a central issue; or laboratory personnel if blood or transfusion was mentioned or was a central issue.

Interviews with health staff was carried out independently mostly in their private rooms. All interviews were tape recorded and performed by the main author (MC).

Data Analysis

Data generated from interviews with the key informants – relatives and health care providers – were transcribed in full to record the respondents' verbatim account of the deceased's final illness up to her death. The transcribed material were categorized and analyzed according to the appropriate component of the Three Phases of Delay Model to which it relates. An interpretation of the data with a view to provide possible explanations for the findings was performed.

The analysis of the data collected was limited only to non-biomedical issues.

RESULTS

In most of the 32 maternal death cases autopsied, the death was not due to one factor but an interaction of at least two of the three phases of delay. In 3 of the 32 cases only one phase of delay was identified; 21 women experienced two different phases of delay; 7 cases subjected to all three phases of delay. However, in one of the cases no phase of delay could be associated with the death. Appendix 6 illustrates the delays experienced by individual cases.

Delay in deciding to seek care

The length of time in delay within this phase of the model is estimated from the moment somebody, either the woman or her family realized that there is a complication. Seven of the thirty-two women delayed the process of seeking medical attention after the recognition of the complication. The delay in time period range from two hours and up to five days. The average time in delay was up to forty-eight hours. The factors that contributed to the delay in deciding to seek care are collectively classified as "patient factors" because they emanate directly from within the individual patient, her family or both. The factors identified under this phase of delay in this study are:

Underestimation of the severity of the complication

Health care seeking behavior is strongly influenced by illness characteristics as perceived by the individual and/or family members. First, the illness or complication must be recognized and classified as abnormal. However, recognition of an illness is defined by the patient or her relatives' view of reality, not by the health professional's medical criteria, with which it may be different (26). Recognition of an illness may be influenced by factors such as the prevalence of the condition (27). For example if a condition is widespread and common, it is generally perceived as normal so it may not be regarded as a problem. In a study among pregnant women in Senegal, 13% regarded fever, pallor and dizziness as normal signs in pregnancy because they are common among pregnant women (28). Pregnancy and

childbirth are commonly considered to be natural, normal work for women. This may inflict a negative effect on health care seeking for pregnant or laboring women when complications developed. It may result in delay in seeking medical attention. In Gambian societies, pregnant women are socially classified as *“unwell women”* implying that these women are always with health problems as long as the pregnancy is on. This classification has a negative connotation in that it may cause undue delay in the process of seeking medical care when complications develop.

After the recognition of the illness as abnormal, its perceived severity is an important factor in the decision-making process. If a condition is not rated as severe it may not merit seeking medical care. In other words the perceived severity of the condition is a good determinant for seeking care. The health belief model best explains the rationale for such a behavior (29). This model asserts that it is the “perceived severity” and the “perceived threat” of an illness or a complication as viewed by the woman or her relatives that will motivate them to seek care. A study carried out in India in which family members of women who died a maternal death were asked about their awareness of the seriousness of the complication, high proportion of the relatives did not regard the complication as serious and did not see the need to seek care (30). Another inhibiting factor in seeking care may be having many previous problem-free pregnancies. This may instill the notion that *“it has not happened before so may not happen now”* thus taking risk. Women or their relatives tend to use this as their “risk predicting tool” for present and subsequent pregnancies. If the previous pregnancy or pregnancies were without incidents subsequent ones are usually thought to be. Several testimonies in the data collected tend to suggest this pattern of attitude among relatives:

“This was her ninth pregnancy and all her previous pregnancies were delivered at home. She at times delivers without even calling for help from the traditional birth attendant. We thought she will deliver this time without a problem”.

Cultural or traditional reasons

Brown (31) defined culture as a complex whole that refers to the learnt pattern of thoughts and behavior characteristics of a social group; and that it involves religion, kinship, knowledge, belief, art and morals and child bearing practices. Culture and experience shapes peoples’ beliefs, way of thinking and consequently influences how an individual or groups behaves in any given circumstances. The tendency to act or not doing anything in the presence of a complication is also influenced by the interpretations supported by their cultural beliefs. Some traditions in certain cultures may also influence behavior particularly in health care seeking. Illnesses or diseases are culturally or traditionally classified either by cause or origin and this classification may restraint one from seeking medical attention. Several studies carried out in Africa and elsewhere (32-34) have shown how culture influenced health

care seeking. In Benin for example labor that last up to a day was considered to be normal because it was culturally believed that difficult labor was a sign of infidelity on the part of the woman (32).

In Gambian society pregnancy and childbirth are generally regarded as an entirely women's entity so men assume an absolutely passive role in it. Furthermore, older women in their menopause including traditional birth attendants are assumed to be "experts" on issues of pregnancy and childbirth especially in the rural areas. This is because of the number of pregnancies and deliveries they survived. These women are consulted during pregnancy, labor and childbirth if a complication is recognized. Their "advice" or "words" on these issues are hardly challenged. In Gambian culture words of an elder are not challenged. In the collected data, family members of a deceased woman who had an episode of bleeding before delivery revealed that even after the recognition of the complication, care was not sought immediately. The step-mother looking after the woman, "*being the expert*", asked them to wait until after the next Muslims praying time which was three hours away by then. From the testimony the rationale for the delay was that it is believed labor and childbirth occur at specific times corresponding with the Muslim praying times:

"Labor and delivery takes places at certain times.....these times correspond with the Muslims praying times. It was around midday and the next praying time was 2:00 pm so we thought she will deliver by then. It was after then when she did not deliver we took her to the health center".

This testimony illustrates how religious belief has influenced the care-seeking process. Ideas and practices relating to illness are inseparable from the domain of religious beliefs and practices. *Jansen* (35) asserted that religion, medicine and magic are closely interwoven. The value attached to prayers in this case is very important. Prayers are use in the healing process and it is interesting to note how it could be linked with labor and childbirth.

The step-mother's position is in many folds: she is a "*health expert*" and a parent to the woman. During the deliberations the head of the household, a man, was around but never interfered even though in Gambian society men are generally the decision-makers. He cannot intervene because it is pregnancy and childbirth for which men assumed not to have roles. Even if the woman with the complication had a different opinion to that of her step-mother she cannot utter it because she acts as a parent to her.

Experience with the health care system

A woman's own or a close relative's previous encounter with the health system is a very important determinant in subsequent health care seeking process. Bad experience with the health system will mostly lead to reluctance or non-utilization of the health care system even if deemed necessary. Decision to seek care is regarded as a patient factor but health service factors often influence the

decision-making process. There are instances in which one may want to seek medical care but certain health service factors prevent them from doing so. There are a number of reasons why women are reluctant or do not even use the health system during labor or delivery and prefer home delivery assisted by a TBA or relatives. *Sundari* (36) identified unfamiliar setting at the health facility, being attended to by strangers, lack of family support, attendant being a male care provider (unwelcome in some cultures including in the Gambia), non-tolerance of health staff of cultural practices related to childbirth, reduced autonomy, the lack of sympathy and understanding on the part of health care personnel and not seeing the need for care are some of factors contributing to non-utilization of health services during labor or childbirth. Several studies carried out in developing countries (34, 37, 38) have revealed how health services related factors affects health service uptake. In the collected data, testimonies indicated that structural factors in the way maternal care services is being provided barred women from seeking care. Prenatal care clinics are held on specific days and for specified communities in the Gambia. In the rural area prenatal clinics are not held on weekends. This gives the impression to women that maternal health services are available to them only on the days clinics are held. In the collected data, testimonies indicated that women with an obstetrical complication did not seek care early due to structural factors in the health system. Relatives of a deceased woman stated that they stayed at home from Thursday up to Monday because the clinic day for their village is held only on Mondays, and moreover, during the weekends the clinic is closed.

"It was on Thursday she complained of abdominal pains.....throughout the weekend she was with severe abdominal pain, but we had to wait until the following Monday as it is the day on which pregnant women are attended to.....the clinic is closed on Saturdays and Sundays".

