



Maternal and child health care seeking behaviour: mixed methods study in an urban and rural area of Sierra Leone, 2016

Study report

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EXECUTIVE SUMMARY

Background and aim:

Sierra Leone has amongst the world's highest estimated maternal and child mortality. The 2014-16 Ebola outbreak led to reduced health system utilisation particularly among pregnant women and young children. We aimed to describe health and health-seeking behaviour and its determinants during pregnancy and childbirth and in children <5 years (under5s), since Ebola, to inform current health service planning for Médecins Sans Frontières and the Ministry of Health and Sanitation, Sierra Leone.

Methods:

In October 2016-January 2017, we conducted a sequential mixed methods study in Magburaka town (urban) and Yoni chiefdom (rural), Tonkolili District. Phase 1 comprised household survey and structured interviews and Phase 2 comprised in-depth qualitative interviews. For the household survey we selected 30 clusters in each area: by random GPS points (Magburaka) and by random village selection stratified by population size (Yoni). Women who had given birth since the onset of Ebola in Sierra Leone, and carers of under5s were included. We collected data on health-seeking behaviours, barriers to healthcare, childbirth and outcomes, recent under5 febrile illness, vaccination and bed net coverage, and child mortality using a structured questionnaire on tablet devices. Structured interviews were conducted concurrently with key stakeholders at survey cluster sites in Yoni gathering information on maternal deaths since the onset of Ebola. Sampling for in-depth interviews was purposive, informed by survey findings and sites were selected based on preliminary survey analysis prioritising clusters with the most frequently reported and most severe barriers to healthcare. We analysed quantitative data by calculating means, medians and proportions and 95% confidence intervals allowing for clustering; and analysed qualitative data thematically identifying emergent themes.

Key results:

608 women and 643 carers of 1092 under5s, were surveyed, and 72 in-depth interviews (19 mothers, 12 caregivers, 17 community leaders and 24 health workers) were conducted.

Of 583 childbirths in Magburaka, 38 (6.5%; 95%CI: 4.0-11) had resulted in stillbirth. Of 775 childbirths in Yoni, 19 (2.5%; 95%CI: 1.6-3.8) had resulted in stillbirth.

59% (95%CI: 51-66) of under5s in Magburaka and 65% (95%CI: 59-71) in Yoni had experienced febrile illness in the 2 weeks before the day of the survey.

17 of 545 (3.1% (95%CI: 1.6-6.1) children born alive in Magburaka had subsequently died. In contrast 122 of 756 (16.1% (95%CI 13-20)) children born alive in Yoni had subsequently died. Under5s mortality rate was 0.26 (95% CI: 0.16-0.43) per 10,000/day in Magburaka vs 1.55 (95%CI: 1.30-1.86) per 10,000/day in Yoni.

Twenty five maternal deaths were reported since the onset of the Ebola outbreak in 12/29 (41%) of sampled villages in Yoni. Maternal deaths were probably underreported as only 8 (28%) of villages had a death registration book to formally record deaths and healthcare workers reported disincentives to reporting deaths. The most frequent cause of death was bleeding (47% (95%CI: 22-75)). Most deaths (76% (95%CI: 44-93)) occurred in the community, outside of health facilities. The reason provided for all those who did not seek or reach healthcare was that the health facility was too far away or inaccessible in the time required.

86% (95%CI: 78-92) of women in Magburaka and 92% (95%CI: 81-97) of women in Yoni sought help for labour/ childbirth (from either a skilled or unskilled provider), though the median delay from the start of labour until seeking care was 12 hours in both areas. 95% (95%CI: 91-98) of carers in Magburaka vs 80% (95%CI: 63-90) of carers in Yoni sought advice or treatment when a child <5years was unwell with (most recent) febrile illness. Of those seeking care, 94% (95%CI: 90-96) of carers in Magburaka and 91% (95%CI: 81-96) in

Yoni sought care for the child in the 'formal sector' (health facility or government community health worker) at some point during the illness.

Perceived barriers to accessing care (notably cost, lack of medicines provided at health facilities and poor attitudes of healthcare workers) led to delayed or aborted care seeking. A preference for seeking biomedical care over traditional and alternative care was widely held especially for labour and childbirth. Traditional remedies were considered appropriate for certain conditions and interviews indicated that use of alternatives to healthcare was more commonplace than reported in the survey.

Decision making around care seeking usually was determined by the husband or made collectively after weighing up options which often entailed delay, with decisions only made once symptoms were severe. A degree of fatalism in decision making and outcomes (e.g. "God's will") was evident from interviews.

59% (95%CI: 48-68) of women in Magburaka and 90% (95%CI: 80-95) in Yoni experienced at least one problem (barrier) which delayed or prevented them accessing and receiving healthcare during their most recent pregnancy and or for labour/ childbirth. 48% (95%CI: 37-58) of carers in Magburaka and 90% (95%CI: 80-96) of carers in Yoni experienced at least one problem (barrier) which delayed or prevented them accessing and receiving healthcare for children during the most recent under5s febrile illness. Substantial and multiple barriers (especially costs, lack of availability of medicines and distance) inevitably led to women and carers seeking alternatives to healthcare.

Delays from barriers (especially distance, costs of healthcare, costs of transport and fear of travelling alone) were widely perceived by interviewees to be a major contributor to avoidable maternal and child deaths.

The majority of women reported giving birth in a health facility, however 31% (95%CI 23-40) of women in Magburaka and 48% (95%CI: 36-59) of women in Yoni reported giving birth outside of a health facility (either at home or on the way to a health facility). Overall, 74% (95% CI: 65-81) of women reported having assistance from a skilled provider (trained healthcare worker, not including traditional birth attendant) in Magburaka compared with 48% (95%CI: 38-59) in Yoni. Of those giving birth at home 34% (95%CI: 21-51) had skilled assistance in Magburaka whereas in Yoni 4% (95%CI: 1.3-12) had skilled assistance. 26/301 (8.6% (95%CI: 6.0-12)) women received a Caesarean section in Magburaka and 3/307 (1.0% (95% 0.3-3.0) in Yoni.

In Magburaka, 14% of women were required to pay for something (e.g. delivery charge, payment to healthcare worker, medicines, blood) in labour/ for childbirth vs 49% (95%CI: 38-60) in Yoni. In Magburaka 92% (95%CI: 88-95) of under5s taken to healthcare facilities for febrile illness received medications and in 4.9% (95%CI: 2.9-8.2) of cases the carer paid for these; in Yoni 96% (95%CI: 93-98) received medications and in 41% (95%CI: 29-55) of cases the carer paid for them. Payment was perceived by interviewees as problematic, contrary to promises of free healthcare and led to (widely held) mistrust of healthcare workers. Healthcare workers described working in challenging conditions without pay or with minimal remuneration and without adequate supplies or adequate support; they considered that suboptimal working conditions compromised their effectiveness and necessitated charging patients for care. However, interviewees generally reported provision and receipt of good quality and free healthcare from Magburaka hospital, in contrast to many other health facilities.

Coverage amongst eligible under5s for one or more doses of measles vaccine was 86% (95%CI: 80-90) in Magburaka and 83% (95%CI: 59-94) in Yoni; and for one or more doses of polio vaccine was 98% (95%CI: 97-99) in Magburaka and 90% (95%CI: 62-98) in Yoni with the vast majority of vaccinations received during recent mass vaccination campaigns. Lack of availability of vaccines and payment for vaccines were common barriers to vaccination in Yoni (each reported by 37% of carers in Yoni).

The proportion of households possessing one or more intact LLITN was 31% (95%CI: 27-36) in Magburaka and 12% (95%CI: 9.1-16) in Yoni. The proportion of pregnant women who slept under an intact LLITN the night before the survey was 23% in Magburaka and 7.4% in Yoni and was similar for under5s.

Conclusions:

Health outcomes such as the proportion of births resulting in stillbirth and incidence of childhood febrile illness are poor in both areas and under5 mortality rate in Yoni is close to the emergency threshold. A high proportion of women gave birth at home without skilled assistance. The proportion of women receiving Caesarean section in Yoni (1%) is considerably below the 10% threshold considered essential by WHO to prevent excess maternal death.

A high proportion (~90%) of pregnant women and carers of under5s do seek assistance and care for labour or when their child is sick; that many do not receive healthcare indicates unmet health need. Findings suggest clear preference for biomedical care over traditional remedies amongst pregnant women and carers of young children. There are however substantial barriers to seeking and accessing healthcare for women and children in both areas leading to use of alternative therapies and delays seeking, reaching and receiving healthcare. Delays caused by barriers (especially needing to find money to pay for healthcare including payment for medicines and the healthcare worker, gathering money for transport, and distance) were perceived to be a major contributor to avoidable deaths. Our findings indicate that free provision of healthcare is not available to a large proportion of eligible women and children in Yoni. Care provided by Magburaka hospital is perceived as good quality and free but is largely inaccessible for women and children resident in Yoni.

Our findings indicate little progress towards the President's Recovery Priorities (PRP), suggesting widespread problems with healthcare worker payroll, the medicine and vaccine supply chain, the ambulance service and suboptimal maternal death surveillance.

There is evident inequity in access to healthcare with those in Yoni experiencing much more frequent and severe barriers.

Measles vaccination coverage is below that required for herd immunity in both areas and LLITN availability and use among pregnant women and under5s is low in Magburaka and minimal in Yoni.

Urgent action is needed; only by tackling barriers to care can preventable deaths be realistically reduced and the critical health needs of women and children in Tonkolili be met. The presence and sustained commitment of MSF, working with MOHS, is perceived to be critical to achieving change.

Recommendations:

Médecins Sans Frontières (MSF), the Sierra Leone Ministry of Health and Sanitation and other partners should work together to implement the following key recommendations into practice:

1. Undertake community engagement, health education and health promotion for maternal and child health through existing community networks, targeting all groups involved in decisions regarding care seeking (e.g. husbands, families)
2. Facilitate access to free healthcare through developing community-level transport plans, strengthening ambulance services, assuring referral pathways (including for children) and monitoring and enforcing implementation of free healthcare through increased community accountability and ownership
3. Strengthen rural health services by upgrading health facilities and assuring supply, prioritising outreach activities, implementing the Community Health Worker programme and strengthening formal links between communities and health workers
4. Provide quality training, support and supervision for healthcare workers to deliver free quality healthcare with focus on holistic care provision and enhancing peer support networks
5. Advocate on behalf of women, children and healthcare workers to raise awareness of and to address unmet health needs and barriers to free healthcare

6. Support vaccination activities and vaccination strategy development, and conduct regular 'catch up' mass bed-net distribution campaigns, to achieve target coverage thresholds sufficient for community-wide benefit
7. Strengthen maternal death surveillance and death review procedures, and consider integrating paediatric death surveillance into the Surveillance and Response system

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List of abbreviations

BEmONC	Basic Emergency Obstetric and Newborn Care
CAG	Community Advocacy and wellness Group
CEmONC	Comprehensive Emergency Obstetric and Newborn Care
CHW	Community Health Worker
CHP	Community Health Post
CHC	Community Health Centre
CHO	Community Health Officer
CI	Confidence interval
DHIS	District Health Information System
DHMT	District Health Management Team
DHS	Demographic and Health Survey
DRS	Delay Reduction Strategy
EMC	Ebola Management Centre
EPI	Expanded Programme for Immunisation
FHCI	Free Healthcare Initiative
HCW	Healthcare worker
IDI	In-depth interview (qualitative)
KAP	Knowledge, Attitude and Practice
M	Magburaka
MoHS	Ministry of Health and Sanitation
MCHP	Maternal and Child Health Post
MCHA	Maternal and Child Health Aide
MDSR	Maternal Death Surveillance and Response
MSF	Médecins sans Frontières
MSF- OCA	Médecins sans Frontières – Operational Centre Amsterdam
OSM	OpenStreetMap
PHU	Peripheral Health Unit
PR	Prevalence ratio
PRP	President's Recovery Priorities
SMPW	Social Mobilizers of Pregnant women (formally called TBAs)
TBA	Traditional Birth Attendant
WHO	World Health Organisation
Y	Yoni

1 INTRODUCTION

1.1 CONTEXT

Sierra Leone is one of the poorest countries in the world, ranked 179th out of 188 countries according to the United Nations Development Programme Human Development Index (1).

