Republic of Namibia

MINISTRY OF HEALTH AND SOCIAL SERVICES

Report of the Prevalence and Contributing Factors of Facility-Based Maternal and Neonatal Deaths in Five Regions of Namibia (Erongo, Hardap, //Karas, Khomas, Omaheke) during 2010–2012

Survey Report

March 2014

Republic of Namibia

MINISTRY OF HEALTH AND SOCIAL SERVICES

Report of the Prevalence and Contributing Factors of Facility-Based Maternal and Neonatal Deaths in Five Regions of Namibia (Erongo, Hardap, //Karas, Khomas, Omaheke) during 2010–2012

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PREFACE

Acknowledging the magnitude of disease burden through evidence-based information is a requisite of a sound health system.

These report findings and recommendations supplement efforts already initiated by the Ministry of Health and Social Services to improve maternal and newborn health in Namibia.

This study was conducted with the ultimate end result in mind of providing inroads into providing appropriate interventions that will improve maternal and newborn health in the five study regions.

The nature of the study necessitated the collection of data from the health facilities, health workers and members of the community. Five Health Regional Directorates, namely Erongo, Hardap, //Karas, Khomas and Omaheke made immense contribution to the finalization of this document.

The Ministry wishes to commend the Hardap Regional Directorate for spearheading, commitment and excellent dedication towards making this study a success.

My sincere gratitude is also extended to the Ministry of Health and Social Services, National level especially the Primary Health Care Services Directorate, IntraHealth and University of Namibia's Multidisciplinary Research Center for availing staff members to give technical support. My special appreciation goes to USAID/PEPFAR for funding the whole process of the study and report production. I would also want to commend the Regional Directors of the five regions who assisted in one way or another.

I believe that the findings and recommendation of this survey will assist health service providers, programme mangers, local authorities and members of the community in improving maternal and newborn care in Namibia. Further it demonstrates the devastating contribution that HIV/AIDS has on maternal and newborn mortality. Thus I encourage them to consult this document on a regular basis in order to make informed decisions that contribute to improved maternal and newborn health.

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Mr. Andrew Ndishishi

Permanent Secretary – Ministry of Health and Social Service

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ANC	Antenatal care
ARV	Antiretroviral
BEmOC	Basic emergency obstetric care
CEmOC	Comprehensive emergency obstetric care
CH	Central hospital
CMO	Chief medical officer
CPR	Contraceptive prevalence rate
C/SHPA	Chief/senior health programme administrator
DH	District hospital
DHS	Demographic and Health Survey
EmOC	Emergency obstetric care
FGD	Focus group discussion
HAART	Highly active antiretroviral therapy
HC	Health centre
HIS	Health information system
HRH	Human resources for health
ICD-10	International Classification of Diseases, 10th edition
ICU	Intensive care unit
IH	Intermediate hospital
IV	Intravenous
Immpact	Initiative for Maternal Mortality Programme Assessment
IRB	Institutional review board
MDG	Millennium Development Goal
MoHSS	Ministry of Health and Social Services
MMR	Maternal mortality ratio
MM rate	Maternal mortality rate
MNCH	Maternal, newborn, and child health
MRC	Multidisciplinary Research Centre
NEM List	Namibia Essential Medications List (2008)
NMR	Neonatal mortality rate
PMDF	Proportion of maternal deaths among females of reproductive age
PMDRC	Policy Management and Development Review Committee
PMTCT	Prevention of mother-to-child transmission of HIV
PPH	Postpartum haemorrhage
RAPID	Rapid Ascertainment Process for Institutional Deaths
SBA	Skilled birth attendant
SPSS	Statistical Package for the Social Sciences
TB	Tuberculosis
TBA	Traditional birth attendant
TFR	Total fertility rate
TWG	Technical working group

UNAIDS	Joint United Nations Programme on HIV and AIDS
UNAM	University of Namibia
UNDP	United Nations Development Programme
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USD	United States dollar
WCBA	Women of childbearing age
WHO	World Health Organization

KEY DEFINITIONS[1]

Maternal death: A death of a woman while pregnant or within 42 days of termination of pregnancy irrespective of the duration and site of pregnancy from any cause related to or aggravated by the pregnancy or its management but not from incidental or accident causes.

Pregnancy-related death: The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the cause of death.

Direct obstetric death: The death of a pregnant woman during pregnancy or within 42 days of termination of pregnancy due to obstetric complications of the pregnancy state (pregnancy, birth or postpartum) OR interventions, omissions, and/or incorrect treatment for complications. This includes: haemorrhage, infection, preeclampsia/eclampsia, obstructed labour, unsafe abortion, and complications of anaesthesia or surgery.

Indirect obstetric death: Death of a pregnant woman during pregnancy or within 42 days of termination of pregnancy from preexisting disease or injury exacerbated by pregnancy. This includes: complications of chronic disease (e.g., cardiac, renal), severe anaemia, tuberculosis, HIV deaths related to or exacerbated by pregnancy state, and violence related to pregnancy state (i.e., domestic violence, homicide, suicide).

Incidental death: Death from unrelated causes which happen to occur during pregnancy or within 42 days of end of pregnancy.

Late maternal death: The death of a woman from direct or indirect obstetric causes, more than 42 days but less than one year after end of pregnancy.

Maternal mortality ratio (MMR): The number of maternal deaths per 100,000 live births (live neonate of >500g or at least 22 weeks gestation) over a given period.

Maternal mortality rate (MM rate): The number of maternal deaths per 100,000 women of reproductive age in the same population in the given period.

Neonatal mortality rate (NMR): The number of deaths to live-born infants in the first 28 days of life per 1000 live births in the same period.

Perinatal death (rate): The number of stillbirths (gestation of 7 months or longer) and deaths to infants in the first week of life per 1000 live births in the same period.

Proportion of maternal deaths among females of reproductive age (PMDF): The number of maternal deaths in a given time period divided by total women of reproductive age.

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[1] World Health Organization. 2010. Trends in maternal mortality: 1990-2010. WHO, UNICEF, UNFPA and World Bank estimates. Geneva.

1. Executive Summary

A multisource survey of facility-based maternal and neonatal mortality in the five southern regions of Namibia (Erongo, Hardap, //Karas, Khomas, and Omaheke) covering the time period from January 2010–June 2012 (two and a half years) was undertaken to complete a national picture for maternal and neonatal health. A similar study of the northern regions was conducted in 2010. The main objectives of the five-region study were the following:

- To determine the prevalence and most common causes of maternal deaths in facilities in the five regions, including direct and indirect causes, in accordance with the WHO/ICD-10 definition of maternal death
- To clarify characteristics of women who experience maternal death (e.g., educational level, urban vs. rural residence, age at death) in order to inform maternal health care programme initiatives
- To determine the prevalence and characteristics of unreported maternal deaths in health facilities in the five regions
- To determine the prevalence and most prevalent causes of neonatal deaths in facilities in the five regions
- To evaluate systems and health workforce issues contributing to reduced quality and delayed provision of maternal and neonatal health care services in the five regions
- To further delineate important issues that may relate to household and community-level delays in seeking and reaching care as a contributor to maternal and neonatal death.

The study was commissioned by the Ministry of Health and Social Services, with technical support from USAID and IntraHealth International and contracted research support from the University of Namibia (UNAM) Multidisciplinary Research Centre. Prior to initiation of the study, the Ministry approved a full proposal, and institutional review board (IRB) approval was obtained from both the Ministry and IntraHealth, meeting national and international standards for ethical human subjects research.

Data were collected over a three-month period (March–May 2013) through the use of various standardised tools and both quantitative and qualitative methods. (Copies of each of the data collection tools are included in the appendices of this report.) The key study components were:

1. Clinical audits of reported maternal deaths in the facilities surveyed
2. Clinical audits of neonatal deaths in the facilities surveyed
3. Rapid Ascertainment Process for Institutional Deaths (RAPID) survey to identify maternal deaths
4. Emergency obstetric care signal function survey at district hospitals
5. Verbal autopsy using a standard WHO verbal autopsy tool (2012 version)
6. Focus group discussions in selected communities.

UNAM researchers completed data analysis in September–October 2013, and the composite report was prepared and reviewed from October 2013 to March 2014 by all stakeholders, including the Technical Working Group, UNAM researchers, Ministry personnel, and IntraHealth technical staff.

Of a total of 57 maternal deaths evaluated in the five regions during this time period, most (95%) occurred in higher-level facilities (district, intermediate, and central hospitals), and 75% of the women had given birth in the facility in which they died. Although some women died at a higher-level facility subsequent to transfer from a health centre or home birth, this represented only a small number of cases. On average, maternal deaths occurred three days after admission to the facility and two-thirds of women died after delivery. Approximately 12% of the women died as a result of abortion. Only 15 of the 57 births were officially reported as a maternal death with a clinical audit. The remaining maternal deaths were discovered through the RAPID process of identifying deaths to women of reproductive age which should have been classified as a maternal death. Even more significantly, in 60% of the unreported maternal deaths (many of which occurred in general medical wards and intensive care units), investigation disclosed a direct cause of maternal death. Direct causes also made up approximately 60% of the recorded maternal deaths evaluated through the maternal death clinical audits. Overall, the most common causes of direct maternal death were sepsis (21%), postpartum haemorrhage (10%), and preeclampsia (10%). Causes of death related to complications of anaesthesia or surgery were uncommon.

Among indirect causes of maternal death, HIV/AIDS was the most important cause and responsible for sixty-eight percent of all indirect deaths. Approximately 60% of mothers who died were known to be HIV-positive but in only 15 of these cases was the maternal death determined to be due to directly or indirectly to HIV. Only 47% of HIV-positive women were reported to have been receiving highly active antiretroviral therapy (HAART) at the time of their death. The audit data on HIV-related maternal mortality were also reflected in the verbal autopsy responses, which suggested that fear and stigma around HIV/AIDS continue to limit care-seeking and compliance with HAART treatment and other appropriate interventions for HIV-positive pregnant women.

In comparison to the previous eight-region study, this study had fewer maternal deaths attributable to postpartum haemorrhage (10% compared to 35% in previous study) and more deaths due to sepsis (21% compared to 16% in previous study). HIV/AIDS was also noted as a significant cause of indirect maternal mortality in the previous study at 35% of all deaths. The timing of maternal deaths in both studies was similar, with almost two-thirds occurring postpartum.

With such a small number of total deaths, it is challenging to draw conclusions about the characteristics of the women who died and difficult to make comparisons with larger population statistics. Approximately one-third of women who died were never married, one-fourth (24.5%) had completed primary school, and more than one-third (38.5%) had completed secondary

school. Almost 75% were from urban areas. Only 42% of women who died a maternal death were indicated to have attended prenatal care, although this figure may not have been accurate due to incomplete records and would be significantly different from national averages if it were.

An additional component of this study, which was not included in the previous study of the northern regions, was an evaluation of facility-based neonatal deaths during the same time period. There were almost 500 neonatal deaths evaluated; most also occurred at the larger hospitals (where most of the births occurred). For neonates who died, more than 70% of mothers had been recorded to have received antenatal care, though a significant percentage did not initiate care until the second trimester. Approximately two-thirds of neonatal deaths occurred at the facility in which the neonate was born and, as indicated by both birth weight and gestational age data, prematurity was the cause of more than half of neonatal deaths. Other important causes were birth asphyxia, sepsis, and respiratory distress syndrome. Qualitative data from focus group discussions as well as neonatal death audit responses indicate that few facilities are equipped to care for premature neonates. Moreover, transfer of premature neonates was delayed in a number of facilities during the time period of this study.

Qualitative data from the verbal autopsies and focus group discussions point to concerns about respectful, high-quality care in facilities. While delays in the decision to seek care remain a critical issue requiring sustained community-based efforts to address, a more serious issue may be the need to address provision of consistent high-quality care at facilities. In addition, some of the district hospitals assessed lacked the resources or health personnel to provide key signal functions for emergency obstetric care (EmOC) and should be upgraded. Many of the focus group participants stated that the facilities available for EmOC either did not have the number of trained providers necessary to meet demand or assigned health workers were not present in the facilities. A number of focus group participants described a lack of respect and attentiveness to women in labour. Delayed decision-making was also noted by some health workers during the maternal death clinical audit reviews. Finally, concerns were shared about inappropriate early discharge of mothers and babies after delivery.

The results of this study are consistent with available data from other sources, including Demographic and Health Survey data, public health facilities' data, and World Health Organization estimates. More than half of the unreported maternal deaths were due to direct causes of maternal mortality that should have been recognised. Clearly, the government health information system is not recording a significant proportion of maternal deaths at facilities. In a number of cases, the researchers were not able to obtain complete information due to misfiled and incomplete records, a common problem at all levels of health facilities. The information provided by both quantitative and qualitative data sources also points to the critical need to address quality of care at facilities. Community-based strategies to promote antenatal care and institutional births will only be successful if facilities make respectful and high-quality maternity care routinely available. Recommendations focus on strengthening maternal and neonatal health care at the community and facility levels, improving monitoring of maternal and neonatal deaths, and increasing epidemiological and intervention research and evaluation.

2. INTRODUCTION

2.1 Overview of Maternal and Neonatal Health in Namibia

Globally, there has been extensive improvement in maternal health, with a decline of worldwide maternal deaths by 47% in the last decade from an estimated 543,000 to 287,000. Nonetheless, maternal health remains a significant problem in many countries, and overall progress still remains far short of the Millennium Development Goal (MDG) #5 target of reducing maternal deaths by 75% by 2015. Sub-Saharan Africa continues to have the highest burden of maternal deaths (58% of global maternal deaths) as well as the highest proportion of maternal deaths due to HIV/AIDS (WHO 2010).

The most recently available World Health Organization (WHO) estimate of the maternal mortality ratio (MMR) for Namibia in 2010 is 200 maternal deaths per 100,000 live births, placing Namibia in the category of moderate MMR countries (defined as an MMR between 100-200/100,000 live births). This represents a decline from estimates in recent years. According to WHO estimates, the Namibian MMR peaked in 2005 at 310 maternal deaths/100,000 live births. Data from the Namibian Demographic and Health Survey (DHS) in 2006–2007 produced even higher estimates of 449 maternal deaths/100,000 live births, a significant increase from the prior 2000 DHS report of 271 deaths/100,000 live births (Ministry of Health and Social Services and Macro International 2008).

Overall reduction in infant and child mortality has been slow in Namibia. The perinatal mortality rate, which is an important indicator of maternal health and safe obstetric care, combines the stillbirth rate after seven months of pregnancy with the early neonatal (within one week of life) mortality rate. According to DHS data for the same 2006–2007 period, Namibia's perinatal mortality rate increased slightly from 27/1,000 live births in 2000 to 29/1,000 live births in 2006, although the neonatal mortality rate decreased from 28 to 24 deaths/1,000 live births during the same time period. An estimated 53% of all under-five child deaths are attributable to HIV/AIDS.

Namibia is one of a number of sub-Saharan African countries in which the HIV epidemic has had an enormous impact on maternal health and maternal deaths. In 2010, WHO estimated that 59.4% of maternal deaths in Namibia were attributable to HIV/AIDS, and the 2010 National HIV Sentinel Survey concluded that 18.8% of adults in Namibia were HIV-positive (Ministry of Health and Social Services 2010a). This represents a significant contribution to the increased MMR of the last decade. As antiretroviral (ARV) drugs become increasingly available, maternal deaths due to HIV/AIDS should significantly decline. Over the 1990–2010 period, however, the progress towards reduction of the national MMR was only 2% overall (average annual reduction of 0.1%), making Namibia one of 14 sub-Saharan countries designated as having made insufficient progress towards MDG #5. Other important maternal health statistics include WHO's 2010 estimate of the lifetime risk of maternal death in Namibia (1:160) and the proportion of maternal deaths to females of reproductive age (PMDF) (3%). The *Namibian Millennium Development Goals Third Report* produced in August 2010 reiterates the issues surrounding maternal health

(Republic of Namibia 2010). Although the coverage of antenatal care (ANC), delivery by skilled attendance, and contraceptive prevalence rates have all improved in the last decade, the increase in the maternal mortality rate—even if largely attributable to HIV—is concerning and demands significant and timely investment.

A 2009 WHO maternal and child health report for Namibia includes detailed information that is also helpful in understanding the current maternal and neonatal health situation (WHO 2009a). The report is largely a review of DHS data but also draws on several other sources of data. Overall, the report indicates that most deliveries in Namibia take place in facilities (81%) and are assumed to be assisted by skilled birth attendants (SBAs). This varies by urban (94%) versus rural (73%) location as well as educational level. Seven percent of all births nationwide are carried out by traditional birth attendants (TBAs). Most Namibian women attend ANC, and more than 70% attend the recommended minimum of four ANC visits, but more than a third do not attend a first antenatal visit until after the first trimester. Only 65% of women receive any postnatal follow-up.

Namibian society in general is supportive of larger families. While there has been a reduction in the total fertility rate to 3.6 as noted in the 2006–2007 DHS survey (Ministry of Health and Social Services and Macro International 2008) and increasing acceptance of modern contraceptive methods, there is still significant urban-rural variation in the total fertility rate, use of contraception, and average birth intervals. Adolescent pregnancy rates are high, exceeding 15%–25% in some rural areas.

It is well known that gender equality, women's empowerment and education, and a safe living environment contribute to the health of women and families. Conversely, stress, poverty, HIV/AIDS, unemployment, and substance abuse can escalate or exacerbate gender-related and/or partner violence. The 2006–2007 DHS survey found that partner violence is a significant concern in Namibia. A notable proportion (44%) of surveyed men held the opinion that women sometimes deserve to be beaten, and 33% stated that forcing a partner to have sex was not rape. Recognising that women who are pregnant are more often the victims of domestic and societal violence than women who are not, WHO's revised definition of maternal deaths includes violence related to pregnancy state (i.e., domestic violence, homicide, suicide) as an indirect cause of maternal death. Under-recognition and coding of violence-related maternal deaths in Namibia may affect national MMR estimates.

In 2005, the Ministry of Health and Social Services (MoHSS) completed a three-month needs assessment for emergency obstetric care (EmOC) in Namibia, based on UN process indicators for the availability, utilisation, and quality of EmOC. Although this needs assessment was undertaken over a short period of time and may not represent the current situation, as of 2013 it had not been updated or repeated. The assessment covered all 34 state hospitals, seven private hospitals, 32 health centres, and 27 health clinics (a 10% sample of all health clinics) with the purpose of identifying gaps in EmOC to be addressed to ensure EmOC access for all women (Ministry of Health and Social Services 2006). Only four of the hospitals surveyed were providing all eight of the signal functions of EmOC during the three-month survey period. Moreover, the

distribution of these four facilities was skewed; in Khomas region, the survey documented 3.4 EmOC facilities per 100,000 population, whereas ten of thirteen regions in the country had no EmOC facility coverage at all. Nationwide, approximately 23% of deliveries took place in an EmOC-designated facility, and 42% of public health facilities had adequate SBAs. Although the overall proportion of Caesarean section deliveries was 8%, which is in the WHO-recommended range of 5%–15%, in some private hospitals the Caesarean section rate exceeded 60%. In addition, the case fatality rate for direct obstetric complications in facilities was high (0.4%), and a significant proportion of maternal deaths recorded during the study period occurred in the first four days postpartum. Of the total causes of maternal mortality identified during this time period, the highest were severe eclampsia (33%), haemorrhage (25%), and obstructed or prolonged labour (25%). HIV/AIDS was by far the most common indirect cause of maternal mortality (37%), although other important indirect causes included complications of abortion (8.3%) and postpartum sepsis (8.3%). The EmOC needs assessment also identified additional concerns such as critical unfilled posts in public hospitals, lack of continuous availability of critical medications (including misoprostol and antimalarials), incomplete records, and a shortage of ambulance services for health centres.

Several recent practical guidelines and processes make evident the Government of Namibia's firm commitment to improving health for women and children in Namibia. One important document is the *Road Map for Accelerating the Reduction of Maternal and Neonatal Morbidity and Mortality,* released in 2010 as a framework for building partnerships and increasing investment in maternal, newborn, and child health (MNCH) at both public institutional and program levels (Ministry of Health and Social Services 2010b). Important interventions towards meeting the overall goal of accelerating the reduction of maternal and child mortality in Namibia were initiated subsequent to the *Road Map*. These include progressively deploying trained health providers for EmOC, conducting additional training of SBAs, expanding prevention of mother-to-child transmission (PMTCT) of HIV services, initiating a maternal death review, improving outreach services (particularly transport/ambulance services for rural communities), and defining and supporting a minimum package of maternal and neonatal health services for each level of the health care system. The *Biennial Report of the National Maternal and Child Health Management Committee (2008-2010)* details some of the progress towards improvements (Ministry of Health and Social Services 2011).

2.2 Justification and Context for Survey

In 2010, the MoHSS with the support of the United Nations Population Fund (UNFPA) undertook and disseminated a report of a retrospective cross-sectional survey of maternal deaths in district and intermediate hospitals in eight of Namibia's most populated regions in the North East, North West and Central areas (Ministry of Health and Social Services 2010c). The study included 13 out of 22 total districts within the regions of Caprivi, Kavango, Kunene, Ohangwena, Omusati, Oshana, Oshikoto, and Otjozondjupa. The remaining five regions of Erongo, Hardap, //Karas, Khomas, and Omaheke were not included in the original survey due to the small proportion of the national population living in these regions (only 10% of Namibians live in the southern

regions) and the expense and challenges in completing a largely rural survey that might not add significant information.

The general objectives for the eight-region survey were to establish the main contributing factors leading to maternal deaths (including community-based factors such as delayed care-seeking) and to determine the prevalence of unreported maternal deaths in the selected regions. The study included all deaths from January 1, 2008 through May 31, 2010 (two and a half years) and collected data over a 4-6-week period. The survey had three basic components:

1. Clinical audits of reported maternal deaths in facilities surveyed
2. Survey using the Rapid Ascertainment Process for Institutional Deaths (RAPID) methodology to identify maternal deaths not reported through routine auditing using an adapted and pretested version of the Immpact Tool developed by the Initiative for Maternal Mortality Programme Assessment (Immpact) and supported by the WHO (Immpact 2007)
3. Verbal autopsy using a standard WHO verbal autopsy tool to interview the family and community members of women who died a maternal death with the purpose of investigating additional medical causes and other contributing factors (WHO 1995).

Among the conclusions described in the report were the following key findings. First, of 97 **reported maternal deaths investigated**, 94% occurred in health facilities (the remainder occurred en route). Common identified direct causes of reported maternal deaths included:

- Postpartum haemorrhage (PPH) (35%)
- Preeclampsia/eclampsia (21%)
- Puerperal sepsis (16%)
- Obstructed labor (11%)
- Antepartum haemorrhage (9%)
- Septic abortion (2%).

Indirect causes of maternal death included:

- HIV/AIDS complicating pregnancy (35%)
- Pneumonia (20%)
- Tuberculosis (13%)
- Meningitis (presumably related to malaria) (5%)
- Anesthesia-related deaths (5%).

An additional 74 **unreported maternal deaths** were identified through the RAPID process as having occurred during the time period studied, representing 39% more deaths than the 97 reported deaths in the study. The majority of the unreported deaths were in the medical wards (44%), general wards (31%), and gynaecology wards (18%). Almost half (47%) of the unreported maternal deaths occurred during the first six weeks postpartum, 27% occurred after an abortion, and 26% of the women died while still pregnant. This is in contrast to the reported maternal

deaths, three-fourths of which (72%) were in the postpartum period and 28% during pregnancy, with no post-abortion deaths recorded.

Of all the **deliveries** resulting in a maternal death, 34% were conducted by doctors and another third (34%) by nurses; other deliveries resulting in death were carried out by relatives (7%), TBAs (4%), other traditional practitioners (6%), or were unaccounted for (14%).

The verbal autopsy reports indicated that women experienced **delayed care** for several overlapping reasons. Many experienced delayed care due to decisions to seek care at the household level first (59%). Fewer women experienced delayed care due to issues en route to a facility or lack of transport (17%). Well over half (59%) experienced delayed care at facilities. Table 1 summarizes key conclusions, recommendations, and progress resulting from the report.

Table 1: Conclusions and recommendations from 2010 maternal mortality survey in eight regions*

Conclusion or recommendation	Steps/progress
Women experience delays impacting maternal health, most significantly in the decision to seek care at the household/community level (delay #1) and in receiving care at health facilities (delay #3)	• Radio messaging and community-distributed leaflets promoting ANC and facility births • Access to ANC expanded to be provided at more health clinics (not only hospitals) and on a daily basis • Mobile outreach units and maternity waiting homes to be refurbished or developed (where not in existence) to expand access and promote EmOC in some areas
The system of reporting maternal deaths is not adequate to capture all deaths (particularly those not occurring on the maternity ward), and there are misunderstandings among health workers on the definition of a maternal death	• Dissemination of definition of maternal death to health workers broadly through posters and job aides • National process of facility-based maternal and peri/neonatal death reviews initiated in 2010 • Regional delivery units established to support reporting (within 7 days) and reviewing (within 1 month) of maternal and neonatal deaths
There must be improvements in the quality of maternal health services to ensure appropriate EmOC for all women, including: enhancing health workers' skills in emergency obstetrics, expanding nurses' scope of practice as SBAs, and approving and making available essential EmOC medications on the Namibia Essential Medications (NEM) List (including magnesium sulphate for preeclampsia/ eclampsia and misoprostol for prevention and treatment of PPH where oxytocin not available)	• EmOC, ANC, and life-saving skills training in some regions: Training of trainers completed and a training for Kavango region completed • Discussions of expanding scope of work for enrolled nurses to include appropriate EmOC functions • Discussions on updating the NEM List to include magnesium sulphate for preeclampsia/eclampsia specifically

* Caprivi, Kavango, Kunene, Ohangwena, Omusati, Oshana, Oshikoto, and Otjozondjupa

Subsequently, the MoHSS requested a survey of the remaining five southern regions not originally surveyed, in cooperation with and with funding support from USAID. The five-region

study described in this report was perceived as important for completing the picture of maternal health in Namibia and to respond to the reality that although most of the population lives in the heavily populated northern regions, the other regions—which make up almost 50% of the landmass of Namibia—are underserved. Barriers to safe motherhood, such as delayed care-seeking and lack of access to quality EmOC services, are also exacerbated where the population is spread widely over rural areas. The expectation is that both the process involved in conducting this study and the results generated will contribute to maintaining a high profile of commitment to maternal and neonatal health while creating a model for a multisource evaluation and helping take Namibia forward in addressing maternal and neonatal health and reducing mortality.

It was evident from the 2010 survey in eight regions that compromised quality of facility-based care is a major contributing factor to maternal and neonatal mortality in Namibia. In August 2012, a Presidential inquiry process was initiated into the activities, affairs, management, and operations of the MoHSS (Republic of Namibia 2012). This was largely in response to negative reports in the media about maternal health care services in public institutions. The report that resulted from the inquiry clearly documented shortages of staff (which can lead to poor quality of care and staff burnout) as well as infrastructure and equipment gaps as noted in the EmOC facility assessment. The report also found that:

- The conduct, ethics, and attitudes of some health workers towards patients were unacceptable
- Some nurses and doctors were rude, impatient, and sometimes incompetent and negligent
- Doctors at times refused to attend patients in the facility after hours and instead gave orders by telephone without actually seeing the patient
- Older health workers blamed poor conduct on the training of newer nurses, which they perceived as lacking an emphasis on ethics.

Namibia has shown great progress in the last decade in addressing the HIV/AIDS epidemic and reducing related morbidity and mortality. Although much of the increase in MMR and the perinatal mortality rate in recent years can be attributed to HIV/AIDS, other indicators of compromised maternal and neonatal health and limited availability and quality of EmOC services indicate opportunities for wider investment. This is a critical time for Namibia to prioritise maternal and child health and the health workers who provide care, and put Namibia back on track towards achieving Millennium Development Goals.

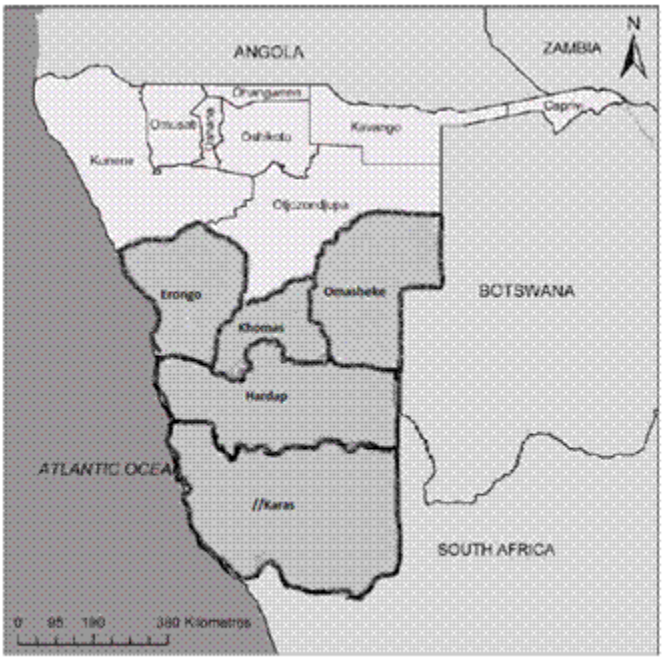
2.3 Profile of Namibia and Description of Survey Regions

The information for this section comes from the United Nations Development Programme *Human Development Report 2011* (UNDP 2011). Namibia is situated in Southern Africa, bordering the Atlantic Ocean to the west and sharing borders inland with Angola, Botswana, Zambia, and South Africa. The total landmass is 824,292 square kilometers. Overall, Namibia's climate is dry with high plateaus, desert areas, and limited freshwater resources, which exacerbates risk of drought conditions. Natural resources for Namibia include diamonds, uranium, copper, silver, lead, and other metals as well as the fishing industry.

The government of Namibia is a Republic, having achieved independence from the South Africa mandate and established a Constitution in 1990. At present, Namibia is a middle-income country but with one of the most unequal income distributions globally. The gross domestic product is $15.5 billion at $7300 per capita. Approximately 55% of Namibians live below the poverty line (defined as $2 USD/day). The Human Development Index for Namibia is 0.625, ranking Namibia 120th out of 187 countries globally.