Another health service factor identified to have inhibited the decision-making process in this study was perceived provider attitude. *Mbaruku* (24) in his intervention study to combat maternal mortality in Tanzania identified poor staff attitude towards patients and on work as a major contributor to both high maternal mortality and low utilization of the services in *Kigoma*. Poor provider attitude was also identified as a major contributing factor to low compliance to a referral hospital by at-risked women (37). In the collected data, testimonies identified that perceived poor provider attitude was an obstacle to service utilization. Older people expect to be treated nicely by the care providers and particularly by those whom they are older than. This perceived poor provider attitude and behavior instill an unnecessary fear on the would-be patient and her relatives:

"She was vomiting throughout the night, the following morning the husband decided to take her to the health centre but she refused..... she has not yet get an antenatal care card. She feared the nurses because if she goes to complain about the vomiting she will be asked about the card and without the card they [nurse] will tell her all salty words and may even be insulted.....she may not even be given medicine".

Information received at a health facility from care providers should be an enabling rather than a restrictive factor in care seeking. Health information received is also an important factor consider to during the health care seeking process. To encourage continuity in medical care, health staff should provide clear information to patients and her relatives on when to return and locations where services can be obtained. However, practically the way and manner in which information exchange is carried out in facilities in the Gambia, does not allow for the provision of clear and understandable information. Clinics are congested and chaotically organized; the available staffs are more eager to finish routines. What should be information exchange is characterized by a one way of communication in which the care provider hands down information to the woman. The patient is not given the opportunity to ask for clarification nor does the care provider check if the woman understood the information. All these restraint the provision of clear and comprehensible information and consequently affects the decision-making process. Unclear information received from care providers was one of the reasons relatives gave for not seeking care early. A lady with multiple pregnancies was advised to deliver in a hospital. However the way the information was provided resulted in it being misinterpreted. That restricted the woman and her relatives to seek care early:

“At the clinic she was told that she had twin pregnancies. She was told by the nurses to report to the hospital when in labor. When labor began we decided to go to the hospital. We were not told to report to the hospital before labor began”.

Probably if she was told to deliver in the hospital and all the possible complications that could arise thoroughly explain to her she would have decided to go and stay in the town with her relatives where the hospital is located to reach the hospital in case of emergency. This is a common practice among pregnant women whose risk status is explained well to them and who are booked for hospital delivery.

Delay in reaching an appropriate obstetric care facility

The accessibility of health services, influenced by distance and availability of transportation, is considered to play a dual role in the health care seeking process. On the one hand, it influences people’s decision-making and on the other hand, it determines the time spent in reaching a facility after the decision to seek care has been made. Reaching an appropriate obstetric care facility early is influenced by the location and geographical distribution of these facilities. Once a decision to seek medical care has been made other obstacles must be overcome in reaching there. In this study among the 32 cases autopsied 27 (84%) had delay in reaching an appropriate obstetric care facility. From the testimonies contained in the data collected the constant reasons identified resulting in a delay in

reaching an appropriate obstetric care facility can be grouped into three subcategories: lack of transportation, prolonged transportation, and seeking care at more than one facility.

Lack of transportation

Transportation constraints contribute to the late arrival of patients to a hospital. This is particularly the case for women with obstetric complication. Community factors such as poor road conditions, lack of readily available transport or inadequate means of transportation are responsible. Relatives of the deceased experienced transportation difficulties during the process of seeking health care. Transportation difficulties encountered in some instances led to the use of alternative means of transportation such as cart (donkey, ox or horse) or in extreme case they had to walk. The family of a deceased woman who was bleeding heavily explained that they had to stay at home over night because transport was not available:

“She started pouring blood late in the evening just after evening prayers [around 5:00 pm].....we took her to the main road [tarred road] to look for transport. We were there [main road] up to twelve midnight but couldn’t get transport. All the vehicles that came were full. We had to go back home and get up early morning the following day to catch the first transports”.

Overcoming transportation difficulties in the community and reaching a medical facility does not mean the transportation hardship is over. Some health facilities are without an ambulance, and even among those with an ambulance it serves multiple purposes. It may be practically unavailable at certain times. Some of the ambulances are not in good road worthiness so are not risked using. This shows the transportation difficulties that could happen when obstetric emergencies are to be referred from one medical facility to another. Care-providers attested to this:

“The patient came to the health centre at around 4:00 pm.....she cannot be managed here because she may need an operation [caesarean section]. We planned to evacuate her to the hospital but our ambulance had a breakdown a week ago. We looked for transport in the village throughout the night but could not get one. The following morning we went to the agricultural department to look for transport but their vehicle had already left for trek. It returned around 11:00 am and thereafter it came to transport the patient to the hospital”

An ambulance may be available but lack of fuel makes it practically inaccessible. Relatives or escorts of patients are asked to provide fuel to enable the ambulance to evacuate their loved one:

“I took my wife to the health centre.....two hours later the nurse told me that she will be transferred to the hospital but that the ambulance had no fuel. I was asked to buy fuel for the ambulance to take my wife. I bought twenty liters of diesel”.

Prolonged transportation

Long distance, bad road condition, poor state of the vehicle and visiting different health facilities all contribute to prolonged traveling time. As comprehensive emergency obstetrical care services are not available in the peripheral health facilities consequently obstetric emergencies traveled up to the hospital. The length of time used for the journey is also influenced by the distance to trek. Several testimonies highlighted prolonged traveling time:

“She was admitted in the hospital for two weeks and discharged on a Monday. On her return to our village (85 km away from hospital) she felt down unconscious. We took her to the health centre at our village where she was transferred to another health centre (20 km away); she was again transferred to the hospital [60 km away]. She spent few hours at the hospital and died”.

Seeking care at more than two medical facilities

Peripheral health facilities' inability to provide comprehensive obstetrical services forces them to refer all those cases needing such services from one facility to another ending up in the hospital. Most of the cases in this study visited at least two different medical facilities. Eighteen of the cases (56%) visited two different facilities and another eight cases (25%) visited three different medical facilities. From the testimonies a husband narrated:

“We took her to the health centre in the village. She was examined by the nurse who later transferred her to another health center (44 km away). There she spent the night and the following morning she was transferred to the hospital (36 km away). On our way to the hospital we had to cross two different river crossing points. Immediately we reached the hospital she died”.

Delay in actually receiving care after reaching the hospital

When other obstacles are overcome and women with obstetrical complications reached an obstetrical care medical facility, there may be other problems that threaten their chances of survival. Delays in the delivery of care are symptomatic of the inadequacy in the health care delivery system. Inadequacy may be due to one or a chain of the following: shortage of supplies, equipment, lack of trained personnel, and incompetence of the available staff. Failures of the health care delivery system have been identified as a major contributing factor to maternal mortality (8, 10, 20, 24, 39). Of the 32 cases autopsied 31 had experienced delay in receiving prompt and adequate obstetric care. Lack of blood at the blood bank in the hospital was more often mentioned in the testimonies:

“When we reached the hospital the doctor and the nurses told us to find two bottles of blood for her. We went to the laboratory but the lab man said there was no blood. I donated one bottle and bought another one in the lab. After giving her the blood the nurses told us to get another two bottles. We again went back to the lab but the man at the lab insisted there was no blood. I paid him D300.00 to get the two bottles”.

Lack of readily available blood was complicated by shortages of basic supplies at the hospital such as blood bags. Testimonies from the collected data mentioned shortage of medical supplies:

“She was pouring blood at home so we took her to the health center where we were told that she needed blood but blood bags were finished. We were then transferred to the hospital [60 km away] but there no blood bags were available. She was in the hospital from midday up to the following day when she died without getting blood”.

Another operational issue mentioned in the testimonies was lack of electricity supply. This affected not only operations but also prevented the laboratory from functioning. A medical doctor explained:

“She came to the hospital at around 12:00 am with retained second twin [transverse lie]. I asked them to prepare her for operation unfortunately at that time there was no electricity in the entire hospital. At 6:00 pm [12 hours later] electricity supply was available in the hospital. We rushed her to the operating theatre to perform a caesarean section. Her uterus was ruptured and baby was already dead. Less than thirty minutes after the operation she died”.