Life expectancy at birth is under 50 years. The country has amongst the highest child under 5 years mortality rate, the highest reported maternal mortality ratio, and the highest lifetime risk for women dying in childbirth worldwide (2).

The comparison with high income countries is stark; for example compared to the UK the Sierra Leone under 5 mortality rate and maternal mortality ratio are over 36 and 113 times higher respectively (Table 1)(3).The vast majority of these deaths are preventable with infections the leading cause of death in childhood (acute respiratory tract infection, malaria and diarrhoea account for 44% of deaths combined in Sierra Leone) (3).

The majority of maternal deaths are mostly due to avoidable complications relating to pregnancy and childbirth (such as severe bleeding, infections, high blood pressure, delivery complications and unsafe abortion) (4); however there is little available data from Sierra Leone.

Table 1: Comparison of under-five and maternal mortality in Sierra Leone and UK(5)

Indicator	Sierra Leone	UK
Child < 5 years mortality rate	182 per 1000 live births	5 per 1000 live births
Maternal mortality ratio	1360 maternal deaths per 100,000 live births	12 maternal deaths per 100,000 live births
Lifetime risk of maternal death	1 in 17 women aged 15-49	1 in 4600 women aged 15-49

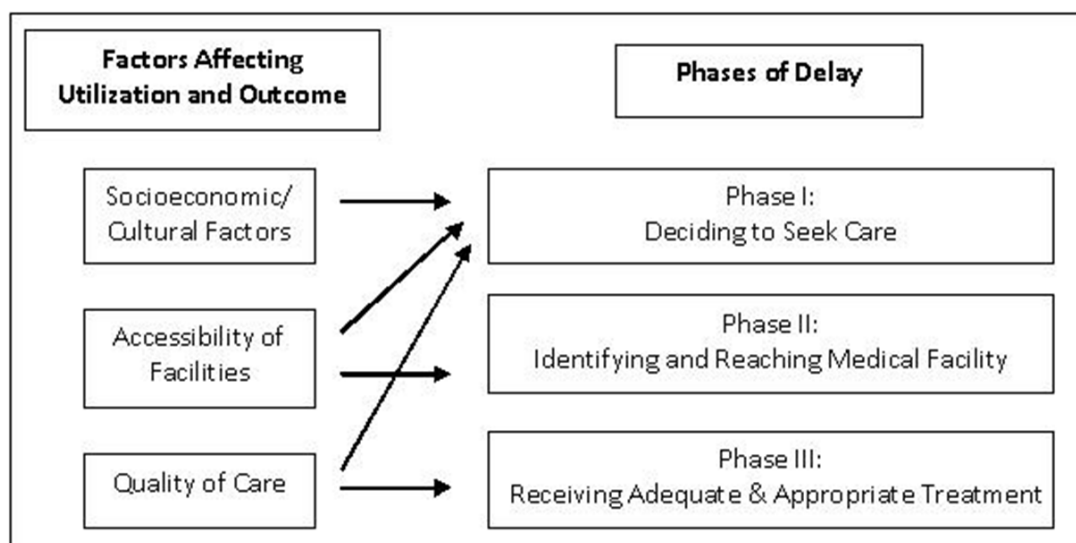
The recent Ebola outbreak proved devastating to the population of Sierra Leone. The outbreak led to considerable morbidity and mortality with the reported 14,122 clinically compatible Ebola cases and 3955 deaths in the country almost certainly underestimates(6). The outbreak placed unprecedented strain on an already under-resourced health system. Health care workers were disproportionately affected by Ebola, and resources were prioritised to Ebola outbreak response activities at the expense of essential healthcare services (7,8). It is apparent that there was a breakdown in trust in healthcare systems which were unable to respond to the needs of patients, leading to widespread disengagement with health care services at population level.

These negative impacts had the greatest impact on pregnant women and young children with reduced service provision and marked reductions in healthcare utilisation probably leading to greatly increased morbidity and mortality (9–11).

It is well documented that delays in access to emergency obstetric care and treatment are major contributing factors to maternal death, particularly in the resource poor setting (12).

High maternal mortality is often attributed to the “three delays model”. These are: 1). delay in deciding to seek care, 2). delay in reaching care, 3). delay in receiving adequate healthcare (Figure 1) (12) Delay in receiving adequate care during febrile illness is also perceived to be a major contributor to morbidity and mortality in children and therefore this model may equally be applied in relation to under 5 mortality(13).

Figure 1: The three delays model (14).



Improving healthcare provision and access to care for women and children are national priorities for Sierra Leone. The Free Health Care Initiative (FHCI) was launched in 2010 with the intention that healthcare should be provided free of charge at the point of care for pregnant and breastfeeding women and for children aged <5 years (15).

Reducing maternal and neonatal morbidity and mortality and reducing child morbidity and mortality are key objectives of the Reproductive, Newborn and Child Health Strategy 2011-2015 produced by the Ministry of Health and Sanitation (MoHS), Sierra Leone (16).

1.2 THE HEALTH SYSTEM IN SIERRA LEONE

The health system in Sierra Leone is usually described in three categories: primary, secondary and tertiary care. According to the Basic Package of Essential Health Services for Sierra Leone, Community Health Workers (CHWs) are the first point of care for patients, although the 2012 Policy for Community Health Workers is still in the process of being implemented. Primary healthcare is delivered from Peripheral Health Units (PHUs) at three basic levels: Maternal and Child Health Posts (MCHPs), Community Health Posts (CHPs) and Community Health Centres (CHCs).

MCHPs are the first line of health facilities at grassroots level and are staffed by Maternal and Child Health Aides (MCHA) supported by Social Mobilizers of Pregnant women (SMPW) and Community Advocacy and wellness Group (CAGs), formally known as Traditional Birth Attendants (TBAs)¹, who provide basic health care, routine antenatal care and supervise deliveries. CHPs provide the same services as MCHPs and additional curative functions and should additionally be staffed by State Enrolled Community Health Nurses (SECHNs). CHCs are generally located at chiefdom headquarter towns and should have facilities for inpatient care. In addition to providing all the services provided at CHPs, CHCs should manage

¹ Please note: whilst TBAs are now officially referred to as SMPWs and CAGs, for the purposes of this report we retain the use of TBA as this was the term used during data collection and referred to by study participants.

obstetric complications and severe illness and provide more extensive outpatient services. CHCs should be staffed with a Community Health Officer (CHO) in addition to SECHN(s), midwives and MCH Aides. Secondary care hospitals include District and Regional Government Hospitals. Tertiary Care Hospitals are mainly concentrated in Freetown and the Western Area.

The health system in Sierra Leone is chronically underfunded, under-resourced and understaffed.

1.3 MSF PRESENCE IN TONKOLILI DISTRICT, SIERRA LEONE

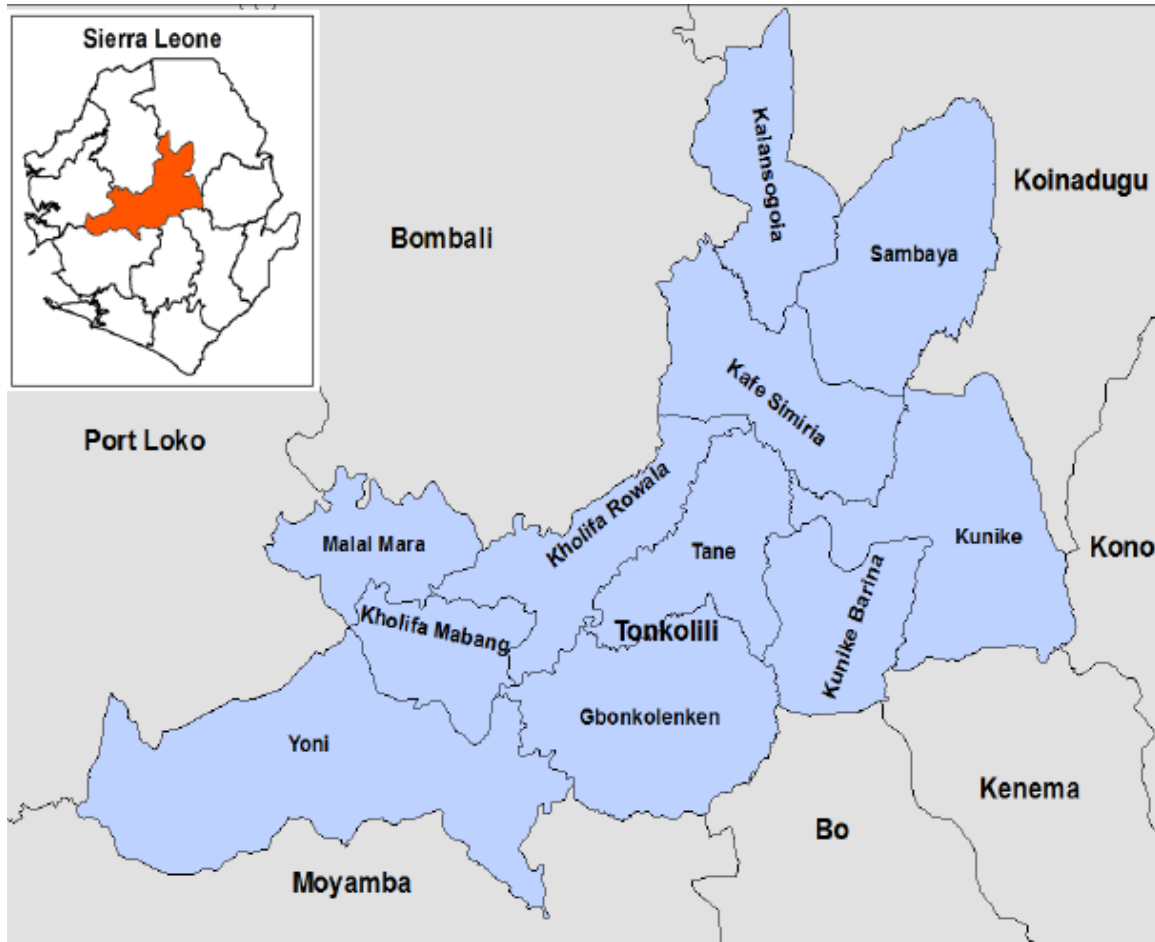
Tonkolili District (area~7003 km²) is located in the Northern Province of Sierra Leone (Figure 1) and has a population of 434,937 according to projections based on the 2004 census (17). The capital and largest city is Magburaka. The district comprises eleven chiefdoms.

The district has a poor road network and many areas prove inaccessible during the rainy season.

In Tonkolili health services are delivered through a network of health facilities consisting of 107 PHUs comprising 13 CHCs, 10 CHPs, 81 MCHPs and 3 hospitals (one governmental and one private). Five CHCs are designated as or are to be developed into Basic Emergency Obstetrics and Neonatal Care (BEmONC) centers.