As of July 2012, Namibia's estimated population was 2,265,828 persons, an estimate that takes into account the excess mortality due to HIV/AIDS. The population density is one of the lowest in the world at three persons per square kilometer. The population's overall age structure is relatively young, with a third (34%) of the population aged 14 or younger, and 62% between the ages of 15 and 65 years; only 4% of the population is over 65 years of age. The annual population growth rate is 0.817%, with a birth rate of 21.11 births/1,000 population, a death rate of 13.09 deaths/1,000 population, and an annual outmigration rate of 0.15 migrant(s)/1,000 population. The five regions included in this study (Erongo, Hardap, //Karas, Khomas, and Omaheke) are in the southern half of the country as shown in Map 1.

Map 1: Regional map of Namibia



Source: http://mapsofworld.com, September 2013

Over a third (38%) of Namibia's population is urban, with a 3.3% annual rate of migration to urban areas. The country's ethnic populations include black (88%), white (6%), and mixed (6%). Approximately 50% of the population belongs to the Ovambo tribe and 9% to the Kavangos tribe; other ethnic groups include Herero (7%), Damara (7%), Nama (5%), Caprivian (4%), Bushmen (3%), Baster (2%), and Tswana (0.5%). Namibians are 80%–90% Christian and 10%–20% other indigenous religions. The official language of Namibia is English, with Afrikaans being the common language of most of the population and about 60% of the white population; German speakers also account for 32%, and small percentages for other indigenous languages. Approximately 88% of the population is literate (defined as individuals over 15 years who can read and write).

Life expectancy for Namibians at birth is 62 years for females and 53 years for males. The total fertility rate is 3.6, and the contraceptive prevalence rate is 55.1% (according to the 2006–07 DHS survey). According to 2009 UNAIDS estimates, the HIV prevalence rate is 13.1%, with an estimated 180,000 persons living with HIV/AIDS. The prevalence of under-five child malnutrition

is 16.5%. Physician density is 4/10,000 and hospital bed density 27 beds/10,000 population. Table 2 summarizes information pertaining to the five study regions.

Table 2: Characteristics of the five study regions

CHARACTERISTIC	REGION				
	ERONGO	HARDAP	//KARAS	KHOMAS	OMAHEKE
Surface area (km^2)	63,720	109,888	161,215	36,805	84,612
Total population (2011 census)	150,809	79,507	77,421	342,141	71,233
# of districts	4	3	3	1	1
Population density (persons/km^2)	1.6	0.6	0.5	9.2	0.8
% of females completing primary school	7.4	7.8	11.1	4.7	6.5
% female literacy	95.8	91	96.5	96.7	77.8
Contraceptive prevalence rate (CPR)	78.5	63.3	68.2	77.7	57.7
Estimated total fertility rate (TFR)	2.8	3.3	3.2	2.6	5.1
Annual growth rate (%)	5.4	2.4	0.3	5.2	-1.9
Mean age at first birth	21.3	20.6	21.4	22.5	20.3
% of women receiving ANC in last pregnancy	93	95.5	98.8	96.8	91.5
% of women delivering with SBA at last birth	92.6	90.5	93.7	95.3	76.2
# of women of childbearing age (WCBA), 15-49 years (2010) # of WCBA, 15-49 years (2011) # of WCBA, 15-49 years (2012)	28,652 29,024 29,402	16,777 17,296 17,815	20,330 20,595 20,862	74 151 75 305 77 118	19,896 20,393 20,903
Estimated live births per annum (2010) Estimated live births per annum (2011) Estimated live births per annum (2012)	5014 5079 5145	16,546 16,760 16,978	3229 3271 3312	11 864 12 049 13 636	3482 3569 3658
# live births in facilities studied (2010) # live births in facilities studied (2011) # live births in facilities studied (Jan–June 2012)	4763 3736 1907	2222 2082 1080	1665 1730 927	12535 9362 5336	1193 1187 658
# of central and/or intermediate hospitals[2]	0	0	0	2	0
# district hospitals[3]	4	2	4	0	1
# health centres with 24-hour services available for delivery[4]	0	2	3	0	1
# clinics with 24-hour services available for delivery	10	8	8	2	12

[1] Demographic Information extracted from Ministry of Health and Social Services (Windhoek, Namibia) and Macro International, Inc. 2008. Namibia Demographic and Health Survey 2006-2007. Calverton, MD: Macro International.

[2] Khomas region only: Katutura State Hospital and Windhoek Central Hospital

[3] District hospitals: Erongo (Omaruru, Swakopmund, Usakos, Walvis Bay), Hardap (Aranos, Mariental, Rehoboth), //Karas (Karasburg, Keetmanshoop, Luderitz, Oranjemund), Omaheke (Gobabis)

[4] Health centres and clinics surveyed: Hardap (Aranos, Maltahohe), //Karas (Aroab, Bethanie, Noordoewer, Rosh Pinah Clinic)

3. Aims and Objectives

The primary aim of this study was to complete a national picture of maternal and neonatal mortality in Namibia through a survey of facility-based maternal and neonatal deaths over a two-and-one-half-year period in five regions not previously surveyed: Erongo, Hardap, //Karas, Khomas, and Omaheke. A secondary aim, reflecting on the delays in receiving maternity care at health facilities noted in the first study as well as data from other sources pointing to high maternal and neonatal mortality at health facilities, was to further delineate potential reasons for delayed care and inadequate quality of care at public institutions.

3.1 General Objectives

The study's general objectives were to determine the prevalence and characteristics of health facility-based maternal deaths (both reported and unreported) and reported neonatal deaths, and to establish the main contributing factors leading to maternal and neonatal deaths in the five identified regions of Namibia.

3.2 Specific Objectives

The study had six specific objectives:

1. To determine the prevalence and most common causes of maternal deaths in facilities in the five regions (Erongo, Hardap, //Karas, Khomas, and Omaheke), including direct and indirect causes, in accordance with the WHO/ICD-10 definition of maternal death
2. To clarify characteristics of women who experience maternal death (e.g., educational level, urban vs. rural residence, age at death) in order to inform maternal health care programme initiatives
3. To determine the prevalence and most prevalent causes of neonatal deaths in facilities in the five regions
4. To determine the prevalence and characteristics of unreported maternal deaths in health facilities in the five regions
5. To evaluate systems and health workforce issues contributing to reduced quality and delayed provision of maternal and neonatal health care services in the five regions
6. To further delineate important issues that may relate to household and community-level delays in seeking and reaching care as a contributor to maternal and neonatal death.

4. METHODOLOGY

4.1 Study Design and Timing

This was a retrospective multisource study of facility-based maternal and neonatal deaths that occurred over the two-and-one-half-year time period from January 1, 2010 through June 30, 2012 in all district hospitals and health centres providing continuous 24-hour delivery services (i.e., health workers present 24 hours/day and not just on an on-call basis) in five regions: Erongo, Hardap, //Karas, Khomas, and Omaheke. This time frame was considered recent enough to minimise problems due to lack of available records in health facilities or lack of reliable recall of events contributing to maternal death by respondents taking part in community verbal autopsy surveys.

The study's six components included the same methods as the earlier eight-region study. In addition, it was broadened to include clinical audits of neonatal deaths, an EmOC survey at district hospitals, and focus group discussions. It should be noted that the qualitative focus groups in selected communities were not the primary aim of the study; this report includes broad observations generated by the focus group data but does not present in-depth focus group analyses. The six data collection elements were as follows:

1. Clinical audits of reported maternal deaths in the facilities surveyed
2. Clinical audits of neonatal deaths in the facilities surveyed
3. RAPID survey to identify maternal deaths not reported through routine auditing, using the Immpact tool (Immpact 2007)
4. EmOC signal function survey at district hospitals using a tool adapted from a multiagency handbook on monitoring emergency obstetric care (WHO 2009b)
5. Verbal autopsies using a standard WHO verbal autopsy tool (2012 version) to interview the family or closest community members of women who died maternal deaths (reported or unreported) with the purpose of investigating additional medical causes and other contributing factors (WHO 2012)
6. Qualitative focus group discussions in selected communities to investigate community-based maternal and neonatal health care attitudes, care-seeking behaviours, and perceptions and use of health services.

With technical support from IntraHealth, the MoHSS, and regional representatives from the Technical Working Group (TWG), study personnel carefully reviewed and updated the tools for each of the components to improve the accuracy of reporting. Because the international standardised tools were field-tested in the original eight-region study, additional pretesting was not necessary and these tools received only minor adjustments. The focus group discussion guidelines underwent more substantial revisions. Table 3 maps the six study objectives against the six data collection tools. The actual data collection tools are included in the appendices.

Table 3: Study objectives and data collection tools

Study objectives	Clinical audit of maternal deaths	Clinical audit of neonatal deaths	RAPID survey of unreported maternal deaths	EmOC signal function survey of district hospitals	Verbal autopsy of maternal deaths	Focus group discussions
1. Determine prevalence and most common causes of reported maternal deaths	X				X	
2. Clarify characteristics of women who experience a maternal death	X		X		X	
3. Determine prevalence and most common causes of neonatal death		X				
4. Determine prevalence and characteristics of women who experience an unreported maternal death			X		X	
5. Evaluate systems and health workforce issues contributing to reduced quality and delayed maternal and neonatal health care services	X	X	X	X	X	X
6. Delineate the importance of community-level delays in seeking and reaching care	X	X	X	X	X	X

4.2 Sampling and Study Population

The survey area consisted of five regions in southern Namibia (Erongo, Hardap, //Karas, Khomas, and Omaheke). The study included all sites providing 24-hour delivery services and all reported and unreported facility-based maternal and neonatal deaths during the two-and-a-half-year study period (January 2010–June 2012).

The verbal autopsy portion of the study focused on a subset of maternal deaths, selected based on a convenience sample from each region. The focus group discussions were a limited component of the study in terms of both time and resource availability; the focus groups, therefore, used convenience sampling of volunteers meeting the inclusion criteria determined by the TWG in the study proposal. Criteria included parent gender (mothers vs. fathers), type of health facility used (central/district hospital vs. health centre or clinic), and distance from facilities (less than 50 km vs. more than 50 km).

4.3 Data Collection and Analysis

4.3.1 Selection and training of data collection teams

The study coordinator, regional directors, principal investigator, IntraHealth technical personnel, and the TWG provided oversight and support to select regional teams of data collectors. For the clinical audits, RAPID survey, EmOC signal function survey, and verbal autopsies, data collectors were health workers familiar with health facilities and possessing appropriate communication skills for interacting with and gathering information from community members. For the focus group discussions, data collectors were members of the UNAM team of researchers with expertise facilitating focus groups and analyzing qualitative data.

TWG staff and UNAM conducted training of data collectors centrally. Training covered ethics of human subjects research, the aims and objectives of the study, and data collection processes. Training participants carefully reviewed and practiced using each of the tools to ensure reliability and consistency of data collection. Prior to the start of data collection a team made up of the principal investigator, study coordinator, and IntraHealth technical staff also made a supervisory visit to each of the health facilities serving as data collection points (March–April 2013). In addition, the regional directors visited facilities in their own regions separately. Data collection in the five regions was begun in April 2013 completed by June 2013.

The regional directors' offices performed an initial review of the data from all sources and then forwarded the data to the principal investigator, who reviewed the data for each tool before in turn forwarding data to the statistician for data entry and analysis. IntraHealth, which was responsible for providing and coordinating personnel with evaluation expertise, contracted with the Multidisciplinary Research Centre at UNAM to provide this expertise. IntraHealth received results of the quantitative data and content analyses of the qualitative data in September and October 2013 and used the results to formulate the study report. The MoHSS, TWG, UNAM, IntraHealth, and the Policy Management and Development Review Committee (PMDRC) of the MoHSS all reviewed the report prior to its dissemination.

4.3.2 Clinical audit of reported maternal deaths

Beginning in 2010, all health facilities providing maternity care services were expected to complete a process of maternal death review within seven days of a maternal death, with the review carried out by the health workers involved and at the institution where the death occurred. Each maternal death is entered on a confidential maternal death review form, which is given a unique number and maintained at the institution for review as well as reviewed by a Regional Maternal and Peri/Neonatal Death review committee within one month of the death.

Data collectors reviewed all maternal deaths recorded in each of the facilities during the period under retrospective study (January 1, 2010–June 30, 2012) and collected pertinent data from the confidential maternal death review form as well as other supporting clinical documentation (e.g., case notes, operating theatre registers, death records). Data collectors cross-checked the maternal death records with additional institutional death registers from the given time period.

After data collectors completed the clinical audit of maternal deaths tool (see Appendix 1), the study team analysed the data using Excel and SPSS.

Inclusion criteria:

- Reported maternal deaths to WCBA (15-49 years of age) within identified facilities during the period under study (January 1, 2010–June 30, 2012)

Exclusion criteria:

- Maternal deaths outside of the study period
- Maternal deaths outside of the facilities studied
- Deaths to women <15 years or >49 years of age

4.3.3 Clinical audit of reported neonatal deaths

Beginning in 2010, all health facilities providing maternity care services were also expected to complete a process of peri/neonatal death review within seven days of a death, with the review carried out by the health workers involved and at the institution where the death occurred. Each peri/neonatal death is entered on a confidential peri/neonatal death review form, which is given a unique number and maintained at the institution for review as well as reviewed by a Regional Maternal and Peri/Neonatal Death review committee within one month of the death.

Data collectors reviewed all neonatal deaths recorded in each of the facilities during the period under study (January 1, 2010–June 30, 2012) and collected pertinent data from the confidential peri/neonatal death review form as well as other supporting clinical documentation (e.g., case notes, operating theatre registers, paediatric ward registers). After data collectors completed the clinical audit of neonatal deaths tool (see Appendix 2), the study team analysed the data in Excel and SPSS.

Inclusion criteria:

- Reported neonatal deaths (deaths to a live-born infant within 28 days of birth) within identified facilities during the study period (January 1, 2010–June 30, 2012)
- Both newborns born at the hospital who died prior to discharge and newborns who were admitted or readmitted and died within 28 days of birth

Exclusion criteria:

- Stillbirths (deaths reported on the peri/neonatal death review form as having occurred prior to birth)
- Neonatal deaths outside of the study period or at home

4.3.4 RAPID survey of facility-based maternal deaths

Data collectors used the modified Immpact RAPID tool to review institutional records of maternal deaths during the two-and-a-half-year period from January 1, 2010–June 30, 2012 in order to identify unreported pregnancy-related deaths. Necessary information to complete the two RAPID forms (Appendix 3) was collected from death registers, midnight census reports, case

notes, operating theatre reports, autopsy reports, and other available hospital records. Based on information retrieved, deaths were classified as "maternal," "non-maternal," or "maternal death unclear." For any death initially deemed unclear by the data collectors, the study team undertook further evaluation of the data to clarify and decide on final classification. RAPID data were analysed using Excel and SPSS.

Inclusion criteria:

- All deaths to WCBA (15-49 years of age) from January 1, 2010–June 30, 2012 within identified facilities in the regions under study regardless of recorded cause of death

Exclusion criteria:

- Known maternal deaths for which a maternal death record exists
- Deaths of women more than 42 days from the time of delivery or after termination of pregnancy (e.g., late maternal deaths)
- Maternal deaths occurring outside of the study period

4.3.5 EmOC signal function survey

To complete a description of current institutional resources and available services for EmOC, the data collectors completed an EmOC signal function survey at a subsample of the central, intermediate, and district hospitals and health centres included in the study from the five regions, based on observation of services available at the facilities and interviews with key health workers and leaders.

The data collection tool was based on WHO/UNFPA's signal EmOC functions and is intended to reflect continual availability of signal functions for EmOC in the three months prior to the survey (see Appendix 4). Data were organised and analysed using Excel and SPSS.

4.3.6 Verbal autopsies

For maternal deaths identified through maternal death records or the RAPID process, data collectors conducted a verbal autopsy with those meeting the criteria at the community level. After introduction and communication with the closest relative or contact of the deceased, the data collection team went directly to the residence of the deceased woman. Using the modified WHO verbal autopsy form (see Appendix 5), the team gathered necessary information through an interview with the closest family or community member identified concerning the circumstances and their understanding of the maternal death. Completion of verbal autopsy interviews took approximately two hours per maternal death investigated.

Inclusion criteria:

- Maternal deaths reported at the included facilities during the study period regardless of the gestational age and the site of the pregnancy (e.g., including ectopic pregnancies as well as intrauterine pregnancy with all outcomes)

- Deaths to WCBA (15-49 years of age) identified as being "maternal" through the RAPID survey
- Maternal deaths occurring within the regions under study and the woman resided within the regions under study

Exclusion criteria:

- Maternal deaths reported at the included facilities where a residence for the woman could not be discovered (e.g., family moved) or where the woman's residence was outside of the region under study
- Deaths determined by the RAPID survey to be "non-maternal," such as those that resulted from an incident or accident unrelated to pregnancy
- Deaths of women more than 42 days from the time of delivery or after termination of pregnancy (e.g., late maternal deaths)
- Maternal deaths where a family member or close contact could not be identified for interview or where the site of residence was unreasonably far or difficult to reach

4.3.7 Focus group discussions

Focus group discussions were undertaken to identify prevalent community perceptions of maternal and neonatal-related morbidity and mortality, care-seeking behaviours, and access and quality of EmOC services. However, the focus groups were a limited component of the overall study, in terms of both time and resource availability.

Sampling. The MoHSS regional personnel's familiarity with regional maternal and neonatal mortality patterns played an important role in the selection of facilities for the focus group component of the study. The focus group sampling of district hospitals also stratified on urban/rural location; both urban and rural communities were selected, with "urban" defined as being within a 50-km radius of the central health facility, and "rural" defined as more than 50 km from the central health facility.

Recruitment and selection of participants. Recruitment of focus group participants was done in conjunction with individuals sensitised on the study objectives and familiar with the local communities, including health care providers, community health facilitators at the identified facility, and, in some instances, religious leaders. The selection criteria for respondents were mothers or fathers with a child aged 0-12 months who had been born at a participating health facility. This time period (0-12 months) was selected to reduce recall bias with limiting the time from death and to facilitate being able to locate participants. Participant criteria did not require a minimum education attainment. Data collectors used snowball sampling techniques to recruit participants meeting the inclusion criteria. Health providers at the selected facilities used existing facility records to identify an emergency contact or relative of a deceased woman to be recruited as the first participant, and the selected participant acted as a referral source to recruit more participants until the desired number of 8-10 participants was achieved. In cases where

fewer or more than eight people were recruited, the focus group discussion took place with those present.

Location. Data collectors conducted most of the focus group discussions in a meeting room within the selected health facilities, particularly in the urban areas, where most of the mothers planned to visit the clinic after the discussions. If a meeting space was not available, the discussions were conducted in a church hall or other open community meeting space.

Data collection. The focus group discussion guide included in the study protocol guided the data collection efforts (Appendix 6). The guide comprised three main themes (i.e., decision to seek care, reaching care, and receiving care). The facilitators were researchers from the University of Namibia who had experience in conducting focus group discussions. For each group, the facilitator recruited an assistant who was conversant in the local language. The facilitator, after introducing the purpose of the study, relayed the questions to the research assistant who then directly translated. The facilitator and research assistant probed answers as needed for further clarification. Each discussion lasted 1-2 hours. The discussions were tape-recorded. Both the facilitator and research assistant also took notes and subsequently reviewed and compared them. A third person was recruited to transcribe the discussions according to the three themes, and these transcribed notes were reviewed to clarify any ambiguities.

Analysis. The focus group discussions were not coded in their original format or language. Instead, coders reviewed quotes thematically and placed them into defined categories. Although the preselected quotes were often removed from the larger context of the conversations, they illustrated the three broad themes of interest (i.e., seeking care, reaching care, and receiving care). The focus group data were analysed by two coders in the IntraHealth home office in Chapel Hill, USA, using a list of codes that emerged from careful reading of the exemplary quotes. The two coders conducted coding independently and then examined discrepancies and agreed upon whether a given code should be used for a particular exemplary quote. The coders also refined the code definitions at the point of intercoder confirmation.

4.4 Data Quality and Analysis

The validity of data collection was assured by training data collectors on standard tools and through supervision by regional supervisors and coordinators for quality checks throughout the study period. Team leaders reviewed all data collection tools in the field on a daily basis to check for completeness and accuracy. Regional supervisors regularly conducted data validation with data collectors to discuss and resolve any data collection issues and were available for consultation throughout the study. The teams then forwarded the complete dataset to the principal investigator. During the first stage of statistical analysis, descriptive statistics were run on the entire dataset to check for outliers and any other potential errors.

4.5 Study Limitations

By definition, a retrospective study involves collecting information from records that may be incomplete and from individuals who may have recall bias. These sources of bias were minimised by delineating a defined time period (two and a half years) of maternal and neonatal deaths and completing the data collection over a relatively short time frame. Still, lack of completed records in some files and missing death certificates may have misled data collectors, resulted in incomplete information for data forms, and allowed room for interpretation bias. Missing data from clinical records was a significant issue at all sites, and it was necessary to collect much of the information from registers because the clinical audits were often incomplete.

Collection of sensitive information and assessment of health services is challenging under the best of circumstances. Though this study made efforts to standardise tools, it is clear that interpretation of factors contributing to maternal death remains subjective, and there is room for bias. A maternal death is always an unfortunate event. While this study was meant to collect information and support facilities and programs in improving health services and not for any punitive purposes towards health workers or facilities, it is possible that misinformation or limited information was made available because of fear of retribution.

Data collectors completed the verbal autopsies in communities. Although the data collectors were familiar with local culture and relationships, it was challenging to identify and access key informants who understood the circumstances leading up to maternal deaths. Selection bias may have affected some findings to the extent that investigators may have chosen to interview families who were more easily accessible. Some families were also difficult to trace due to local migration and poor access in hard-to-reach areas. Finally, verbal autopsies could not be conducted on maternal deaths which were still under medico-legal investigation.

For the focus group discussions, the researchers relied heavily on the support of health workers, community mobilisers, religious leaders, and informed members from the community to organise the groups. In some instances this approach worked very well, while on other occasions it did not work well, and the researchers spent more time organising participants for the groups than conducting the actual discussions. Moreover, because of the heavy reliance on community cooperation and coordination, some selection bias may have resulted. It is also possible that some people who were unhappy with the health services may have volunteered to participate as a means of voicing their dissatisfaction, resulting in a negative bias.

The recruitment of male participants for the focus groups was problematic. In some areas, males were willing to participate, while elsewhere there was resistance. Males offered excuses such as "I am not staying with the mother of my child," or "I cannot comment on any pregnancy-related instances," or "I am not willing to discuss my involvement with the mother of my child." Some female participants also were unwilling to have their male partners participate, stating "I do not know who the father is," or "I am not married," or "I don't want the father to be part of any focus group discussion."

4.6 Ethical Considerations

The Ethical and Research Committee of the MoHSS granted permission to undertake this study, which also underwent IntraHealth's internal human subjects review process. All technical personnel and researchers involved in the study provided evidence of completion of basic training in the ethics of human subjects research through either FHI360's Research Ethics Training Curriculum or the University of Miami's Collaborative IRB Training Initiative. Both of these human subjects research training short courses are available electronically and for public use.

Regional directors provided permission to access health facilities and patient records, while access to communities for verbal autopsies and focus group discussions was obtained from regional governors and/or local community leaders. All data collectors received training on confidential data collection prior to the study, and the completed forms were delinked and kept confidential in accordance with existing ethical standards for human subjects research in Namibia and internationally. Only members of the research team had access to the unpublished data. No facility records were removed from health facilities, and hard copies of data tools were shredded after completion of data entry, analysis, and approval. Electronic data were maintained only on data entry computers, which remained within the purview of the study coordinator and IntraHealth technical staff for the duration of the study and analysis. After finalisation of the study, all data will be handed over to the MoHSS for secondary analysis purposes.

For the additional information collected from health workers at facilities related to review of records and completion of RAPID surveys and from community members for the verbal autopsies, the study team obtained informed verbal consent from all respondents prior to interviews and data collection and informed respondents that they could withdraw from the data collection process at any time. Focus group moderators also obtained verbal informed consent from all focus group participants prior to the discussions and instructed participants that they were free to leave at any point in the discussion. Identifying information obtained during the maternal death audit and RAPID surveys for the purpose of verbal autopsy was kept in locked cabinets and will be destroyed upon approval of the study report. No personal identifying information was entered into any database. The study provided the option of counseling services for any respondent who might require counseling subsequent to an interview, if deemed necessary by the data collector and principal investigator. However, no one required counseling.

5. FINDINGS

5.1 Maternal Mortality

Table 4 presents an overview of maternal deaths at the 18 facilities surveyed during the 30-month retrospective study period (January 2010–June 2012). The table also includes an extrapolated maternal mortality rate per institution based on MoHSS health information system (HIS) statistics for live births for the same time period. Because the overall numbers are small for each facility and the distribution of births varies considerably, both between facilities and over time at each facility, these extrapolations are broad estimates only but are relatively consistent with the most recent national MMR estimate of 200 maternal deaths per 100,000 live births (WHO 2009a).

Table 4: Overview of facilities surveyed and maternal deaths

Region	Facility	# of live births	# of maternal deaths (% of total study maternal deaths)	Extrapolated MMR (deaths/100,000 live births)
Erongo	Omaruru District Hospital*	1060	1 (1.8%)	MMR=94.3
	Swakopmund District* Hospital	4191	3 (7%)	MMR=71.5
	Usakos District*Hospital	608	0	MMR=0
	Walvis Bay District*Hospital	4107	4 (7%)	MMR=97.3
	TOTAL: Erongo	**9966**	**8 (14%)**	**MMR=80.2**
Hardap	Maltahohe Health Center	n/a	0	NA
	Aranos District* and Aranos Health Center	637	2 (3.5%)	MMR=314
	Mariental District*	2679	1 (1.8%)	MMR=37
	Rehobeth District	2185	2 (3.5%)	MMR=91.5
	TOTAL: Hardap	**5501**	**5 (8.8%)**	**MMR=91**
//Karas	Karasburg District*Hospital	823	3 (5.3%)	MMR=364.5
	Keetmanshoop District*Hospital	2652	2 (3.5%)	MMR=75.4
	Luderitz District*Hospital	974	1 (1.8%)	MMR=102.6
	Aroab Health Center*	n/a	0	n/a
	Bethanie Health Center*	n/a	0	n/a
	Rosh Pinah Clinic	n/a	0	n/a
	Noordoewer Health* Center	n/a	0	n/a
	Oranjemund Health Center*	n/a	0	n/a
	TOTAL: //Karas	**4449**	**6 (10.5%)**	**MMR=134.8**
Omaheke	Gobabis District Hospital*	3730	3 (7%)	MMR=107.2
	Gobabis Clinic**	n/a	1 (1.8%)	n/a
	TOTAL: Omaheke	**3730**	**4 (8.7%)**	**MMR=107**
Khomas	Katutura State Hospital*	18495	20 (35.1%)	MMR=108
	Windhoek Central Hospital*	9539	14 (24.6)	MMR=146.7
	TOTAL: Khomas	**28,034**	**34 (59.6%)**	**MMR=121.2**

*The districts with an asterisk (*) include the representational subset of facilities (including different facility levels such as district hospitals and health centres) selected for the EmOC facility survey.

**This maternal death occurred in relation to Gobabis Clinic and in the process of transport and is counted in the Gobabis District Hospital statistics.

5.2 Results from Facility-Based Maternal Death Clinical Audit

A total of 57 maternal deaths were recorded in Erongo, Hardap, //Karas, Khomas and Omaheke regions in the study period (January 2010–June 2012). As shown in Table 4, Khomas region recorded the highest number of deaths (34), whereas Omaheke region only recorded four maternal deaths. Only 15 of the 57 cases (27%) were reported; the remaining 42 cases were unreported maternal deaths discovered in facilities through the RAPID survey. All of these deaths are included in the data presented below, but we also discuss important characteristics of the unreported deaths in a separate section.

Table 5 shows the distribution of maternal deaths by type of health facility where they occurred (i.e., clinic, health centre, or district, intermediate, or central hospitals). Few maternal deaths occurred at clinics (n=1) and health centres (n=2). The majority of cases occurred at district and intermediate hospitals, where most deliveries also took place. This was an expected result since, according to MoHSS policy, only precipitous deliveries are conducted at the clinic level.

Table 5: Type of health facility where the maternal death occurred

	Number of maternal death cases	Percent of all maternal deaths during study period
Clinic	1	1.8
Health centre	2	3.5
District hospital	20	35.1
Intermediate hospital	20	35.1
Central hospital	14	24.6
Total	**57**	**100.0**

The distribution of maternal deaths by age group is shown in Table 6. Most of the maternal deaths occurred to women in the 25-39 year age group. There were few cases of maternal deaths among women under 20 years of age or among women in the older age groups (40 years and above). This is worth noting in comparison to age-specific fertility patterns for Namibia overall, which according to DHS data peak in the 20-24 year age group.

Table 6: Distribution of maternal deaths by age (n=57)

Age group	# of maternal deaths during study period	% of total maternal deaths
15-19	2	3.5
20-24	8	14.0
25-29	10	17.5
30-34	18	31.6
35-39	16	28.1
40-44	2	3.5
45-49	1	1.8
Total	**57**	**100.0**

5.2.1 Causes of maternal death

Causes of maternal death are classified as direct or indirect. Direct causes include obstetric complications of pregnancy, birth, or postpartum state and interventions, omissions, and/or incorrect treatment for these complications. Indirect causes include preexisting disease or injury exacerbated by pregnancy. The definitions and delineations used by the WHO ICD-10 classification system were followed in this study. Overall, as shown in Table 7, most women died as a result of a direct cause (n=35; or 61% of total deaths).