Delay in the decision-making process on the side of the medical team was constantly mentioned in the testimonies. Shortage of medical doctors is a common phenomenon in developing countries (36) and this can have grave consequences for patients needing urgent medical attention. A very good illustration was:

“She was brought to the hospital on the 13th around 9:00 am from another health centre. The doctor came to see her and diagnosed hand presentation. He [doctor] asked us [midwives] to observe her. Nothing was done until the 15th in late evening [48 hours later] when he [doctor] took her to the theatre. He first tried external cephalic version which failed. Then he decided to perform a caesarean section. The patient was wheeled back in the ward dead”.

Quality of care as perceived by the relatives

Technical quality of care cannot be evaluated through the information generated from the consumers of health care services. However, information generated from such interviews provides very important clues regarding how users of the health system perceived health services. Quality perceptions have strong influence on one's inclination to avail to health services. If the health care system cannot be trusted to guarantee a threshold level of quality, it will remain underutilized, be bypassed, used only for minor ailments, or used as a measure of last resort. On the other hand high utilization of health care services cannot always be associated with the quality of care. There may be no other alternative services available forcing people to use the only available services. The high utilization of maternal health services identified in this study cannot and should not be used to conclude that the services provided are of high quality. From the data collected testimonies revealed relatives' perceived poor quality of care. Provider and user interaction was not the least desirable according to the data.

Husbands or men escorting women to health facilities expressed outraged for always being asked to leave the ward. A common testimony was:

"After carrying her to the bed in the delivery room the nurse told me to go out. Anytime I go to see her, the nurse will shout "go out of this place [labor ward].....that this is not a place for men. The way they [care providers] talk to elders is not nice. Some of them may be the same age as my children".

It was not only men who were subjected to what they called "*harassment*". Even women escorts expressed similar sentiments. A woman narrates what she was told:

"You brought her [patient] here [hospital] because you cannot manage her at home.....so just stay away from the ward. Whenever we [midwives] need you we will call you. I don't want to see you in the ward again and if you come in I will call the security guards to get you out of the hospital".

Similar expressions were common in the testimonies.

The testimonies also indicated relatives subjected to unwarranted hospital charges. This did not go well with them and expressed gross dissatisfaction. They paid the charges because they were desperate to get care for their loved one and secondly they had no one to complain to:

"On the day my wife was discharge a nurse came to the bedside and told me the bed fee was D50.00. Few minutes later another fat nurse came and told me that I should pay an additional D100.00 for not having a pregnancy card. I wanted to go to the cashier to pay the money myself but they asked me to give them the money instead. After they took the money we [me and my wife] were asked to leave because the bed my wife occupied was to be used by another patient. We were not given a receipt for the payment".

Relatives of those cases who need blood transfusion also had resentment on the manner blood issues was handled. The collected data indicates relatives' skepticism on how blood issue is handled. They are with the opinion that blood is sold by the laboratory officers. An eloquent statement was:

"Anytime you go for blood in the lab they [lab personnel] will tell you there is no blood, but if you give them money you will get blood. At times they call someone [sitting inside the lab] who pretends to be a donor [commercial donor]. They are playing games on us. We know that they sell blood just to make money on us. It is time the government help us to stop this".

Another common testimony in the collected data is the relatives being very critical of the health workers' attitude; "*bad speech*", feeling of being talked to by the care providers in an unfriendly way or "*short speech*", feeling that words of the care providers was rude or undesirable. Relatives were more critical on female care-providers than their male counterpart. Patients and their relatives want to be treated with respect and dignity, and expect that when they ask questions it should be answered in a nice way. Exceptionally in one of the testimonies relatives were very pleased with a particular staff just because she talks to them nicely. Their patient died however but praised the nurse in no certain terms:

“The nurse we met was very nice.....she greets us.....she talked to us very nicely.....she comes frequently to check the patient.....she helps us with hot water.....she allow us to see our patient. If all nurses were like that people will be very happy”.

Common in the testimonies were critical comments against the care-providers:

“My wife said she was hungry I went and bought some food. I asked the nurse if she [the patient] is allowed to eat. The nurse did not respond. I asked her the second time: she responded angrily that she doesn’t know. I told her [nurse] she should know because she was the one paid to do the job. They [care-providers] talked in a very bad way to us [patients or escorts]”.

Highlighting these testimonies is important because it identifies the vicissitudes experienced by the relatives during the care seeking process and secondly it describes its relevance to them. They are not necessarily objectively correct; however, they serve to illustrate the users’ perception of the health care delivery system. The health system should be sensitive to these concerns and must effort to address them if the trust and confidence of the population is to be ensured. A synopsis of five case histories is presented in appendix 7.

DISCUSSION

Methodological issues

A Limitation of the study may be the data collector being an authority at the department of health. This may be seen as an inhibitor in two ways. One, the care providers being interviewed may be intimidated by his presence so may not provide a full account of what happened during the process of providing care particularly in cases where deficiency in care was identified. On the other hand, being a health professional with a different cultural background and orientation, relatives’ of the deceased women may not provide all detailed traditional issues that may have influenced the health care seeking behavior or process. However, the biggest strength in this study lies with the fact that data was collected from two different levels and moreover from many sources at each level. This adds to the validity and comprehensiveness of the data generated.

The use of the Three Delay Model in the analysis of the data allows for the illumination of the common inhibiting factors experienced by women during the process of seeking obstetric care rather than emphasizing unique aspects of individual cases.

Delays

This study confirms the findings of previous studies (20, 34, 36, 38) that maternal deaths are the consequences of a long and complex chain of delays, and only in few cases can a death be attributed

to a specific event. It also reaffirms that any one delay could be fatal to the woman with obstetrical complication.

Delay in deciding to seek medical care on the part of the woman or her relatives is regarded entirely as patient factor however; in this study health service related factors was identified to influence the decision-making process. They acted as an impediment. In other words health service factors have been implicated in the utilization of obstetric care even after a complication was recognized. Structural issues (conducting maternal health clinic on specific days or clinics closed to women on weekends) and interaction issues (perceived poor provider attitudes and misunderstood information) identified needs urgent attention. Underestimation of an obstetric complication by a woman or her relatives may arguably be a consequence of lack of health information. In an attempt to enhance prompt utilization of maternal care services when an obstetric complication occurs, the health system must effort to address the issues of use of services. Information about danger signs of pregnancy and childbirth and where to seek help should be targeted to women and their relatives including men rather than focusing only on women during prenatal clinics. The health system should also endeavor to address the structural problems as well as assuring that the health facilities are user friendly.

Unlike findings of other studies (20, 34, 36) where economic reasons was the inhibitor resulting in a delay in seeking care or not even attempting to seek care, that was not the case in this study. When relatives were asked what prompted them to seek care from a medical facility and not from other alternatives they expressed confidence on modern medical care. This is a sign of their trust on conventional medical care.

Transportation difficulties experienced both at community and at health facility level shows the reality of the communication problems in the rural areas of the country. Since there are no public transportation facilities in most parts of the rural areas, communities need to form partnership with the local commercial transport owners in addressing the transport problem. This strategy was adopted in Northwestern Nigeria (40) and contributed to the reduction of maternal deaths. The mean time of obstetric emergencies reaching medical facility did improve as well. It has also registered considerable cost reduction in transportation

Major health centers are strategically located and making them fully functional as obstetric referral facilities is very urgent. This will not only reduce the prolonged transportation time currently experienced by women, but would certainly improve access to emergency obstetric care services. The inadequate means of transporting emergency cases from peripheral health facilities to the referral hospital should be a cause for concern. Reliable and readily available transport system is a key element of safe

motherhood and furthermore, provision of EOC is a health service function. It is therefore the responsibility of the health system to assure adequate fuel supply, that ambulances are in good road worthiness and that they are accessible when needed. Other strategies such as patients paying certain amount of money for referral services can be piloted. This is being practiced in NGO run health facilities in the country and seems to be effective.