The District Health Management Team (DHMT) oversees the health system in the district and represents the MoHS in the district. Amongst their responsibilities the DHMT also are responsible for surveillance of disease in the district and leadership and management of health programmes. According to the Demographic and Health Survey (DHS) 2013 in the five years prior to the survey just 35.2% of live births in Tonkolili District were delivered in a health facility and only 37.8% of women received assistance in delivery from a skilled provider. According to DHS 2013, 72.2% of women in the district reported at least one serious problem accessing healthcare and 57.3% of children aged 12-59 months in Tonkolili had received all basic vaccinations (17). During the Ebola outbreak transmission in Tonkolili was intense and there were 456 confirmed cases of Ebola Virus Disease. It was perceived that healthcare utilization in Tonkolili decreased substantially during the outbreak and that utilisation of healthcare services by women and children under 5 years remained lower than before the outbreak; however, the situation post Ebola was uncertain.

Figure 2: Tonkolili District and chiefdoms (18)



Between December 2014 and May 2015 MSF-OCA ran an Ebola Management Centre (EMC) in Tonkolili and has provided ongoing care for survivors of Ebola virus disease. In January 2016, MSF-OCA began supporting reproductive and child health service provision at Magburaka Government Hospital. From March 2016 MSF-OCA has supported provision of maternal child health services at Magburaka MCHP and at Mile 91 CHC in Yoni chiefdom. MSF-OCA provides hands-on practical support in the form of HCWs, delivers training, and provides essential medical supplies, and support for human resources.

Improving access to quality primary and secondary care for children aged <5 years, and improving access to quality comprehensive sexual and reproductive health services, including neonatal care, are explicit objectives for MSF-OCA in Tonkolili District.

MSF-OCA has extended support to healthcare facilities to a total of five PHUs in Yoni chiefdom.

MSF-OCA is also providing technical and practical support to the DHMT.

An MSF epidemiologist and a Community Health Officer support activities of the DHMT surveillance officers including training of HCWs, facilitating routine data collection and analysis. This support has facilitated the extension of routine surveillance to include deaths, with particular focus on improving the reporting and recording of maternal deaths and deaths occurring in children aged <5 years.

Reproductive health data received from Magburaka hospital (supported by MSF-OCA) indicate very high frequency of obstetric complications even accounting for the fact it is the referral hospital for the District. For example, in March 2016 of 142 pregnancy related maternity admissions 67 (47.2%) experienced serious complications including: post-partum haemorrhage (25, 17.6%); post abortion complications (9, 6.3%); obstructed labour (8, 5.6%); eclampsia (5, 3.5%); and ruptured uterus (3, 2.1%). Many of these complications and their severity are perceived to be attributed to delays in receiving obstetric care and treatment. In March there were 197 admissions to Magburaka hospital for children aged < 5 years, 77 (39.1%) were for severe malaria, 20 (10.2%) for neonatal sepsis and 19 (9.6%) were lower respiratory infections.

Through successful and effective collaboration it is perceived that MSF-OCA has established an excellent working relationship with the MoHS in Tonkolili District.

1.4 BACKGROUND AND JUSTIFICATION FOR THE STUDY

In order to plan and deliver effective and efficient services which are culturally appropriate and acceptable to the local population it is first necessary to assess population health needs and gain sufficient understanding of health behaviours and their determinants.

Whilst MSF-OCA has been gaining practical experience of the context, a key priority was to assess population health needs and in particular gain greater insight into health seeking behaviour of women and children in the localities of MSF-OCA current and planned operations. This is considered critical to DRS strategy development and implementation, and fundamental to ensuring provision of culturally appropriate services at all MSF supported health facilities and in the community. In addition up-to-date robust and detailed baseline health information at local level was required in order to systematically plan MSF-OCA interventions and to evaluate their impact in the future.

Although DHS 2013 did include Tonkolili, there was little recent information on health status and health behaviour at a local level. It was therefore proposed to conduct surveys of health behaviour.

Health behaviour is defined as action taken by a person to maintain, attain, or regain good health and to prevent illness (19). Health behaviour can be assessed by identifying and measuring indicators at population level. Ideally indicators should be strongly associated with a health outcome(s) and be measurable. In this context key indicators include the proportion of pregnant women attending a health care facility for childbirth, proportion of children attending health facilities when unwell with fever, and the proportion of children receiving recommended routine childhood vaccinations. These indicators are considered important and relevant reflecting morbidity in the population and have implications for health policy and action. Health behaviour reflects a person's health beliefs and the situational context. Health behaviour surveys permit identification of beliefs, perceptions and the context. Health behaviour surveys may be complimented by qualitative research methods such as interview studies to enable in-depth exploration of these factors. Health behaviour surveys in combination with qualitative methods should allow identification of barriers to accessing and utilising healthcare (past and current) and provide insight as to how these might be mitigated.

An estimation of actual health outcome in the population is also important and relevant for planning. Mortality is often considered the gold standard indicator of health status. However,

primarily measuring mortality using a mortality survey does not necessarily provide the depth of information to allow understanding of the contributing factors. In addition there are a number of issues that present practical and logistical challenges to mortality estimation. Maternal mortality in Sierra Leone (though extremely high relative to other countries) remains a rare outcome at population level so estimation requires a prohibitively large sample size perceived to be beyond available resources. MSF-OCA is however, currently supporting the DHMT to strengthen routine surveillance capacity to include death reporting, building on systems developed during the Ebola outbreak. It is anticipated that mortality estimates derived from this work may be monitored over time more efficiently than repeated large mortality surveys. Indicators of health outcomes may however also be collected during a health behaviour survey. Mortality data can be gathered during a health behaviour survey and be used to supplement and triangulate with information from other sources in order to provide a more comprehensive estimate of mortality.

Thus in this context it was perceived that the information derived from health behaviour surveys in combination with qualitative methods would be directly relevant to current service planning for both MSF and the MoHS. It was perceived that the study would also provide robust and detailed baseline health information enabling future evaluation of the impact of programmes and interventions in the area of MSF operations.

Following the Ebola outbreak the President of Sierra Leone set out the President's Recovery Priorities (PRP) to be implemented from 1st April 2016- 30th June 2017. The following Key Result Areas and priority initiatives (in bullets) are of particular relevance to this study:

Key Result Area 1: Save the lives of 600 women and 5,000 children by 2018

- Human resources for improved maternal and child outcomes: by cleaning and sustaining the MoHS payroll
- Increase capacity of community health workers: ensuring appropriate distribution especially to hard to reach areas
- Strengthen supply chain system: ensure supplies and a working cold chain
- Reduce teenage pregnancy: 100 new adolescent friendly health centres
- Develop a functional national ambulance service
- Improve emergency obstetric services- upgrade 33 facilities to EmONC standard

Key Result Area 2: Prevent, detect and respond to epidemics

- Strengthen health data systems: train staff on new Maternal Death Surveillance and Response (MDSR) system and integrate into existing District Health Information System (DHIS).
- Improve community sanitation

This study was conducted approximately halfway through the period of PRP implementation and therefore also offered opportunity to evaluate progress on whether desired changes had been achieved, provide commentary and identify enabling and restricting factors to achieving change.

2 AIM AND OBJECTIVES

2.1 OVERALL AIM

To describe health seeking behaviour during pregnancy, for childbirth and in children under the age of five years, and to identify barriers to accessing and receiving healthcare services at the time of the study and since the start of the Ebola outbreak in an urban and rural area of Tonkolili District.

2.2 PRIMARY OBJECTIVES

1. To estimate utilisation of health facilities by women for childbirth in Magburaka town and Yoni chiefdom since the start of the Ebola outbreak
2. To estimate utilisation of healthcare services by children aged <5 years in Magburaka town and Yoni chiefdom during their most recent febrile illness within the three month period preceding the day of the survey
3. To identify and describe factors influencing utilisation of health services and delays in seeking and receiving adequate healthcare during pregnancy and for childbirth
4. To identify and describe factors influencing utilisation of health services and delays in seeking and receiving adequate healthcare for febrile illness in children aged <5 years

2.3 SECONDARY OBJECTIVES

5. To estimate utilisation of antenatal care facilities by women during pregnancy in Magburaka town and Yoni chiefdom in the two years preceding the day of the survey;
6. To estimate vaccination coverage for measles and polio in children aged <5 years in Magburaka town and in Yoni chiefdom on the day of the survey;
7. To identify and describe health beliefs and perceptions (of risk, barriers and enablers) in relation to the decision to seek healthcare (Phase 1 of the three delays model) in Magburaka town and in Yoni chiefdom since the start of the Ebola outbreak:
 - a. for women in relation to pregnancy and childbirth
 - b. for carers of children aged<5 years in relation to childhood febrile illness
8. To identify and describe perceptions of barriers and enablers to accessing healthcare (Phase 2 of the three delays model) in Magburaka town and in Yoni chiefdom since the start of the Ebola outbreak:
 - a. for women in relation to pregnancy and childbirth
 - b. for carers of children aged<5 years in relation to childhood febrile illness
9. To identify and describe perceptions of barriers and enablers to receiving adequate and appropriate treatment healthcare (Phase 3 of the three delays model) in Magburaka town and in Yoni chiefdom since the start of the Ebola outbreak:
 - a. for women in relation to pregnancy and childbirth
 - b. for carers of children aged<5 years in relation to childhood febrile illness
10. To estimate all-cause mortality in children under the age of 5 years within the two combined study areas since the start of the Ebola outbreak

11. To estimate all-cause maternal mortality since the start of the Ebola outbreak
12. To measure estimate the Long-Lasting Insecticide-Treated bed net (LLITN) coverage ratio for children under five years of age

3 METHODS

This study incorporated a mixed methods sequential explanatory design. This consisted of two distinct phases: quantitative, followed by qualitative data collection and analysis. The qualitative component was designed to help explain, or elaborate on, the quantitative results obtained in the first phase. Preliminary analysis of the quantitative phase informed the implementation of the qualitative phase. The rationale for this approach was that the quantitative data and subsequent analysis would provide a general understanding of the research problem. The qualitative data and analysis would refine and explain statistical results by exploring participants' views in more depth (20).

Methods included a household survey, structured interviews and in-depth interviews. The household survey was employed primarily in order to address objectives relating to Phase 2 of the three delays model (objectives 1-2, 5-6) and mortality estimation and LLITN use (objectives 10-12); however was also used to identify factors influencing health behaviour (objectives 8-9) which were subsequently explored by qualitative methods. Structured interviews were employed primarily in order to estimate maternal mortality (objective 11). In-depth interviews were subsequently employed primarily in order to address objectives relating to Phase 1 and Phase 3 of the three delays model (objectives 3-4 and 7-9).

3.1 STUDY AREA

The study was conducted separately in two localities. The first locality was Magburaka town (urban area). The second locality was Yoni chiefdom (rural area) where the lowest administrative level is a village. The survey and structured interviews were performed concurrently. The second qualitative phase took place in both Magburaka town and Yoni in locations selected purposively (as described in section 3.11) to ensure both a variety of characteristics and rich data collection.

3.2 SURVEY DESIGN

The primary study design was a health behaviour survey using a two-stage cluster sampling methodology as an adaptation of the standardized method recommended by the World Health Organization (WHO) (21) (described further in section 3.9).

The household survey was split into two component parts. The first component, *maternal health and health seeking behaviour* focused on health seeking behaviour of women in pregnancy and childbirth, and to obtain a birth history from women in order to estimate child mortality. The second component, *child health and health seeking behaviour* focused on health seeking behaviour relating to children aged <5 years. The survey was split into two sections accordingly.