Table 7: Direct versus indirect causes of maternal death by region (n=57)

	Direct cause	Indirect cause	Total maternal deaths in the region
Erongo	5	3	8
Hardap	2	3	5
//Karas	2	4	6
Khomas	24	10	34
Omaheke	2	2	4
Total	**35 (61%)**	**22 (39%)**	**57**

The most common **direct cause** of maternal death was reported to be sepsis (21% of all deaths), followed by postpartum haemorrhage (10% of all deaths) and preeclampsia (10% of all deaths). However, it is important to note that antepartum haemorrhage, septic abortion, and eclampsia were also prominent causes of direct maternal deaths. One woman died as a result of anaesthesia complications, and one as a result of surgical complications. Figure 1 shows the distribution of direct causes of maternal deaths. Of the 22 women who died as a result of one or more **indirect causes** of maternal death during the study period, HIV/AIDS was the most common contributing cause of indirect maternal death (n=15; 68.2%), followed by severe anaemia (n=7; 31.8%), and tuberculosis (n=6; 27.3%). Five of the six maternal deaths due to tuberculosis occurred in the Hardap region. Additionally, one woman died as a result of domestic violence, and one woman died as a result of cardiac disease. The percentage distribution of indirect causes of maternal death is included in Figure 2.

Figure 1: Percentage distribution of causes of direct maternal death (n=35)

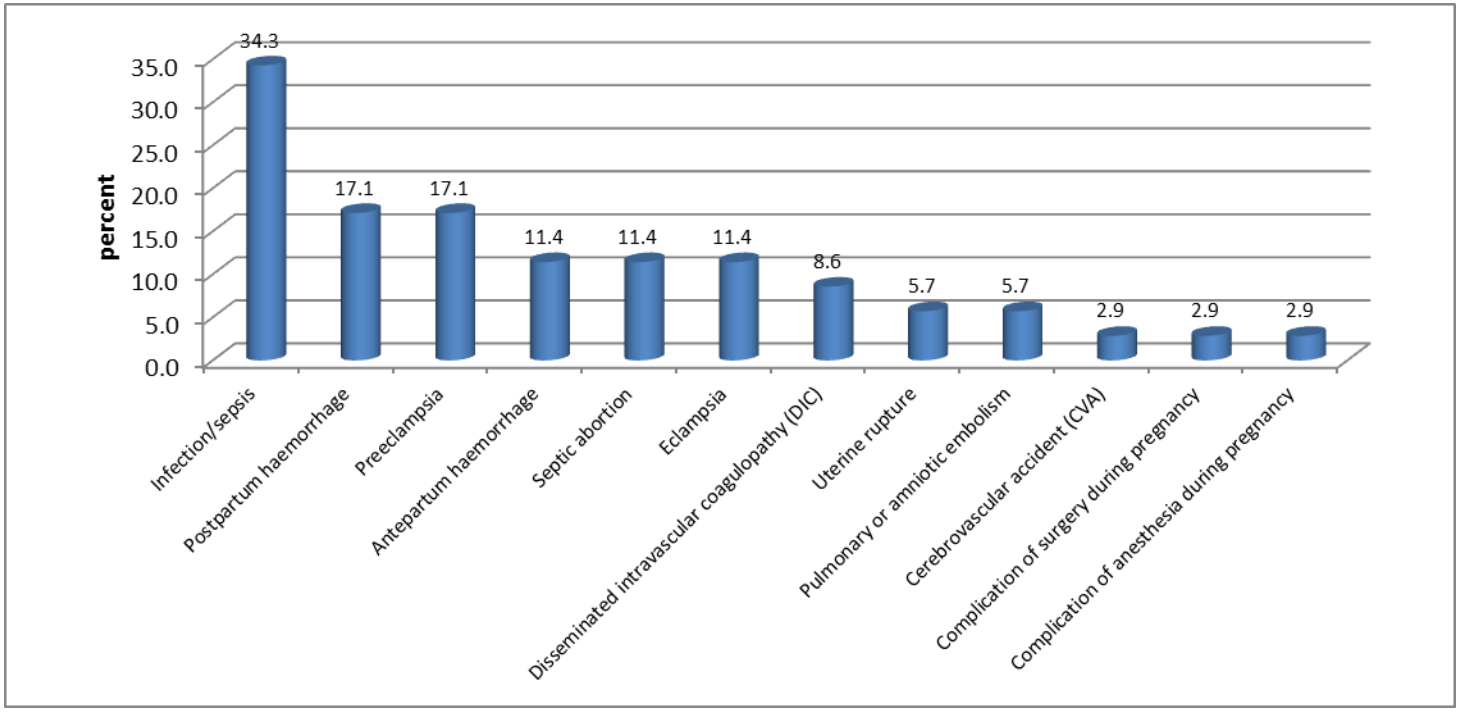
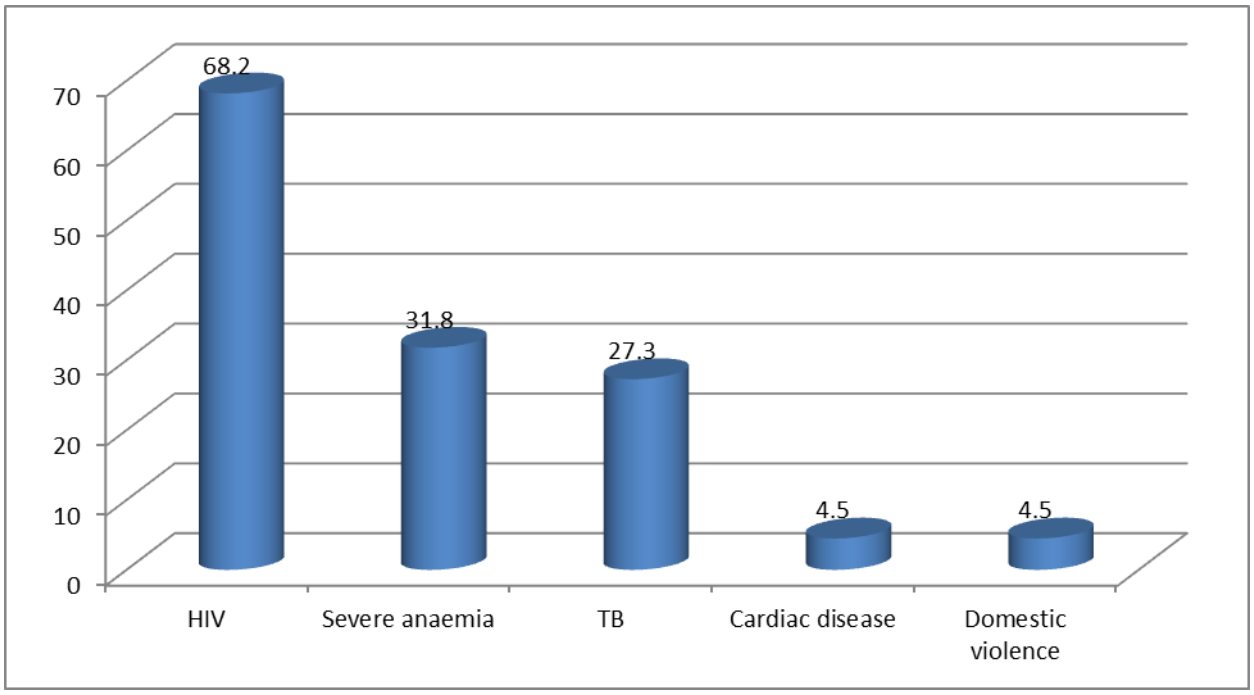


Figure 2: Percentage distribution of causes of indirect maternal death* (n=22)

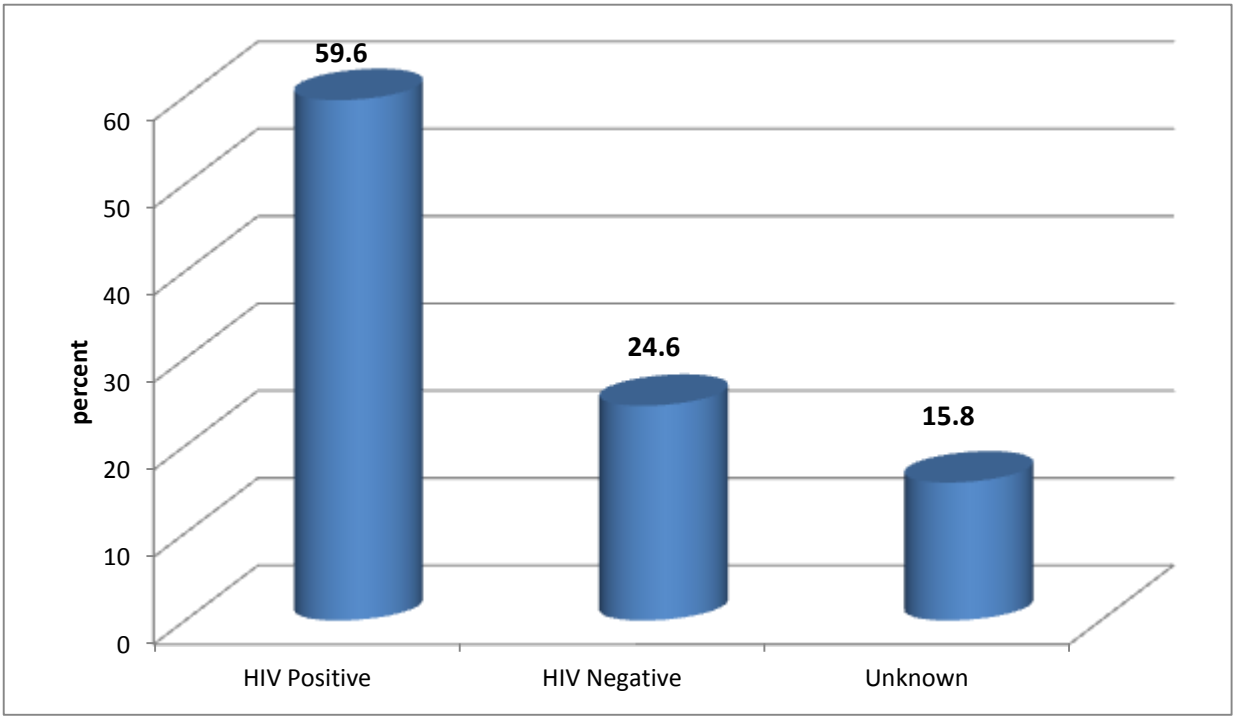


*In some cases, more than one indirect cause of maternal death contributed

5.2.2 HIV/AIDS

Approximately 60% (n=34) of mothers who died were known to be HIV-positive (Figure 3). In thirty (30) of these cases, HIV was indicated as one of the primary diagnoses at the time of death but only in 15 of these cases was the maternal death determined to be due to HIV. In the other 15 cases, a direct cause of maternal mortality was determined. Only 47% (n=16) of HIV-positive women were reported to have been receiving highly active antiretroviral therapy (HAART) at the time of their death. These findings are consistent with clear evidence from other studies and populations that HIV-positive women are at increased risk of maternal death not only due to complications of HIV/AIDS but due to other direct causes of maternal death, including infection, preeclampsia, and severe anaemia (Abdool-Karim et al. 2010; Calvert and Ronsmans 2013; Gorman 2013).

Figure 3: HIV status of maternal death cases



With small numbers of total maternal deaths, it is difficult to statistically evaluate maternal deaths according to characteristics such as marital status, employment, and educational status in comparison to national data, although it is worth noting that a third of the maternal deaths were among unmarried women. Table 8 lists the distributions available.

Table 8: Distribution of number of maternal deaths by background characteristics of deceased

Characteristic of deceased	# of deaths	% of total maternal deaths in study period (n=57)
Marital status		
Never married	19	33.3
Married	9	15.7
Living together	9	15.7
Divorced	2	3.5
Separated	1	1.8
Unknown	17	30
Education		
No formal schooling	4	7
Primary	14	24.5
Secondary	22	38.5
Higher	1	1.8%
Unknown	16	28

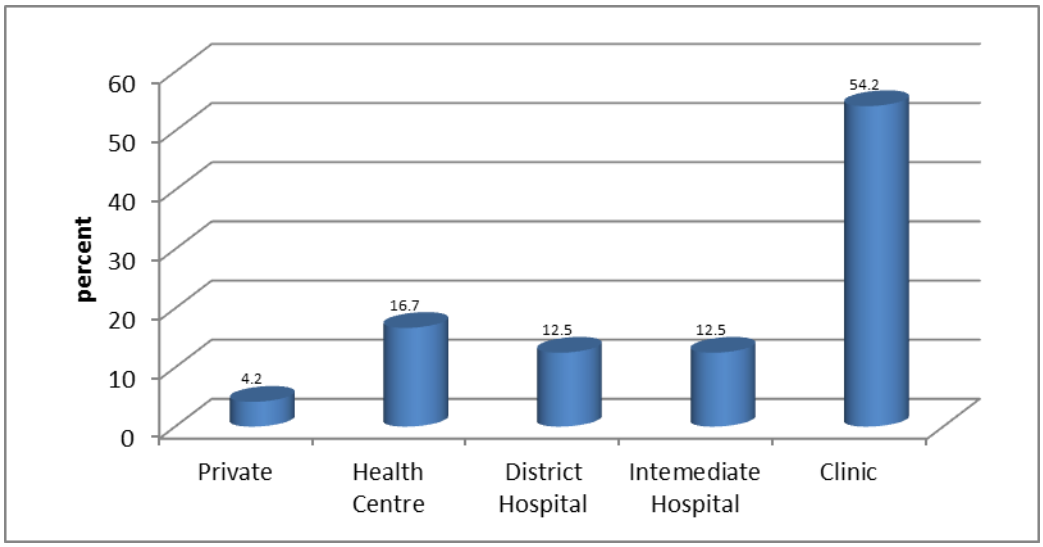
Characteristic of deceased	# of deaths	% of total maternal deaths in study period (n=57)
Employment		
Mainly employed	15	26.3
Mainly unemployed	13	22.8
Housewife	6	10.5
Student	1	1.8
Other	6	10.5
Unknown	16	28

5.2.3 Antenatal care

Approximately 42% (n=24) of women who died a maternal death were indicated to have attended antenatal care. Nineteen women (33.3%) did not attend ANC at all. For the remaining 14, it was not known whether they had attended ANC or not.

The majority of women who attended ANC did so at a clinic (54.2% of total attending ANC), while 16.7% attended ANC at health centres (Figure 4). Only 4.2% of women who died attended ANC at a private clinic or a hospital. Registered nurses (70.8%) and enrolled midwives (58.3%) were reported to be the most common providers of ANC; only a few women received ANC from medical officers (8.3%). Some women received care from multiple cadres of health workers.

Figure 4: Place of antenatal care (ANC) for women who attended ANC (n=24)



Of the 24 women who died a maternal death and were known to have attended ANC, the timing of the first ANC visit was recorded in 23 records (Table 9). There was no documentation of the timing of first visit for one case. Of those with recorded timing, 60.9% (n=14) first attended ANC in the second trimester and 5 (21.7%) first attended ANC in the first trimester.

Table 9: Timing of first ANC visit for women who attended ANC (n=23)

	Number of maternal deaths	Percent
First trimester	5	21.7
Second trimester	14	60.9
Third trimester	4	17.4
Total	**23**	**100.0**

5.2.4 Place, method, and outcome of delivery

Of the 57 recorded maternal deaths, 18 women died while pregnant. About 68% (n=39) of mothers who died had delivered or had an abortion. Of the 39 cases, two women did not have a recorded place of delivery. The majority of the remaining 37 women delivered at intermediate or district hospitals (Table 10). Only one birth occurred at a health centre. Seven births (or 18.9% of those who delivered) were to women who delivered at home and came to the hospital postpartum.

Table 10: Place of delivery for women who died after delivery or abortion (n=37)

Type of facility	Number of births per type of facility	Percent
Home	7	18.9
Health centre	1	2.7
District hospital	12	32.4
Intermediate hospital	13	35.1
Central hospital	4	10.8
Total	**37**	**100**

As Table 11 shows, approximately one-half of the women who died delivered live babies through normal vaginal delivery (n=20; 51.3%). Twelve women (30.8% of women who delivered) underwent Caesarean section. The remaining seven maternal deaths were in women who had had an abortion (17.9%).

Table 11: Method of delivery of women who died after delivery or abortion (n=39)

	Number of maternal deaths	% of total maternal deaths in study period
Normal vaginal delivery	20	51.3
C-section	12	30.8
Abortion	7	17.9
Total	**39**	**100.0**

Of the 39 women who delivered prior to their death, in three cases the outcome of delivery was not indicated. The majority of the remaining women (n=22 or 61.1%) had live births, 6 (16.7%) had stillbirths, and one had a macerated stillbirth (Table 12).

Table 12: Outcome of delivery for women who died a maternal death (n=36)

	Number of maternal deaths	Percent
Live births	22	61.1
Fresh stillbirths	6	16.7
Macerated stillbirths	1	2.8
Abortion	7	19.4
Total	**36**	**100.0**

5.2.5 Interventions performed

A number of interventions were completed during antenatal, intrapartum, and postpartum stages for women who died a maternal death. Prior to labour, the most common interventions were intravenous antibiotics (14%) followed by treatment for preeclampsia (7%). The most common interventions during labour were Caesarean section (17.5%), intravenous antibiotics (12.3%), and admission to an intensive care unit (ICU) (10.5%). Because most maternal deaths occurred postpartum (and days after admission to facilities), postpartum interventions also are critical to consider (see Figure 5). Important postpartum interventions included admission to an ICU (33.3%), blood transfusion (31.6%), and intravenous antibiotics (31.6%). Multiple interventions may have been undertaken and recorded for the same woman.

5.2.6 Other factors associated with maternal deaths

The final section of the maternal death clinical audit includes other contributing factors to the death as determined by the data collectors who reviewed the available records. The responses to this section of the audit are shown in Figure 6. These results indicate that delay in seeking help was the main contributing factor identified. Refusal of care and negligence of providers were the second most commonly mentioned contributors to maternal death. Lack of facilities, equipment, or consumables also contributed.

Figure 5: Percentage of recorded interventions performed postpartum for women who died a maternal death (n=57)

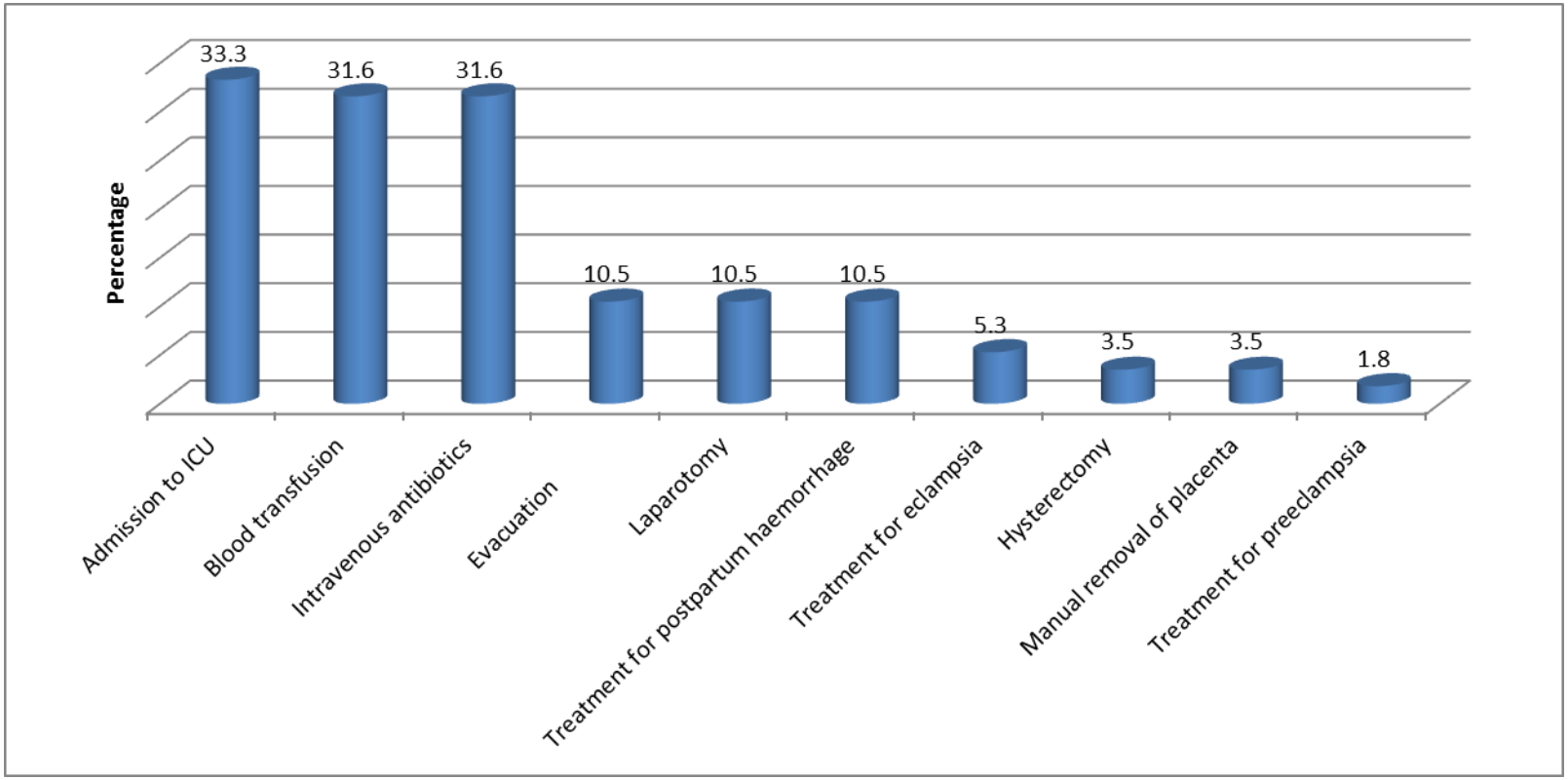
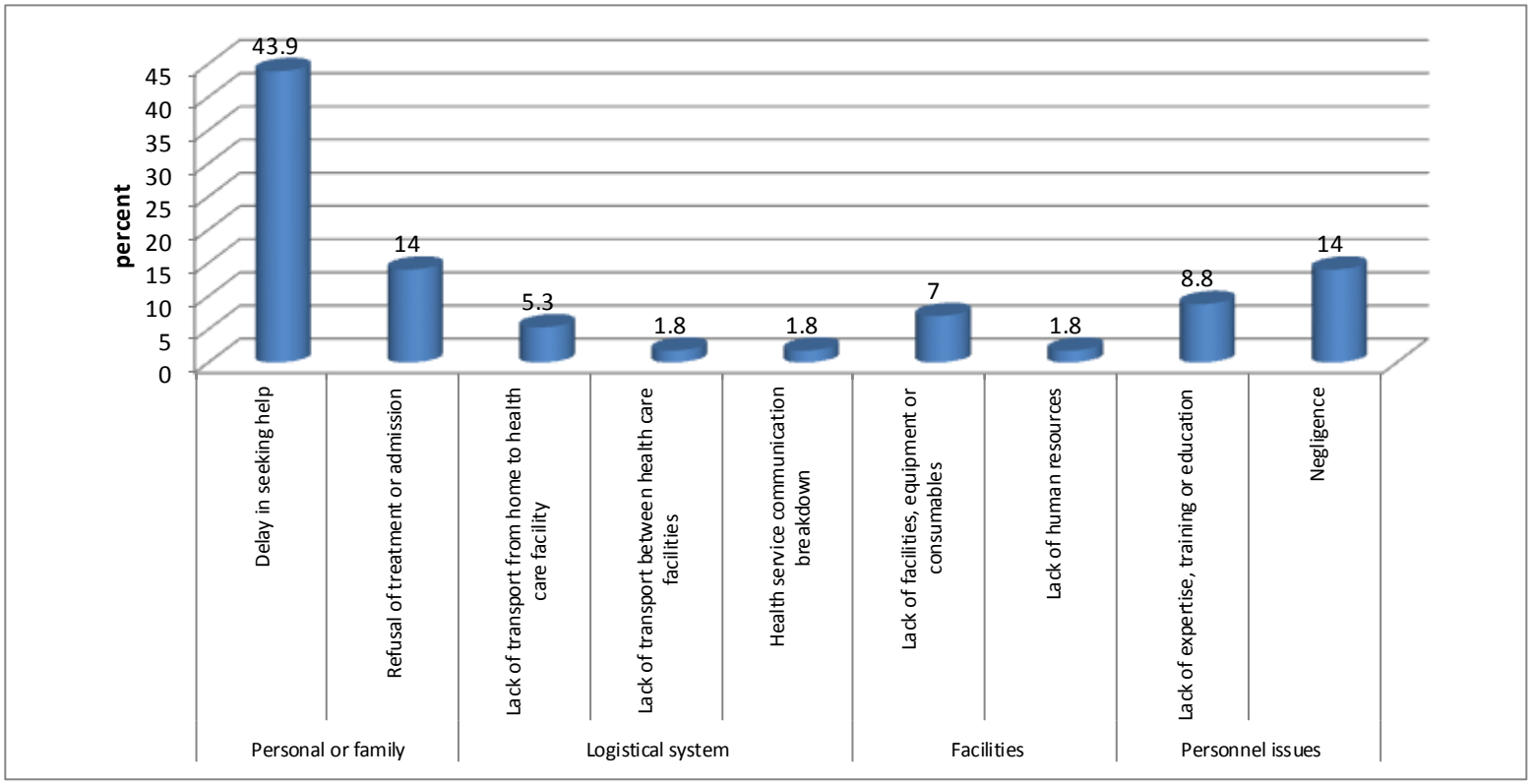


Figure 6: Distribution of contributing factors to maternal deaths (n=57)



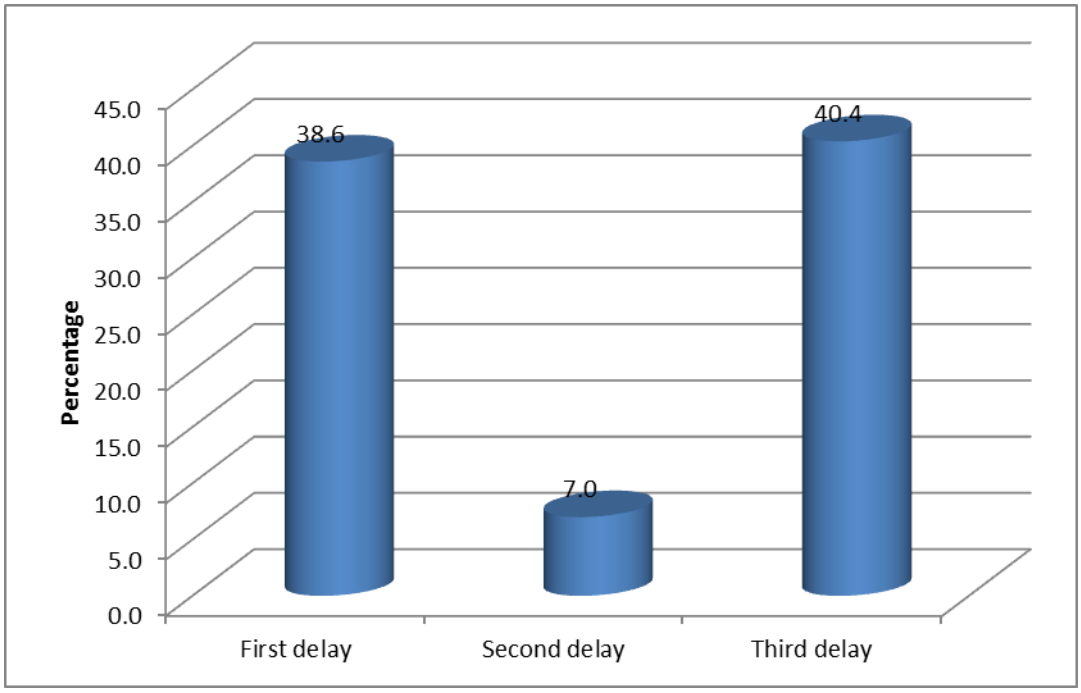
There are three types of delays that are usually considered as contributors to maternal mortality:

1. Delay in deciding to seek medical attention
2. Delay in reaching a health facility (due to finances or transport)
3. Delay in receiving care at facility.

Figure 7 shows the prevalence of the three types of delays among all 57 maternal deaths. Most mothers (40.4%) who died experienced the third type of delay—delay in receiving care after arriving at a health facility. A comparable proportion of mothers (38.6%) experienced the first type of delay (delay in seeking care). Only a few mothers (7%) experienced the second type of delay (delay in reaching care).

The most common reason mentioned for experiencing the third type of delay was disrespectful treatment from nurses who initially attended to the patient but did not follow up with prompt care. Although not related to delays, there was also concern that some mothers were discharged too soon after delivery, reflecting poor quality of care and follow-up. Some cases could not be classified for reason of delay due to inadequate and/or incomplete records.

Figure 7: Percentage distribution of delays involved in maternal death (n=57)



5.3 Results from RAPID Assessment of Women of Childbearing Age Deaths

The study team extracted and evaluated a total of 900 deaths (out of 1,436 total deaths discovered) of women of childbearing age (15-49 years). Table 13 shows the 1,436 deaths to WCBA over the study period, by region/district and year. Many deaths could not be investigated because of poorly labeled or

missing files and incomplete data. Of the 900 that could be extracted and evaluated, 42 (4.7%) were discovered to be unreported maternal deaths. Although the 42 unreported maternal deaths were included in the composite data (n=57) discussed in the previous section, it is worth also considering them separately, given that the deaths initially unreported as maternal deaths composed a significant proportion (75%) of all facility-based maternal deaths.