Delay in receiving care once an obstetric care facility is reached was an identified common encounter. This was a result of operational difficulties and it again indicates the inadequacy of the health care delivery system to address the obstetric care needs of women who urgently needed it. Addressing the operational problems at the obstetric referral facility and making a high quality services available in would probably have saved the lives of many women. Putting in place a perinatal audit system in the hospital could be very instrumental in addressing the situation. There is also a need for an emergency preparedness, which is a team effort in a health unit or system. It includes sharing of responsibility, ensuring emergency stock, timely access to life saving interventions and dedications to mortality

Quality of care as perceived by the relatives

Relatives' interaction with care-providers was generally not satisfactory as identified in the testimonies. This should be a concern to the health care system because it may erode the already existing trust and confidence women and their relatives have on modern health care. The testimonies indicate poor quality of maternal health care as outlined by *Mensch's* guidelines for quality (41). *Mensch* identified four key criteria for quality: information exchange, provider competence, interpersonal relations, and mechanisms to encourage continuity of care. The collected data shows deficiencies in at least one of the criteria. The implications of this to the health system are that it may lead to non-utilization of services or availing to the system only as a last resort.

There is increasing call and efforts to get men on board in ensuring women's health. Men are very significant players in the health of women particularly in the Gambia. They dictate the reproductive life of most women; they make decision on when and where to seek health care. Chasing men or the husband of a woman away in the maternity wards of the hospital is not helpful. This may inflict a negative effect on the current call on male involvement in female reproductive health. The health system operations should be seen to practice what it is preaching rather doing the contrary.

CONCLUSION

The experiences of the 32 maternal deaths shows the reality women and their relatives are confronted with in the process of seeking obstetric care services. Health care delivery and services in other health division of the country is not significantly different to what prevails in the study area. It is highly possible that women in those divisions may have to overcome the same difficulties if they are to survive.

It is therefore believed that most of the difficulties identified here could therefore be useful in devising and implementing effective interventions to combat maternal mortality throughout the country. These are to overcome the factors of delay in obtaining health care and to improve antenatal and obstetric care services.

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APPENDICES

Appendix 1: Verbal autopsy and contributing factors questionnaire of Maternal Deaths

Case Review Number: |_|_|

Name:	
Q01: Village of residence:	PHC Village 1 Non-PHC Village 2 Other 3
Q02 : Division of Residence	CRD 1 URD 2 Other 3

EXPLAIN STUDY

Part A: interview details

No	Questions and filters	Coding Categories	Skip to						
QA01	Interviewers initials	<table border="1"> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>							
QA02	Date of interview	__/__/__							
QA03									

Part B: Selection of people to be interviewed

No.	Questions and filters	Coding Categories	Skip to
QB01	Who was looking after/caring for the woman before her death? <i>More than one answer is possible</i> If Other, please specify _____	Husband 1 Co-wife 2 Mother 3 Mother-in-law 4 Father 5 Sister 6 Brother 7 Brother-in-law 8 Son 10 Daughter 11 TBA 12 Granny 13 Other 14	
QB02	Who was around at the time of the woman's death? If Other, please specify _____	Husband 1 Co-wife 2 Mother 3 Mother-in-law 4 Father 5 Sister 6 Brother 7 Brother-in-law 8 Son 10 Daughter 11 TBA 12 Granny 13 Other 14	
QB03	If woman was married and husband hasn't been mentioned: Ask: Was her husband around (i.e. in the village) just before she died?	Yes 1 No 2 Not married 3 Dead 4	

Part C: Listing of people who participated in the interview:

Name	Relationship to woman	Present when the woman	When they joined/left the interview
		Ill	Died

Section 1: Background

No	Questions and filters	Coding Categories	Skip to
	<i>I'd like to begin by getting some background information about the woman</i>		

Q101	How long ago did the woman die? <i>(write down what is said and code in months)</i>	Months __ _	
Q102	How old was the woman when she died?	Years __ _ <i>(99=unknown)</i>	
Q103	Where did the death occur? If at health facility, specify _____	Home 1 Health facility 2 During transport 3 Unknown 4	
Q104	Was the death due to an accident?	Yes 1 No 2 Don't know 9	
Q105	Do you know the cause of death? <i>If Yes, specify</i> _____	Yes 1 No 2	
Q106	Do you have a death certificate? If yes, ask permission for photocopying	Yes 1 No 2	
Q107	Do you know if the woman, before she died, had any long term medical problems? (i.e. hypertension, diabetes, epilepsy.....) If yes, specify: _____	Yes 1 No 2 Don't know 9	→Q109 →Q109
Q108	Was she on treatment for this illness? If yes, specify _____	Yes 1 No 2 Don't know 9	
Q109	What was her marital status? If married or living together, specify for husband Name _____ NSURNO _ _ _ _ _ _ _ _ _ _	Married 1 Living together 2 Single 3 Widowed 4 Divorced 5	→Q112 →Q112 →Q112
Q110	How many co-wives did she have in the marriage?	_	
Q111	What was her rank	Wife number: _	
Q112	Has she ever been to school (koranic or other) If yes: What was the highest level she attended For madrassa: How many years __ _ <i>(Unknown = 99)</i>	No formal education 1 Madrassa 2 Primary 3 Secondary 4 Technical 5 University 6 Don't know 9	
Q113	What was her occupation? <i>Specify</i>		
Q114			
Q115	<i>Pre-amble: if married, answer the following questions for her husband, otherwise for the head of the compound or household:</i> What was the highest level of school he attended For madrassa: How many years __ _ <i>(Unknown = 99)</i>	No formal education 1 Madrassa 2 Primary 3 Secondary 4 Technical 5 University 6 Don't know 9	
Q116	What is his occupation? <i>Specify</i>		
Q117	Has the woman ever been pregnant, including pregnancies that ended early or where the baby did not survive?	Yes 1 No 2 Don't know 9	→Q124 →Q124
Q118	Was she pregnant when she died?	Yes 1 No 2 Don't know 9	→Q120 →Q120
Q119	How long had she been pregnant for?	Months _	
Q120	What was the outcome of her last pregnancy?	Live birth 1 Stillbirth 2 Abortion/miscarriage 3 Mother and child died after labor began 4 Mother died during pregnancy but before labor began 5	→Q124 →Q124
Q121	How long after the end of the end of this last pregnancy did she die?	Weeks __ _	
Q122			
Q123	How old is this woman?	Years __ _ !	
Q124			

Section 2: Family or community's account of events around the woman's death and illness

Give an introduction explaining that we would like them to tell us what happened:

1. Around the woman's death (final hours)
2. From the time the woman started to become ill to her death

Try and create a time line based on what they say if the story is complicated (attached at back of survey).

Section 3: Symptoms

Fill in based on history but if the material has not been covered ask the following questions:

(Note with an asterix * those responses already given in Section 2)

Q301	How long had the woman been ill before she died? (Your best guess from what the reporters have said!!)		
Q302	What symptoms did the woman have when she died or just before she died? (What did she say and what did you observe?):		
Q303	What symptoms did the woman have when her illness started? (What did she say and what did you observe?):		
Q304			

For deaths during pregnancy and prior to the onset of labour go to Section 4

For deaths during pregnancy but after onset of labour go to Section 5

For all other deaths go to Section 6

Section 4: Deaths during pregnancy, prior to onset of labour: symptoms

No	Questions and filters	Coding categories	Skip to
Filter	<i>Only ask the questions in this section when the woman died while pregnant, and prior to the onset of labour</i>		
	<i>I'd like to ask you some questions about the woman's health during her pregnancy</i>		
	During pregnancy did she		
Q401	Have swelling of the legs?	Yes 1 No 2 Don't know 9	
Q402	Have swelling of the face?	Yes 1 No 2 Don't know 9	
Q403	Complain of blurred vision?	Yes 1 No 2 Don't know 9	
Q404	Have any fits?	Yes 1 No 2 Don't know 9	
Q405	Was she pale?	Yes 1 No 2 Don't know 9	
Q406	Was she short of breath when she carried out regular household activities?	Yes 1 No 2 Don't know 9	
Q407	Lose weight?	Yes 1 No 2 Don't know 9	
Q408	During pregnancy did she have her blood pressure taken	Yes 1 No 2 Don't know 9	→Q410 →Q410
Q409	Did she tell you what the blood pressure results were? If told.....what was the result?	High 1 Normal 2 Weren't told 3 Don't know 9	
	<i>Questions about her final illness/death</i>		
Q410	During her final illness, was she bleeding from the vagina?	Yes 1 No 2 Don't know 9	→Q414 →Q414
Q411	Did the bleeding wet her clothes, the bed or the floor?	Yes 1 No 2 Don't know 9	
Q412	Was anything done to stop the bleeding? If Yes, specify _____	Yes 1 No 2 Don't know 9	
Q413	Was she in pain while bleeding?	Yes 1 No 2 Don't know 9	
Q414	Did she have any other episodes of bleeding during her pregnancy?	Yes 1 No 2 Don't know 9	→Q416 →Q416
Q415	Were they painful?	Yes 1 No 2 Don't know 9	
Q416	Did she have high fever during her final illness?	Yes 1 No 2 Don't know 9	
Q417	Was she yellow at the time of her death?	Yes 1 No 2 Don't know 9	
Q418	Was she short of breath at the time of death?	Yes 1 No 2 Don't know 9	
Q419	Had she been ill with another illness during this pregnancy? If yes, specify _____	Yes 1 No 2 Don't know 9	