3.3 STRUCTURED INTERVIEWS WITH KEY INFORMANTS TO ESTIMATE MATERNAL MORTALITY IN YONI

In addition to the household survey, in order to estimate maternal mortality in the rural area of Yoni, structured interviews were conducted (with verbal consent) with one or more of Head of village/section or healthcare worker (informants) at each cluster site. Informants were asked to estimate the number of maternal deaths occurring since the start of the Ebola outbreak in Sierra Leone. For potential use in rate estimation informant were also asked to

estimate the total number of women aged 15-49 years in the cluster at the time of the survey. This was an adaption of the informant method used elsewhere (22). Information on likely cause of death and barriers to accessing care were also elicited.

3.4 IN-DEPTH QUALITATIVE INTERVIEWS

As a third element of the study a qualitative component was included that was considered sequential to the survey, in order to explore and explain quantitative results. In-depth interviews (IDIs) were based on a topic guide adapted based on findings derived from preliminary survey analysis. To enable a deeper examination and understanding of barriers and enablers to accessing care during pregnancy, childbirth and for children under 5, flexible, iterative and participatory techniques were included.

3.5 STUDY POPULATION

The study population comprised the following population groups of Magburaka and Yoni chiefdoms:

- Women that gave birth (live or stillbirth) since the start of the Ebola outbreak (survey & IDIs)
- Carers of children aged <5 years on the day of the study (survey & IDIs)
- Key community members (village elders, head of transport unions, youth groups etc.; structured interviews and IDIs)
- Health workers (PHU staff, traditional birth attendants/healers, 'pepper' doctors etc.; IDIs)

However, data was only collected from a sample of the population (cluster sites: see section 3.12).

Population estimates referred to here were derived from national census projections from 2004. Population figures for Magburaka and villages in Yoni were derived from PHU catchment population estimates held by the DHMT. Using these estimates the populations of Magburaka and Yoni chiefdom were estimated to be around 124,000 and 120,000 respectively. Extrapolating from DHS 2013 it was estimated that women who have given birth in the last two years and children aged <5 years comprised ~6% and ~16.6% of the typical household respectively.²¹ Thus the estimated study population of women who gave birth in the two years preceding the survey was 7,440 and 7,200 in Magburaka and Yoni respectively. The estimated study population of children aged <5years was 20,584 and 19,920 in Magburaka and Yoni respectively.

3.5.1 Inclusion and exclusion criteria

Survey

A person was eligible for the first component of the survey (*maternal health and health seeking behaviour*) if she satisfied all of the following criteria:

- Woman in the selected household who had given birth (live or stillbirth) in Tonkolili District since the start of the Ebola outbreak (mid-May 2014).

And

- Informed consent was given by the eligible woman in the selected household.

A person was eligible for the second component of the survey (*child health and health seeking behaviour*) if s/he satisfied all of the following criteria:

- Member of the selected household responsible for care of children within the household and sufficiently informed in order to provide information on all children within the household

And

- Informed consent was given by the eligible individual in the selected household.

A person was excluded from the survey if s/he satisfied one of the following criteria:

- Eligible person refused to participate in the survey

or

- The Head of Household refused permission for eligible individual within the household to participate in the survey

A maximum of one eligible person per household was included for each of the two components of the survey. If the household contained more than one eligible person one was selected randomly by drawing of lots; this was performed independently for each of the two components.

The survey components were often performed within the same household consecutively subject to the presence of individuals meeting the inclusion criteria.

Structured interviews with key informants

Individuals were selected for interviews by convenience if they were a Head of village or healthcare worker or in the sampled community. Structured interviews were performed only in sampled clusters in Yoni (and not in Magburaka for logistical reasons and because the information was collected centrally).

In-depth interviews

A person was selected and invited for in-depth interview based on the following criteria:

- Woman who has given birth (live or stillbirth) since the start of the Ebola outbreak

Or

- Caregiver for children under 5

Or

- Key community member

Or

- Health worker

A person was excluded from participating in IDIs if s/he met one of the following criteria:

- Did not consent to be interviewed

Or

- Was identified by MSF medics as too unwell to be interviewed

3.6 DEFINITIONS

3.6.1 Household definitions

Definition of household

A household was defined as a person or a group of persons, related or unrelated, who lived together and who shared a common source of food over the recall period.²¹

A household was excluded from the survey if none of the household members fulfilled all these criteria.

Head of household

The head of the household was defined as one of the members of the household recognised as the head of the household by the other members of the household or by him/herself.

3.6.2 Illness and recall definitions

Definition of febrile illness

Illness with fever (an abnormally high body temperature usually accompanied by shivering).

Recall period and start of Ebola outbreak (approx. 2.5 years)²

For most outcomes the recall period began at the 'start of the Ebola outbreak'. The start of the Ebola outbreak was defined as the date that Ebola outbreak officially recognised in Sierra Leone mid-May 2014), and was perceived to be memorable for people in the district. Local events were referred to in questioning in order to determine more accurately the time of death and seeking behaviour by allowing interviewees to place them in time sequence with locally well-known events.

A recall period of three months was selected for utilisation of a health facility for febrile illness as: nearly all children <5 years in the study area were expected to have experienced febrile illness in that time period, an important consideration for sampling (see section 7.1). In addition, it was considered that febrile illness affecting a child in the household and taking a child to health facility, or the decision not to do so, should have been sufficiently memorable for the informant within this timeframe.

3.6.3 Outcome indicator definitions

Multiple outcomes were investigated in this study. Here we define some major indicators that were measured in this study:

Utilisation of health facilities by women for childbirth since the start of the Ebola outbreak in Sierra Leone:

Woman who attended a health facility (PHU or hospital) during their most recent labour and gave birth in the health facility (live or stillbirth), at any time since mid-May 2014 until the day of the survey.

² We refer in the protocol to a 2 year recall period which is approximately equivalent to the period since the start Ebola and the implementation of the study.

Utilisation of healthcare services by children aged <5 years during their most recent febrile illness in the three months preceding the time of the survey:

Child aged <5 years on the day of the survey who was taken to a health facility (PHU or hospital) or otherwise sought advice or treatment from a healthcare provider during their most recent febrile illness (definition above) with symptoms whatever the underlying cause, at any time in the three months preceding the day of the survey.

Utilisation of antenatal care facilities by women during pregnancy since the start of the Ebola outbreak in Sierra Leone:

Woman who received antenatal care from a skilled provider (doctor, nurse, midwife or MCH Aide), either at a health facility or via outreach services, during their most recent pregnancy since mid-May 2014 until the day of the survey (note that the number of such encounters were assessed).

Vaccination for measles in children aged <5 years at the time of the survey:

Child aged <5 years at the time of the survey who had received one or more measles vaccination(s) at any time as evidenced by vaccination card or as reported by the woman or member of household (note that the analysis includes age of child and nature of evidence of vaccination).

All-cause mortality in children under the age of 5 years within the two combined study areas since mid-May 2014 until the day of the survey:

Child who was live born and subsequently died at any time since mid-May 2014 until the day of the survey (from any cause) and was aged <5 years at the time of death.

All-cause maternal mortality since the start of the Ebola outbreak in Sierra Leone:

Woman who died from any cause whilst pregnant or during childbirth or within two months of the birth or termination of pregnancy at any time since mid-May 2014 until the day of the survey.

3.6.4 Models of healthcare definitions

Biomedical/allopathic model of care:

The biomedical model draws upon biochemical explanations of ill health as the basis for treatment and intervention. The term is often used interchangeably with 'western', 'conventional' or 'allopathic' medicine; the latter defined as 'the prevailing form of conventional or orthodox medical practice, based as far as feasible on formally arrived-at diagnostic categories of conditions that are treated on the basis of best available evidence for efficacy of therapeutic measures' (23)

Traditional model of care:

Traditional medicine has been defined as 'the sum total of the knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health, as well as in the prevention, diagnosis, improvement or treatment of physical and mental illnesses.' (24) The term is often used interchangeably with 'complementary', 'alternative' and 'non-conventional' medicine.

3.7 SAMPLE SIZE PARAMETERS

Calculation of the estimated sample size required for the survey was based on estimates of a number of parameters including: the prevalence of the key outcome(s) in the study population, design effect, non-response rate, and population size from which the sample was selected; and the desired precision of the derived estimate(s).

The key outcomes in this study relate to the two primary objectives and the two components of the survey and were:

1. Utilisation of health facilities by women for childbirth in the two years preceding the day of the survey;

and

2. Utilisation of health facilities by children aged <5 years during their most recent febrile illness in the three months preceding the day of the survey.

The parameters used and the rationale is provided in detail in Appendix 1

3.8 SURVEY SAMPLE SIZE CALCULATION

Sample size estimates and parameters used in calculation of sample size relating to achieving primary objectives are presented in Tables 2 and 3 below. Required sample size for each of two components of the survey (*maternal health and health seeking and child health and health seeking*) was calculated using OpenEpi.

Table 2: Sample size to estimate utilisation of health facilities for childbirth in the two years prior to survey

Locality	Study pop. Size	Prev. of outcome (%)	Precision (confidence limits) (%)	Design effect	Total no. of individuals required	Household non-response rate (%)	No. of households to search to recruit sample
Magburaka	7440	50	10	2	190	6	576
Yoni	7200	50	10	2	190	6	576

Table 3: Sample size to estimate utilisation of healthcare services by children aged <5 years for most recent febrile illness in the three months prior to survey

Locality	Study pop. Size	Prev. of outcome (%)	Precision (confidence limits) (%)	Design effect	Total no. of individuals required	Household non-response rate (%)	No. of households to search to recruit sample
Magburaka	20584	50	10	4	383	6	415
Yoni	19920	50	10	4	383	6	415

The number of individuals in the study population per household was derived from DHS 2013; there were approximately 0.35 women per household who had given birth within the last two years, and 0.98 children per household aged 0-59 months.²¹ The number of households required to achieve the required sample size was adjusted to account for an anticipated 6% non-response rate. Therefore, the estimated number of households was: the sample size divided by the estimated household prevalence, multiplied by 1.06 (for example in Table 1 the estimated number of households required to meet sample size in Magburaka was $(190/0.35)*1.06 \sim 576$).

Sample size calculations for secondary objectives were calculated similarly and are provided in Appendix 1.

3.9 SURVEY SAMPLING STRATEGY

A two-stage cluster sampling methodology was chosen as an adaptation of the standardized method recommended by the WHO (21).

In order to achieve the required sample size to meet primary and secondary objectives:

- Thirty clusters were selected from all sections in Magburaka and thirty clusters were selected from all villages in Yoni.
- Ten women meeting inclusion criteria were recruited at each cluster site
- Informants sufficient to provide information relating to 15 children <5 years were recruited at each cluster site.

Sampling continued until the minimum sample size per cluster was achieved. The selection of 30 clusters in each locality was to facilitate adequate recruitment given the expected prevalence of the target population per household and to achieve a representative sample of the population within practical constraints and minimise design effect. Primary objectives could have been achieved with a smaller number of clusters and a smaller sample size (for example 20 clusters of 10 women and 20 children aged <5 years per cluster would be sufficient). However the advantages of achieving secondary objectives, achieving representativeness and the adequate resources at hand permitted more extensive sampling.