Table 13: Total deaths to women of childbearing age (15–49 years), by region, district, and year

Region	District	2010	2011	2012 (6 months)	Total
Erongo	Omaruru	11	8	3	**22**
	Swakopmund	28	34	2	**64**
	Usakos	2	10	0	**12**
	Walvis Bay	46	33	6	**85**
Hardap	Aranos	5	9	1	**15**
	Mariental	29	32	11	**72**
	Rehoboth	42	19	5	**66**
//Karas	Karasburg	6	8	2	**16**
	Keetmanshoop	28	37	14	**79**
	Luderitz	55	37	19	**111**
Khomas	Windhoek: Katutura Intermediate Hospital	259	266	62	**587**
	Windhoek: Windhoek Central Hospital	81	70	9	**160**
Omaheke	Gobabis	77	60	10	**147**
Total		**669**	**623**	**144**	**1436**

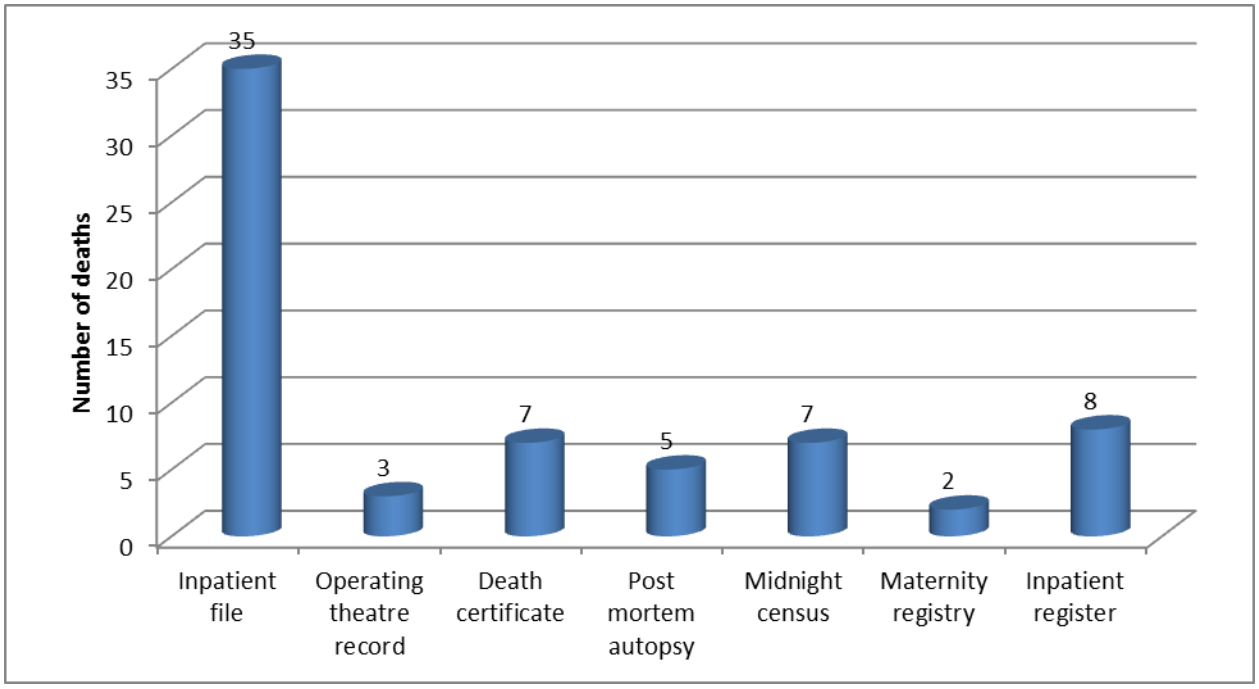
Most (30) of the unreported maternal deaths occurred in Khomas region (Table 14) and specifically at Katutura Intermediate Hospital (30) and Windhoek Central Hospital (13). At both facilities, the majority of unreported deaths were recorded in the general medical ward (n=20; 71.4%). A substantial number of unreported maternal deaths also occurred in other types of wards (n=17; 40.5%), mainly the ICU.

Table 14: Deaths to women of childbearing age and unreported maternal deaths, by region

Region	All deaths to women (15-49 years)		Unreported maternal deaths	
	Number	%	Number	%
Erongo	148	16.4	7	16.7
Hardap	123	13.7	2	4.8
Khomas	421	46.8	30	71.4
Omaheke	94	10.4	3	7.1
//Karas	114	12.7	-	-
Total	**900**	**100.0**	**42**	**100.0**

Almost 60% of unreported deaths were as a result of a direct cause of maternal mortality. The primary diagnoses at death for most of the unreported maternal deaths were haemorrhage (n=8), infection or sepsis (n=8), and preeclampsia/eclampsia (n=8). HIV, tuberculosis, and severe anaemia were the common indirect causes of unreported maternal deaths. The most prevalent complications recorded among the unreported maternal deaths were respiratory arrest not related to anaesthesia (9 cases), shock (8 cases), and sepsis/infection (8 cases). The most common procedures or interventions performed were intubation and ventilation not related to anaesthesia, transfusion of more than 5 units of blood, and cardiopulmonary resuscitation. Nine women had undergone emergency Caesarean section. Figure 8 shows the number of unreported maternal deaths by information source. Data collectors obtained most of the information on unreported deaths from inpatient files or books (n=35; 83.3%), including ICU registers. Only two cases included appropriate information in the maternity register.

Figure 8: Number of maternal deaths by source of information (n=42)



As is clear from Table 15, the determination and/or recording of pregnancy status is often not a part of admission to facilities. For almost half (439/900) of the WCBA who died over the study period and whose records were extracted and evaluated, it was not possible to determine whether their death may have been related to pregnancy or complications exacerbated by pregnancy. In many situations, records provided no indication of menstrual history, pregnancy test, and/or family planning status.

Table 15: Pregnancy status at time of unreported death (n=889)*

Status	Number of deaths	Percent
Died pregnant	14	1.6
Died within 42 days of end of pregnancy (postpartum)	19	2.1
Died within 42 days of end of pregnancy (postabortion)	9	1.0
Death not pregnancy-related	419	47.1
Pregnancy-related status unclear	428	48.1
Total	**889**	**100**

*Information missing for 11 of the 900 deaths evaluated in WCBA

5.4 Verbal Autopsy Results of Maternal Deaths

The verbal autopsy is a method used to ascertain the potential cause or causes of death based on an interview with next of kin or other caregivers when a death occurs outside the health facility and where vital registration and medical certification are lacking. Out of 57 maternal deaths in the 30-month study period, data collectors were able to conduct 41 verbal autopsies (72%) representing 12 health facilities (Table 16). It was not possible to complete a verbal autopsy on all deaths due to lack of available respondents and time and distance constraints.

Table 16: Distribution of maternal deaths by place of death and verbal autopsy (n=41)

Health facility	District	Region	Type of heath facility	Number of verbal autopsies	Percent
Walvisbay	Walvisbay	Erongo	District	5	12.2
Swakopmund	Swakopmund	Erongo	District	2	4.9
Omaruru	Omaruru	Erongo	District	1	2.4
Rehoboth	Rehoboth	Hardap	District	2	4.9
Aranos	Aranos	Hardap	Health centre	2	4.9
Mariental	Mariental	Hardap	District	1	2.4
Keetmanshoop	Keetmanshoop	//Karas	District	2	4.9
Luderitz	Luderitz	//Karas	District	1	2.4
//Karasburg	//Karasburg	//Karas	District	3	7.3
Windhoek Central	Windhoek	Khomas	Central hospital	3	7.3
Katutura Intermediate	Windhoek	Khomas	Intermediate hospital	15	36.6
Gobabis	Gobabis	Omaheke	District	4	9.8
Total				**41**	**100.0**

Table 17 shows that most of the verbal autopsy respondents were siblings (41.5%) or mothers (24.4%) of the deceased. Table 27 summarises key characteristics of the deceased. Although it is not possible to draw broad conclusions from a limited data set, it is worth noting that 73% of the deceased were from urban areas and 53.7% had secondary education. A significant proportion (46.3%) were unmarried.

Table 17: Verbal autopsy respondent's relationship to the deceased (n=41)

Relationship to deceased	Number	Percent
Mother	10	24.4
Spouse	6	14.6
Sibling	17	41.5
Other relative	6	14.6
No relation	2	4.9

Table 18: Characteristics of the deceased as reported in verbal autopsies (n=41)

Key characteristics	Number	Percent
Usual place of residence		
Urban	30	73.2
Rural	11	26.8
Marital status		
Never married	19	46.3
Married	9	21.9
Living together	9	21.9
Divorced	2	4.8
Separated	1	2.4
Missing information	1	2.4
Highest level of education		
No education	4	9.8
Primary	14	34.1
Secondary	22	53.7
Higher	1	2.4
Economic activity in year prior to death		
Mainly employed	15	36.6
Mainly unemployed	13	31.7
Housewife	6	14.6
Student	1	2.4
Domestic worker (unsalaried)	6	14.6

Tables 19–21 summarise the information provided by verbal autopsy respondents about previously diagnosed medical conditions in the deceased as well as the mode of transportation used to reach the health facility and perceptions about events that contributed to the maternal death.

Table 19: Number of maternal deaths, by previous known medical condition diagnosed (n=41)

Medical condition	Number	Percent
TB	7	17.1
HIV	24	58.5
Depression	6	14.6
High blood pressure	4	9.8
Asthma	3	7.3
Heart disease	1	2.4
Stroke	1	2.4
Liver disease	1	2.4

Table 20: Mode of transport used to reach facility for women who died a maternal death (n=41)

Mode of transport to health facility	Number	Percent
Taxi	15	36.6
Private car	11	26.8
On foot	2	4.9
Bus	1	2.4
Other	7	17.1
Not stated or unknown	5	12.2
Total	**41**	**100.0**

Table 21: Events stated to have contributed to maternal death, as reported by verbal autopsy respondents (n=41)

Illnesses/events that contributed to maternal death	Number
No knowledge of danger signs	11
Slow decision-making by health worker	9
Poor service at health facility	8
Health worker attitudes	7
Verbal autopsy respondent not informed of maternal death	6
Lack of money	3
Lack of transport	3
Waiting for husband's decision	2

While going through the standardised verbal autopsy questionnaire, interviewers also recorded respondents' subjective statements regarding the cause or causes of death. Table 22 lists selected verbal autopsy responses that discuss the reported cause of maternal death, classified into one of eight categories. (Although some responses could be placed into more than one category due to the complexity of the deceased women's lives, we limited responses to one category per response. Some responses were also ambiguous or unclear, potentially due to translation and cultural issues.) The perceived cause-of-death categories are as follows:

1. **Negligence and/or poor treatment by health worker**: Respondent reports of delays in receiving care because a health care provider did not respond to requests in a timely manner. This category also includes reports that providers were rude and disrespectful, sometimes turning the dying patient away.
2. **HIV-related**: Reports that the deceased was living with HIV or AIDS and that HIV/AIDS may have contributed to her death.
3. **Abortion**: Reports that the deceased had undergone an abortion that may have contributed to her death.
4. **Violence against pregnant woman**: Reports that the deceased had experienced physical abuse or violence that may have contributed to her death.
5. **Lack of resources**: Reports of insufficient health services infrastructure and/or resources, including transportation and ambulance services.
6. **Refusal to seek care**: Reports that the deceased refused to seek care at the health facility and/or self-medicated.
7. **Other illness or medical issue**: Identified causes of death not covered by the other categories.
8. **Unknown**: Reports that the respondents were surprised by the death of the deceased, did not know the cause of death, and did not observe danger signs or symptoms.

Table 22: Reported causes of maternal death: verbal autopsy questionnaire responses, by category

Negligence and/or poor treatment by health worker (n=19)
They called ambulance after home delivery and it came late, the health professionals who came with ambulance were not really sure of what they were doing as they had to wait for instructions from unknown third party.
Health worker's negligence. She was not attended to on time.
Due to the negligence of the staff that her child died, because she was not attended to while she was admitted in the hospital and left to come home because she was complaining of pain and not being cared for.
Waited too long at the hospital for admission.
Patient was not treated on time. She was not given due respect.
According to husband he was called by his wife to hold her while vomiting but nurses told him to leave his wife as nurses claim the wife not to be seriously sick.
Upon admission to the hospital, relatives did not see any investigations carried out such as x-rays while patient was complaining of chest pain.
Treatment to the patient was delayed and she was not given respect.
The patient went to the toilet unattended and fell on her way and injured her face. She was supposed to be assisted as she was very weak.
The husband say medical doctors took long to come see his wife after called by nurses. Doctor took 2 hours to come.
Husband said on the second time he took wife to hospital, they were sent back without any assistance due to the fact that the deceased was waited already the previous day.
The mother is not happy with the way her daughter was handled when she went to the hospital as she was sent home instead

of being admitted. The health workers' attitudes were not good; did not respect the patient so that she was able to die in peace and with dignity.
According to the husband they were not treated well and were sent back home.
Negative attitude of the health staff.
Mother says that the daughter had hearing problems and when she asked nurses anything or them telling her something they used to ignore her.
Because of the talks the nurses that she will die, she also started not eating the food if there is no family member around. Even the tablets, she refused taking them if there is no family member.
Washing methods were not good. She was not cared for by health personnel. Sister of the deceased had to travel to wash her.
Hospital staff was arguing about the admission because the cousin took her out of the hospital on her own and was not transferred. The referral letter became an issue.
There was a serious disagreement between the deceased and her boyfriend. The next morning the boyfriend left and the deceased was taken to the hospital where she died after 6 days. The health workers had a negative attitude and language barrier.
HIV-related (n=15)
The deceased was sick for a long time with HIV, and on top of her status she became pregnant and it worsened her condition and that might have contributed to her sickness and death. Due to attitudes of health workers at the hospital, she was always reluctant to go the hospital.
The deceased death was HIV-related. The deceased was not adherent to HIV prophylaxis. The deceased refused to start HAART.
Died because she was HIV-positive and got very sick.
These illnesses that are nowadays in Namibia (i.e., AIDS).
The lungs collapsed. She was on HIV treatment.
She kept her illness to herself. The family only found out that she was HIV-positive when she became pregnant and that was the cause of her death.
Mother says I think my daughter was ashamed of her HIV status because after her visit to the ANC clinic she was tested positive. When she was back home from the clinic she was crying a lot, and did not want to eat she was in her room. Her condition deteriorated, she lost weight, got poor appetite.
She drank alcohol while she was HIV-positive and on TB medicine.
She took treatment on and off not continuously. She defaulted.
According to relatives the deceased died of HIV/AIDS.
She didn't know if it was because of the abscess which she (the deceased) had on the anus and inside stomach which was said by the doctors in Windhoek or because she was HIV-positive and became pregnant because she didn't disclose that to her family (the pregnancy).
According to the doctor, they told us that it was lung infection, but we also believe that her HIV also contributed.
According to the verbal autopsy respondent her sister was HIV-positive and when she became pregnant it became worse. Apart from that her husband used to demand for sex everyday up to the point that she could not take it anymore. She then asked her sister if it is possible to intervene, because she was tired and could not handle it anymore.

The mother was aware that the patient died because she did not continuously took the ARV treatment.
We just heard on her death that she was HIV-positive. If we knew earlier, we could have assisted her to get treatment and maybe she would have still been alive today.
Abortion (n=4)
The deceased had stress-related problems with the boyfriend who had another girlfriend. The deceased attempted to terminate pregnancy at 6-7 months gestation. She then had heavy bleeding, clots, and lost a lot of blood after the attempt to terminate pregnancy.
She died because of abortion.
Stress-related problems regarding the denied pregnancy.
I am not really sure, but I think the stress of not knowing who the father of the baby she was carrying was killed her, plus maybe the consequences of the abortion that she induced herself (says the mother).
Other illness or medical issue (n=13)
Pneumonia (chest pain, difficulty in breathing, coughing, shortness of breath).
Maybe she died because she was suffering from an enlarged heart and at the same time having TB. The doctors also warned her not to fall pregnant with the heart condition she had, but she did not take care and she fell pregnant.
The respondent says she does not know for certain but it might be TB.
According to husband the deceased died of epigastric pain after she complained of epigastric pain that result after drinking sour milk at home.
The deceased got tired during delivery.
The cousin believed that the cause of death was due to HIV-positive and meningitis. Although she had those diseases, it was still felt that she was not treated properly of meningitis.
According to the family she bled because of a retained placenta that the doctors could not remove.
The husband said his wife was not sick before her death. She had had TB and defaulted on her medicine. She died suddenly in the hospital.
I think the pregnancy is the cause of my child's death.
The deceased was taken to the hospital and sent home. At home she developed shortness of breath, confusion, then they took her back to the hospital.
According to relatives there was no delay and they received proper care at the health facility. The relatives say she is not sure about the days but she used to be in and out of the hospital with diarrhea, vomiting, and general body weakness. She died 3 days after giving birth.
When they came to the hospital doctor was doing a lumbar puncture but he felt there is no cooperation from the patient and left. A second doctor came in who performed it successfully.
Respondent said it was because of depression; because the father of the baby wanted her to have an abortion.
Violence against pregnant woman (n=2)
The night before the delivery she was assaulted by her sister-in-law.
The deceased was possible assault by her boyfriend since the mother heard the serious disagreement. The next morning the mother took the deceased to the hospital because the deceased was unable to walk. Before the assault, she was fine, normal, no problem.

Lack of resources (n=4)
She was bleeding too much and there was no transport available to the clinic.
If oxygen was available at the clinic she could have been saved and if there was an ambulance driver who could have taken her to the hospital on time.
There was no oxygen at the clinic to be given to her. No ambulance driver was available to take her to the nearest hospital.
Respondent asked why couldn't the MoHSS send another ambulance driver to replace the one on leave. Why can't any driver be authorized to drive government vehicle be allowed to drive the MoHSS vehicles in case of emergency in the absence of the ambulance driver.
Refusal to seek care (n=6)
She was a difficult person and did not make decision to seek medical assistance. She got sick but stayed at home for some days and she was only noticed by neighbors that she was not coming out of the house and when they went to visit her, she was ill and they took her to the hospital.
She was complaining of chronic headache for 3 days but did not go to the clinic. She decided to take Panadol at home for the headache.
According to the brother his sister treated with ibuprofen tablets while she was pregnant. He feels that it is the cause or contributing factor for early labour or premature labour. Secondly when she was on admission in the ward nurses used to talk that she will also die and it made her feel badly.
The deceased started with labour pain early morning and informed mother, the mother advised her to call her if pain persist so that she can take her to the hospital. However, the deceased felt and decided on her own to stay a while longer at home.
According to respondent: my mother was sick for three years. During her pregnancy she was refused to eat and also refused to go to hospital.
According to the family: Although she knew she was hypertensive she didn't make effort to attend ANC.
Unknown (n=7)
She went to clinic for follow-up, there was no problem until the day of her death.
Uninformed and shocked. Didn't know the cause.
She said the deceased and the husband had an argument after which she went to the hospital in labour, but she does not know what was the cause of death.
Health workers did not give information to family members regarding her illness and diagnosis.
She said her sister was not ill, she only started with pain in the morning on 11/05/12 then went to the clinic. She delivered and after delivery she was told her sister was not okay have to be sent to the hospital and at around 07h00 in the morning she phoned the hospital and was told her sister died around 06h00 in the morning.
No knowledge of danger signs: if the patient and relatives had knowledge of danger signs of the disease they could have reported it earlier to the hospital.
The respondent noted when she visited her, the patient was struggling against the nurses as they placed an IV, but later they were successful.

Summary and discussion of verbal autopsy survey results

It was possible to conduct a verbal autopsy for 41 of 57 maternal deaths (72%) identified by the study, primarily with siblings or mothers of the deceased. Most of the women for whom verbal autopsies were performed were urban residents and nearly half were never married. The verbal autopsies elicited

perceived causes of death, which may or may not be related to the actual cause(s) of death. The cause that drew the largest number of comments (about half of the cases) was negligence or poor treatment by health workers. Verbal autopsy respondents also perceived HIV/AIDS and other medical problems to be significant contributors.

5.5 Results from Facility-Based Neonatal Death Audit

Table 23 presents an overview of neonatal deaths at the 18 facilities surveyed during the 30-month retrospective study period (January 2010–June 2012). The table also includes an extrapolated neonatal mortality rate per institution based on MoHSS HIS statistics for live births for the same time period. Because the overall numbers are small for each facility and the distribution of births varies considerably, both between facilities and over time at each facility, these extrapolations are broad estimates only. The neonatal mortality rates in the 18 facilities over the same time period appear to be lower overall than the national neonatal mortality rate of 24 deaths per 1000 live births established by the most recent 2006-2007 DHS survey.

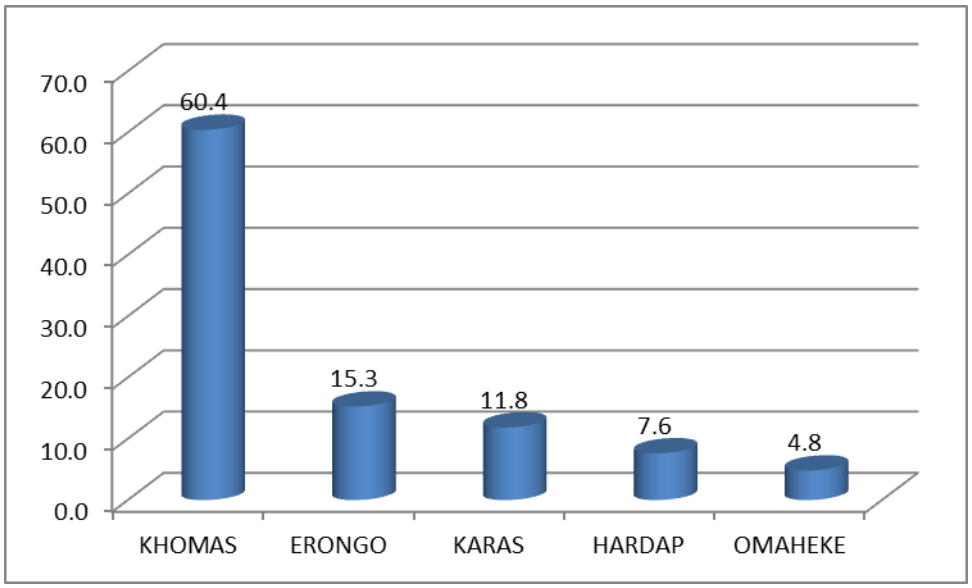
Table 23: Overview of facilities surveyed and neonatal deaths during the study period (n=498)

Region	Facility	# of live births	# of neonatal deaths (% of total study neonatal deaths)	Extrapolated NMR (deaths/1000 live births)
Erongo	Omaruru District Hospital*	1060	3 (0.6%)	NMR=2.8
	Swakopmund District Hospital*	4191	25 (5%)	NMR=5.9
	Usakos District Hospital*	608	7 (1.4%)	NMR=11.5
	Walvis Bay District Hospital*	4107	41 (8.2%)	NMR=10
	TOTAL: Erongo	**9966**	**76**	**NMR=7.6**
Hardap	Maltahohe Health Centre	n/a	n/a	n/a
	Aranos Health Centre*	637	2 (n%)	NMR=3.1
	Mariental District Hospital*	2679	20 (n%)	NMR=7.5
	Rehoboth District Hospital*	2185	16 (n%)	NMR=7.3
	TOTAL: Hardap	**5501**	**38**	**NMR=6.9**
//Karas	Karasburg DistrictHospital*	823	9 (1.8%)	NMR=10.9
	Keetmanshoop DistrictHospital*	2652	29 (5.8%)	NMR=10.9
	Luderitz DistrictHospital*	974	20 (4%)	NMR=20.5
	Aroab Health Centre*	n/a	n/a	n/a
	Bethanie Health Centre*	n/a	n/a	n/a
	Rosh Pinah Clinic	n/a	n/a	n/a
	Noordoewer Health* Centre	n/a	n/a	n/a
	Oranjemund Private Hospital	n/a	n/a	n/a
	TOTAL: //Karas	**4449**	**58**	**NMR=13**
Omaheke	Gobabis District Hospital*	3730	24	NMR=6.4
	Gobabis Clinic	n/a	n/a	n/a
	TOTAL: Omaheke	**3730**	**24**	**NMR=6.4**
Khomas	Katutura State Hospital*	18495	89	NMR=4.8
	Windhoek Central Hospital*	9539	212	NMR=22.2
	TOTAL: Khomas	**28,034**	**301**	**NMR=10.7**
TOTAL			**498 (100%)**	

As in the previous section, the districts indicated with an asterisk (*) include the representational subset of facilities (including different facility levels such as district hospitals and health centres) selected for the EmOC facility survey.

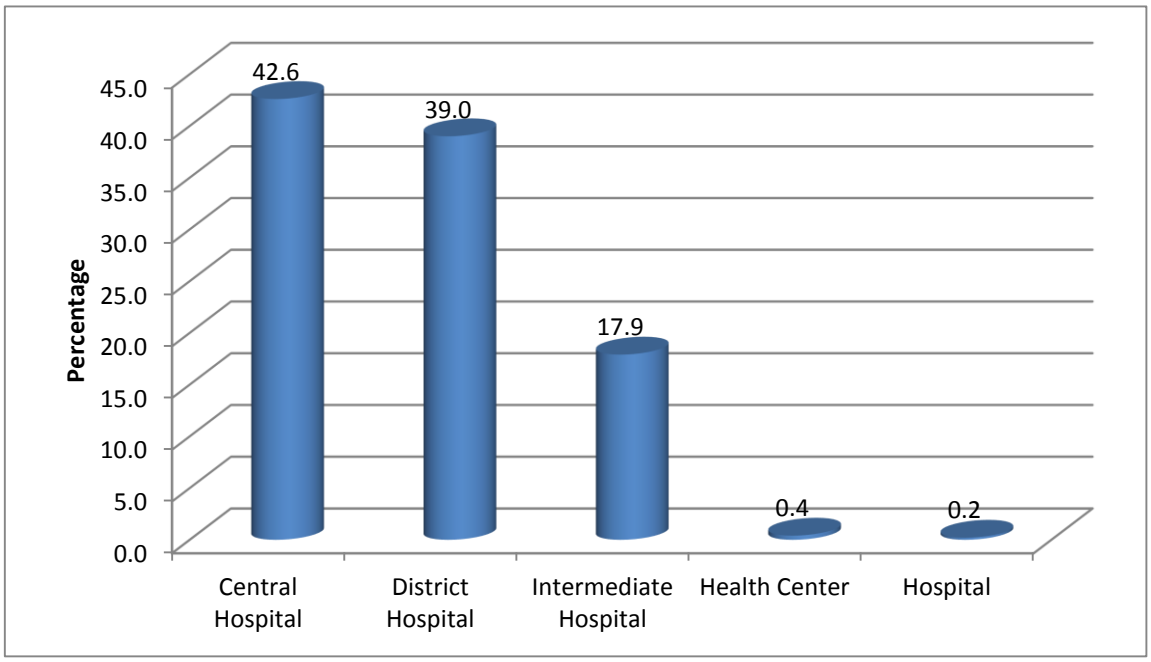
A total of 498 neonatal deaths were recorded in the five regions for the study period (January 2010–June 2012). A high number occurred in Khomas region (60.4% or n=301), where most of the births also occurred (Figure 9).

Figure 9: Regional distribution of neonatal deaths during study period (n=498)



In Khomas region, most of the neonatal deaths occurred at Windhoek Central Hospital (n=212; 42.6%). Other neonatal deaths occurred at various district hospitals (Figure 10). The district hospitals which recorded the highest number of neonatal deaths were Walvisbay (n=41), followed by Keetmanshoop (n=29), Swakopmund (n=25), Gobabis (n=24), Luderitz (n=20), and Mariental (n=20). All other district hospitals recorded less than 20 neonatal deaths during the study period. For 319 neonatal deaths (or 64% of those studied), it was reported that the death occurred at the facility where labour and birth occurred (not shown).

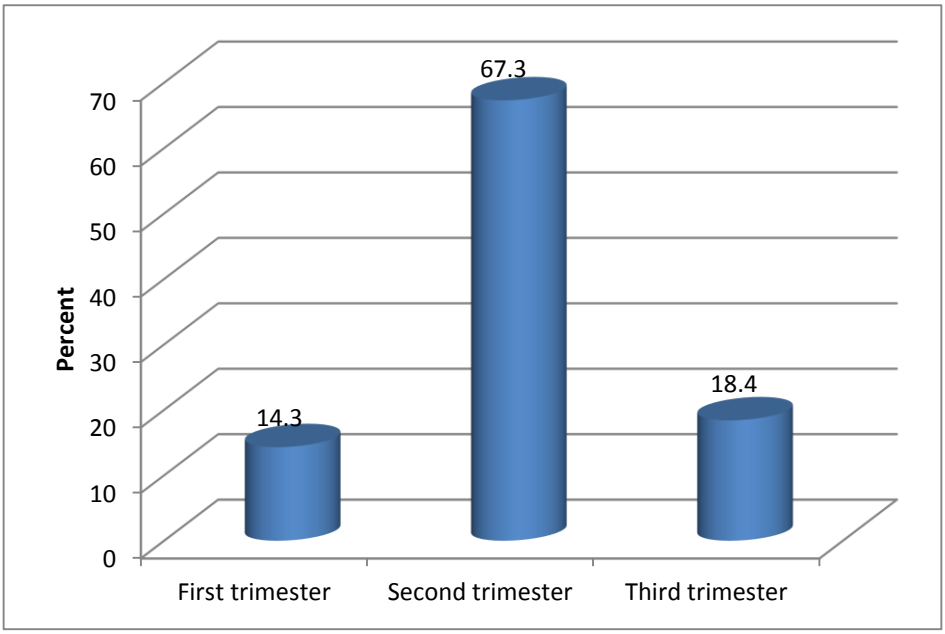
Figure 10: Distribution of neonatal deaths by type of facility during study period (n=498)



Note: "Hospital" refers to Oranjemund Private Hospital

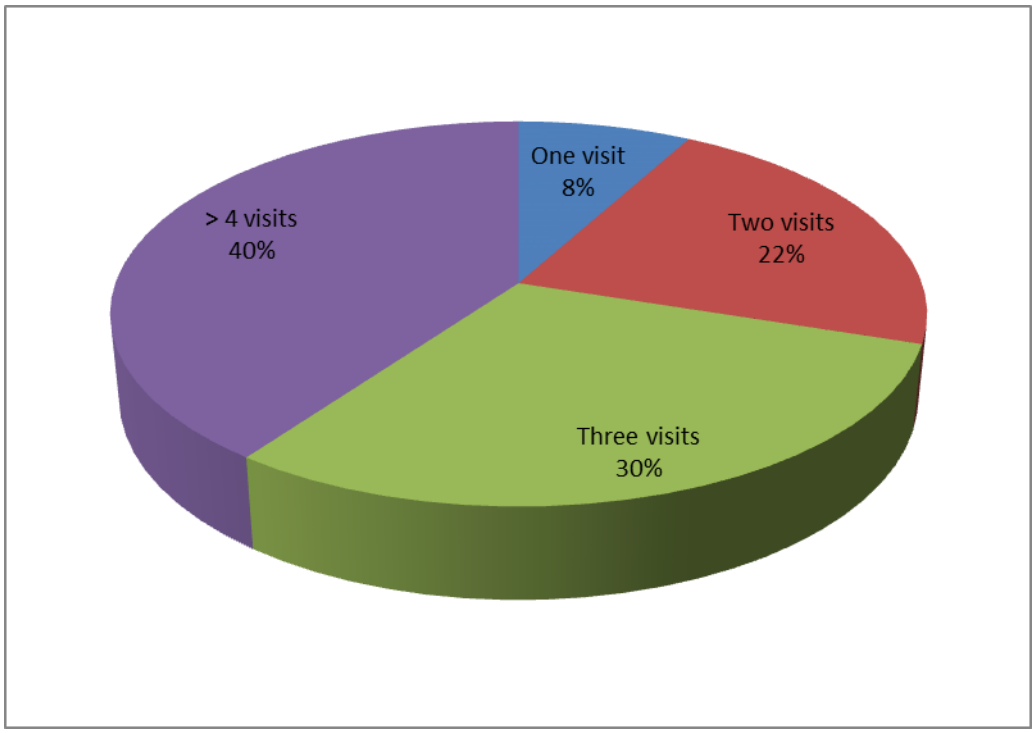
More than 70% (n=352) of mothers of neonates who died received some antenatal care. Of these, only 321 records indicated when the women had started ANC. Two-thirds (67.3%) of those with recorded ANC initiation started ANC in the second trimester (Figure 11). Fewer women initiated ANC in either the first (14.3%) or third (18.4%) trimesters.