Now go to section 6

Section 5: Deaths during labour, delivery or within 6 weeks after delivery: symptoms

No	Questions and filters	Coding categories	Skip to
Filter	<i>Only ask the questions in this section when the woman died during labour/delivery or within 6 weeks after delivery</i>		
	<i>I would now like to ask you some questions about the woman's last delivery (.make clear that the relatives should talk about the one that is related to the death)</i>		
Q501	Were did the delivery take place?	Home 1 On the way to the health facility 2 Health facility 3 During referral 4 Died undelivered 5 Don't know 9	
Q502	Who assisted at her delivery?	No one 1 Relative (no health worker) 2 TBA 3 Nurse/midwife 4 Doctor 5 Don't know 9	
Q503	What sort of delivery was it?	Normal 1 Instruments used 2 Caesarean Section 3 Don't know 9	
Q504	How many months pregnant was the woman when labour began?	Months <input type="text"/> <input type="text"/> (99= don't know)	
Q505	Was she in good health when labour began?	Yes 1 No 2 Don't know 9	
Q506	How long was she in labour for?	Hours <input type="text"/> <input type="text"/> (99= don't know)	
Q507	Did the woman die before the baby was born?	Yes 1 No 2 Don't know 9	→Q510
Q508	Was the placenta delivered?	Yes 1 No 2 Don't know 9	→Q510 →Q510
Q509	How long after birth of the child was the placenta delivered?	Hours <input type="text"/> <input type="text"/> (99= don't know)	
Q510	Did she have any fits before she died?	Yes 1 No 2 Don't know 9	→Q511
Q511	Did the fits stop after the baby was born?	Yes 1 No 2 Don't know 9	
<i>Questions about the woman's health during her last pregnancy:</i>			
During the pregnancy did she:			
Q512	Have swelling of the legs?	Yes 1 No 2 Don't know 9	
Q513	Have swelling of the face?	Yes 1 No 2 Don't know 9	
Q514	Complain of blurred vision?	Yes 1 No 2 Don't know 9	
Q515	Have any fits?	Yes 1 No 2 Don't know 9	
Q516	Was she pale?	Yes 1 No 2 Don't know 9	
Q517	Was she short of breath when she carried out regular household activities?	Yes 1 No 2 Don't know 9	
Q518	Lose weight?	Yes 1 No 2 Don't know 9	
Q519	During her pregnancy did she have her blood pressure taken?	Yes 1 No 2 Don't know 9	→520
Q520	Did she tell you what the blood pressure results were? If told.....what was the result?	High 1 Normal 2 Weren't told 3 Don't know 9	
Q521	During her final illness, was she bleeding from the vagina?	Yes 1 No 2 Don't know 9	→Q526 →Q526
Q522	Did the bleeding wet her clothes, the bed or the floor?	Yes 1 No 2 Don't know 9	
Q523	Was anything done to stop the bleeding? If Yes, specify _____	Yes 1 No 2 Don't know 9	
Q524	Was she in pain while bleeding?	Yes 1 No 2 Don't know 9	→Q526 →Q526
Q525	Did the pains start before the labour pains?	Yes 1	

		No 2 Don't know 9	
Q526	Did she have a vaginal examination during her illness?	Yes 1 No 2 Don't know 9	→Q528 →Q528
Q527	Did the vaginal examination increase/cause bleeding?	Yes 1 No 2 Don't know 9	
Q528	Did she have any other episodes of bleeding during her pregnancy?	Yes 1 No 2 Don't know 9	→Q530 →Q530
Q529	Were they painful?	Yes 1 No 2 Don't know 9	
Q530	Did she have high fever during her final illness?	Yes 1 No 2 Don't know 9	
Q531	Did she have foul smelling discharge during her final illness?	Yes 1 No 2 Don't know 9	
Q532	Was she yellow at the time of her death?	Yes 1 No 2 Don't know 9	
Q533	Was she short of breath at the time of death?	Yes 1 No 2 Don't know 9	
Q534	Had she been ill with another illness during this pregnancy? If yes, specify _____	Yes 1 No 2 Don't know 9	

Now go to section 6

Section 6: Health seeking behavior/contributing factors

Q601	Between the woman falling ill and dying did she seek or did you take her to see anyone for treatment?	Yes 1 No 2 Don't know 9	
	Where did she go? <i>Fill in table Q602- unprompted column</i>		→602
	Did she go to see anyone else? <i>Fill in table Q602- unprompted column</i>		→602
	For all those not mentioned: ask whether they went to see: <i>Fill in table Q602- prompted column</i>		→602

Q602. Fill in table

	Unprompted	Prompted
VHW		
TBA		
Dispensary		
Health Centre		
Hospital		
Private Doctor		
Pharmacist		
Drug seller		
Sooth sayer		
Marabout		
Herbalist		
Other, specify _____		

I would like to ask you some more questions about events around the final illness and death of the woman

Q603	In this period did you take the woman to see anyone for treatment?	Yes 1 No 2 Don't know 9	→Q606
Q604	Why not? _____ <i>Prompt: Did you take the woman to see any traditional healers/marabouts? If yes: continue</i>	Yes 1 No 2 Don't know 9	→Q614 →Q614
Q605	Who did you go to see? <i>Prompt: Did you go to see anyone else?</i>		
Q606	Who was involved in making the initial decision that the woman should go for treatment?		

Q607	What prompted you to send the woman for treatment? (e.g. what symptoms)		
Q608	Once the decision was made to take the woman for treatment did the woman go straight away?	Yes 1 No 2 Don't know 9	→611
Q609	Why not?		
Q610	How long was the delay?		
Q611	Was it difficult to find the funds to send the woman for treatment?	Yes 1 No 2 Don't know 9	
Q612	Where did the funds come from for the woman to go for her treatment? (i.e. who paid?)		

Q613. Once the decision was made to seek care

	Centre 1	Centre 2	Centre 3
a. How did the woman get there?			
b. How long did it take to get there?			
c. If by car/bus/cart: Did you have to pay for transport? If YES: who paid & and how much?			
d. When you got tohow long did you have to wait before the woman was seen?			
e. Who did she see?			
f. What did they do?			
g. What did they tell you?			
h. How much did you have to pay?			
i. Did they ask you to go and buy anything? If YES: How much was spent? Where did the money come from?			
j. Did they refer the woman?			
k. If YES: Where to? Did you go? If YES: next column If NO: why not?			
l. What did you do next?			

All maternal deaths

<i>I'd like to ask some general questions about health seeking behavior during the woman's pregnancy</i>			
Q614	Did she ever go for antenatal care during her pregnancy?	Yes 1 No 2 Don't know 9	→619 →619
Q615	How many times did she go for antenatal care?	<input type="text"/> (99= unknown)	
Q616	Is the antenatal or other health card still available? <i>If yes, ask permission for photocopying</i>	Yes 1 No 2 Don't know 9	
Q617	Do you know where she was asked to deliver?	Yes 1 No 2 Don't know 9	→619 →619
Q618	Where?		
Q619	Apart from ANC visits did she ever go for health care during the last	Yes 1	

	pregnancy?	No 2 Don't know 9	→622 →622
Q620	Who did she go to see? Specify: <i>(more than one answer possible)</i>	TBA 1 Nurse/midwife 2 Doctor 3 Pharmacies 4 Drug seller 5 Traditional healer 6 Marabout 7 Herbalist 8 Don't know 9	
Q621	Why did she go there?		