Cluster selection in Magburaka town/ urban area was by selection of random GPS points. Magburaka Town was traced into OpenStreetMap, (OSM) (<http://www.openstreetmap.org>) to the building, street, and boundary level by volunteers as part of the Missing Maps project (<http://www.missingmaps.org/>). The satellite imagery used was donated by Bing (<https://www.microsoft.com/maps/>) to OSM. The data was then reviewed by the local Ministry of Health for final validation. The residential areas of the town were then imported into Quantum GIS software (Version 2.12.1) and random points generated using the random point function. The points were saved as GPX format, which allowed the identification of the starting survey household. Selection of 60 random points was performed two weeks prior to survey implementation. The selected cluster sites were visited before survey implementation to ensure suitability (i.e. that the point fell in a residential area) and that clusters were sufficiently dispersed to avoid potential cluster contamination (potential for overlap with another cluster during the survey). Clusters were confirmed in order of their random selection (i.e. 1-60) and when replacement was required, the selection was in numerical order of the random selection up to the point when 30 clusters had been confirmed.

To select households within a cluster in Magburaka the nearest house to the GPS point was located and selected as the first house to assess for eligibility. If inclusion criteria were not met the next household following in order of physical proximity was then assessed. Physical proximity was defined as being the household whose front door was closest to the left of the front door of the household that was just assessed. If the household was eligible and individuals were interviewed the next household to be assessed was the next house to the left or, if the cluster was perceived to have a sufficient number of houses and cluster contamination was not a perceived risk then the second house to the left. This procedure was continued until the desired number of individuals was sampled in the cluster.

Cluster selection in Yoni was by random village selection stratified by population size (population <500 and ≥500; two strata). A frame of all villages was drawn together with their estimated populations projected from the 2006 census. In view of considerable uncertainty about the accuracy of these estimates at the time of the survey, stratified random sampling was performed. Fifteen villages were randomly selected using random number generation from those villages with an estimated population ≥500 and a further fifteen randomly selected from those villages with estimated population of <500.

The standard WHO/EPI methodology was used in Yoni to select households within a cluster: accordingly, a pen was thrown on the ground in the central point of the cluster, and a line was drawn in its direction towards the edge of the cluster. To prevent centre bias the team walked in the direction of the pen until the edge of the cluster was reached, the pen was thrown again and households along this line were counted until the edge of the cluster was reached. The survey team delineated the edge of the cluster in advance of household selection with the assistance of the Head of village/section. One of the households was selected using a random number table as the first to be assessed for eligibility in the cluster and individuals within the household were interviewed if inclusion criteria were met. If inclusion criteria were not met the next household following in order of physical proximity was then assessed +/- individuals interviewed. Physical proximity was defined as being the household whose front door is closest to the left of the front door of the household that was just assessed. If the household was eligible and individuals were interviewed the next household to be assessed was the next house to the left or, if the cluster was perceived to have a sufficient number of houses, the second or third house to the left (dependant on perceived size of village). This procedure was continued until the desired number of individuals had been sampled in the cluster.

If all households of a selected village were included in the study before completing the required number of households, the cluster was continued by selecting the (geographically) closest village (this was pre-determined corresponding to numbers used in the original selection process). The chosen sampling methodology was again used in the closest village/ section to select the first household in the village/ section.

3.10 SELECTION AND SAMPLE SIZE FOR STRUCTURED INTERVIEWS WITH KEY INFORMANTS

Structured interviews were conducted in survey cluster sites in Yoni only (for logistical reasons including uncertainties with section boundaries they were not attempted in Magburaka). One structured interview with one or more participants was conducted at each cluster site. Selection of participants was based on convenience subject to the inclusion/ exclusion criteria.

3.11 SELECTION AND SAMPLE SIZE FOR IN-DEPTH INTERVIEWS

Selection of survey sites was informed by preliminary survey analysis. A composite 'score' was produced for each cluster site visited during the survey to enable ranking of clusters by both how frequently respondents reported barriers to healthcare and the severity of the barrier (i.e. whether it delayed or prevented healthcare access). Sites were selected purposively based on those with highest scores (i.e. those with the highest proportion of respondents reporting severe barriers to healthcare for both mothers and children under 5) and to include sites with a diverse range of characteristics (i.e. sites with and without a PHU; on a main road and more remote).

Sample size was determined as the study progressed (25) and interviews were conducted until the team felt theoretical saturation was reached, i.e. until no new themes were emerging (26) (in line with Guest et al. who suggest saturation occurs for such research design 'within the first twelve interviews, although basic elements for meta-themes were present as early as six interviews'(27)). The focus of data collection was on richness of information, with an adequate sample size being one that sufficiently answers the research question (i.e., that is large enough to capture a range of experiences but not so large as to be repetitive) (28).

Participants were selected purposively, allowing for the researcher to select key informants who had experience of pregnancy and useful perspectives on childbirth. Participants were selected based on the inclusion criteria outlined above, and were recruited through local gatekeepers e.g. community leaders for mothers and caregivers, and MSF teams for health workers and key stakeholders).

Maximum variation sampling was used to ensure the consideration of key demographic variables likely to have an impact on participant's views, for example, age, ethnicity, and occupation. This aimed to ensure that the sample was both diverse and representative of the communities in question, and so maximise a fair share of perspectives and views.

Based on this a sampling frame was used (Table 4):

Table 4: Overview of sampling for in-depth interviews

Participant group	Foreseen variables to be considered per participant group	Foreseen variables for all groups
1. Women who gave birth since Ebola outbreak /caregiver of under 5	<ul style="list-style-type: none"> • Number of children • Delivery/seeking care for child in/outside facilities • Child living/deceased • Position in household (e.g. female head; polygamous marriage etc.) • Marital status 	<ul style="list-style-type: none"> • Location of residence (rural/urban)
2. Key community members	<ul style="list-style-type: none"> • Gender • Position (elder; religious leader; local group/union representative etc.) • Parent/caregiver • Gender 	<ul style="list-style-type: none"> • Age • Language • Ethnicity • Education level
3. Health workers	<ul style="list-style-type: none"> • Position (nurse; midwife; TBA; PHU staff; traditional practitioner etc.) • Location of work (government /private/MSF facility; home etc.) • Parent/caregiver 	

3.12 DATA COLLECTION

3.12.1 Survey

Selected villages/ sections according to the sampling were engaged by the MSF-OCA outreach team in the field via the Paramount Chief in both Magburaka and Yoni. Permissions were sought and gained through this route. In addition in Yoni on the day of the survey the heads of the villages and community leaders were visited, the purpose of the survey explained and permissions acquired before conducting interviews in their villages.

For each selected household containing eligible individuals (for either component) the survey questionnaire (Appendix 2) included:

- Age and sex of all household members
- Use of malaria bed nets

For the first component of the survey (*maternal health and health seeking*) the survey questionnaire (Appendix 3) included the following sections:

- Age, sex and pregnancy status of all persons who met the inclusion criteria
- Health behaviour in pregnancy
- Health behaviour for childbirth
- Barriers to healthcare
- Birth history over the preceding eight years (to identify all children who were at any stage under 5 years during the study period)

For the second component of the survey (*child health and health seeking*) the survey questionnaire (Appendix 4) included the following sections:

- Age, sex of all persons who met the inclusion criteria
- Health behaviour during illness
- Barriers to healthcare
- Vaccination status

In terms of barriers to healthcare participants were asked about whether specific factors were a problem for them in accessing healthcare and if so whether these barriers delayed them reaching healthcare facilities or prevented them attending healthcare entirely.

3.12.2 Structured interviews with key informants

Structured interviews were conducted in each cluster concurrently with the survey and permissions for the interviews were sought and explanations given at the same time as the survey as outlined above. Participants were selected according to the inclusion criteria. A bespoke questionnaire (Appendix 5) was used to collect information relating to the number, cause and circumstances of maternal deaths in the locality and the number of women resident in the locality. No personally identifiable data was collected.

3.12.3 In-depth qualitative interviews

In-depth interviews were conducted subsequent to the quantitative survey. Interviews were conducted using a topic guide (Appendix 6). Information was captured based on conversations with selected participants and allowed emergent themes (as well as discrepancies from majority themes) to be further explored and tested.

IDIs required 45-60 minutes and were piloted to ensure the responses were natural, and that the technique was working to capture an optimal descriptive response. They were conducted by study team members trained in qualitative methods. Interviews were audio recorded. In addition, interviewers also took written notes concerning the interview. Daily debriefing sessions were conducted with all field teams to assure quality assurance and strong communication amongst the study team members.

3.13 DATA ENTRY AND ANALYSIS

3.13.1 Quantitative data

Quantitative data arising from household questionnaires and structured interviews was entered into Dharma platform software on Sony Xperia tablet devices by the data collection team.

All data were anonymised. Data were extracted from Dharma in Microsoft Excel format.

We calculated means or medians (range) of numerical variables. For categorical variables, we calculated proportions using the non-missing values as denominators and 95% confidence intervals (95%CI) allowing for clustering. To identify potential associations, we calculated adjusted prevalence ratios (PR) using Poisson regression. Data cleaning and analysis was conducted using STATA v14 (Stata Corporation, Texas, USA)

3.13.2 Qualitative data

Transcription and translation

All audio recordings of interviews were translated and transcribed by the study team from the interview language (Temne or Krio) into English. Translators/transcribers were hired and trained locally. Training included guidance on transcription techniques, ethics and confidentiality. Quality control mechanisms included back translation of transcriptions by a second transcriber (exchanging and back translating each other's work); checking of a subsection of transcripts by the research assistant/translator; and ongoing supervision).

The transcription by a trained local transcriber and translation methods reflected the interpretative approach underpinning the qualitative research, aiming to convey as fully as possible the experiences and representations of the participants.

Analysis of Data

Data was analysed using NVivo ©11 qualitative data analysis software. Both inductive qualitative content analysis and analytical principles from grounded theory were used. All interview transcripts were imported into NVivo after translation and transcription, where they were then coded. A coding framework was developed based on themes emerging during the interviews, as well as themes pre-identified by the study team from survey findings. Emergent categories and themes were identified based on meticulous and systematic reading and coding of the transcripts. Codes and sub-codes were refined during the analysis. Data coding and analysis began whilst data collection was ongoing, to allow for the refining of questions and the in-depth exploration of certain themes if required. A coding manual was developed with the study team in order to adequately reflect emerging themes. This manual was discussed, revised and validated by the study team. Agreement between researchers was obtained for all final coded data. Similarities and differences across sub-groups were explored.

3.14 ETHICAL ISSUES

The survey protocol was approved both by the Ethics Review Board of MSF and the ethics committee of the MoHS of Sierra Leone. Detailed ethical considerations and mitigating measures and the consent process are described more comprehensively in the study protocol.

All potential participants had the study explained to them in a language with which they were familiar. Participation was voluntary. It was explicitly explained to the heads of the villages, that they were freely allowed to decline the participation of their village without any consequences or penalty. In selected households, the purpose of the study was explained to eligible participants and heads of household and verbal consent was obtained to conduct interviews. No incentives or inducements were provided to any respondents. It was also explicitly clarified that participation is in no way linked to receiving (or not receiving) services or other benefits. Information forms (approved by the above ethics committees) were provided.

Confidentiality was protected during data collection. Interviews were organised and conducted in a designated place so as to optimise privacy and confidentiality. Collection of potentially identifiable information was minimised.

Each interviewee participant within the study was allocated a unique identifying number. This unique identifying number was written on all study forms, audio files and transcriptions. This information will be destroyed six months after the end of the study

Data were entered on computers specifically dedicated to the study. Computers were password protected. Paper study forms and audio recordings will be stored for 10 years at the MSF-OCA Headquarters in Amsterdam then destroyed. Electronic data were anonymous. Back-ups of the electronic data were done on external support (CD or external hard disk) and encrypted. All study forms and study data are stored in a locked room in a secured area, with controlled access available only to study team members.