Figure 11: Percent distribution of initiation of ANC for those who attended, by trimester (n=352)



Among mothers of deceased neonates who had documented ANC visits, the frequency of visits ranged widely from one to more than four visits (Figure 12). It is worth noting that most women (92%) with documented ANC who experienced a neonatal death had had at least two ANC visits.

Figure 12: Percent distribution of number of ANC visits for women who experienced a neonatal death who attended ANC (n=352)



Of the 441 neonatal deaths where information was available, the maternal HIV/AIDS status was unknown for 79 (17.9%) of the cases (Table 24). Overall, 102 (23.1%) of neonatal deaths for whom maternal HIV status was indicated were born to HIV-positive mothers. Fifty-nine (11.8%) of these mothers were on full HAART during pregnancy; 31 (6.2%) mothers were on ARV prophylaxis and 62 (12.4%) neonates born to HIV-positive women received early ARV prophylaxis. Twelve women who were HIV-positive were not recorded as receiving any antiretroviral medication.

Table 24: Recorded HIV status of women who experienced a neonatal death (n=441)

HIV status	Number	Percent
HIV-positive	102	23.1
HIV-negative	260	59.0
Unknown	79	17.9
Total	**441**	**100.0**

Of the 498 newborn deaths identified, the mode of delivery was unknown for 82 cases (16.5%), as there was no indication in the registers or files. Of the remaining 415 neonatal deaths, most (70.2%) newborns who died were delivered by normal vaginal delivery, and more than one-fourth (116 or 27.9%) were delivered by Caesarean section (Table 25).

Table 25: Method of delivery for neonatal deaths (n=416)

Method of delivery	Number of neonate deaths	Percent
Normal vaginal delivery	292	70.2
Assisted vaginal delivery with vacuum	4	1.0
Caesarean section	116	27.9
Breech delivery	4	1.0
Total	**416**	**100.0**

The place of delivery was unknown for 10 of 498 (2%) of the cases of neonatal death due to incomplete records. Otherwise, most women delivered at either district or intermediate hospitals (Table 26).

Table 26: Recorded place of delivery of neonates who died (n=488)

Place of delivery	Number of neonatal deaths	Percent
Home	20	4.1
En route to health facility	2	0.4
Clinic	11	2.3
Health centre	11	2.3
District hospital	204	41.8
Intermediate hospital	153	31.4
Central hospital	78	16.0
Private hospital	9	1.8
Total	**488**	**100**

Of neonates who died, 28.7% were born at term (>37 weeks) and another 6% at near term or late preterm (35-36 weeks completed), making up one-third of all neonatal deaths identified (Figure 13). Approximately 50% of deaths were to preterm neonates. Five percent were moderately preterm (33-34 weeks), 45% were at 26-32 weeks gestation, and 6% were very preterm and presumably nonviable at less than 26 weeks gestation (6%).

Figure 13: Percentage of neonatal deaths by gestational age in weeks (n=468)

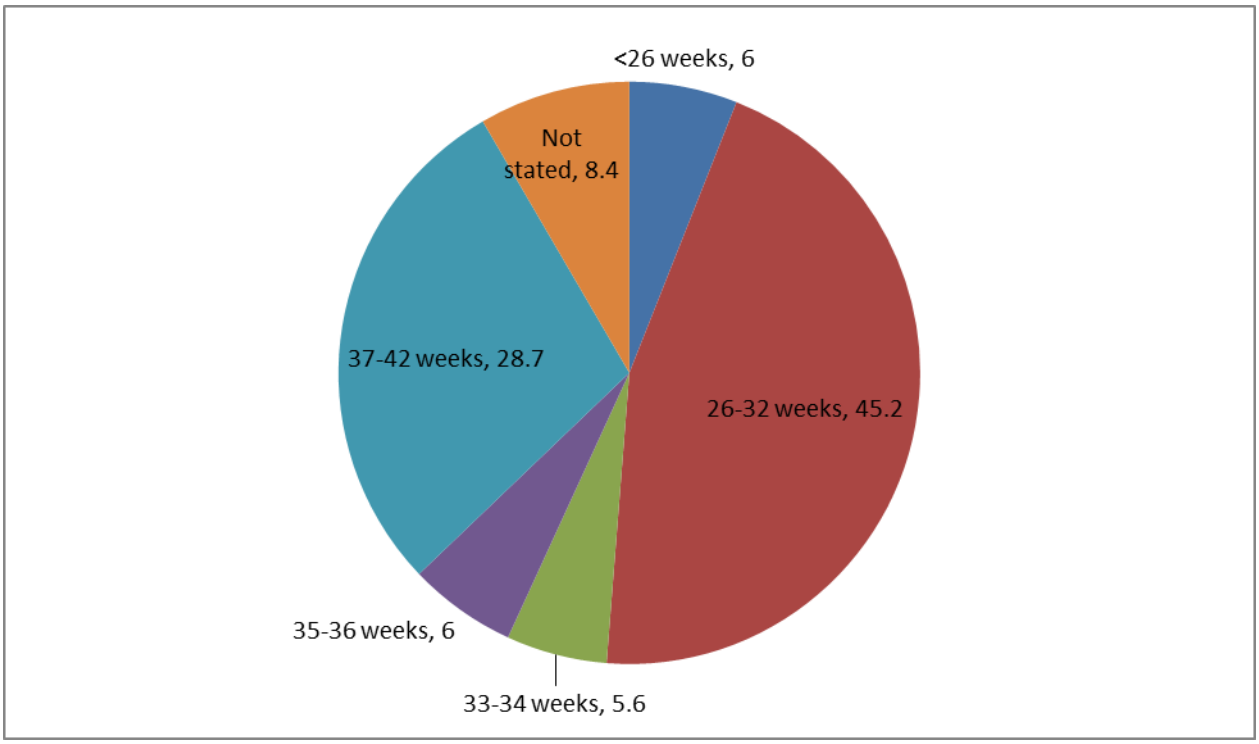
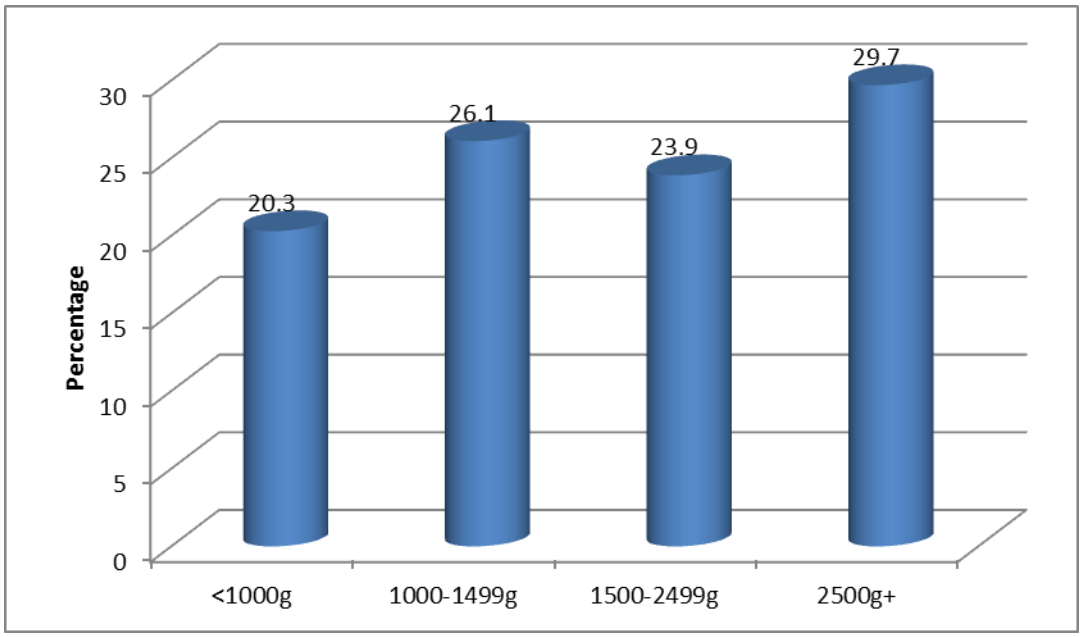


Table 27: Distribution of number of neonatal deaths by gestational age in weeks and birth weight ranges (n=498)

Gestation	<1000	1000-1499g	1500-2499g	2500g+	Not stated	Total	Percent
<26 weeks	24	4	1	0	1	**30**	6.0
26-32	63	96	47	7	12	**225**	45.2
33-34	0	7	17	4	0	**28**	5.6
35-36	0	1	16	11	2	**30**	6.0
37-42	1	1	22	112	7	**143**	28.7
Not stated	7	13	9	5	8	**42**	8.4
Total	**95**	**122**	**112**	**139**	**30**	**498**	**100.0**
Percent	19.1	24.5	22.5	27.9	6.0	100.0	

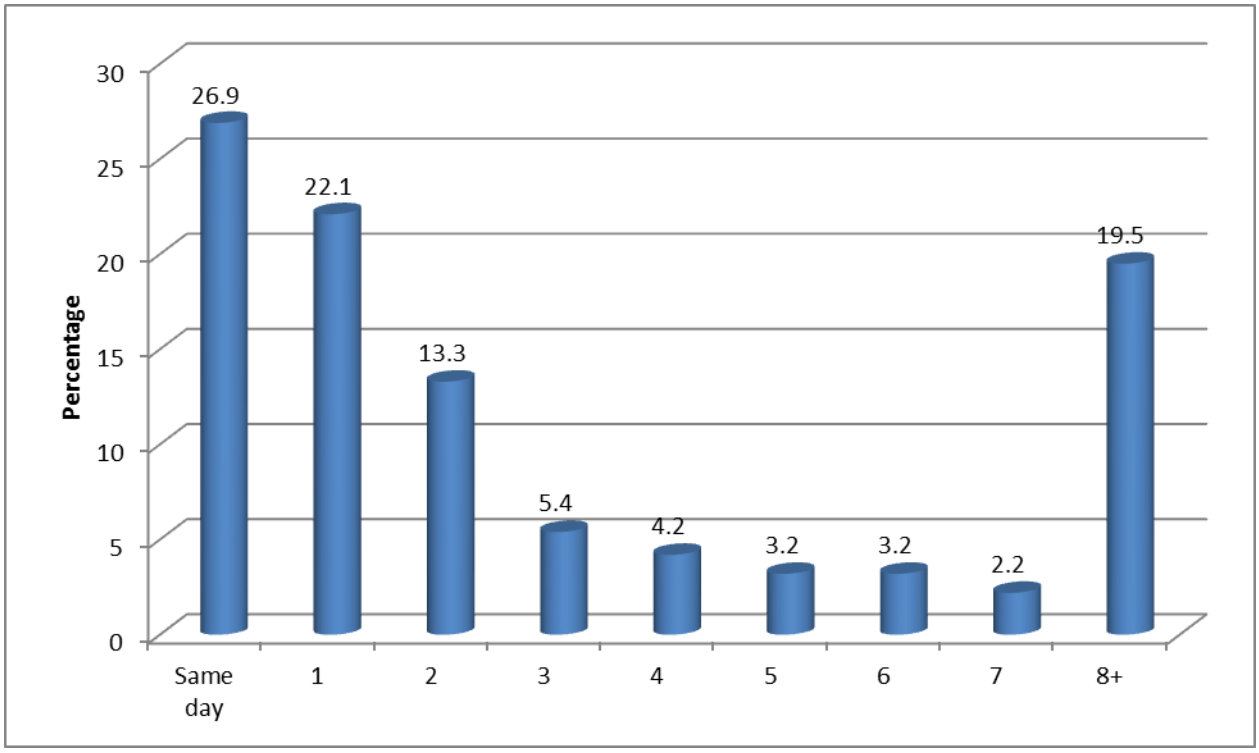
Almost one-third of neonates (29.7%) who died weighed >2500g at the time of death (Figure 14). All other neonates were low birth weight (<2500g). Twenty-four percent weighed 1500g–2499g, and another 23.7% weighed 1000–1499g. Twenty-one percent of neonates weighed less than 1000g. The weight data for neonates who died are consistent with the gestational age data, indicating a significant burden of prematurity.

Figure 14: Percentage of neonates who died, by birth weight ranges (n=468)



Of neonates who died, 27% died on the day of birth and an additional 22% died within the first 24 hours of life, making up almost 50% of all of the deaths (Figure 15). The incidence of neonatal deaths declined on all subsequent days in the study up to one week. Almost 20% of neonates died on the eighth day or later.

Figure 15: Percentage of neonatal deaths, by day of life (n=498)



5.5.1 Causes of death among neonates

As shown in Table 28, the most common cause of neonatal death was prematurity (n=270 or 54.2%), which is reflected in birth weight and gestational age tables as well. Respiratory distress syndrome (n=131), birth asphyxia (n=88), sepsis (n=86), and congenital malformations (n=50) were also prevalent causes of neonatal deaths. Respiratory distress syndrome is most often the result of prematurity; birth asphyxia and hypoxic ischemic encephalopathy (n=34) are both related to intrapartum and immediate neonatal events (e.g., prolonged or obstructed labour, lack of immediate neonatal resuscitation when indicated). Other less common causes of neonatal death were noted to be necrotizing enterocolitis, hypothermia, jaundice, surgical complications, birth trauma, and tetanus.

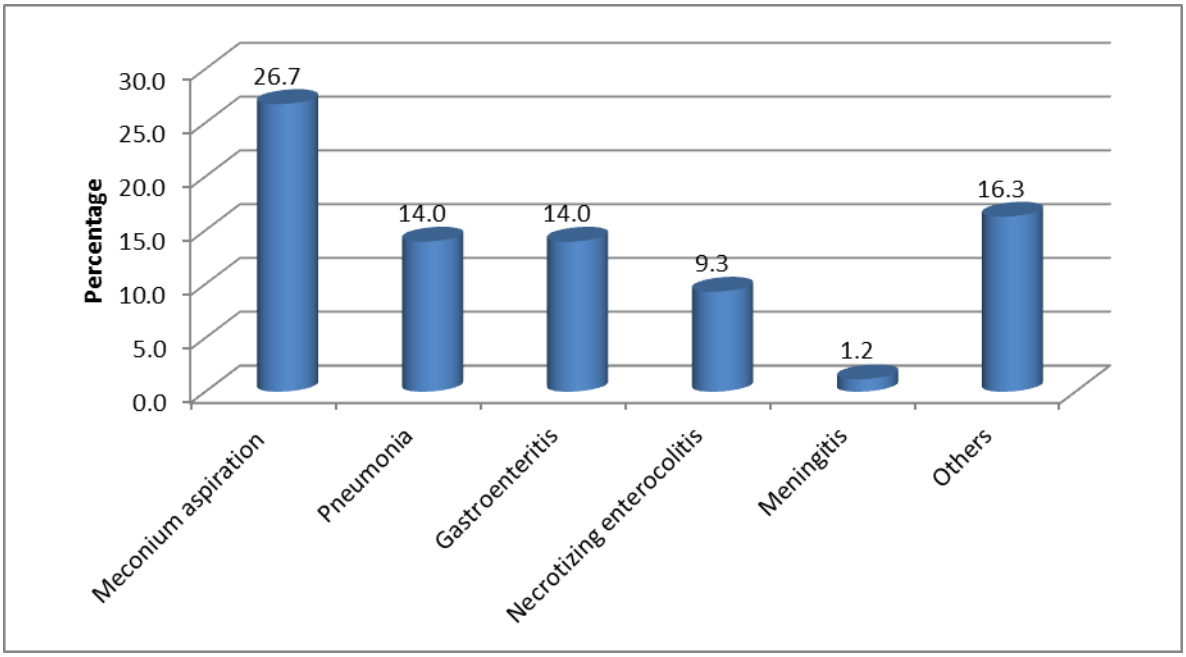
Table 28: Probable causes of neonatal death by day of life (n=498)*

Causes	Same day	1	2	3	4	5	6	7	8+	Total
Prematurity	84	64	37	12	15	8	11	4	35	**270**
Birth Asphyxia	29	27	16	1	6	0	2	1	6	**88**
Hypothermia	1	3	0	0	0	0	1	0	1	**6**
Congenital Malformation	14	8	6	3	0	2	1	2	14	**50**
Hypoxic Ischemic Encephalopathy	5	8	6	6	3	3	2	1	0	**34**
Necrotising enterocolitis	0	1	0	0	1	0	2	1	13	**18**
Surgical complication	1	0	0	0	0	0	0	0	2	**3**
Birth Trauma	1	0	1	0	0	0	0	0	0	**2**
Jaundice	0	1	1	2	1	2	1	0	6	**14**
Tetanus	1	1	0	0	0	0	0	0	0	**2**
Sepsis	16	14	8	4	3	1	2	2	36	**86**
Respiratory distress syndrome	48	37	20	3	3	2	4	2	12	**131**

*There were multiple contributing causes of death in many neonatal mortalities

Figure 16 shows the distribution of causes of sepsis among the 86 neonatal babies who died as a result of sepsis. Meconium aspiration (26.7%) was reported to be the main cause of death among this category of babies. Less commonly recorded causes of death related to sepsis included septicemia (7), umbilical cord sepsis (2), septic shock (1), pulmonary oedema/infection (1), chroriamontis (1), jejunal atresia (1), and diarrhea and abdominal distension (1).

Figure 16: Distribution of causes of sepsis among neonate deaths (n=86)



5.5.2 Interventions provided to neonates who died

As shown in Table 29, three-fifths (60%) of neonates who died received IV fluids, 51% underwent attempted neonatal resuscitation, and 49.2% were given at least some antibiotics. About 14% of neonates were referred to a higher-level neonatal care unit. Approximately one-third of babies who died were not fed (37.3%). A few were fed expressed breast milk (16.3%), and 15.7% were breastfed. Only 9.8% were given formula milk, and very few were given water.

Table 29: Interventions provided to neonates (n=498)

Intervention	Number	Percent
Neonatal resuscitation	254	51.0
IV fluids	299	60.0
Antibiotics	245	49.2
Continuous positive airway pressure	186	37.3
ICU/high care unit	70	14.1
Blood and blood product transfusion	19	3.8
Traditional medicines	4	0.8

5.5.3 Delays as contributors to neonatal deaths

The results from this section support contributions from all three types of delay to neonatal death, according to the health workers interviewed: delays in seeking, reaching, and obtaining care (Table 30). The third type of delay (delay in receiving care) was perceived to be common (47.8%) for neonatal death cases, reinforcing the fact that two-thirds of neonatal deaths occurred at the hospital where the woman laboured and delivered. Only 0.5% of mothers of neonates who died experienced the second

type of delay (delay in reaching a facility due to transport or financial barriers). For the 96 mothers of neonates who experienced the third type of delay the most common reason given for the delay was a lack of facilities (including medications and supplies) to care for premature neonates (9.2%), lack of trained and available providers (6.4%), and negligence (9%) (not shown). Other causes of the third type of delay noted were delays transferring neonates to higher-level facilities and delays in making the decision to perform a Caesarean section during prolonged labour. A number of neonates also were reported to have experienced a combination of the first and third delays (n=22; 10.9%).

Table 30: Types of neonatal delays experienced (n=201)

Type of delay	Number	Percent
First delay only	77	38.3
Second delay only	1	0.5
Third delay only	96	47.8
First and second delays	3	1.5
First and third delays	22	10.9
Second and third delays	1	0.5
All delays	1	0.5
Total	**201**	**100.0**

5.6 Results from EmOC Facilities Assessment

Data collectors assessed a total of 18 health facilities using the EmOC survey tool, selecting a representational sample from different levels of facilities. The majority were selected from //Karas region (n=7; 38.9%) because of population density (Table 23). Four facilities were included from Erongo and Hardap, respectively, and only one facility was selected from Omaheke region. The intermediate and central hospitals in Windhoek district (Khomas region) were also assessed. Overall, the selection included nine district hospitals, five health centres, two hospitals, and an intermediate and a central hospital.

Table 31: Regional distribution of health facilities assessed (n=18)

Region	Number of facilities	Percent
Erongo	4	22.2
Hardap	4	22.2
//Karas	7	38.9
Khomas	2	11.1
Omaheke	1	5.6
Total	**18**	**100.0**

5.6.1 Performance of signal functions

Tables 32-33 display a summary of available basic emergency obstetric care (BEmOC) and comprehensive emergency obstetric care (CEmOC) signal functions by facility. As per the methodology, services not performed at the site in the past three months are considered not to be available.

Table 32: EmOC assessment of hospitals according to BEmOC and CEmOC functions performed in past three months

Health facility	Type	BEmOC						CEmOC		
		Parenteral antibiotics	Uterotonics	Parenteral anticonvul-sants	Manual removal of placenta	Manual removal of retained products	Neonatal resuscit-ation	Assisted vaginal delivery	Transfusion of blood products	Caesarean section and laparotomy
Windhoek	CH	YES	YES	YES	NO	YES	YES	YES	YES	YES
Katutura	IH	YES	YES	YES	NO	YES	YES	YES	YES	YES
Walvisbay	DH	YES	YES	NO	YES	NO	NO	YES	YES	YES
Swakopmund	DH	YES	YES	YES	YES	NO	YES	YES	YES	YES
Omaruru	DH	YES	YES	YES	*	YES	NO	YES	YES	YES
Usakos	DH	YES	YES	YES	YES	YES	NO	YES	YES	NO
Rehoboth	DH	YES	YES	YES	YES	YES	YES	YES	YES	YES
Mariental	DH	YES	YES	YES	YES	YES	YES	YES	YES	YES
Keetmanshoop	DH	YES	YES	NO	NO	YES	YES	YES	YES	YES
Luderitz	DH	YES	YES	YES	YES	YES	YES	YES	YES	YES
Karasburg	DH	YES	YES	YES	NO	YES	NO	YES	YES	YES
Oranjemund	DH	YES	YES	YES	NO	NO	NO	YES	NO	YES
Gobabis	DH	YES	YES	YES	YES	YES	YES	YES	YES	YES

*Not indicated

National protocol expects that all health centres be fully able to offer BEmOC signal functions and that district (DH), intermediate (IH), and central hospitals (CH) be able to offer both BEmOC and CEmOC signal functions. However, this signal function assessment demonstrated significant deficits in the ability of many of the health centres (HC) and hospitals to provide full scope BEmOC and CEmOC services. Only one health centre (Aranos) offered all BEmOC functions, and just four district hospitals offered all CEmOC functions (Rehoboth, Mariental, Luderitz, and Gobabis). Windhoek Central and Katutura Intermediate Hospitals offered all CEmOC functions with the exception of manual removal of the placenta because there were no cases in the past three months prior to the assessment period. Likewise, there were no cases of manual removal of retained products in Swakomund and Walvisbay hospitals during the three month time period.

Table 33: EmOC assessment of health centers according to BEmOC functions performed in past three months

Health facility	Type	BEmOC					
		Parenteral antibiotics	Uterotonics	Parenteral anticonvul-sants	Manual removal of placenta	Manual removal of retained products	Neonatal resuscit-ation
Bethanie	HC	NO	YES	NO	NO	NO	NO
Aroab	HC	YES	YES	NO	NO	NO	NO
Noordoever	HC	YES	YES	YES	NO	NO	NO
Maltahohe	HC	YES	YES	YES	YES	NO	NO
Aranos	HC	YES	YES	YES	YES	YES	YES

All health facilities assessed indicated that health workers there had administered uterotonic drugs in the past three months. Only one health centre in //Karas region (Bethanie) indicated that health workers had not administered parenteral antibiotics, but no specific reason was given. Two facilities (Bethanie and Aroab health centres) in //Karas region indicated that they did not perform manual removal of placenta due to policy issues, and three facilities (Omaruru, Walvisbay, and Usakos district hospitals) in Erongo region did not perform assisted vaginal delivery due to training issues of health care providers. One district hospital (Usakos), which should be able to offer CEmOC services, did not perform surgery due to lack of an anaesthetist, nor did it have adequate trained staff for neonatal resuscitation.

5.6.2 Infrastructure assessment

In the three months prior to the study, only one of the 18 health facilities (Gobabis district hospital) indicated that it had been without electricity which affected the telephone service for one to two hours at the time of the assessment. Otherwise water supply and regular ambulance/transport to transport patients were available. All other facilities indicated that they had access to these basic services.

5.7 Study Supervisor's Observations

During the field supervision trips to districts and facilities, the TWG teams noted in their trip reports a number of important considerations that were not documented elsewhere but contributed to the overall quality of maternal and neonatal care available at these institutions. In many of the institutions, for example, the TWG teams noted that obtaining files was challenging, or files were incomplete or not filed systematically. In some cases, a final diagnosis was never recorded for the mother or neonate (e.g., left as "query" from admission until discharge or death).

TWG teams observed that history-taking in maternal records was incomplete, and partograph records of labour and birth were not routinely completed or used in decision-making. Regarding maternal deaths, in some institutions it was not possible to determine a woman's pregnancy status at time of death because medical notes were lacking regarding last menses, pregnancy test, or use of family planning in women of childbearing age who were admitted to wards other than the obstetric ward. One team noted that there was confusion between stillbirth and neonatal death; some neonates who were

born alive but with very low Apgar scores (1-3) were registered as stillbirths and not neonatal deaths. Another team mentioned general concern that premature newborns were not being cared for immediately or transferred soon enough to higher-level facilities.

5.8 Community Focus Group Discussions

5.81. Introduction

The primary aim of the maternal and neonatal mortality study was to generate information in five regions of the country through a multisource study. The focus group discussions were conducted in all five regions. The objective of the focus group component was "to further delineate the importance of household and community-level delays in seeking and reaching care as a contributor to maternal and neonatal death and to determine how health-care-seeking behaviour in women of childbearing age may affect maternal health outcomes in the community." This section of the report discusses three broad themes, namely, how mothers and babies seek, reach, and access health care. Analysis of the focus group discussions centered on examining these themes and identifying subthemes.

5.8.2 Composition of groups and participants

As shown in Tables 34 and 35, a total of 12 focus group discussions were held in the five regions: Windhoek (4), Swakopmund (2), Gobabis (2), Karasburg (2), and Mariental (2). The final group size ranged from 4 to 14 participants, most of whom were female. As previously noted, efforts to recruit male participants were largely unsuccessful due to either non-availability, limited knowledge in assisting spouses/partners during and after delivery, or not being in a relationship with the mother. Some women also indicated that they did not want their partners to be interviewed. In cases where just one man showed up for a focus group, a data collection team member conducted a key informant interview instead. There was no specifically set education attainment criteria requirement.

Table 34: Composition of focus group discussions, by health facility and gender

Region	Location of group	Distance from health facility in km	Female participants	Male participants
Khomas	Groot Aub	>50	8	4
	Dordabis	>50	14	None
	Okuryangava	<50	9	None
	Otjomuise	<50	6	None
//Karas	Karasburg	<50	5	1 (key informant interview)
	Aussenkehr	>50	14	5
Hardap	Mariental	<50	6	1 (key informant interview)
	Stampriet	>50	12	None
Erongo	Arandis	>50	9	None
	Swakopmund	<50	6	None
Omaheke	Drimiopsis	>50	12	4
	Gobabis	>50	8	5

Because only one focus group discussion was conducted per facility, we do not identify specific facilities in the exemplary quotes included in this section of the report. This is to avoid deductive disclosure,

whereby a person familiar with the facility and population might be able to infer the identity of a respondent by knowing their location. In the following sections, all quotes are from women, unless otherwise noted.

Table 35: Focus group participants, by age and gender

Region	Place	Female	Ages	Male	Ages
Khomas	Groot Aub	08	19, 19, 21, 22, 22, 25, 26, 37	04	21, 22, 22, 28
	Dordabis	14	19, 19, 20, 20, 21, 22, 24, 26, 25, 31, 32, 32, 34, 38	None*	None
	Okuryangava	09	Ages not collected	None	NA
	Otjomuise	06	Ages not collected	None	NA
//Karas	Karasburg	05	23, 27, 31, 37, 37	None**	None
	Aussenkehr	14	21, 24, 25, 27, 27, 28, 29, 30, 33, 33, 34, 35, 36, 45	05	23, 27, 32, 32, 36
Hardap	Mariental	06	21, 22, 26, 28, 30, 33	None**	None
	Stampriet	12	19, 19, 20, 21, 21, 22, 23, 23, 30, 33, 34, 38	None***	None
Erongo	Arandis	09	Ages not collected	None	NA
	Swakopmund	06	Ages not collected	None	NA
Omaheke	Drimiopsis	12	Ages not collected	None	NA
	Gobabis	08	Ages not collected	05	NA

*Despite phone calls to prospective male participants and prior confirmation of their availability, only one father turned up; because he was under the influence of alcohol, the group discussion with fathers was cancelled.
**Despite phone calls and prior confirmation, only one father turned up and the group discussion with fathers was cancelled.
***Some fathers came with the mothers; when they were asked to come later for a separate discussion, they did not return and the group discussion with fathers was cancelled.