Only for women who died after delivery

Q622	Did she ever go for postnatal care?	Yes 1 No 2 Don't know 9	→626 →626
Q623	Who did she go to see? Specify: <i>(more than one answer possible)</i>	TBA 1 Nurse/midwife 2 Doctor 3 Pharmacies 4 Drug seller 5 Traditional healer 6 Marabout 7 Herbalist 8 Don't know 9	
Q624	Did she go for a routine visit or for a specific problem?	Specific 1 Routine 2 Don't know 9	→626 →626
Q625	What was the problem?		

All deaths

Q626	Does the family give permission to examine any health records pertaining the woman?	Yes 1 No 2 Don't know 9	
------	---	-------------------------------	--

Section 7: All suspected maternal deaths:

Questions about pregnancy history

Q701	How many times had the woman been pregnant in total (including the one during which she died)?	 (99= unknown)	
Q702	How many live births did she have?	 (99= unknown)	
Q703	How many stillbirths did she have?	 (99= unknown)	
Q704	How many abortions/stillbirths did she have?	 (99= unknown)	
Q705	What was the woman's age at first pregnancy?	Years	

Any additional notes or comments not included in the survey:

Reliability of interview	Good 1
--------------------------	--------

		Indifferent 2 Bad 3	
	Is there anyone else who should be interviewed?	Yes 1 No 2	
	If YES: Instructions on how to find them		

End of questionnaire (for time line see next page)

TIME LINE FOR SYMPTOMS/TREATMENT FROM THEIR START UP TO DEATH

Symptoms/Complaints

Start of
Illness-----Death
(Time interval)

Treatment Sought

Appendix 2: Classification form Verbal Autopsy –Maternal Deaths

A. Cause of death

Initials of reviewer |_|_|

Survey number. |_|_|_|

Name of deceased _____

Date review |_|_|/|_|_|_|/|_|_|_|_|

Suspected maternal death within 42 days post-partum (ICD 9): Yes/No

Suspected maternal death within 1 year post-partum (ICD 10): Yes/No

	categories	Underlying cause(s)
Suspected maternal death	Direct cause	Level 1..... Level 2.....
	Indirect cause	Hepatitis Malaria TB Anemia Heart disease AIDS Injuries Other _____ Unknown
Suspected non maternal death	21 Chronic liver disease 22 Chronic renal disease 23 Diabetes 24 Malignancy 25 Maternal 26 Stroke 27 Under-nutrition 28 Other _____ 29 Unknown	

Additional
Comments.....
.....
.....

B. Checklist contributing factors

Initials of reviewer | | |

Survey number. | | | |

Name of deceased _____

Date review | | | / | | | | / | | | | |

Summary contributing factors More than one answer possible		Importance of factor	
Level 1	Level 2	Probably would have avoided death	Possibly would have avoided death
Perception of illness in the community	<i>Other perception of the disease</i>		
	Not recognizing severity of the problem		
	Lack of knowledge of treatment-possibilities		
Decision making	Delay in decision-making process		
	Essential people in decision-making process not available		
	Disagreement in decision-making		
Resource constraints	Lack of transport		
	Lack of money		
Access to care	Delay in reaching health facility		
	Delay in getting to see professional health staff		
	Obstructions in getting care		
Quality of care	Substandard primary care		
	Substandard obstetric referral care		

Additional
Comments.....
.....
.....

Appendix 3: Antenatal care record

Case #	Cause of death	ANC Clinic visits	Number of times checked during routine clinic visits					
			Height	Blood Pressure	Weight	Hemoglobin	Urine	Syphilis screening
1	Hemorrhage	3	0	3	3	1	1	1
2	Hemorrhage	1	0	1	1	1	0	0
3	Eclampsia	6	0	6	5	0	0	0
4	Obstructed labor	3	0	2	1	1	1	0
5	Eclampsia	1	0	1	0	0	0	0
6	Obstructed labor	3	0	3	3	1	1	0
7	Hemorrhage	4	0	4	4	1	1	0
8	Anemia	Did not attend						
9	Obstructed labor	4	0	4	4	1	1	0
10	AIDS	1	0	1	1	0	0	0
11	Anemia	5	0	3	0	2	1	0
12	Anemia	4	0	4	0	1	1	1
13	Anemia	4	0	3	0	2	0	0
14	Hemorrhage	9	0	8	8	1	1	0
15	Anemia	1	0	1	0	1	0	0
16	Eclampsia	6	0	2	6	1	2	0
17	Sepsis	4	0	4	0	0	0	0
18	Hemorrhage	1	0	1	0	1	0	0
19	Sepsis	5	0	5	1	1	0	0
20	Obstructed labor	8	0	7	5	1	1	0
21	Obstructed labor	1	0	1	1	1	0	0
22	Anemia	Yes but don't know	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know
23	Obstructed labor	10	0	10	10	0	0	0
24	Obstructed labor	4	0	4	4	1	1	0
25	Eclampsia	4	0	4	4	1	1	0
26	Anemia	3	0	1	1	1	0	0
27	Hemorrhage	1	0	1	1	1	1	0
28	Eclampsia	4	0	4	4	1	1	0
29	Hemorrhage	4	0	3	3	1	1	0
30	Eclampsia	6	0	6	3	1	1	0
31	Obstructed labor	Yes but don't know	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know
32	Anemia	Yes but don't know	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know
33	Hemorrhage	3	0	3	3	1	0	0
34	Anemia	2	0	2	0	1	0	0
35	Eclampsia	1	0	1	1	0	0	0
36	Hemorrhage	3	0	3	0	0	0	0
37	Eclampsia	4	0	3	4	1	1	0
38	hemorrhage	1	0	1	1	1	1	0
39	Anemia	Yes but don't know	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know
40	Anemia	3	0	2	2	1	1	0
41	Unknown	4	0	4	4	2	0	0
42	Anemia	4	0	4	3	1	1	0