Data collection teams were trained thoroughly on privacy and confidentiality and those involved in IDIs signed a confidentiality agreement. Audio files were anonymised and no names or locations were linked to the identifying codes.

3.15 COLLABORATION

The study was carried out in collaboration between MSF-OCA and the MoHS of Sierra Leone, who was a co-investigator. MSF-OCA was the study sponsor, responsible for the funding, in charge of the field part of the study, the analysis and report writing. Study results belong to MSF-OCA and the MoHS of Sierra Leone. Permission for publication must be obtained from MSF-OCA and the MoHS.

3.16 IMPLEMENTATION OF THE STUDY IN THE FIELD

The study was implemented in accordance with the study protocol.

Twenty individuals were recruited as survey data collectors and underwent initial training with 17 progressing and completing 5 days of training and piloting. The survey team comprised 8 data collection teams of two persons and between 2 and 4 supervisors (up to 3 MSF supervisors and 1 MOHS) per day. The survey was implemented from 29th October to 10th November 2016 inclusive.

The qualitative data collection team comprised of 2 qualitative researchers, 3 research assistants/translators and 5 transcribers/translators. Two teams conducted interviews (each team made up of one qualitative researcher and one research assistant/translator). Research assistant/translators received a three day training including piloting of data collection. Transcribers received a one-day training and close ongoing supervision. Interviews were conducted between 10th December 2016 and 3rd January 2017.

4 RESULTS

4.1 OVERVIEW

4.1.1 Survey

Thirty clusters were selected in Magburaka. Ten clusters were replaced before implementation of the survey in accordance with stated methods. Two of these did not fall in residential areas and the remaining eight clusters were considered to lie in close proximity to other selected clusters such that there was perceived risk of cluster contamination. The location of final selected clusters in Magburaka is indicated in Figure 3.

Thirty clusters were selected in Yoni. There were no refusals or replacements required. The location of selected clusters in Yoni is indicated in Figure 4.

In Magburaka, 386 households were included. 301 women were included in the maternal component and 325 carers of children <5 years were included, providing information on 529 children <5 years of whom 482 (91%) had experienced febrile illness in the preceding 3 months (Table 5).

In Yoni, 356 households were included. 307 women were included in the maternal component and 318 carers of children <5 years were included, providing information on 563 children <5 years of whom 507 (90%) had experienced febrile illness in the preceding 3 months (Table 5).

The sample size was therefore reached and exceeded. There were no documented refusals to participate amongst households or eligible persons in any locality.

Table 5. Number of participants and households included in the survey by place

Category	Magburaka	Number included	
		Yoni	Total
Households	386	356	742
Women (given birth since Ebola)	301	307	608
Carers of children <5years	325	318	643
Children <5 years*	529	563	1092
Children <5 years with febrile illness within 3 months*	482	507	989

*Information provided by carer

Figure 3. Cluster sites in Magburaka

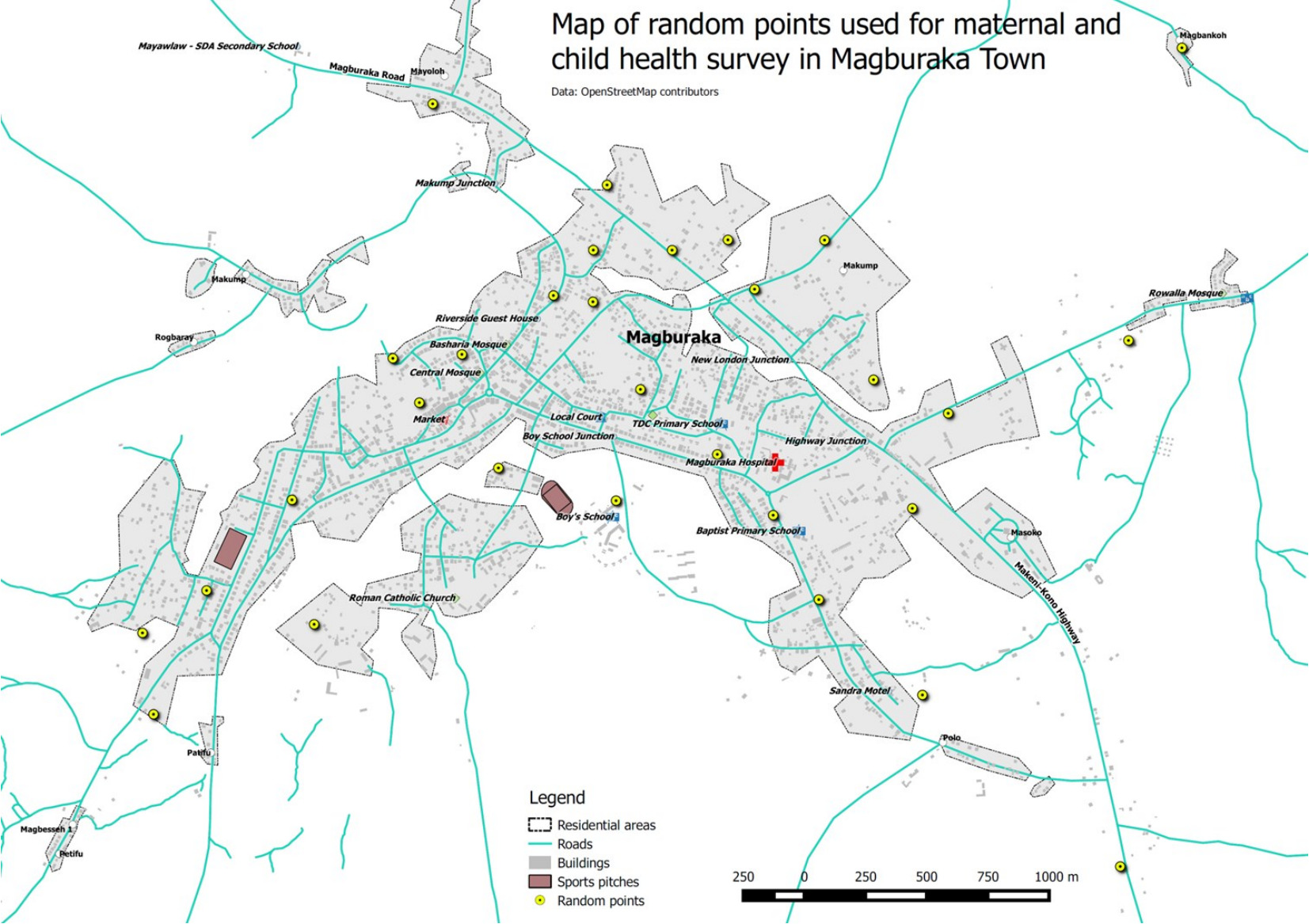
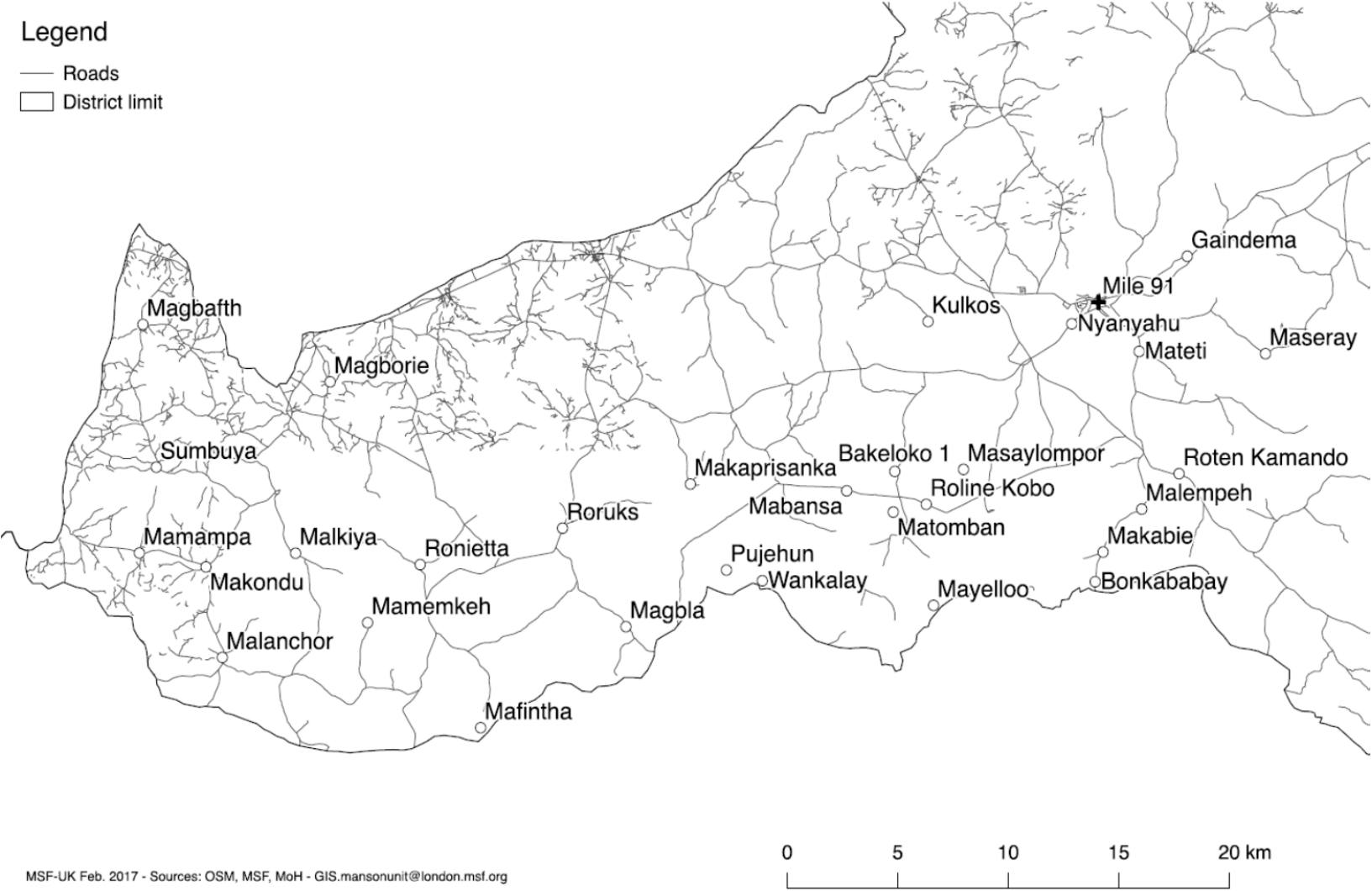


Figure 4. Cluster sites in Yoni

Map of villages sampled for maternal and child health survey in Yoni chiefdom



MSF-UK Feb. 2017 - Sources: OSM, MSF, MoH - GIS.mansonunit@london.msf.org

4.1.2 Structured interviews with key informants

Interviews to capture details of maternal deaths and recording were conducted in 29 of 30 survey cluster locations (villages) in Yoni. Informants included: HCWs (n=21), village chiefs (n=19) and village elders (n=3). HCWs (including CHWs and TBAs) were available in 19 of 30 villages.

4.1.3 In-depth qualitative interviews

IDIs were conducted in 5 of the survey cluster sites in Magburaka and 6 sites (villages) in Yoni. 72 IDIs were conducted; 35 in Magburaka (with 9 mothers, 6 caregivers, 8 community leaders and 12 health workers) and 37 in Yoni (with 10 mothers, 6 caregivers, 9 community leaders and 12 health workers).