5.8.3 Seeking care

Focus group participants discussed the decision to seek care at three points of time: diagnosis of pregnancy and commencement of ANC services; emergencies during pregnancy; and at the time of delivery. In three of the focus groups, women reported that they did not know they were pregnant until they were diagnosed at a health facility. In many of these cases, respondents seemed to be ignorant of the signs of pregnancy:

> *In the beginning of pregnancy, I was just feeling tired. …I went to the clinic to see what was wrong with me. When I went to the clinic they tested me and it was positive. I was three months pregnant by then.*

Most women who participated in the focus groups did not experience emergencies during pregnancy. However, many appeared to be cognizant of warning signs during pregnancy, particularly discharge and bleeding. There was also generalised knowledge of warning signs for infants, including fever and diarrhoea. Many respondents reported that they learned of these warning signs while attending ANC services.

Respondents reported consulting a variety of people about the decision to seek care, including husbands, mothers, and other family members. While some women said that these people made the decision to seek care, no respondents reported that another person had been an obstacle to seeking

care. Men most often felt that their contribution to seeking care was financial: *"When a woman gets pregnant, I need to make sure that I have money."*

Despite acknowledging shortcomings in the services available at health facilities, most women and men stated that delivering at home could be dangerous and that they preferred to give birth at a health facility. One respondent gave a specific example: *"There are times when you tear during the delivery and if you give birth at home, it could be dangerous because you would need stitches."* Nevertheless, several respondents reported receiving supportive care and advice during their pregnancies from traditional caregivers (known as "community birth givers" and "smear aunts") who would presumably not be available for support during a facility-based birth. In particular, women reported receiving massage from these caregivers to ease the labour process. *"We are massaged by our grandmothers. They can tell you when the baby is in the wrong position. Sometimes they help the nurse with delivery."* The traditional caregivers are also often consulted about health problems of infants.

Respondents did not report financial barriers to receiving care. However, while ANC services are free, women reported that there are costs associated with delivering in a health facility. However, several women felt that they would receive services even if they did not have money.

5.8.4 Reaching care: transportation and ambulance services

Transportation was a factor discussed in all the focus group discussions. Most participants reported that they walked to the health facility, took a taxi, or used a private vehicle. The most common barrier to arriving at the health facility was the financial cost of transportation. *"You don't have a choice but to ask the neighbors or family members for transport, or you walk to the clinic."* Some women also complained of being forced to walk home after giving birth, even in the case of Caesarean sections, because of lack of transport.

There was concern in most of the focus groups that there is a lack of effective ambulance services to deal with emergencies. Participants identified several problems related to emergency transport, including the total lack of ambulances in a given area, the lack of qualified drivers, the long distances to be covered, and delays in calling for the ambulances. As one participant noted,

> *[The ambulance is] taking long to come because it's only one ambulance that works for three towns. …Sometimes when you call, the ambulance might be in [town], so that's why we wait for long. But if the ambulance is in [town] it only takes half an hour to come. The waiting is caused by nurses that answer the phone and not informing the ambulance guys on time.*

Delays in ambulance services could also result in a woman giving birth in the community in a lower-level facility than advisable, or in the ambulance itself, resulting in elevated risk as revealed in this situation:

My pains started in the morning. I went to the clinic and an ambulance was called. I gave birth at the clinic while waiting for the ambulance. I lost a lot of blood and my blood pressure was low and I was taken to [the hospital].

5.8.5 Receiving care: negative practices

To gain a better understanding of the facility-level and provider-level factors that contribute to poor quality of care in the maternity and delivery wards, we used the focus group discussions to explore client perceptions of negative practices in maternity and neonatal care. This should not be interpreted to mean that there were no positive experiences reported by focus group participants. However, this analysis focuses on describing the range of negative practices reported. Table 34 summarises reports of 14 distinct types of negative practices by facility. The 14 negative practices cover facility factors such as perceptions about insufficient resources and infrastructure as well as perceptions about providers such as reported direct physical abuse of labouring mothers. The table shows both what practices were reported the most and which facilities had the most reports of negative practices. These results are illuminating but must be interpreted with care, since a single individual might have reported a story for a facility that covered several negative practices. Thus, the proportion of negative practices in a facility does not represent *how often* that practice occurs in a facility, but rather *any* report of it occurring. It is also important to note that during focus group discussions, strong personalities or dramatic stories can change the tenor of the conversation. It is possible that after having heard the negative experiences of others, some participants may have stressed the negative over the positive of their experiences.

Focus group participants' comments suggest that negative provider practices can directly affect clients' perceptions about service quality and shape women's health care choices. For example, in discussing institutional versus home birth, the group facilitator received the following response:

Facilitator: *Do you know of any women that gave birth at home?*
Respondent: *There are some of them that choose to give birth at home because they are not treated well at the hospital.*

Another respondent reported delaying going to the hospital:

I…told my uncle that I would only go to the hospital once my water broke. I did not want to stay long in the hospital because the nurses were not very patient with patients.

Table 36: Reported prevalence of negative practices by facility

Region	Facility	Not enough staff to provide timely care, waiting long, insufficient facility	Providers rude, scornful, mocking, disrespectful, yelling	No ambulance/waiting long for ambulance	No privacy (left naked, doors open, guards peeping), no confidentiality	Giving birth without being attended, needing to clean self or baby	Ignoring women at arrival, making wait needlessly	Language difficulties/tribal affiliation	Ignoring when women say they are ready to birth/push	Providers rude, scornful, mocking, disrespectful, yelling **at young people**	Physical abuse (beating, slapping), refusing physical assistance	Babies not examined before discharge; mother/baby misdiagnosed	Patients told to clean room or equipment	No/inadequate pain control (episiotomy, c-section)	**No. negative practices mentioned**	**% Negative practices mentioned per facility**
Erongo	Arandis														5	36%
	Swakopmund														10	71%
Hardap	Mariental														10	71%
	Stampriet														5	36%
Karas	Aussenkehr														8	57%
	Karasburg														11	79%
Khomas	Dordabis														10	71%
	Groot Aub														7	50%
	Okuryangava														5	36%
	Otjimuise														2	14%
Omahek e	Dirmiopsis														4	29%
	Gobabis														8	57%
Katatura Reference Hospital															7	50%
No. facilities mentioned		12	12	9	9	7	7	7	6	6	5	4	4	2		
% Facilities mentioned		92%	92%	69%	69%	54%	54%	54%	46%	46%	38%	31%	31%	15%		

The following sections illustrate 13 of the 14 negative practices. (The negative practice associated with lack of ambulances was covered in the preceding section on reaching care.)

Insufficient infrastructure and resources. The focus group results indicate that some clients perceive that the health facilities available to them are not sufficient to provide the maternity and neonatal services they need. During the focus groups for nearly all of the facilities (92%), participants described their facility as too small (either in physical size or number of providers working in the facility) and lacking doctors. Participants consistently reported that there were only one or two health providers on duty at a given time in the maternity unit. Another common comment was that there are enough health facilities but not enough providers to staff them. In one case, a situation was described involving a lone health worker who had to request assistance from an unlikely source: *"Two young pregnant mothers gave birth that night and there was only one nurse on duty and she asked the cleaners to assist with the delivery of the babies."* Participants expressed some sympathy for the health workers in understaffed facilities, saying they work "day and night" and are often tired and hungry.

Sometimes clients noted that facilities were not able to accommodate more than one woman in labour at a time due to infrastructure restrictions. *"When there are two people in labour, one is in the room and they give another person a mattress on the floor in the other room."* This situation not only has an impact on quality of care but also on privacy and clients' desire to give birth in that facility. As one participant noted, *"Women have to wait in the waiting room for the other women to give birth before they can be assisted."* Although we cannot make direct inferences from the focus group data, these findings suggest that women's concerns over health worker staffing and competency may contribute to delayed care-seeking.

Focus group participants occasionally reported that facilities were missing equipment and commodities, but these reports were relatively unspecific and, therefore, difficult to interpret.

Provider absence or reluctance to provide services. In one-third of focus groups, clients noted instances where providers were ostensibly available and on call but were not physically present at the facility. If asked to return to the facility, in some cases they refused because they were engaged in other activities, such as sleeping or eating. As one focus group participant stated, in times of emergency "*sometimes we find nurses sleeping and when we wake them up they tell us to go. It's a problem. They just don't treat us well. They don't treat you well because they are sleeping and if you wake them up they are very rude."* Provider absences and the lack of availability of skilled birth attendants at a given time are related issues, both resulting in delayed attention to patients' immediate needs. One mother commented:

> *I went to* [facility] *when I was eight months pregnant. My baby was not in the correct position. …A student nurse was on duty and she assisted me. The nurse student did not know what the problem was because I was pushing and the baby was not coming. They then called the doctor, but he was busy. They put me on the drip. The doctor came later and it was too late to take me for C-section. They gave me an indemnity form to sign.*

Deliberate delays in providing care. Although many focus group participants commented on staff shortages, some participants reported that even when providers were available, they would not provide services or would make clients wait. In about half of the focus groups, clients reported that providers sometimes deliberately delayed providing care: *"They take their time to attend to you; they don't usually rush for their patients."* This included cases where providers were available, on duty, and physically present at the facility but not attending to clients despite requests to do so. *"There are a lot of nurses, but only [a] few do their job. The rest just sit and have conversations."* In a couple of cases, this even included sending a woman who was currently in labour away from the facility. This negative practice differs from the issue of absent providers discussed in the preceding section in that the health provider is working and does not have to be called into the facility.

Refusal to listen to clients about the progression of labour. In approximately half the focus groups, clients described situations when providers had not listened to them when they felt labour was progressing:

> *When the baby was about to come, the nurse told me that I will not deliver immediately. When the pains started, I was in the maternity ward, got on the bed and the baby came. The nurse only came afterwards and asked me why I did not call her and whether I wanted her to lose her job.*

Respondents stated that providers might fail to respond or might ignore a client despite her claims of being ready to push and deliver her baby, or providers might insist that clients walk (or even run) during labour even when clients felt that this was not possible. One mother stated, *"On my way to the delivery room, there was a lady who gave birth on the floor while she told the nurses that the baby was coming. The nurses talk to patients any way they like."* While it is common practice to encourage women to stand up or walk around as they wish during the early stages of labour with no ill effects, doing so in the later stages, and unattended, can prove dangerous to the newborn.

> *I went to the hospital when the labour pains started. The nurse assisted me but when I said that the baby was coming, they did not come to assist me. I told them that the baby was coming while I was in the waiting area. The baby fell out on the head.*

Giving birth unattended. Linked to the issue of staff shortages but also to lack of respect for clients, over half the focus groups included reports where a provider either was not present during the birth of a baby (forcing the client to deliver the baby without support) and/or was not present immediately after the birth, necessitating that the client clean herself or her baby. Several participants described this type of scenario:

> *The shift changed and the new nurse told me to walk in the corridor. I told her that I could not walk as I felt the baby coming. I walked to a nearby room and got onto the bed. The nurse then told me that I will give birth on my own. The baby came and another nurse came to assist me with the delivery.*

When my labour pains started, I came to the hospital with my parents and the male nurse on duty told me to call him when the pain gets worse. I almost gave birth in the waiting room. My mother took me to the delivery room and I gave birth alone with my mother because the nurse was busy with paperwork and did not assist me. The baby was in the birth water for over 10 minutes. The baby could not even cry, only then he came to shake the baby and he started to cry. I had to walk from the delivery room naked to the other room, as he had to clean the delivery room. He had been working day and night and was tired.

When the labour pains started, I came to the hospital and there was only one nurse on duty. There was one lady in labour already. I went to the delivery room as I felt the baby was coming. The nurse told me to wait as he was busy with the other girl. I gave birth on my own. He only came back after delivery and assisted me with cleaning the room. I did not have a choice but to clean my baby myself. …The staff complement is not enough for the maternity ward.

Disrespectful providers. Participants in nearly all of the focus groups reported that providers are rude, scornful, or disrespectful. As one client noted, *"At this clinic you must always ask, and they are always scolding you."* Others stated that providers "*shout [at] and insult*" the mothers. A mother stated, *"I fell pregnant when my previous baby was just a year and 3 months. And the nurse scolded at me in public that it was my stupidity that I fell pregnant. I felt very bad, and embarrassed at the same time."* Another commented:

I took a taxi to the hospital at around 3h00 a.m. They were doing a false examination (so they thought the baby was still far). Only later they agreed to give me a bed to lie on. The nurses were not nice. She left me on the bed naked and she went and talked on the phone. That I did not like.

Prejudices against young people/mothers. Nearly half the focus groups included reports of providers being rude, scornful, and/or disrespectful to young clients (i.e., under 20 years old) because of their age. According to one respondent:

There was a 17-year-old girl and the nurses were very rude to her. I assisted her and showed her what to do and what not to do. They even beat her so she could push and do as they said. It was confusing for her. She gave birth, but the baby died the next day. The nurses claimed that the girl did not want to open her legs and the baby had head injuries.

A younger focus group participant stated, *"The nurses completely chased me to go get my parents [when diagnosed she was pregnant]. Apparently I was under-age, so they will not do anything until I have my parents present. I felt very embarrassed."* Another young respondent reported,

After giving birth, my baby was taken to the baby room. They did not even tell me if it was a boy or a girl and whether something was wrong. Only that evening the nurse told me

that it was a boy. They told me that because I was underage, they could not give me information.

Physical abuse. In five separate focus groups, participants reported physical abuse being perpetrated by providers. This was defined as the provider maliciously laying hands on the client in an effort to speed up labour, or as punishment for not following orders, or for any other reason. Also included in this category were instances where a provider failed to physically assist patients who needed help.

> Participant: *I really was not feeling well after that nurse hit me on the belly.*
> Facilitator: *Why did she hit you on the belly?*
> Participant: *I don't know. Maybe she wanted me not to push or she was stressed.*

> *I spent two days with the pain; I went to tell my father…then he took me to the hospital, but they have sent me back home. But around 20h00 in the evening I decided to go back. Then, I couldn't walk, and they were forcing me to climb on the trolley, they refused to lift me to put me on top of the trolley. It was only one security [guard] who came to help me climb.*

Mismanagement of client pain. In two of the focus groups, clients mentioned that a provider did not provide either any or enough pain control for episiotomies, Caesarean sections, or other procedures where pain control is allowed. *"I went for C-section but I felt the pain throughout the operation. They took me from the delivery room to the recovery room. I was in pain, but they were careless with me."* In at least one case, this was perceived as a punishment for the mother's inability to control her actions:

> *I didn't get the two last injections because I was in pain and she didn't handle me with care. They told me to hold my legs to inject me for the stitching [episiotomy], but I unfortunately lost control and kicked the nurse. So they decided to stitch me without any injection. I felt the stitch pain for almost two weeks.*

Inappropriate discharge of newborns and mothers. In several of the focus groups, there was some discussion that providers did not adequately examine newborns after delivery or before discharge. Clients had the suspicion that providers missed complications or illnesses that should have been identified and treated prior to discharge for either the baby or mother. One mother reported:

> *I told the nurse the baby's eyes were not opening and was [sic] red. She said it is how it should be. I kept quiet because it's her job and she maybe knows what she's saying. The doctor said it's normal even without touching the baby. We went home and told my mother and when the baby opened the eyes we could see it's not well. …The baby had a cut somewhere on his face. I think it's scissors they were using. She said I'm overreacting and that I should stop talking nonsense. I told her I'm not talking nonsense—it's my first-born*

and I'm concerned, or am I not supposed to ask any questions? …I took my baby to the eye specialist. He said the baby had an eye infection. If you had taken the baby a bit later, the baby would have gone blind. I went back to the hospital and told them, 'You know my status but yet you are neglecting me.' The nurses apologized and begged me not to take the incident to the newspaper.

Lack of privacy and confidentiality. Nearly 70% of focus groups included reports of a lack of privacy or confidentiality. Some participants commented on the lack of privacy in general terms: *"There is no privacy at the [clinic] because there is only one room without a door for delivery."* In other reports, clients described being left in an exposed state (for example, left naked with the doors open and viewable by the public). *"There is no privacy. While you are naked, people come in and out of the rooms."* In a few cases, respondents indicated that client information had been openly shared without regard to Namibian confidentiality guidelines: *"There is no patience for pregnant mothers. They gossip about patients. I listened while they were talking about me."*

Clients required to perform housekeeping. Another issue linked to those of staff shortages and lack of respect for clients was that of clients performing housekeeping duties. Focus group participants in a third of the groups reported that health workers sometimes ordered clients to clean the room or equipment during labour or following delivery. *"The facilities are not clean and in some cases, we, the patients, were given cleaning materials to clean the rooms and the toilet."* There were several reports of labouring women vomiting and then being told to clean it or being punished for having "made a mess."

When I came to the hospital I was nauseous and when I saw a dustbin, I spit in it. The nurse said I must act as if it's my house, but I just looked at her because the pain was too much.

Language difficulties/tribal affiliation. Just over half of the focus groups included reports that language and/or tribal affiliation impacted quality of care. With incomplete information about the participants' tribal affiliations, it is difficult to say for certain what effect providers' tribal affiliations may have. However, several participants mentioned that providers of a certain tribe were either friendlier or ruder.

The question of whether language affects the quality of care was more clear-cut. One individual commented, *"…The female nurses only want to speak English and some people cannot speak English very well. She refuses to speak Afrikaans, even though she understands. Other people have to help with translations."* A male focus group participant also remarked that *"Sometimes the language barrier is a problem at the clinic. Some women might not be literate."* A mother stated:

They never cleaned me properly because I had pains until the next morning. In the afternoon, a Nama nurse came on duty and she cleaned me. I think the language plays a major role. If my mother was not present, I would have gone home and anything could have happened to me or the baby.

5.8.6 Summary of focus group discussions

Namibia supports and promotes facility-based births and access to skilled birth attendants. However, the quality of maternal and neonatal care is crucial. Focus group participants reported some negative practices in all 13 health facilities. The most frequently described negative practices included the lack of staff to provide timely care and rude, disrespectful, and mean health providers. Where the actual or perceived quality of care is poor, it is understandable that women may delay going to a health facility to deliver (as reflected in the quantitative data) or avoid going altogether. On the other hand, respectful maternity care and freedom from the fear of being badly treated and abused in health facilities will encourage women to seek help when they need it.

Focus group participants shared a variety of comments about the perceived lack of resources at health facilities. Participants complained that facilities lacked health providers, were short on ambulances (or required long wait times to be transported), and lacked adequate space to afford minimal privacy or modesty. They also shared comments about providers' expectations that new mothers clean up after a birth. Finally, respondents shared the perception that labouring women who are not considered a priority often do not have a place to rest comfortably or are told to return at the onset of a more advanced stage of labour.

One of the most far-reaching negative practices is the lack of staff to provide timely care and facilities to accommodate the number and needs of women in labour. This issue, mentioned in nearly all of the focus group discussions, demonstrates a need for improved human resources for health (HRH) planning so that health workers are distributed and placed where they are most needed. Negative provider attitudes and behaviours such as ignoring requests for care and assistance or being rude, disrespectful, or physically abusive to women in labour may result from provider bias (e.g., distrust of a certain ethnic group) or may be linked to external or HRH issues. For example, factors relating to the work environment (such as a chronic lack of supplies or medications), workload management issues, or a weak supervision structure may affect health worker attitudes and performance. In turn, there is ample evidence in the social science literature that health worker attitudes and behaviors have an impact on the quality of care provided (Bowser and Hill 2010; Warren et al. 2013; White Ribbon Alliance 2011).

In summary, the information obtained from analysis of the focus group discussions supports the conclusion that in the regions and time period under consideration, a number of challenges with quality of care are present and must be seriously considered and addressed.

6. Conclusions

This multisource, facility-based, retrospective maternal and neonatal mortality survey of the five regions of southern Namibia for the period from January 2010 to June 2012 was commissioned to complete the data picture available for Namibia subsequent to a similar 2010 study of the country's other regions. The results of this study, when considerations of time frame and decreased population density in the five regions are taken into account, are consistent with available data from other sources, including DHS surveys, Government of Namibia facility data, and WHO estimates.

The overall number of maternal deaths identified by this study is small: 57 total in the two-and-a-half-year time period. There were more maternal deaths in Khomas and //Karas regions, which have denser populations. Most deaths occurred at hospitals (not health centres), and most were to women who had delivered at those hospitals. Approximately 60% of deaths were due to direct causes (most importantly sepsis, postpartum haemorrhage, and preeclampsia). More than half of indirect deaths were due to HIV/AIDS, and it was clear from additional comments from the verbal autopsy respondents that HIV/AIDS was considered an important cause of compromised health for many of the women who died. The average time of death from delivery was three days after admission. The study also found that delay in care-seeking was a contributing factor to maternal death in a significant proportion of the cases evaluated.

Although there is a national maternal mortality clinical audit tool for all facilities, 42 of the 57 maternal deaths evaluated had not been reported on a maternal death clinical audit and were only discovered through the RAPID chart review process. These unreported maternal deaths most often had occurred on general medical wards and in ICUs. More than half of the unreported maternal deaths were due to direct causes of maternal mortality that should have been recognized. Clearly, the Government of Namibia HIS is not recording a significant proportion of maternal deaths at facilities. In a number of cases, the researchers were not able to obtain complete information due to misfiled and incomplete records, a common problem at all levels of health facilities.

The information provided by the quantitative data sources regarding the causes and postpartum timing of maternal deaths at facilities and by the qualitative data sources (verbal autopsies and focus group discussions) both point to the critical need to address the quality of care at facilities. The data obtained are consistent with the prevalent concerns expressed in the Namibian media about poor quality of care, lack of adequate skilled staff and equipment, and attitudes of health providers—concerns that were also the impetus for the Presidential inquiry into maternal health care. Overall, the EmOC facility assessment demonstrated the availability of signal functions for maternal and newborn care at the appropriate facility levels but found that some district hospitals were without specific BEmOC functions.

Only 42% of women who died a maternal death were indicated to have received antenatal care by chart audit. This is significantly lower than the average for pregnant women in Namibia (93% according to 2006-2007 DHS data) and needs to be considered. Although the data may be skewed because of incomplete charting, it is apparent that community-based strategies to promote ANC and institutional births will only be successful if facility-based care is of high quality and respectful maternity care is routinely available.

The results of the neonatal mortality clinical audit portion of the study were also relatively consistent with other national estimates of neonatal mortality, though it is also clear from subjective comments during the assessment that some neonatal deaths go unrecorded or are reported as stillbirths. Of almost 500 neonatal deaths evaluated, most occurred at larger hospitals and more than half of deaths were due to prematurity or complications of prematurity (predominantly respiratory distress syndrome and necrotizing enterocolitis), as reflected in birth weight and gestational age estimates. However, a significant number of neonatal deaths were due to birth asphyxia and hypoxic ischemic encephalopathy, which are both conditions most often related to intrapartum care and lack of safe monitoring, delivery, and neonatal resuscitation for prolonged and obstructed labour.

More than half of neonatal deaths occurred in the first two days of life. Where the third type of delay (delay in receiving appropriate care at the facility) was considered to be a significant factor in the newborn's death, the study identified lack of available care for premature newborns as a key concern, including delayed transport and lack of medications, supplies, and provider training.

7. RECOMMENDATIONS

This study report and existing data from previous analyses indicate that significant investments in maternal and neonatal health care with an emphasis on improving quality of care at facilities are needed. We outline four sets of specific recommendations below, focusing on strengthening maternal and neonatal health care at the community and facility levels, improving monitoring of maternal and neonatal deaths, and increasing epidemiological and intervention research and evaluation.

Maternal and neonatal health care in the community

1. ***Make basic ANC, intrapartum and postpartum, and neonatal health care services available to as many women in Namibia as possible.***
   In particular, the care needs of HIV-positive pregnant women should be addressed to assure compliance with HAART and safe and respectful childbirth practices for women with HIV/AIDS. In addition, women need to be linked to appropriate high-quality ANC services through community health workers. Although recommendations often particularly focus on the needs of rural or uneducated women, this study demonstrated that a high proportion of women who died a maternal death lived in urban areas and had secondary education. This supports the reality that all women are at risk and need access to appropriate services.

2. ***Disseminate warning signs of complications in pregnancy, postpartum, and the neonatal period.***
   Perceived late care-seeking was a significant theme in the verbal autopsy results and perceptions of health workers involved in the study. Measures to address care-seeking behaviour include:

   - Community-based strategies that improve knowledge of maternal and neonatal warning signs during pregnancy and birth and encourage individuals to seek skilled care early
   - Strategies to provide ANC closer to women in rural areas
   - Improved emergency transport
   - Improved referral mechanisms.

   Health care-seeking behaviours are slow to change, but increased care-seeking is more likely to occur if messages are integrated into school health programmes, disseminated by multiple media sources (e.g., television, radio, public displays), and discussed during visits with health workers.

3. ***In vulnerable communities where the EmOC sites are distant, make emergency transport and maternity waiting homes in geographically isolated areas readily available, and ensure that women in need of care are able to access these services.***

Maternal and neonatal care at facilities

4. ***Expand the number of appropriately trained skilled birth attendants in all health facilities and ensure that all health workers who are in contact with women of childbearing age understand the basics of maternal risk, morbidity, and mortality.***
   This requires providing training outside the traditional areas of labour and delivery, as many of the maternal deaths occurred in "non-maternity" areas, including emergency and general wards. Information on maternal morbidity and mortality prevention should also be integrated more fully into preservice curricula for all physicians and nurses.

5. ***Respond to inadequacies in the available BEmOC and CEmOC signal functions at institutions so that all are appropriately covered with trained staff and equipment to meet expectations on a 24/7 basis.***
   EmOC signal functions should be reviewed internally and externally on a regular basis to be certain that a high quality of continual care is available. If women in the community know that quality services are continuously available, they will be more likely to seek care when it is needed. This is particularly important in regions with high volume of HIV seroprevalent mothers given their increased risk to maternal complications and death.

6. **Reinforce the MoHSS core values in the provision of maternal and newborn care.**
   Interpersonal care that is disrespectful and abusive to women before, during, and after birth is appalling because of the high value societies attach to motherhood and because we know that women are intensely vulnerable during this time. Furthermore, disrespect and abuse during maternity care are a violation of women's basic human rights. All childbearing women need and deserve respectful care and protection of their autonomy and right to self-determination; this includes special care to protect the mother-baby pair as well as women who are marginalised or especially vulnerable (e.g., adolescents, ethnic minorities, and women living with physical or mental disabilities or HIV).

   The disrespect and abuse that childbearing women encounter during maternity care can be summarised in seven major categories that overlap and occur along a continuum from subtle disrespect and humiliation to overt violence, many of which were evoked in the verbal autopsy and focus group results. The categories include physical abuse, non-consented clinical care, an absence of confidentiality, non-dignified care (including verbal abuse), discrimination based on specific patient attributes, abandonment or denial of care, and detention in facilities.

In upgrading staff skills, it is, therefore, important to emphasise not only sound clinical interventions but the importance of respectful care. Interventions that address issues of staff motivation and supportive supervision are critical for sustainable long-term changes. All health workers who are in contact with women of childbearing age, whether or not they work directly in maternity care, need to be trained to recognise complications of pregnancy, seek additional help from other providers as needed, understand the definition of a maternal death, and correctly complete a maternal death audit. However, because health workers often work in stressful situations with limited support and supervision, it is also important to convey that they are valued and respected by leadership and the populations they serve, which will go a long way towards improving their motivation and encouraging health workers to provide respectful and high-quality care.

7. ***Encourage team-based reviews of maternal and neonatal death audits in a supportive environment.***
   Reviewing and discussing cases is an important step to improve future care-giving. Effective maternal and perinatal audits are associated with improved quality of care and reduction of severe adverse outcomes. Thus, clinical audits are rewarding for both patients and providers. The study indicates that clinical audits are either not being done or are conducted ineffectively in most institutions, with a poorly established structure and process that lessens their ability to improve quality of care. The fundamental changes that are urgently needed to establish successful audit systems in Namibian institutions are within reach.

8. ***Ensure completeness of record-keeping on hospital wards.***
   Provide job aides and support to assist health providers to take complete history and examination for all women of reproductive age given the large numbers of missed maternal deaths found in this study. Complete records allow data to be used for assessment and quality improvement initiatives that will be meaningful to the staff directly involved in the care of women and neonates. Information from district hospitals is limited and detailed analysis is made difficult by problems of isolation, poor communications, staff shortages and often, incomplete record keeping.

Monitoring of maternal and neonatal deaths

9. ***Brief all health workers on key definitions.***
   Health workers should be familiar with the definitions of maternal death, direct and indirect causes, and neonatal death. They should also be able to differentiate between a neonatal death and a stillbirth.

10. ***Conduct periodic RAPID assessments.***
    RAPID assessments can identify locations and causes of unreported maternal deaths, particularly from key strategic departments such as female wards and ICUs.

11. Raise expectations and devote more attention to record-keeping.

Managers can reinforce the importance of thorough record-keeping and institute regular reviews and positive reinforcement mechanisms.

12. Improve and standardise the filing systems in all facilities in a sustainable fashion.

Areas needing continuous research and evaluation

14. Elucidate the most successful strategies for improving the quality of care provided by health workers.

Areas of possible intervention include attitudinal change, expectations for provision of respectful care, and key positive elements needed to maintain a motivated workforce (e.g., training, equipment supply, adequate workforce employees, and supervision).

15. Identify the highest impact interventions for addressing delay in care-seeking at the community level.

Community-level interventions include messaging about the availability of appropriate and respectful care.