Appendix 4: Characteristics of the maternal deaths identified

Case #	Identity		Residence		Medical cause	Death		Pregnancy		
	Age (yr)	Parity	Village	Distance to hospital ³ (km)		Period	Time	Place	Outcome	Remark
1	31	5	Non-PHC	44	Hemorrhage	Postpartum	Within an hour after delivery	hospital	MSB	
2	22	2	PHC	76	Hemorrhage	Postpartum	3 days postpartum	Hospital	LB & FSB	Twin delivery (2 nd time)
3	16	0	Non-PHC	72	Eclampsia	Postpartum	A day postpartum	Hospital	LB	
4	24	2	Non-PHC	16	Obstructed labor	Postpartum	5 hrs postpartum	Hospital	LB & FSB	Twin delivery
5	20	1	PHC	85	Eclampsia	Postpartum	7 days postpartum	Hospital	MSB	
6	20	2	Non-PHC	70	Obstructed labor	Postpartum	2 days postpartum	Hospital	MSB	
7	34	5	PHC	20	Hemorrhage	Postpartum	An hr postpartum	Hospital	FSB	Twin delivery
8	30	5	PHC	66	Anemia	Postpartum	6 days postpartum	Hospital	FSB	Twin delivery
9	35	7	PHC	17	Obstructed labor	Intrapartum	During labor	Hospital	FSB	Baby was abnormal
10	31	4	PHC	7	AIDS	Postpartum	3 days postpartum	Hospital	FSB	Twin delivery
11	30	4	Non-PHC	50	Anemia	Postpartum	An hr postpartum	Hospital	FSB	
12	21	0	Non-PHC	51	Anemia	Postpartum	3 days postpartum	Hospital	FSB	
13	35	9	PHC	59	Anemia	Intrapartum	During labor	Health centre	NA ³	
14	40	10	Non-PHC	66	Hemorrhage	Ante partum	Before labor began	Hospital	NA	
15	28	5	PHC	84	Anemia	Postpartum	A day postpartum	Hospital	FSB	
16	21	0	PHC	17	Eclampsia	Intrapartum	During labor	Hospital	NA	
17	20	1	PHC	45	Sepsis	Postpartum	5 days postpartum	Hospital	LB	
18	32	7	PHC	110	Hemorrhage	Postpartum	3 days postpartum	Hospital	MSB	
19	34	3	PHC	107	Sepsis	Postpartum	9 days postpartum	Hospital	LB	
20	32	5	PHC	62	Obstructed labor	Postpartum	3 hrs postpartum	Hospital	MSB	
21	21	2	PHC	20	Obstructed labor	Postpartum	24 hrs postpartum	Hospital	MSB	
22	30	3	PHC	59	Anemia	Ante partum	Before labor began	On the way to hospital	NA	
23	24	1	Non-PHC	84	Obstructed labor	Postpartum	2 days postpartum	Hospital	LB	
24	30	2	Non-PHC	60	Obstructed labor	Postpartum	An hr postpartum	Hospital	MSB	
25	18	0	PHC	25	Obstructed labor	Postpartum	1 day postpartum	Hospital	FSB	
26	19	2	Non-PHC	48	Anemia	Postpartum	5 days postpartum	Hospital	LB & FSB	Twin delivery
27	43	11	PHC	66	Hemorrhage	Intrapartum	During labor	Hospital	NA	
28	20	0	PHC	39	Eclampsia	Postpartum	24 hrs postpartum	Hospital	LB	
29	26	5	PHC	38	Hemorrhage	Postpartum	2 hrs postpartum	Hospital	FSB	

Case #	Identity		Residence		Assigned cause	Death		Pregnancy		
	Age (yr)	Parity	Village	Distance to hospital (km)		Period	Time	Place	Outcome	Remark
30	27	0	PHC	26	Eclampsia	Postpartum	8 days postpartum	Hospital	LB	
31	14	0	Non-PHC	15	Obstructed labor	Postpartum	12 days postpartum	Hospital	LB	
32	28	5	PHC	69	Anemia	Postpartum	8 days postpartum	Hospital	LB	
33	35	8	Non-PHC	60	Hemorrhage	Postpartum	A day postpartum	Hospital	FSB	
34	25	2	Non-PHC	16	Anemia	Postpartum	24 days postpartum	Hospital	LB	
35	28	7	PHC	37	Eclampsia	Ante partum	At 28 weeks of gestation	Hospital	NA	
36	30	7	Non-PHC	40	Hemorrhage	Intrapartum	During labor	Hospital	NA	
37	16	0	PHC	95	Eclampsia	Postpartum	15 minutes postpartum	Hospital	FSB	
38	30	8	PHC	100	Hemorrhage	Intrapartum	During labor	Hospital	NA	
39	25	3	Non-PHC	60	Anemia	Ante partum	At 28 weeks of gestation	Hospital	NA	
40	32	6	Non-PHC	60	Anemia	Postpartum	12 hrs postpartum	Hospital	MSB	
41	15	0	Non-PHC	80	Unknown	Intrapartum	During labor	Hospital	NA	
42	25	5	Non-PHC	91	Anemia	Postpartum	6 days postpartum	Home	LB	Twin delivery

Appendix 5: Delivery outcome

Case #	Recommended place during ANC registration	Actual place of delivery	Type of delivery	Attendant at birth
1	Note stated	Hospital	Vacuum extraction	Doctor
2	Home	Hospital	Normal	Midwife
3	Health centre	Hospital	Vacuum extraction	Doctor
4	Not stated	1 st twin on the way & 2 nd Hospital	Normal & C/Section	Aunt & Doctor
5	Not stated	Hospital	Normal	Midwife
6	Health centre	Hospital	Forceps	Doctor
7	Health centre	Hospital	Normal (both twins)	Doctor
8	Did not attend ANC clinic	Hospital	Normal (both twins)	Midwife
9	Not stated	Hospital (baby extracted after mother died)	Forceps	Doctor & Midwives
10	Not stated	Hospital	Normal (both twins)	Midwife
11	Not stated	Hospital	Normal	Midwife
12	Hospital	Hospital	Vacuum extraction	Doctor
13	Not stated	Died undelivered at health centre		
14	Hospital	Died before labor began		
15	Not stated	Health centre	Normal	Midwife
16	Health centre	Died undelivered		
17	Home	Home	Normal	TBA
18	Hospital	Hospital	Normal	Midwife
19	Home	Home	Normal	Relative
20	Home	Hospital	Caesarean section	Doctor
21	Hospital	Hospital	Caesarean section	Doctor
22	Don't know ¹	Died before onset of labor on the way		
23	Not stated	Hospital	Caesarean section	Doctor
24	Not stated	Hospital	Caesarean section	Doctor
25	Not stated	Hospital	Normal	Midwife
26	Health centre	Hospital	Normal (both twins)	Midwife
27	Hospital	Died during labor at the hospital		Midwife
28	Not stated	Hospital	Vacuum extraction	Midwife
29	Health centre	Dispensary	Normal	Nurse
30	Not stated	Hospital	Normal	Midwife
31	Don't know	Hospital	Caesarean section	Doctor
32	Don't know	Hospital	Normal	Midwife
33	Not stated	Hospital	Normal	Midwife
34	Home	Hospital	Normal	Midwife
35	Hospital	Died undelivered at the hospital		
36	Not stated	Died during labor at the hospital		Midwife
37	Health centre	Hospital	Forceps	Doctor
38	Hospital	Died undelivered at the hospital		
39	Don't know	Died undelivered at the hospital		
40	Hospital	Hospital	Normal	Midwife
41	Health centre	Died at the hospital undelivered		
42	Home	Hospital	Normal (both twins)	Midwife

Appendix 6: Delays experienced among the 32 cases autopsied.

Case #	Reported symptoms	Delays experienced		
		Delay 1	Delay 2	Delay 3
1	Bleeding.	Decided to seek medical help 3 hours after recognition of the complication.	Means of transport to first health facility not available. She was referred to the hospital.	Blood was not available at the laboratory. Paid money before blood was available.
2	Bleeding.	-	Reported to the clinic in their village where she was referred to another health centre then to the hospital.	Needed at least three units of blood but able to buy only one unit at the lab.
3	Fitting.	-	Reported to a health centre then referred to the hospital but no ambulance at the health centre.	No magnesium sulphate available.
4	Twin pregnancy.	-	Transportation difficulties and ferry service closed. Delivered first twin on the way.	Caesarean section planned for the delivery of second twin but no electricity in the hospital.
5	Generalized edema.	Reported at a medical facility after fitting.	Detained at the first health facility visited for 3 hours, transferred to another health centre then to the hospital.	Admitted at the hospital for 10 days then discharged. On her way home she fitted. Returned to the hospital, needed blood but not available.
6	Labor pains.	Kept at home for over 2 hours before deciding to seek medical care and spent over 2 hour on the way.	At the centre she was detained for 24 hours before transferred to the hospital the following day.	Second stage of labor lasted more than 10 hours with no active intervention.
7	Bleeding.	-	Transport not available, had to cross a river. She was referred to the hospital but no ambulance at the centre. Crossed another river.	Blood need but was not readily available. Husband paid money for blood.
8	Shortness of breath.	Not registered so was reluctant to go to seek health care.	Went to a health centre where she was referred to the hospital but no ambulance.	Blood needed but was not readily available. Paid money for blood.
9	Labor pains.	-	-	Obstructed labor but no active management done.
10	Vomiting and abdominal pains.	Stayed at home for 5 days before seeking medical care.	Transportation difficulties experienced.	Seen at the outpatients given tablets and sent home.
11	Oedema and shortness of breath.	-	At the health centre was given tablets and sent home. She reported to a local drug store later where she was referred to the hospital. Transportation problems encountered.	Blood not readily available. Husband bought blood.
12	Shortness of breath	-	Reported to a medical facility where she was later transferred to the hospital.	Blood needed. Relatives bought 4 units of blood but reacted to all of them.
13	Labor pains	Decided to seek medical care 3 hours later.	Reported to a health facility then later transferred to another health centre.	Needed blood but was not available.
14	Bleeding	-	Sought care at a health centre where she was detained before taken to the hospital.	Blood needed but not available and escort had no money.
15	Bleeding	-	Went to a nearby health facility where she was transferred to another centre then to the hospital.	Needed blood but not available in the lab and escort had no money.
16	Labor pains and fitted.	-	Reported to a health facility with labor pains but sent home and asked to report later. Returned and fitted then referred to the hospital. No ambulance.	No active management of labor.
17	Shortness of breath and offensive vaginal discharge.	-	Reported to the health facility and asked to proceed to the hospital. No ambulance provided.	Urgently needed blood among other things but blood bags were not available.