Numbers of caregivers interviewed were less than anticipated in both locations as it became clear that there was significant overlap with the mothers group (both mothers and caregivers spoke about maternal and child health). Health workers represented the most heterogeneous group and as a result had the most interviewees.

There were no documented refusals to participate in any locality.

Table 6. Number of participants and households included in in-depth interview study by place

Participant group	Number included		Total
	Magburaka	Yoni	
Mothers	9	10	19
Caregivers	6	6	12
Community leaders	8	9	17
Health workers	12	12	24
Totals	35	37	72

4.2 DEMOGRAPHICS OF PARTICIPANTS

4.2.1 Survey participants and household composition

4.2.1.1 Household composition

The composition of households in Magburaka and Yoni was similar with a mean of ~9 persons, ~2 children under 5 years and no significant difference in the proportion of pregnant women per household (0.15 in Magburaka and 0.27 in Yoni) (Appendix 7, Table 7.1.1).

4.2.1.2 Demographics of women who had given birth since Ebola

The age of women included in the maternal health seeking component was similar between both areas: median 25 years (range: 15-59) in Magburaka; and median 26 years (range: 15-46) in Yoni. However, 56% (95%CI: 48-63) of women were literate in Magburaka compared

with 16% (95%CI: 10-23) in Yoni and overall women in Magburaka reported higher educational attainment (Appendix 7, Table 7.1.2).

The proportion of women who were married was significantly different: 71% (95%CI: 66-76) in Magburaka and 92% (95%CI: 86-95) in Yoni. 32% (95%CI: 26-38) of married women in Magburaka and 46% (95%CI: 38-53) of married women in Yoni were in a polygamous relationship.

The proportion of women pregnant on the day of the survey was 2.9% (95%CI: 1.7-5.3) in Magburaka vs 11% (95%CI: 8.5-15) in Yoni. The total number of childbirths (live and stillbirth) experienced by women prior to the day of survey was 2.9 (95%CI: 2.6-3.1) in Magburaka vs 4.1 (95%CI: 3.7-4.5) in Yoni.

4.2.1.3 Demographics of carers and children

The age of carers included in the child health seeking component was similar: median 27 years in both areas (age range: 15-70 in Magburaka and 15-65 in Yoni). The relationship of the carer to the child <5 years was not significantly different between areas, with 82% carers surveyed in Magburaka and 84% in Yoni being parents, and 8% and 5% grandparents with only a minimal number of carers reporting other relationship (such as sibling). The educational attainment and marital status of the carers was similar to that of women informants for the maternal health seeking with substantial differences between the two areas (Appendix 7, Tables 7.1.3).

The mean age of children was identical in each area (2.0 (95%CI: 1.9-2.2)). 54% (95%CI: 49-58) in Magburaka were males vs 46% (95%CI: 42-29) in Yoni)

4.2.2 In-depth qualitative interview participants

Participants in the 'mothers' group were aged between 18 and 40: 15 (79%) were aged between 18 and 30 and 4 (21%) were between 31 and 40.

Participants in the 'caregivers' group were aged 18 to 65: 5 (42%) were aged 18 to 30; 1 (8%) was 31 to 40; 6 (50%) were over 41. 10/12 (83%) were female. In terms of the relationship to the child(ren) in their care: 4 (33%) were the mother; 2 (17%) were caring for others' children in addition to their own; 3 (25%) were the grandmother 2 (17%) were the male head of household; and 1 (8%) was an aunt.

Participants in the 'community leader' group were aged between 28 and 75: 1 (6%) was aged 18 to 30; 2 (12%) between 31 and 40; and 14 (82%) were over 41; 16 (94%) were male. They held diverse positions including section/paramount chiefs; village headmen and elders; religious leaders (imams and pastors) and heads of various unions (bike riders, taxi drivers, traders, women, youth, and teachers).

Participants in the 'health worker' group were aged between 24 and 78. 7 (29%) were aged 18 to 30; 7 (29%) between 31 and 40; and 10 (42%) were over 41. 9 (38%) were male. They held various positions and included MSF and MoHS staff in Magburaka and Mile 91; DHMT staff; rural PHU staff; CHWs; TBAs; traditional practitioners; and a pharmacist.

4.3 HEALTH OUTCOMES

4.3.1 Complications in labour

17% (95%CI: 13-21) of women in Magburaka and 23% (95%CI: 17-29) in Yoni reported that they had difficulties in labour.

Most commonly reported complications were bleeding (reported by 8.3% women in Magburaka and 13% in Yoni), severely high blood pressure (8.3% women in Magburaka and 1.0% in Yoni) and prolonged/ obstructed labour (3.7% women in Magburaka and 2.0% in Yoni) (Appendix 7, Table 7.2.1).

4.3.2 Stillbirth

Of 583 childbirths reported in the preceding 8 years among women in Magburaka, 38 (6.5%; 95%CI: 4.0-11) had resulted in stillbirth. Of 775 childbirths reported among women in Yoni, 19 (2.5%; 95%CI: 1.6-3.8) had resulted in stillbirth.

4.3.3 Obstetric fistula

Women were asked if they had experienced a constant leakage of urine and stool since labour/ childbirth, which were considered to be compatible with obstetric fistula. 7/297 (2.4% (95%CI: 1.0-5.2)) of women in Magburaka and 15/305 (4.9% (95%CI: 2.1-11)) of women in Yoni reported these symptoms. 4 women in Magburaka and 1 in Yoni had received an operation to address the symptoms. None of the women in Magburaka remained symptomatic on the day of the survey though 7 (47% (95%CI: 16-81)) had unresolved symptoms in Yoni.

4.3.4 Incidence of recent febrile illness

59% (95%CI: 51-66) of children <5 years in Magburaka and 65% (95%CI: 59-71) in Yoni reported having experienced febrile illness in the 2 weeks before the day of the survey. Timing of the febrile illness relative to the day of the survey was similar in both areas (Appendix 7, Table 7.2.4).

4.3.5 Under 5 years morbidity from febrile illness on day of the survey

Amongst children <5 years with recent febrile illness, 1.9% (95%CI: 0.8-4.4) had not improved or had got worse (i.e. were actively unwell and unimproved on the day of the survey) in Magburaka compared with 14% (95%CI: 8.9-21) in Yoni (Appendix 7, Table 7.2.5).

4.3.6 Under 5 years mortality

17 of 545 (3.1% (95%CI: 1.6-6.1)) children born alive to women in Magburaka had subsequently died. In contrast, 122 of 756 (16.1% (95%CI: 13-20)) children born alive to women in Yoni had subsequently died. When restricted to children who had died at the age <5 years, mortality was 0.26 /10,000/ day in Magburaka compared with 1.55/10,000/day in Yoni (Table 7).

Table 7. Under 5 years mortality rates

	Magburaka				Yoni			
	# child <5yrs deaths	Total person time (days)	Mortality rate (/10,000/day)	95%CI	# child <5yrs deaths	Total person time (days)	Mortality rate (/10,000/day)	95% CI
U5 mortality rate	15	317730	0.26	0.16-0.43	116	746588	1.55	1.30-1.86

4.3.7 Maternal mortality

4.3.7.1 Maternal death recording in Yoni

According to interviewed informants (structured interviews), deaths (including maternal deaths) were normally recorded in 16 (55%) villages. A healthcare worker (normally a CHW) was responsible for recording deaths in 13 of these villages, in two villages the village chief was responsible and in one a teacher recorded deaths. However, when asked how death was counted only 8 (28%) villages had a death registration book (Appendix 7, Table 7.2.6).

Estimating the total number of women aged 15-49 years residing in the village was generally challenging: 4 (14%) villages provided a number derived from a population estimate of some description, in 6 villages (21%) informants provided an estimate from their own knowledge in which they were confident, and in 19 (66%) villages, informants either provided a rough guess in which they were not confident, or were unable to provide a guess.

During qualitative data collection participants suggested that both communities and rural health workers could be reticent to report deaths. District-level health workers explained that people in rural communities became panicked or afraid when they were asked for information, and sometimes refused to give it. This was generally ascribed to a fear of the investigation process which was perceived to be recriminatory and punitive, as well as health workers' concerns over admitting to 'failure'.

'They don't want to report the deaths....it's embarrassing because to me, it's totally dishonest. You have to be honest with yourself and to the community you are serving. Why [reporting] is zero, even when they lose a child? ... Sometimes they push away the death from their own centre. They will refer just at the moment they see the child will die so they will not count that death on them... I'll tell you, most of them, they falsify those reports... because if you have a maternal death, you have a whole team coming to interview you, the maternal death review committee, and then the results, in the health centre itself and in your community. Also, for children, I think they feel that someone will tell them that they were not doing the right thing, that's why this child died, so, they will not want to report five deaths in the morning.' [Magburaka (M)_71_Health Worker (HW)]

4.3.7.2 Maternal deaths in Yoni

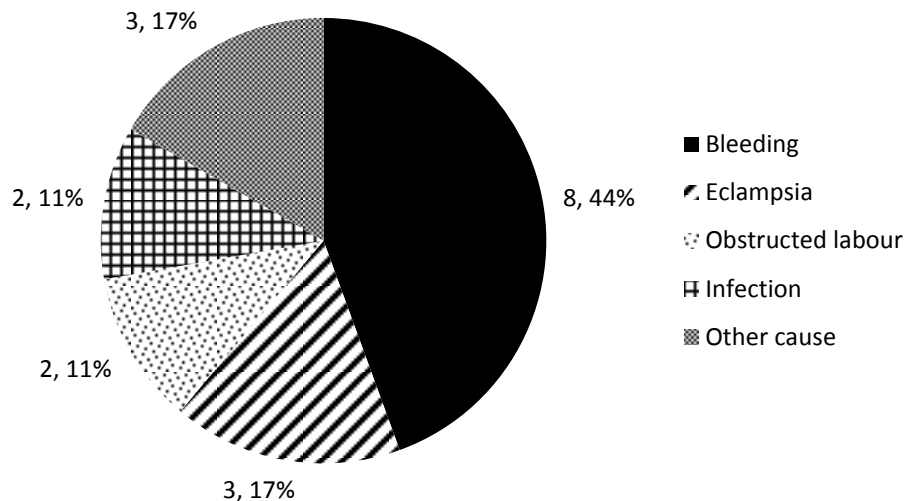
Twenty five maternal deaths were reported in total across all clusters since the Ebola outbreak. Maternal deaths were reported in 12 (41%) villages and the range in number of deaths reported by village was 0-7. Details were provided for 21 (84%) of the deaths.

Median age of women who died was 23 years and range was 15-42 years; 5 (24%) were in women aged <20 years. Of the 19 deaths where timing of death of death in relation to

pregnancy/ childbirth was known, 3 (16% (95%CI: 3.1-52)) deaths occurred during pregnancy, 7 (37% (95%CI: 16-65)) occurred during childbirth and 9 (47% (95%CI: 22-75)) occurred after childbirth.

For 18 deaths the informant was able to provide a cause of death from their own knowledge. Of those, 8 (44%) were reportedly caused by bleeding (Appendix 7, Table 7.2.7 and summarised in Figure 5).

Figure 5. Cause of maternal death (n=18) as reported by informant



Sixteen (76%) deaths occurred in the community with only 5 (24% (95%CI: 7.0-56)) occurring in a healthcare facility. In 4 (19% (95%CI: 6.0-46)) cases, the woman died whilst on the way to the health facility.