16. Investigate the impact of HIV/AIDS on maternal death in Namibia.

It may also be important to study how the impact on maternal mortality of HIV/AIDS may be changing with the increasing availability of HAART.

17. Increase understanding of maternal mortality patterns.

The higher prevalence of deaths among unmarried women and deaths to pregnant women who did not have a live birth warrant particular investigation.

An implementable action plan should be developed and implemented on these recommendations at both the national and regional level that takes in to consideration barriers and enablers.

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APPENDICES

APPENDIX 1. FACILITY-BASED MATERNAL DEATH CLINICAL AUDIT FORM

REPUBLIC OF NAMIBIA
Ministry of Health and Social Services
IntraHealth International

Facility Based Maternal Death Clinical Audit Form (Tool #1)

Instructions for completion of this tool:

1. Do not begin data collection unless permission has been granted by appropriate authorities to enter facilities and begin to collect data.
2. This form must be completed for all reported maternal deaths at the health facility. Data should be collected from as many medical records as are applicable and available in the facility, including: maternal death review form and under inpatient ward registers (antepartum, labor and delivery and postpartum) operating room register and case notes.
3. Clearly mark answers and spell using block letters as necessary.
4. After completion of tool on each maternal death clinical audit, supervisor must review prior to data entry.

Section A: DATA COLLECTOR INFORMATION

a.1	**Date of Audit**	D	D	M	M	Y	Y
a.2	**Data Collector Code**	#		#		#	
a.3	**Supervisor Code**	#		#		#	
a.4	**Quality Check performed on audit?**	Yes		1			
		No		0			
	Supervisor Signature						

Section 1: LOCALITY WHERE DEATH OCCURRED

1.1	**Region**	Erongo 1 Hardap 2 //Karas 3	Khomas 4 Omaheke 5	Answer
1.2	**District**	Walvis Bay 11 Swakopmund 12 Omaruru 13 Usakos 14 Rehoboth 21 Mariental 22 Aranos 23	Keetmanshoop 31 Luderitz 32 //Karasburg 33 Oranjemund 34 Windhoek 41 Gobabis 51	Answer
1.3	**Name of health facility**			
1.4	**Type of facility**	Clinic 1 Health Center 2 District Hospital 3 Intermediate Hospital 4	Central Hospital 5 Out of Hospital 6 Other: 7	Answer

Section 2: DETAILS OF THE DECEASED (for purposes of Verbal Autopsy only**)**

2.1	**Name of the Deceased**		
2.2	**DOB** ☛ **[** Day / Month / Year **]**		
2.3	**Residential address of Deceased**		
2.4	**Nationality of the Deceased**	Namibian 1 Non Namibian 2	Answer
2.5	**At time of death, number of pregnancies (*Gravida*)** ☛ **[**if one pregnancy, write 01**]**	Answer	
2.6	**At time of death, number of deliveries (*Para*)** ☛ **[**if one delivery, write 01**]**	Answer	
2.7	**How many days after abortion or delivery did female die?** ☛ **[**if on day of delivery write 00, if on day one, write 01. **If >42 days, stop audit]**	Answer	

Section 3: ADMISSION AT FACILITY WHERE DEATH OCCURRED OR FROM WHERE IT WAS REPORTED

3.1	**Date of admission**	D D M M Y Y	
3.2	**Time of admission** ☞ **[**use 24 hour clock. Include hour and minute**]**	H H M M	
3.3	**Date of death**	D D M M Y Y	
3.4	**Time of death** ☞ **[**use 24-hour clock. Include hour and minute**]**	H H M M	
3.5	**State of pregnancy on admission**	Abortion 1 Ectopic 2 Antepartum 3 Intrapartum/In labor 4 Postpartum 5 Other 6 Specify Other:	Answer
3.6	**Condition on admission**	Stable 1 Critically ill 2 Dead on arrival 3 Other: 4 Specify	Answer
3.7	**Primary diagnosis at time of death** ☞ **[**If 1, proceed to question 3.7.1. If 2 skip to question 3.7.2**]**	Direct Cause 1 Indirect Cause 2	Answer
3.7.1	**Primary Diagnosis at time of death:**	Hemorrhage 1 Infection/Sepsis 2 Ectopic Pregnancy 3 Abortion related 4 Pre-eclampsia/Eclampsia 5 Obstructed Labor 6 Uterine rupture 7 Cerebrovascular Accident (CVA) 8 Disseminated Intravascular Coagulopathy (DIC) 9 Pulmonary or Amniotic Embolism 10 Complication of Surgery during pregnancy 11 Complication of Anesthesia during pregnancy 12	Answer

		Other:	13	
3.7.2	**Diagnosis at time of death:** **Indirect Causes**	HIV/AIDS related Malaria Cardiac Disease Renal Disease Tuberculosis Severe anemia Suicide Homicide Domestic violence Other:	1 2 3 4 5 6 7 8 9 10	Answer
3.8	**Reason for admission**			
3.9	**Referral from another hospital?** ☞ **[**If 0 or 99, skip to question 4.1 **]**	Yes No Unknown/missing	1 0 99	Answer
3.9.1	**Name of Referral Hospital**			

Section 4: ANTENATAL CARE

4.1	**Did deceased receive antenatal care?** ☞ **[**if 0 or 99 skip to question 4.2 **]**	Yes No Unknown/missing	1 0 99	Answer
4.1.1	**Total number of antenatal visit** ☞ **[**if 5, skip to question 4.2 **]**	One visit Two visits Three visits ≥4 visits None Unknown	1 2 3 4 5 99	Answer
4.1.2	**Timing of first antenatal visit** ☞ **[**As recorded on health passport, in antenatal records or on maternal death review form**]**	1st trimester 2nd trimester 3rd trimester	1 2 3	Answer
4.1.3	**Location of antenatal visits**	Health Center Clinic District hospital Intermediate hospital	1 2 3 4	Answer

		Central hospital 5 Other: 6 Unknown 99	
4.1.4	**Antenatal care provider**	Specialist 1 Med. Officer 2 Adv. Midwife 3 Reg. Nurse/Midwife 4 Enrolled Nurse/Midwife 5 Other: 6 Unknown 99	Answer
4.2	**HIV Status of Deceased** ☞ **[**if 2 or 99, skip to question 4.3 **]**	HIV positive 1 HIV negative 2 Unknown status 99	Answer
4.2.1	**Deceased was on HAART?** ☞ **[**if 0 or 99 skip to question 4. 3 **]**	Yes 1 No 0 Unknown 99	Answer
4.2.2	**Date of initiation on HAART**	D D M M Y Y	
4.3	**Comments on antenatal care (from health passport, case notes or as recorded on maternal death audit)**		

Section 5: DELIVERY, PUERPERIUM AND NEONATAL INFORMATION

5.1	**Did labor occur at facility?** ☞ **[**if answered 0, skip to question 5.5**]**	Yes 1 No 0	Answer
5.2	**If labor occurred, was a partogram used?**	Yes 1 No 0 Unknown 99	Answer
5.3.1	**Duration of labor: first phase (in hours)** ☞ **[**if unknown, write 99**]**		
5.3.2	**Duration of labor: second stage (in hours)** ☞ **[**if unknown, write 99**]**		

5.3.3	**Duration of labor: third stage (in hours)** ☞ **[**if unknown, write 99**]**		
5.4	**Method of delivery**	Normal vaginal delivery 1 Assisted vaginal delivery with vacuum or Forceps 2 C-section 3 Destructive Delivery 4 Undelivered 5	Answer
5.5	**Place of delivery**	Home 1 Clinic 2 Health Center 3 District hospital 4 Intermediate hospital 5 Central hospital 6 Other: 7	Answer
5.6	**Was delivery successful?** ☞ **[**if 0, skip to question 5.9**]**	Yes 1 No 0 Unknown 99	Answer
5.7	**Outcome of delivery**	Alive 1 Still born 2	Answer
5.8	**Birth weight**		
5.9	**Comments on labor [**as recorded on maternal death review form and in case notes**]**		

Section 6: INTERVENTIONS

6.1.1	**Interventions during early pregnancy**	Evacuation 1 Laparotomy 2	Answer

	☞**[**Multiple answers possible**]**	Hysterectomy 3 Blood transfusion 4 Hysterotomy 5 Intravenous antibiotics 6 Admission to ICU 7 Other: 8 None/unknown 99	
6.1.2	**Interventions during antenatal stage** ☞**[**Multiple answers possible]	Blood transfusion 1 External Cephalic Version 2 Hysterotomy 3 Intravenous antibiotics 4 Admission to ICU 5 Treatment for pre-eclampsia/eclampsia 6 Other 7	Answer
6.1.3	**Interventions during intrapartum stage** ☞**[**Multiple answers possible**]**	Assisted vaginal delivery 1 Hysterotomy <28 wks 2 C-section 3 Hysterectomy 4 Blood transfusion 5 Oxytocin augmented labor 6 Intravenous antibiotics 7 Admission to ICU 8 Treatment for pre-eclampsia/eclampsia 9 Other: 10	Answer
6.1.4	**Interventions during postpartum stage** ☞**[**Multiple answers possible**]**	Evacuation 1 Laparatomy 2 Hysterectomy 3 Blood transfusion 4 Manual removal of placenta 5 Treatment for postpartum hemorrhage 6 Intravenous antibiotics 7 Admission to ICD 8 Treatment for pre-eclampsia/eclampsia 9 Other: 10	Answer
6.1.5	**Interventions Other** ☞**[**Multiple answers possible]	General anesthesia 1 Epidural or Spinal anesthesia 2 Invasive monitoring 3 Admission to ICU 4	Answer

		Other 5 (Specify Other): 6	
6.2	**Was intervention(s) indicated <u>due to</u> a complication during labor or delivery?**	Yes 1 No 0 Unknown 99	Answer
6.3	**Did intervention(s) <u>result in</u> a complication during labor or delivery?**	Yes 1 No 0 Unknown 99	Answer

Section 7: CAUSE OF DEATH

7.1	**Primary cause of death**	
7.2	**Final cause of death**	
7.3	**Contributory (or antecedent) cause/s:**	

Section 8: OTHER FACTORS

In your opinion were any of these factors present?

☞ Instructions: Mark appropriate answer with an X (as many as apply)

	System		Example	Yes	No	Unknown
8.1	*Personal/ Family*	**a.**	Delay in seeking help	1	0	99
		b.	Refusal of treatment or admission	1	0	99
8.2	*Logistical system*	**a.**	Lack of transport from home to health care facility	1	0	99
		b.	Lack of transport between health care facilities	1	0	99
		c.	Health service communication breakdown	1	0	99
8.3	*Facilities*	**a.**	Lack of facilities, equipment or consumables	1	0	99
		b.	Lack of resources	1	0	99
8.4	*Personal health problems*	**a.**	Lack of expertise, training or education	1	0	99
	Three delays:			**Yes**	**No**	**Unknown**
8.5	*Summary*	**a.**	Delay #1 – seeking medical care	1	0	99

	conclusion – which delay or delays were involved in this case?	**b.**	Delay #2 – reaching medical care	1	0	99
		c.	Delay #3 – receiving medical care at facility	1	0	99

Section 9: AUTOPSY

9.1	**Was autopsy performed?** ☞ **[**if 0, End Audit**]**	Yes 1 No 0	Answer
9.2	**If performed, any added or different information provided?**		

☞ **Audit is complete.**

APPENDIX 2. FACILITY-BASED NEONATAL DEATH AUDIT FORM

REPUBLIC OF NAMIBIA
Ministry of Health and Social Services
IntraHealth International

Facility Based Neonatal Death Audit Form (Tool #2)

Instructions for completion of audit form:

1. Do not begin data collection unless permission has been granted by appropriate authorities to enter facilities and begin to collect data.
2. This form must be completed for all deaths of neonates (newborn infants 0-28 days)
3. Data should be collected from as many medical records as are applicable and available in the facility, including: neonatal death review form, midnight census, outpatient register, inpatient ward registers (e.g. pediatric ward), operating room register and case notes.
4. Clearly mark answers and spell using block letters as necessary.
5. After completion of tool on each neonatal death clinical audit, supervisor must review prior to data entry.

Section A: DATA COLLECTOR INFORMATION

a.1	**Date of Audit**	D	D	M	M	Y	Y
a.2	**Data Collector Code**	#		#		#	
a.3	**Supervisor Code**	#		#		#	
a.4	**Quality Check performed on audit?**	Yes		1			
		No		0			
	Supervisor Signature						

Section 1: LOCALITY WHERE DEATH OCCURRED

1.1	**Region**	Erongo 1 Hardap 2 //Karas 3	Khomas 4 Omaheke 5	Answer
1.2	**District**	Walvis Bay 11 Swakopmund 12 Omaruru 13 Usakos 14 Rehoboth 21 Mariental 22 Aranos 23	Keetmanshoop 31 Luderitz 32 //Karasburg 33 Oranjemund 34 Windhoek 41 Gobabis 51	Answer
1.3	**Name of health facility**			
1.4	**Type of facility**	Clinic 1 Health Center 2 District Hospital 3 Intermediate Hospital 4	Central Hospital 5 Out of Hospital 6 Other: 7	Answer

Section 2: DETAILS OF THE DECEASED

2.1	**Gestation (in weeks) at delivery**	
2.2	**How many days after birth did death of neonate occur?** ☞ **[**if on day of delivery write 00, if on day one, write 01. If >28 days, stop audit**]**	
2.3	**At time of neonate death, number of pregnancies for mother (*Gravida*)** ☞ **[**if one pregnancy, write 01**]**	
2.4	**At time of neonate death, number of deliveries for mother (*Para*)** ☞ **[**if one delivery, write 01**]**	

Section 3: ANTE-NATAL CARE OF THE MOTHER

3.1	**Did mother receive antenatal care?** ☞ **[**if 0 or 99, skip to Q. 3.5**]**	Yes No Unknown	1 0 99	Answer
3.2	**Time of first visit**	1st trimester 2nd trimester 3rd trimester Unknown	1 2 3 99	Answer
3.3	**Total number of visits**	One visit Two visits Three visits >4 visits Unknown	1 2 3 4 99	Answer
3.4	**Location of antenatal visits**	Clinic Center District hospital Intermediate hospital Central hospital Other: Unknown	1 2 3 4 5 6 99	Answer
3.5	**HIV status of mother** ☞ **[**if 2 or 99, skip to Q. 3.6**]**	HIV Positive HIV Negative Unknown	1 2 99	Answer
3.5.1	**If mother HIV positive, was mother on HAART during pregnancy?**	Yes No Unknown	1 0 99	Answer
3.5.2	**If mother HIV positive, did neonate receive anti-retroviral medication?**	Yes No Unknown	1 0 99	Answer
3.6	**Comments on maternal history:**			

Section 4: DELIVERY, PUERPERIUM AND NEONATAL INFORMATION

4.1	**Did labor occur at this facility?** ☞ **[**if answered 0, skip to question 4.5**]**	Yes 1 No 0	Answer
4.2	**If labor occurred, was a partogram used?**	Yes 1 No 0 Unknown 99	Answer
4.3.1	**Duration of labor: first phase (in hours)** ☞ **[**if unknown, write 99**]**		
4.3.2	**Duration of labor: second stage (in hours)** ☞ **[**if unknown, write 99**]**		
4.3.3	**Duration of labor: third stage (in hours)** ☞ **[**if unknown, write 99**]**		
4.4	**Method of delivery** ☞ **[**if 99, skip to question 4.5**]**	Normal vaginal delivery 1 Assisted vaginal with vacuum *OR* Forceps 2 C-section 3 Unknown 99	Answer
4.4.1	**If more than one method of delivery explain**		
4.5	**Place of delivery**	Home 1 Clinic 2 Health Center 3 District hospital 4 Intermediate hospital 5 Central hospital 6 Other: 7	Answer
4.6	**Was delivery successful?** ☞ **[**if answered 0, skip to Q. 4.8**]**	Yes 1 No 0 Unknown 99	Answer
4.7	**Outcome of delivery** ☞ **[**if answered 1, skip to Q. 4.8. If answered 2 proceed to Q. 5.7.1.**]**	Alive 1 Still born 2	Answer
4.7.1	**If baby was stillborn, was it:**	Fresh 1 Macerated 2 Unknown 99	Answer
4.8	**Immediate Apgar (1 minute)**		
4.9	**5 minute Apgar**		

4.10	**Birth Weight**	
4.11	**Comments on labor, delivery and puerperium**	

Section 5: DETAILS OF THE BABY'S CONDITION AFTER DELIVERY

5.1	**Date of birth**	D D M M Y Y	
5.2	**Time of birth** ☞ **[**use 24 hour clock. Include hour and minute**]**	H H M M	
5.3	**Where did birth occur, if not at this hospital?** ☞ **[**If at another facility, write facility name**]**	At home 1 On way to hospital 2 During referral from another facility: 3 At another facility: 4	Answer
5.4	**Was neonate admitted or readmitted to this health facility AFTER having been discharged to home?** ☞ **[**If 0, skip to Q. 5.6**]**	Yes 1 No 0	Answer
5.5	**If neonate was admitted or readmitted after discharge, how many days was the neonate sick at home?** ☞ **[**If unknown, write 99**]**		
5.6	**Date death was diagnosed**	D D M M Y Y	
5.7	**Time death was diagnosed** ☞ **[**use 24 hour clock. Include hour and minute**]**	H H M M	
5.8	**Probable cause of neonatal death** ☞ **[**If 12/Sepsis proceed to Q. 5.8.1, for all other proceed to Q. 6.1**]**	Prematurity 1 (gestational age:) Birth asphyxia 2 Hypothermia 3	Answer

	☞ **[**Specify as needed for answers 1/Prematurity; 4/Congenital malformation; 8/Surgical complication; 13/Other**]**	Congenital malformation 4 (specify:) Hypoxic Ischemic 5 Encephalopathy 6 Necrotizing enterocolitis 7 Surgical complication 8 (specify:) Birth Trauma 9 Jaundice/Kernicterus 10 Tetanus 11 Sepsis 12 Other: 13	
5.8.1	**If sepsis, what were causes of sepsis**	Meningitis 1 Tetanus 2 Pneumonia 3 Meconium aspiration 4 Necrotizing entrocolitis 5 Severe dehydration & diarrhea 6 Other: 7 Unknown 99	Answer

Section 6: INTERVENTIONS

6.1	**Intervention for neonate**	Neonatal resuscitation 1 IV fluids 2 Antibiotics 3 Continuous positive airway pressure 4 Transfusion 5 Other: 7	Answer
6.2	**How was neonate fed?**	Breast milk 1 Formula 2 Sterile breast milk (if HIV+ mother) 3 Unknown or not fed 99	Answer

Section 7: OTHER FACTORS

In your opinion were any of these factors present? ☞Instructions: Mark appropriate answer with an X (as many as apply)						
	System		**Example**	**Yes**	**No**	**Unknown**
7.1	*Personal/*	**a.**	Delay in seeking help	1	0	99

	Family	**b.**	Refusal of treatment or admission	1	0	99
7.2	*Logistical system*	**a.**	Lack of transport from home to health care facility	1	0	99
		b.	Lack of transport between health care facilities	1	0	99
		c.	Health service communication breakdown	1	0	99
7.3	*Facilities*	**a.**	Lack of facilities, equipment or consumables	1	0	99
		b.	Lack of resources	1	0	99
7.4	*Personal health problems*	**a.**	Lack of expertise, training or education	1	0	99
	Three delays:			**Yes**	**No**	**Unknown**
8.1	*Summary conclusion – which delay or delays were involved in this case?*	**a.**	Delay #1 – seeking medical care	1	0	99
		b.	Delay #2 – reaching medical care	1	0	99
		c.	Delay #3 – receiving medical care at facility	1	0	99

Section 8: AUTOPSY

8.1	**Was autopsy performed?** ☞ **[i**f answered 0, End audit**]**	Yes 1 No 0	Answer
8.2	**If performed, any added or different information**		

☞ **Audit is complete.**

RAPID Form 1: Registration Review Summary From for Female Deaths Aged 15-49 years

Date:		Name of facility:		Name of registers used to collected information: (circle all registers that apply)	Midnight Census	Inpatient census of admission	Outpatient Register	Inpatient Register	Operating room register	Other

In-patient Number	Age (15-49 yrs)	Date of Admission	Date of Death	Final Diagnosis	Details extracted from: Case notes (1) Nurses report (2) Other (3)	Maternal Death	Yes = 1 No = 0 Uncertain = 99

Name of data collector:	Total number of maternal deaths	

Quality check performed on register: Yes □ No □ Signature of Supervisor

APPENDIX 3. RAPID FORM R2: CASE NOTE EXTRACTION FOR DEATHS OF WOMEN AGED 15-49 YEARS

REPUBLIC OF NAMIBIA
Ministry of Health and Social Services
IntraHealth International

RAPID FORM R2: CASE NOTE EXTRACTION FOR DEATHS OF WOMEN AGED 15-49 YEARS (Tool #3)

1. Do not begin data collection unless permission has been granted by appropriate authorities to enter facilities and begin to collect data.
2. This form must be completed for all deaths of women of reproductive age (15-49 years)
3. Data should be collected from as many medical records as are applicable and available in the facility, including: midnight census, outpatient register, inpatient ward registers (e.g. female ward, surgical ward, emergency/triage services), operating room register and case notes.
4. If unclear as to whether cause of death (if determined to be maternal) is direct or indirect, confirm with supervisor.
5. Clearly mark answers and spell using block letters as necessary
6. After completion of tool on each RAPID survey for deaths to women of reproductive age, supervisor must review prior to data entry.

Section A: DATA COLLECTOR INFORMATION

a.1	**Date of Audit**	D	D	M	M	Y	Y
a.2	**Data Collector Code**	#		#		#	
a.3	**Supervisor Code**	#		#		#	

a.4	**Quality Check performed on audit?**	Yes	1	
		No	0	
	Supervisor Signature			

SECTION 1: FACILITY INFORMATION

1.1	**Facility Name**					
1.2	**Type of Facility**	Clinic Health Center District Hospital Central hospital Other:	1 2 3 4 5			Answer
1.3	**Region**	Erongo Hardap //Karas	1 2 3	Khomas Omaheke	4 5	Answer
1.4	**District**	Walvis Bay Swakopmund Omaruru Usakos Rehoboth Mariental Aranos	11 12 13 14 21 22 23	Keetmanshoop Luderitz //Karasburg Oranjemund Windhoek Gobabis	31 32 33 34 41 51	Answer

SECTION 2: PATIENT INFORMATION (for verbal autopsy only)

2.1	**Patient first name**					
2.2	**Patient last name**					
2.3	**Patient address (for verbal autopsy ONLY)**					
2.4	**District of residence**	Walvis Bay Swakopmund Omaruru Usakos Rehoboth Mariental Aranos	11 12 13 14 21 22 23	Keetmanshoop Luderitz //Karasburg Oranjemund Windhoek Gobabis	31 32 33 34 41 51	Answer
2.5	**Type of residence**	Urban			1	Answer

		Rural 2 Unknown 99	
2.6	**Date of admission**	D D M M Y Y	
2.7	**Time of admission** ☞ **[**use 24 hour clock. Include hour and minute**]**	H H M M	
2.8	**Date of death**	D D M M Y Y	
2.9	**Time of death** ☞ **[**use 24 hour clock. Include hour and minute**]**	H H M M	
2.10	**Place of death** ☞ **[**only one option possible**]**	Female 1 Pediatrics 2 Surgical 3 Operating Room 4 General Medical 5 Maternity 6 Other 7	Answer
2.11	**Age at time of death [in years]**		

SECTION 3: PATIENT CLINICAL DETAILS

3.1	**What were the main complaints on admission:**	**1.** **2.** **3.**	
3.2	**Was cause of death direct or indirect?** ☞ **[**If 1/Direct, proceed to Q. 3.3., if 2/Indirect skip to Q 3.4**]**	Direct 1 Indirect 2	Answer
3.3	**What was the Primary diagnosis at time of death [Direct causes]** ☞ **[**Specify 14 /Other**]**	Hemorrhage 1 Infection/Sepsis 2 Ectopic pregnancy 3 Abortion related 4 Pre-eclampsia/Eclampsia 5 Prolonged or Obstructed labor 6 Uterine rupture 7 Cerebrovascular accident (CVA) 8 Disseminated Intravascular Coagulopathy (DIC) 9	Answer

		Pulmonary or amniotic embolism Complication of surgery during pregnancy Complication of anesthesia during Pregnancy Other: Unknown	10 11 12 13 14 99	
3.4	**Indirect causes:**	HIV/AIDS Related Malaria Cardiac Disease Renal Disease Tuberculosis Severe Anemia Suicide Homicide Domestic Violence Other (specify):	1 2 3 4 5 6 7 8 9 10	Answer
3.5	**How many days after end of most recent pregnancy did death occur?**			
3.6	**Were any of these complications recorded?**	Prolonged Labor Obstructed Labor Ruptured uterus Antepartum hemorrhage Postpartum hemorrhage Pre-eclampsia Eclampsia Sepsis/infection Abnormal fetal presentation Retained Placenta Retained Products of conception Complications of abortion Shock Clotting disorder Oliguria not responding to fluids or diuretics Loss of consciousness lasting >12 hours Respiratory arrest not related to anaesthesia	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	Answer
3.7	**Were any of the following procedures or interventions**	Caesarean section Hysterectomy	1 2	Answer

	performed? ☞ **[**Specify 16/Other**]**	Hysterotomy Manual removal of placenta Repair of ruptured uterus Removal of retained products after delivery Dilatation and curettage Manual vacuum extraction Salpingectomy Culdocentesis Laparotomy Use of vasoactive drugs (e.g. epinephrine, vasopressin) Transfusion of >5 units of blood Intubation and ventilation not related to anaesthesia Cardiopulmonary resuscitation Other:	3 4 5 6 7 8 9 10 11 12 13 14 15 16	
3.8	**Cause of death [as listed on death certificate or autopsy report if different than cause in medical records]**			
3.9	**Records indicate woman's pregnancy status to be:**	Died pregnant Died during delivery Died within 42 days of end of pregnancy (postpartum) Died within 42 days of end of pregnancy (post-abortion) Death not pregnancy related Pregnancy-related status unclear	1 2 3 4 5 6	Answer
3.9	**Sources of information used:** ☞ **[**More than one answer is possible. List all answers in answer column**]**	In-patient file/book Operating theater records/register Death certificate Post-mortem autopsy Midnight census Maternity registry	1 2 3 4 5 6 7	Answer

☞ **End**

APPENDIX 4. REVIEW OF POSSIBLE EMOC FACILITIES

REPUBLIC OF NAMIBIA
Ministry of Health and Social Services
IntraHealth International

Review of Possible EmOC Facilities (Tool #4)

Instructions for evaluating EmOC signal functions:

1. Do not begin data collection unless permission has been granted by appropriate authorities to enter facilities and begin to collect data. **Verbal consent** will be required before speaking with any health worker for data collection purposes with the EmOC signal functions tool.
2. This form must be completed for all facilities included in the study.
3. Answer the following questions about EmOC signal functions by reviewing facility registers, through observation and if necessary interviewing health workers in the maternity ward and other departments. Record whether the function has been performed in the past 3 months, **and if not**, why it has not been performed. Reasons for non-performance include: training issues, supplies and/or equipment issues, management issues, policy issues or no indication. See below for definitions. Check as many responses for each section as apply.
4. *Consider all the following when determining whether a particular signal function was performed*:
   1. *Is staff at the facility trained to provide the service?*
   2. *Are the requisite supplies and equipment present? Is the equipment functioning?*
   3. *Were there no cases for which the use of a particular signal function was indicated?*
   4. *Are the cadres of staff working at the facility authorized to perform the service?*
   5. *Clearly mark answers and spell using block letters as necessary*
   6. *After completion of tool on each EmOC facility audit, supervisor must review prior to data entry.*

Definitions:

Training issues: Authorized cadre is available but not trained, or there is a lack of confidence in providers' skills. Consider anesthesia, surgical skills, nursing care and operating room management.

Supplies, equipment issues: Supplies or equipment are not available, not functional or broken, or needed drugs are unavailable.

Management issues: Providers desire compensation to perform this function, providers are encouraged to perform alternative procedures, or providers uncomfortable or unwilling to perform procedure for reasons unrelated to training.

Policy issues: Required level of staff is not posted to this facility in adequate numbers (or at all), or national or hospital policies do not allow function to be performed.

No indication: No client needing this procedure came to facility during this period.