Case #	Reported symptoms	Delays experienced		
		Delay 1	Delay 2	Delay 3
18	Bleeding.	-	Reported to a medical facility after a long journey then transferred to another health centre then to the hospital.	Needed blood but was not readily available. Relatives had to buy blood.
19	Headache, fever, vomiting and collapsed.	-	Used a donkey cart to a health centre where she was taken to another health centre then finally to the hospital.	Blood need but not available so relatives bought a unit.
20	Labor pains.	Was in labor for 8 hours but was hiding it to the family.	Took to the health centre where she was transferred to the hospital.	Caesarean section not possible instantly.
21	Bleeding	-	Transportation difficulties experienced in getting to the hospital. Had to wait for 10 hours before getting a vehicle.	Blood was not available so husband bought blood.
22	Shortness of breath, vomiting, fever.	-	Went to a nearby health facility where she was given tablets and sent home. Reported back then referred to the hospital but ambulance was not available. Spent 2 hours in late night looking for a vehicle.	Died on the way to the next health facility.
23	Labor pains.	-	Went to the health facility in their village where she was later referred to another health centre. On the way had to cross a river but no ferry.	Needed operation but electricity not available at the hospital.
24	Bleeding.	-	Reported to a health centre where she was referred to the hospital. Ambulance had no fuel.	Needed caesarean section but carried out 48 hours later due to delay on the side of the doctors. Magnesium sulphate not given.
25	Oedema, fitted.	-	Transport difficulties in getting to the hospital.	
26	Shortness of breath, edema.	-	-	Blood needed but not available. Relatives had to buy blood.
27	Bleeding.	-	-	Blood needed but no blood bags at the hospital.
28	Oedema, fitted.	-	-	Magnesium sulphate not given.
29	Bleeding.	-	-	-
30	Oedema, fitted.	-	Reported to a health facility where she was given tablets and sent home. On her way to hospital experienced transportation difficulties.	Magnesium sulphate not given.
41	Labor pains.	-	Reported to a health facility where she transferred to another facility. There she was to be moved to the hospital but lack of vehicle kept her there for 24 hours.	Blood needed but was not readily available.
42	Oedema, shortness of breath, twin pregnancy.	-	-	Needed blood but required number of units not available.

Appendix 7: Case Studies

Case 5

MJ is 20 years old and second wife of the husband. This was her second pregnancy; the first was a still birth. During her last pregnancy **MJ** made her first prenatal care clinic visit when thirty weeks pregnant. She was experiencing swollen face and legs so she went to seek treatment for it at a nearby health facility (5 km away) where she was given tablets and sent home. Two days later she fitted at home and was taken back to the same health facility. Medicines was prescribed but were not available at the facility. The husband bought them at a local drug store. Later she was transferred to a higher level facility (20 km away). There also a drug was prescribed but was not available. Again the husband went to a drug store to buy it. She was again transferred to the hospital (60 km away).

She spent ten days at the hospital then discharged. On the day of her discharge from hospital she was asked to pay D150.00 for bed fee and antenatal care card. No receipt was given. On her way home at the river crossing point she fitted. She was taken back to the health facility near their home village. The husband hired a vehicle for D300.00. At the health facility she was transferred back to another health centre then finally to the hospital. The following day she gave birth to a still born baby. She was said to be pale and needed blood. Blood was not available at the lab. However, the husband managed to buy three units of blood at the laboratory. She reacted to all three units whenever put up. She died six days after delivery.

Cause of death: Eclampsia with Anemia.

(Respondents: husband, co-wife, stepmother and 4 health care providers from three different health facilities)

Case 24

FG is 30 years old and the only wife of the husband. She had three previous pregnancies but only one was a live birth. During her last pregnancy she made four routine prenatal care visits. **FG** registered at the prenatal care clinic when she was twenty-eight weeks pregnant. One morning as she was coming from the market she started bleeding. She then went straight to the health centre in the town. Few minutes later her husband came to see her. After been examined it was decided by the care providers that she would be transferred to the hospital (60 km away). However, there was no fuel in the ambulance. The husband was asked to buy fuel. He bought 20 litters of diesel for D150.00.

At the hospital she was told that she may need an operation as the baby was lying abnormally. She was in the hospital for over 48 hours but no operation was done. On the third day in the evening, she was taken to the operating theatre where an external cephalic version was tried but failed. Later on a caesarean section was performed. Barely 30 minutes after the operation the lady died.

Cause of death: Obstructed labor/Uterine rupture.

(Respondents: Husband and five health workers from two different health facilities)

Case 4

AS is 24 years old and this was her second pregnancy. She made three routine antenatal care visits. It was a multiple pregnancy as indicated through an ultra sound scanning. One evening after supper at around 9:00 pm she complained of labor pains. The TBA was called who came and asked the relatives to prepare and take her to the hospital as was advised at the prenatal clinic. They set out for the hospital using a donkey cart. On their way the first twin was delivered assisted by the TBA and her aunt. The second was however retained.

At the river crossing point to the hospital there was no ferry services. They went back to a nearby village to look for a canoe; fortunately they got one after an hour. At the river they spent considerable length of time as the canoe owner was demanding an amount 15 times more than the usual fare. However, they paid it and were ferried across. After crossing they hired a taxi to the hospital.

They reached the hospital at 12:41 am. The doctor came to see her and asked the nurses to prepare her for theatre as she needed an operation. Unfortunately there was no electricity in the hospital. It was the following afternoon at around 6:00 pm i.e. 16 hours after she reported that electricity was available in the hospital. A caesarean section was performed but she was wheeled dead from the theatre. Prior to that blood was requested but relatives were told at the lab blood was not available. Her aunt donated a unit and bought two units from the laboratory for D300.00.

Cause of death: Obstructed labor/Ruptured uterus

(Respondents: TBA, Mother in-law, Aunt and three health care providers)

Case 18

HJ is 32 year old woman. She had eight previous pregnancies.

During the course of her last pregnancy she had an episode of bleeding. She went to the health centre (8 km away) to seek care. Drugs were prescribed for her and she bought them in a local drug store. Few days later she again started bleeding heavily. She was taken back to the health centre, where she was transferred to another health centre (42 km away). At the health centre she was told she urgently needed blood but there were no blood bags. She was then transferred to the hospital (60 km away).

At the hospital the relatives were asked to find blood for her. They got one unit at the lab for D150.00. They were asked to find another unit but unfortunately there were no blood bags in the hospital.

Cause of Death: Hemorrhage and Abruption placenta

(Respondents: Husband's brother, TBA, co-wife and four health care providers from three different health facilities)

Case 41

AC is 15 years old married lady pregnant for the first time. She made six routine prenatal care visits during this pregnancy.

One afternoon she complained of lower abdominal pain so was taken to the health centre in the village. She was later transferred to another health facility (44 km away). There she was examined and was to be transferred to the hospital (36 km away) but there was no transport. The ambulance of the facility had a breakdown two weeks ago.

For over twenty-four hours transport was not available until the following day at around 10:00 am one government department assisted with their trekking vehicle. She was taken to the hospital but died the following day at the hospital.

Cause of death: Unknown

(Respondents: Husband, mother in-law, father in-law and seven health care providers from three different health facilities).