Section A: DATA COLLECTOR INFORMATION

a.1	**Date of Data Collection**	D	D	M	M	Y	Y
a.2	**Data Collector Code**	#		#		#	
a.3	**Supervisor Code**	#		#		#	
a.4	**Quality Check performed on audit?**	Yes		1			
		No		0			
a.5	**Supervisor Signature**						

Section 1: FACILITY INFORMATION

1.1	**Name of Health Facility**					
1.2	**Region**	Erongo Hardap //Karas	1 2 3	Khomas Omaheke	4 5	Answer
1.3	**District**	Walvis Bay Swakopmund Omaruru Usakos Rehoboth Mariental Aranos	11 12 13 14 21 22 23	Keetmanshoop Luderitz //Karasburg Oranjemund Windhoek Gobabis	31 32 33 34 41 51	Answer

1.4	**Type of facility**	Clinic 1 Health Center 2 District Hospital 3 Intermediate Hospital 4	Central 5 Hospital 6 Out of Hospital 7 Other: 8	Answer

Section 2: PERFORMANCE OF SIGNAL FUNCTIONS

	Item	**Performed in the last 3 months (a)**	**If not performed in the past 3 months, why? (b)**
2.1	Administered parental antibiotics	0. No ☐ 1. Yes ☐	1. Training issues ☐ 2. Supplies, equipment, drug issues ☐ 3.Management issues ☐ 4. Policy issues ☐ 5. No indication ☐
2.2	Administered uterotonic drug (e.g. parenteral oxytocin, ergometrine, synometrine)	0. No ☐ 1. Yes ☐	1. Training issues ☐ 2. Supplies, equipment, drug issues ☐ 3.Management issues ☐ 4. Policy issues ☐ 5. No indication ☐
2.3	Administered parenteral anticonvulsant (magnesium sulphate) for pre-eclampsia and eclampsia	0. No ☐ 1. Yes ☐	1. Training issues ☐ 2. Supplies, equipment, drug issues ☐ 3.Management issues ☐ 4. Policy issues ☐ 5. No indication ☐
2.4	Perform manual removal of placenta	0. No ☐ 1. Yes ☐	1. Training issues ☐ 2. Supplies, equipment, drug issues ☐ 3.Management issues ☐ 4. Policy issues ☐

			5. No indication
2.5	Perform removal of retained products (e.g. manual vacuum aspiration, dilatation and curettage)	0. No ☐ 1. Yes ☐	1. Training issues ☐ 2. Supplies, equipment, drug issues ☐ 3.Management issues ☐ 4. Policy issues ☐ 5. No indication ☐
2.6	Perform assisted vaginal delivery (e.g. vacuum extraction, forceps delivery)	0. No ☐ 1. Yes ☐	1. Training issues ☐ 2. Supplies, equipment, drug issues ☐ 3.Management issues ☐ 4. Policy issues ☐ 5. No indication ☐
2.7	Perform newborn resuscitation (e.g. with bag and mask)	0. No ☐ 1. Yes ☐	1. Training issues ☐ 2. Supplies, equipment, drug issues ☐ 3.Management issues ☐ 4. Policy issues ☐ 5. No indication ☐
2.8	Perform blood transfusion	0. No ☐ 1. Yes ☐	1. Training issues ☐ 2. Supplies, equipment, drug issues ☐ 3.Management issues ☐ 4. Policy issues ☐ 5. No indication ☐
2.9	Perform surgery (e.g. c-section or laparotomy for ectopic pregnancy or uterine rupture)	0. No ☐ 1. Yes ☐	1. Training issues ☐ 2. Supplies, equipment, drug issues ☐ 3.Management issues ☐

			4. Policy issues ☐ 5. No indication ☐

Section 3: INFRASTRUCTURE ASSESSMENT

In the last 3 months, has this facility been without:					
3.1	Signs identifying site as an EMOC site or place for delivery care		**3.3**	Ambulance/transport available on a regular basis to transport patients	0. No ☐ 1. Yes ☐
3.2	24 hour electricity		**3.4**	24 hour telephone service (either telephone available in the facility or cell phone available)	0. No ☐ 1. Yes ☐
3.3	24 hour water supply				

☞ **End**

APPENDIX 5. VERBAL AUTOPSY QUESTIONNAIRE: DEATH OF A PERSON AGED 15 YEARS AND ABOVE

REPUBLIC OF NAMIBIA
Ministry of Health and Social Services
IntraHealth International

VERBAL AUTOPSY QUESTIONNAIRE[2]: DEATH OF A PERSON
AGED 15 YEARS AND ABOVE (Tool #5)

Instructions for completion of this tool:

1. Do not begin verbal autopsy data collection unless permission has been granted by appropriate local authorities and all **participants understand the study and consent to being interviewed**.
2. This form must be completed for all reported maternal deaths and unreported deaths.
3. The VAs should be completed in a private/confidential space with adequate time allowed (1-1 ½ hours).
4. Clearly mark answers and spell using block letters as necessary.
5. All completed Verbal Autopsy forms should be reviewed by supervisor prior to data entry.

Section A: DATA COLLECTOR INFORMATION

a.1	**Date of Data Collection**	D	D	M	M	Y	Y
a.2	**Data Collector Code**	#		#		#	
a.3	**Supervisor Code**	#		#		#	
a.4	**Quality Check performed on audit?**	Yes		1			

[2] World Health Organization. Verbal Autopsy Standards: The 2012 WHO Verbal Autopsy Instrument. Release Candidate 1. Death of a person aged 15 years and above, related to maternal death. WHO/HMN/InDepth Network. WHO. Geneva. 2012

		No	0
a.5	**Supervisor Signature**		

SECTION 1: LOCALITY WHERE DEATH OCCURRED				
No.	**QUESTIONS AND FILTERS**			
1.1	**Region**	Erongo Hardap //Karas Khomas Omaheke	1 2 3 4 5	ANSWER
1.2	**District**	Walvis Bay Swakopmund Omaruru Usakos Rehoboth Mariental Aranos Keetmanshoop Luderitz //Karasburg Oranjemund Windhoek Gobabis	11 12 13 14 21 22 23 31 32 33 34 41 51	ANSWER
1.3	**Name of health facility**			
1.4	**Type of facility**	Clinic Health Center District Hospital Intermediate Hospital Central Hospital Out of Hospital Other	1 2 3 4 5 6 7	ANSWER
		Specify Other:		

SECTION 2: BASIC INFORMATION ABOUT THE INTERVIEW AND THE RESPONDENT (for purposes of cross checking facility based data only)

No.	QUESTIONS AND FILTERS		
2.1	**Name of the Deceased**		
2.2	**How old was Deceased when she died?**		ANSWER
2.3	**Residential address of Deceased**		
2.4	**Name of verbal autopsy respondent:** **Surname:** **Name:**		
2.5	**What is your relationship to the deceased?** ☞ **[**Specify 5/Other Relative**]**	Father 1 Mother 2 Spouse 3 Sibling 4 Other Relative 5 Specify: No Relation 6	ANSWER
2.6	**Did you live with the deceased in the period leading to her death?**	Yes 1 No 0	ANSWER

SECTION 3. INFORMATION ON THE DECEASED AND DATE/PLACE OF DEATH							
No.	QUESTIONS AND FILTERS						
3.1	**Is date of death known?** ☞ **[**If No skip to question 3.3**]**	Yes 1 No 0				ANSWER	
3.2	**When did she die?**	D	D	M	M	Y	Y
3.3	**Was this a woman who died more than 42 days but less than 1 year after being pregnant or delivering a baby?**	Yes 1 No 0 Don't Know 99				ANSWER	
3.4	**What was her citizenship/nationality?**	Namibia 1 Non-Namibian 0 Don't Know 99				ANSWER	
3.5	**What was her place of usual residence?** Larger admin area (e.g., province) Smaller admin area (e.g., county)	a. Larger Admin Area					
		b. Smaller Admin Area					

	Locality (e.g., city, village) Urban/Rural Other country	c. Locality	
		d. Urban (1) or Rural (2)	
		f. Other Country	

3.6	**What was the site of death?** ☞ **[**Specify 7/Other**]**	Out Of Hospital 1 Clinic 2 Health Center 3 District Hospital 4 Intermediate Hospital 5 Central Hospital 6 Other: 7 Don't Know 99	ANSWER
3.7	**What was her marital status?**	Never Married 1 Married/Living with a partner 2 Widowed 3 Divorced 4 Separated 5 Don't Know 99	ANSWER
3.8	**What was her highest level of schooling?**	No Formal Education 1 Primary (Less than 6 years) 2 Secondary (6 - 12 years) 3 Higher Education (> 12 years) 4 Don't Know 99	ANSWER
3.9	**Was she able to read and write?**	Yes 1 No 0 Don't Know 99	ANSWER
3.10	**What was her economical activity status in year prior to death?** ☞ **[**Specify 8/Other**]**	Mainly Employed 1 Mainly Unemployed 2 Home-Maker 3 Student 4 Pension 5 Other: 6 Don't Know 99	ANSWER

SECTION 4. RESPONDENT'S ACCOUNT OF ILLNESS/EVENTS LEADING TO DEATH		
No.	**QUESTIONS AND FILTERS**	
4.1 Could you tell me about the illness/events that led to her death?		
4.2 PRIMARY CAUSE OF DEATH ACCORDING TO RESPONDENT		
4.3 SECONDARY CAUSE OF DEATH ACCORDING TO RESPONDENT		

SECTION 5. CONTEXT AND HISTORY OF PREVIOUSLY KNOWN MEDICAL CONDITIONS				
I would like to ask you some questions concerning the context and previously known medical conditions the deceased had; injuries and accidents that the deceased suffered; and signs and symptoms that the deceased had showed when she was ill. Some of these questions may not appear to be directly related to her death. Please bear with me and answer all the questions. They will help us to get a clear picture of all possible symptoms that the deceased had.				
No.	**QUESTIONS AND FILTERS**			
5.1	**Was there any diagnosis of Tuberculosis?**	Yes No Don't Know	1 0 99	ANSWER
5.2	**Was there any diagnosis of HIV/AIDS?**	Yes No Don't Know	1 0 99	ANSWER
5.3	**Did she have a recent positive test for Malaria?**	Yes No Don't Know	1 0 99	ANSWER
5.4	**Was there any diagnosis of High Blood Pressure?**	Yes No Don't Know	1 0 99	ANSWER
5.5	**Was there any diagnosis of Heart Disease?**	Yes No Don't Know	1 0 99	ANSWER
5.6	**Was there any diagnosis of Diabetes?**	Yes No Don't Know	1 0 99	ANSWER

5.7	**Was there any diagnosis of Asthma?**	Yes No Don't Know	1 0 99	ANSWER

5.8	**Was there any diagnosis of Epilepsy?**	Yes No Don't Know	1 0 99	ANSWER
5.9	**Was there any diagnosis of Cancer?**	Yes No Don't Know	1 0 99	ANSWER
5.10	**Was there any diagnosis of Chronic Obstructive Pulmonary Disease (COPD)?**	Yes No Don't Know	1 0 99	ANSWER
5.11	**Was there any diagnosis of Depression?**	Yes No Don't Know	1 0 99	ANSWER
5.12	**Was there any diagnosis of Stroke?**	Yes No Don't Know	1 0 99	ANSWER
5.13	**Was there any diagnosis of Sickle Cell disease?**	Yes No Don't Know	1 0 99	ANSWER
5.14	**Was there any diagnosis of Kidney disease?**	Yes No Don't Know	1 0 99	ANSWER
5.15	**Was there any diagnosis of Liver disease?**	Yes No Don't Know	1 0 99	ANSWER
5.16	**For how long was she ill before she died?**	Number of days Number of weeks Don't know	 99	
5.17	**Did she die suddenly?**	Yes No Don't Know	1 0 99	ANSWER
5.18	**Did she suffer from any other medically diagnosed illness?** **Can you specify the illness?**	Yes No Don't Know Specify:	1 0 99 	ANSWER

5.19	**Did she suffer from any injury or accident that led to her death?** ☞ **[**If 0 or 99, skip to 5.22**]**	Yes 1 No 0 Don't Know 99	ANSWER
5.20	**What kind of injury/accident?**	Road Traffic 1 Accident 2 Fall 3 Drowning 4 Burn 5 Violence/Assault 6 Other 99 Don't Know	ANSWER
5.21	**Was the injury/accident caused by someone else?**	Yes 1 No 0 Don't Know 99	
5.22	**Do you think she committed suicide?**	Yes 1 No 0 Don't Know 99	

SECTION 6 SYMPTOMS AND SIGNS ASSOCIATED WITH PREGNANCY			
No.	**QUESTIONS AND FILTERS**		
6.1	**Was she pregnant at the time of death?** ☞ **[**If 0 or 99, skip to 7.1**]**	Yes 1 No 0 Don't Know 99	ANSWER
6.2	**Did she die during labor BUT undelivered?** ☞ **[**If 1 or 99, skip to 7.1; if 0 proceed to 6.3**]**	Yes 1 No 0 Don't Know 99	ANSWER
6.3	**Did she die within 6 weeks of a pregnancy that lasted less than 6 months** ☞ **[**1 or 99 skip to section 7.1; if 0 proceed to q.6.4**]**	Yes 1 No 0 Don't Know 99	ANSWER
6.4	**Did she die within 24 hours after delivery?** ☞ **[**If 1 or 99, skip to section 7.1 if 0 proceed to 6.5**]**	Yes 1 No 0 Don't Know 99	ANSWER
6.5	**Did she die within 6 weeks of giving birth?**	Yes 1 No 0 Don't Know 99	ANSWER
6.6	**Was she breastfeeding at death?**	Yes 1 No 0 Don't Know 99	ANSWER
6.7	**How many births, including stillbirths, did she have before this baby**?	Number Of Births	ANSWER

	☞ **[**If woman had births, write number next to births. If woman had stillbirths, write number next to stillbirths. If unknown, write 99**]**	Number Of Stillbirths	ANSWER
		Don't Know 99	ANSWER
6.8	**Did she have any previous C-section?**	Yes 1 No 0 Don't Know 99	ANSWER
6.9	**Did she die during or after pregnancy with twins?**	Yes 1 No 0 Don't Know 99	ANSWER
6.10	**During pregnancy, did she suffer from high blood pressure?**	Yes 1 No 0 Don't Know 99	ANSWER
6.11	**Did she have foul smelling vaginal discharge during pregnancy or after delivery?**	Yes 1 No 0 Don't Know 99	ANSWER
6.12	**During the last 3 months of pregnancy, did she suffer from convulsions?**	Yes 1 No 0 Don't Know 99	ANSWER
6.13	**During the last 3 months of pregnancy, did she suffer from blurred vision?**	Yes 1 No 0 Don't Know 99	ANSWER
6.14	**Did she give birth to a live, healthy baby within 6 weeks of death?**	Yes 1 No 0 Don't Know 99	ANSWER
6.15	**Was there any vaginal bleeding during pregnancy or after delivery?**	Yes 1 No 0 Don't Know 99	ANSWER
6.16	**Was there excessive vaginal bleeding after delivering the baby?**	Yes 1 No 0 Don't Know 99	ANSWER
6.17	**Was the placenta not completely delivered?**	Yes 1 No 0 Don't Know 99	ANSWER
6.18	**Did she deliver or try to deliver an abnormally positioned baby?**	Yes 1 No 0 Don't Know 99	ANSWER
6.19	**Was she in labor for unusually long (more than 24 hours)?**	Yes 1 No 0 Don't Know 99	ANSWER
6.20	**Did she give birth in a health facility?** ☞ **[**If 1/Yes or 99/Don't know skip to 6.23**]**	Yes 1 No 0 Don't Know 99	ANSWER

6.21	**Did she give birth at home?** ☞ **[**If 1/Yes skip to 6.23**]**	Yes 1 No 0 Don't Know 99	ANSWER
6.22	**Did she give birth elsewhere, e.g. on the way to a facility?**	Yes 1 No 0 Don't Know 99	ANSWER
6.23	**Did she receive professional assistance for the delivery?** ☞ **[**If 0 or 99, skip to 6.25**]**	Yes 1 No 0 Don't Know 99	ANSWER
6.24	**What type of health worker assisted in delivery?**	Doctor 1 Enrolled Midwife 2 Registered Midwife 3 Traditional birth assistant 4 Other 5 No Assistance 6 Don't Know 99	ANSWER
6.25	**Did she have a normal vaginal delivery?** ☞ **[**If 1/Yes or 99/don't know, skip to 6.28**]**	Yes 1 No 0 Don't Know 99	ANSWER
6.26	**Did she have an assisted delivery, with forceps/vacuum?** ☞ **[**If 1/Yes or 99/don't know, skip to 6.28**]**	Yes 1 No 0 Don't Know 99	ANSWER
6.27	**Was it a delivery with caesarean section?**	Yes 1 No 0 Don't Know 99	ANSWER
6.28	**Was the baby born more than one month early?**	Yes 1 No 0 Don't Know 99	ANSWER
6.29	**Did she have an operation to remove her uterus shortly before death?**	Yes 1 No 0 Don't Know 99	ANSWER
6.30	**Did she recently have a pregnancy that ended in an abortion (spontaneous or induced)?** ☞ **[**If 0 or 99, skip to 7.1**]**	Yes 1 No 0 Don't Know 99	ANSWER
6.31	**Did she attempt to terminate the pregnancy?**	Yes 1 No 0 Don't Know 99	ANSWER
6.32	**How many days before death did she have an abortion?**	Number Of Days Don't Know 99	ANSWER

6.33	**Did she have heavy bleeding with after abortion?**	Yes No Don't Know	1 0 99	ANSWER

SECTION 7. TREATMENT AND HEALTH SERVICE USE FOR THE FINAL ILLNESS				
No.	**QUESTIONS AND FILTERS**			
7.1	**Did she receive any treatment for the illness that led to death?**	Yes No Don't Know	1 0 99	ANSWER
7.2	**Did she receive intravenous fluids (drip) treatment?**	Yes No Don't Know	1 0 99	ANSWER
7.3	**Did she receive a blood transfusion?**	Yes No Don't Know	1 0 99	ANSWER
7.4	**Did she receive injectable (IV or IM) antibiotics?**	Yes No Don't Know	1 0 99	ANSWER
7.5	**Was she discharged from the hospital very ill?**	Yes No Don't Know	1 0 99	ANSWER

SECTION 8 BACKGROUND				
No.	**QUESTIONS AND FILTERS**			
8.1	**In the final days before death, did she travel to a hospital or health facility?** ☞ **[**If 0 or 99, skip to 8.7**]**	Yes No Don't Know	1 0 99	ANSWER
8.2	**Did she use motorized transport to get to the hospital or health facility?**	Yes No Don't Know	1 0 99	ANSWER
8.3	**Were there any problems during admission to the hospital or health facility?**	Yes No Don't Know	1 0 99	ANSWER
8.4	**Were there any problems with the way she was treated (**medical treatment, procedures, inter-personal attitudes, respect, dignity**) in the hospital or health facility?**	Yes No Don't Know	1 0 99	ANSWER

8.5	**Were there any problems getting medications, or diagnostic tests in the hospital or health facility?**	Yes No Don't Know	1 0 99	ANSWER
8.6	**Does it take more than 4 hours to get to the nearest hospital or health facility from the deceased's household?**	Yes No Don't Know	1 0 99	ANSWER
8.7	**In the final days before death, were there any doubts about whether medical care was needed?**	Yes No Don't Know	1 0 99	ANSWER
8.8	**In the final days before death, was traditional medicine used?**	Yes No Don't Know	1 0 99	ANSWER

Section 9: Data Collector's Observations (to be filled in after completing interview)

9.1 Comments on specific questions

END: Thank Participants

APPENDIX 6. MATERNAL AND NEONATE MORTALITY: FOCUS GROUP DISCUSSION GUIDE AND CONSENT FORMS

REPUBLIC OF NAMIBIA
Ministry of Health and Social Services
IntraHealth International

MATERNAL AND NEONATE MORTALITY STUDY
Focus Group Discussion Guide (Tool #6)

Instructions for Facilitators:

1. Ensure that the room is set up appropriately: the room and seating arrangements must be set up so that participants can see and hear one another.
2. Ensure that all necessary materials needed to run the focus group are available.
3. Welcome the participants and introduce the data collection team. This introduction should include a brief description of the each member's role in the focus group discussion (FGD) as well as an explanation for the presence and purpose of any recording equipment.
4. Introduce the purpose of the FGD and how the FGD will be run:
   4.1 Highlight the main themes of the FGD questions and approximate number of questions;
   4.2 Describe how a focus group works; discuss ground rules;
   4.3 Inform participants of the duration of the focus group;
   4.4 Discuss issues of confidentiality and respect for fellow participants:
      a. All information collected will be confidential; participants do not need to reveal their real names. Instead, they can use a pseudonym or number to identify themselves.
      b. Names will not be disclosed neither will any attributions for quotes be made in any reports;
      c. Encourage participants to speak openly.
   4.5 Explain how data will be used and disseminated.
5. Prior to starting, collect verbal consent and hand out a copy of consent form to all participants along with any information for participants to keep. *This is their copy*.
6. Ask participants if they have any questions or concerns.
7. Once consent seeking process is complete, begin FGD.

MATERNAL AND NEONATE MORTALITY STUDY

Focus Group Discussion Guide

1. Theme One: Decision to seek care:

1.1 What is an emergency during pregnancy? How do you know when a woman is experiencing an obstetric emergency? What are warning signs of complications during pregnancy, delivery or after the baby is born?

1.2 What is an emergency for a baby less than one month of age? What are warning signs of complications for babies?

1.3 Who makes decisions at the household level to seek care for the pregnant mother and/or baby?

1.4 What are barriers to accessing care for pregnant women and/or babies?

Prompts: What would make it easier to access care for pregnant women and babies?

1.5 Who usually pays for maternity or neonatal health care services?

1.6 Do you know if most women plan to have facility based births? Why or why not?

1.7 If a woman plans to deliver at home, who usually helps her?

1.8 What are the usual reasons women plan for home deliveries?

2. Theme Two: Reaching care

2.1 When a woman has an emergency during pregnancy (for example, heavy bleeding before delivery), where does she go for care?

2.2 Where do women go for an emergency for a baby (for example, a baby with a seizure or high fever)?

2.3 How do most women get to ___(insert type of facility)_____? What is their usual transportation method?

2.4 How long does it usually take to reach the nearest facility?

2.5 Do you find the roads and vehicles to be safe?

2.6 Does your community have any supportive services for women or babies who need to get health care in an emergency

Prompt: emergency loans or free transportation

2.7 Who usually accompanies a woman to the health care facility in an emergency? Why does that person accompany the woman?

2.8 Who goes when a newborn is transported to a health care facility in an emergency?

3. Theme Three: Receiving care

3.1 When/If you attended the clinic or hospital for maternity and newborn care services:

1. Can you describe what it was like trying to access care?
2. Were the staff friendly and respectful? [Prompt: e.g. Did they speak kindly to you and were they patient with you?]
3. Did you feel your privacy and confidentiality was respected? [Prompt: e.g. were you in a room or space where others could not see or hear you during examinations?]
4. Did you have to pay for medicine, products or services in an emergency? If you did, can you describe what it was like paying for care?

3.2. How long does it usually take before a woman or baby is admitted? How long does it usually take before a health provider (e.g. doctor or nurse) sees a patient and starts treatment?

3.3 Do you think there are adequate equipment and medicines at the facility?
If not, why not?

3.4 Do you think that there are enough health workers (nurses, midwives and doctors) at the facility? Were the providers available?

3.5 Do you feel confident that the health workers would be able to help you? If not, why not?

3.6 Would you go back to the clinic or hospital for future maternity and newborn care services in emergencies? Would you recommend to others to go to this facility?

3.7 **For non-users only (men):** Do you think it's worth the cost for pregnant women to go to the clinic or hospital for an emergency? Do you think it's worth the cost to take a sick baby to the clinic or hospital for an emergency?

Republic of Namibia

Ministry of Health and Social Services
IntraHealth International

SURVEY TO ESTABLISH THE PREVALENCE OF MATERNAL AND NEONATAL DEATHS AND CONTRIBUTING FACTORS LEADING TO THESE DEATHS IN FIVE REGIONS OF NAMIBIA

Verbal Consent Form for facility-based health workers contributing to EmOC Signal Function Survey for District Hospitals

Hello, my name is ___(Insert name here)___. I am a __(Insert role here)___ with working with the Ministry of Health and Social Services and IntraHealth International. IntraHealth is an international health and development organization based in the United States but with work in Namibia in HIV and maternal and child health.

*IntraHealth International on behalf of the Ministry of Health and Social Welfare of Namibia is currently investigating the causes of maternal and neonatal deaths in this region. A team of specially trained data collectors have been visiting health facilities in _____(Insert Region)_____ and reviewing facility registries to identify maternal and neonatal deaths and determine the cause of death. The **goal of this investigation** is to gather information that can help improve maternal and child services in the future both in the facility and in the community.*

This facility has been identified as one of a number of facilities in this district that will be part of the maternal and neonatal health services audit. We will be evaluating emergency obstetrical care signal functions in this facility. This will involve collecting information on staffing, training and services through the review of registries, observations and by interviewing key health workers who are directly involved in the care of women and newborns in this facility. We have been granted permission to collect this data in this facility by the Regional Director. The length of the interviews can vary; it will depend on what type of information are currently available thorough facility registries and observations. Data collectors will do their best to minimize disruption to your workday and working environment. Data collectors may request explanations or clarification, to view certain documents or to help them locate a service, supplies or equipment.

In order for us to speak with you, we need you to understand the nature of this interview and we need your verbal consent. Your participation in this assessment is voluntary; there is no penalty

for refusing to take part and you may choose to end your participation at any time. Your job will not be affected if you decide not to participate.
We will not be collecting any personal information about you at any time; your participation will be kept confidential and your answers will be kept anonymous.

Please note that there is no financial compensation or other personal benefits from participating in the study. There are no known risks to you resulting from your participation in the study. The information gathered through this evaluation will be combined with findings from maternal and neonatal audits and will be used to help the Ministry of Health improve health services for pregnant women and their babies.

Do you have any questions or concerns at this time?

Please confirm that you are 18 years or older:
☐YES ☐ NO (If no, do not proceed with interview)

Do you volunteer to participate in this assessment?
☐YES ☐ NO

_____ _____
Signature of person obtaining consent attesting that subject consented to voluntarily participate in the review — Date

For study relate questions, please contact the study coordinator, Mr P. Katjiuanjo (enter contact info)
For information on your rights as a participants, please contact Dr. Perle Combary at +1(919) 313- 9142 (USA).

Republic of Namibia

Ministry of Health and Social Services
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SURVEY TO ESTABLISH THE PREVALENCE OF MATERNAL AND NEONATAL DEATHS AND CONTRIBUTING FACTORS LEADING TO THESE DEATHS IN FIVE REGIONS OF NAMIBIA

Verbal Consent Form for Verbal Autopsy Respondents

Hello, my name is ___(Insert name here)___. I am a __(Insert role here)___ with working with the Ministry of Health and Social Services and IntraHealth International. IntraHealth is an international health and development organization based in the United States, but with work in Namibia in HIV and maternal and child health.

*IntraHealth International on behalf of the Ministry of Health and Social Welfare of Namibia are currently investigating the causes of maternal and neonatal deaths in this region. A team of specially trained data collectors have been visiting health facilities in _____(Insert Region)_____ and reviewing facility registries to identify maternal deaths and determine the cause of death. After we identified a case of maternal death, we are hoping to speak with the closest relative or contact of the deceased to find out more information about her death. These interviews are called Verbal Autopsies. The **goal of this investigation** is to gather information that can help improve maternal and child services in the future, both in the facility and in the community.*

During the Verbal Autopsies, we will be asking participants questions related to the health and pregnancy of the deceased as well as questions about her health seeking decisions and behaviors. The interview will take approximately 1.5 hours and will be conducted by a trained interviewer. To protect your privacy and keep your answers confidential only you and the interviewer will be present during the interview.

We understand that this is a sensitive topic and we appreciate your participation and respect the nature of the information. In order for us to speak with you, we need you to understand the nature of this interview and we need your verbal consent. Your participation in this interview is voluntary and there is no penalty for refusing to take part. You may also stop the interview at any time. This information will be kept confidential and we will not use any personal information about you or the deceased at any time. We will destroy your contact information, including this address, once we have collected the information.

Reports will contain information about all the deceased as a group; reports will not focus on a single woman. The information will be used to help the Ministry of Health improve health services for pregnant women and their babies.

Please note that there is no financial compensation or other personal benefits from participating in the study. There are no known risks to you resulting from your participation in the study.

Do you have any questions or concerns at this time?

Please confirm that you are 18 years or older:
☐YES ☐ NO (If no, do not proceed with Verbal Autopsy)

Do you volunteer to participate in this Verbal Autopsy?
☐YES ☐ NO

_____ _____
Signature of person obtaining consent attesting that Date
the subject consented to voluntarily participate in the review

For study relate questions, please contact the study coordinator, Mr P. Katjiuanjo (enter contact info)
For information on your rights as a participants, please contact Dr. Perle Combary at +1(919) 313- 9142 (USA).

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SURVEY TO ESTABLISH THE PREVALENCE OF MATERNAL AND NEONATAL DEATHS AND CONTRIBUTING FACTORS LEADING TO THESE DEATHS IN FIVE REGIONS OF NAMIBIA

Verbal Consent Form for Focus Group Discussion Participants

Hello, my name is ___(Insert name here)___. I am a __(Insert role here)___ with working with the Ministry of Health and Social Services and IntraHealth International. IntraHealth is an international health and development organization based in the United States, but with work in Namibia in HIV and maternal and child health.

I am here as part of a team that is collecting information to better understand the causes of maternal and neonatal deaths in this region. We are working with facilities to evaluate services and review cases where a neonate and/or pregnant or recently delivered woman died. To better understand the community's health seeking behaviors and their experiences with maternal and neonatal health services, we also are conducting a series of focus group discussions with participants, such as yourselves, who are the parent or main caretaker of a child under the age of 12 months and who use health service facilities in this region. We want to better understand what influences women who are pregnant (or mothers and fathers of newborns who are ill) to seek care at a health facility, and what are their experiences of care provided at the facility The ***goal of this investigation*** *is to gather information that can help improve maternal and child care and services in the future, both in the facility and in the community.*

We would like you to participate in this focus group discussion; the information you provide, including your opinion, is very important to us. Before you can participate, we need you to understand the nature of this FGD and we need your consent to participate. Your participation in this FGD is voluntary and there is no penalty for refusing to take part. You may also end your participation at any time without penalty. We ask that all participants here today respect the privacy of fellow participants and keep what you hear from other participants private. Please understand that we cannot force any participant not to share the information they hear today with anyone else. Nonetheless, we ask that you not share the information you hear today with anyone. However, IntraHealth International will not collect any personal information about you and will not link your comments with your identify in any way.

We would like to audio record this discussion only to make sure that we have all the information. The audio recording will be destroyed once we have written down the information. The information gathered through this FGD will be kept safe and confidential.

There is no financial compensation or other personal benefits from participating in the study, though we will provide transportation to/from the site of the focus group discussion and refreshments during the discussion. There are no known risks to you resulting from your participation in the study.

Do you have any questions or concerns at this time?

Please confirm that you are 18 years or older:
☐YES ☐ NO (If no, please ask Participant under the age of 18 to leave)

Do you volunteer to participate in this FGD and be audio recorded?
☐YES ☐ NO

_____ _____
(Signature of person obtaining consent attesting that subject consented to voluntarily participate in the review) Date:

For study relate questions, please contact the study coordinator, Mr P. Katjiuanjo (enter contact info)
For information on your rights as a participant, please contact Dr. Perle Combary at +1(919) 313- 9142 (USA).

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