Healthcare was sought by 9 (45% (95%CI: 16-78)) of 20 women for whom this information was known. The reason provided for not seeking healthcare for all the remaining 11 women was that the health facility was too far away or was inaccessible in the time required.

4.3.8 Demographic factors associated with health outcomes

In Magburaka, lower maternal educational status was associated with stillbirth; when adjusted for age, presence of skilled provider, number of childbirths and marital status, the likelihood of stillbirth was 35% (adjusted PR 0.65 (95%CI: 0.44-0.97), p=0.03) lower with each increased educational level from none, to primary, secondary and higher. Conversely, death of live born children was more likely the higher the educational level of the woman (child death 89% (adjusted PR 1.89, 95%CI: 1.20-3.01, p=0.006) more likely for each higher level of education), however, the number of deaths in Magburaka was relatively small. No such associations were observed in Yoni.

4.4 OVERARCHING BARRIERS TO HEALTHCARE

4.4.1 Barriers to healthcare during pregnancy and or for labour/ childbirth

Barriers relate to healthcare seeking, reaching and accessing healthcare and receiving quality healthcare.

59% (95%CI: 48-68) of women in Magburaka and 90% (95%CI: 80-95) in Yoni experienced at least one problem accessing and receiving healthcare during their most recent pregnancy and or labour/ childbirth. The majority of these problems led to delayed presentation to healthcare and/or prevented women from accessing and receiving healthcare during pregnancy and or for labour/ childbirth. Overall women in Magburaka experienced less difficulties, women in Yoni generally reported greater number of barriers and attendances were delayed and prevented to a much more substantial degree (Figures 6 and 7 and Appendix 7, Table 7.3.1).

Lack of money for either paying for a consultation with a HCW or for paying for transport to get to a health facility was a problem for 26% (95%CI: 19-34) of women in Magburaka and 82% (95%CI: 71-90) of women in Yoni (Appendix 7, Table 7.3.1).

Of all women in both areas, 55% reported distance to health facility as a problem, with 68% (95%CI: 52-81) of women in Yoni reporting that it delayed or prevented their attendance. Not wanting to travel alone was a substantial problem in Yoni delaying or preventing 44% (95%CI: 31-59) of women from obtaining healthcare.

Fear of Ebola was reported by 26% (95%CI: 18-36) of women in Magburaka and 50% (95%CI: 37-63) of women in Yoni as barrier to attendance to a health facility and 20% (95%CI: 12-32) of women in Yoni reportedly did not attend a health facility for childbirth for this reason.

Women in Yoni were more fearful that would not be treated respectfully by HCWs and this led to 36% (95%CI: 26-47) of women delaying or abandoning their attempt to access health facilities.

Figure 6: Factors delaying or preventing seeking/ reaching healthcare for pregnant women in Magburaka

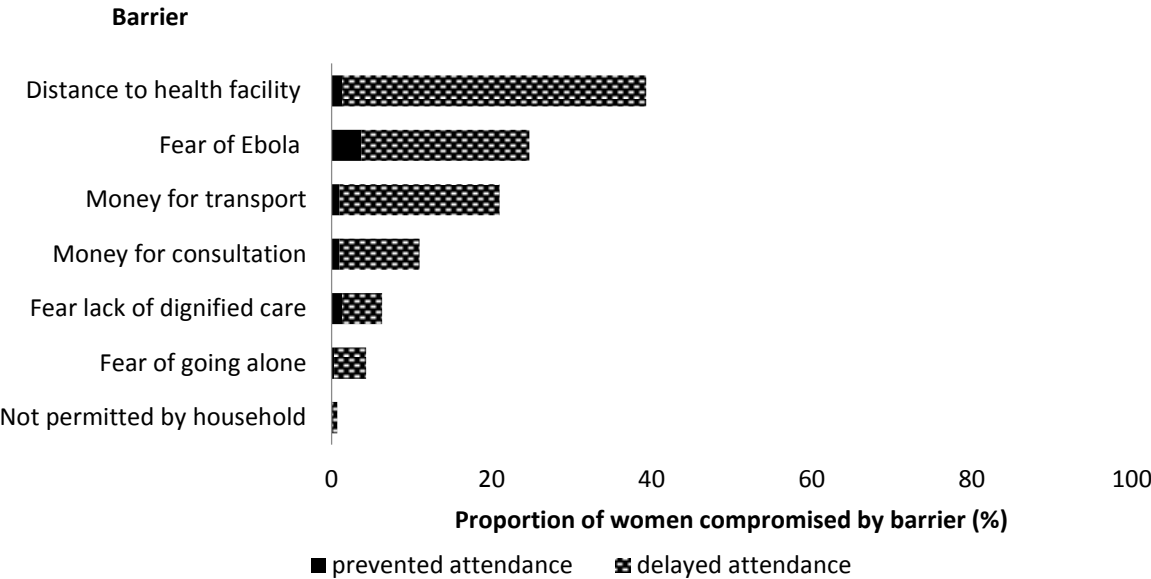
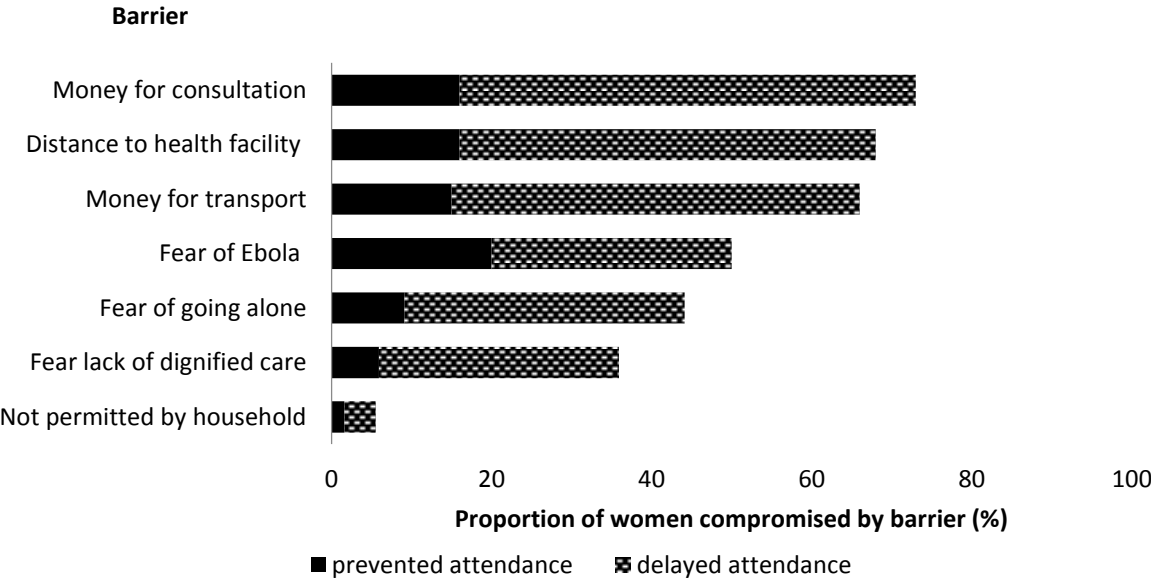


Figure 7: Factors delaying or preventing seeking/ reaching healthcare for pregnant women in Yoni



Qualitative analysis indicated several additional barriers including lack of medications and healthcare worker absences and corroboration or otherwise of the above findings. Qualitative findings are discussed in the context of delay categories below.

4.4.2 Barriers to healthcare during under 5 years febrile illness

48% (95%CI: 37-58) of carers in Magburaka experienced at least one problem accessing care for children during the most recent febrile illness affecting any of them. In Yoni however this was the norm with 90% (95%CI: 80-96) experiencing at least one problem. The majority of these problems led to delayed presentation to healthcare and or entirely prevented febrile children from accessing and receiving healthcare. Carers in Yoni reported a greater number of barriers in general and attendances were delayed and prevented to a much more substantial degree compared with Magburaka (Figures 8 and 9 and Appendix 7, Table 7.3.2).

74% (95%CI: 63-83) of carers in Yoni reported that lack of money to pay for the consultation with a HCW led to delayed attendance or stopped them accessing healthcare (Figure 9). Similarly, 71% (95%CI: 56-83) reported lack of money for transport leading to delays and non-attendance at health facilities. Lack of money for either paying for the consultation or transport to a health facility was a problem for 32% (95%CI: 24-41) of carers in Magburaka and 86% (95%CI: 76-93) of carers in Yoni (Appendix 7, Table 7.3.2).

Distance to a health facility was a common problem reported in both areas but more frequently affected attendance in Yoni leading to 69% (95%CI: 52-82) of carers delaying or abandoning their attempt to access healthcare for their febrile children. Not wanting to travel alone with febrile children was a problem for 33% of carers in Yoni (Appendix 7, Table 7.3.2).

Fear of Ebola delayed or prevented 27% (95%CI: 19-37) of carers in Magburaka and 21% (95%CI: 12-34) of carers in Yoni from attending a health facility with their febrile children.

Carers in Yoni were more fearful that they would not be treated respectfully by HCWs and this led to 37% (95%CI: 25-52) of carers delaying or abandoning their attempt to access health facilities (Appendix 7, Table 7.3.2).

Figure 8: Factors delaying or preventing seeking/ reaching healthcare for febrile children <5 years in Magburaka

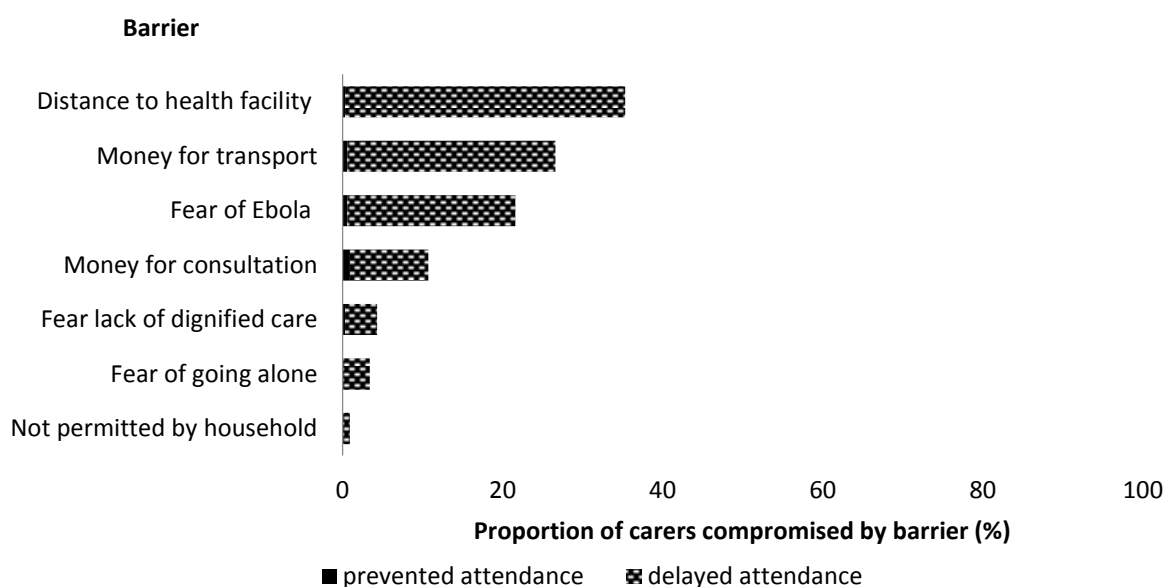
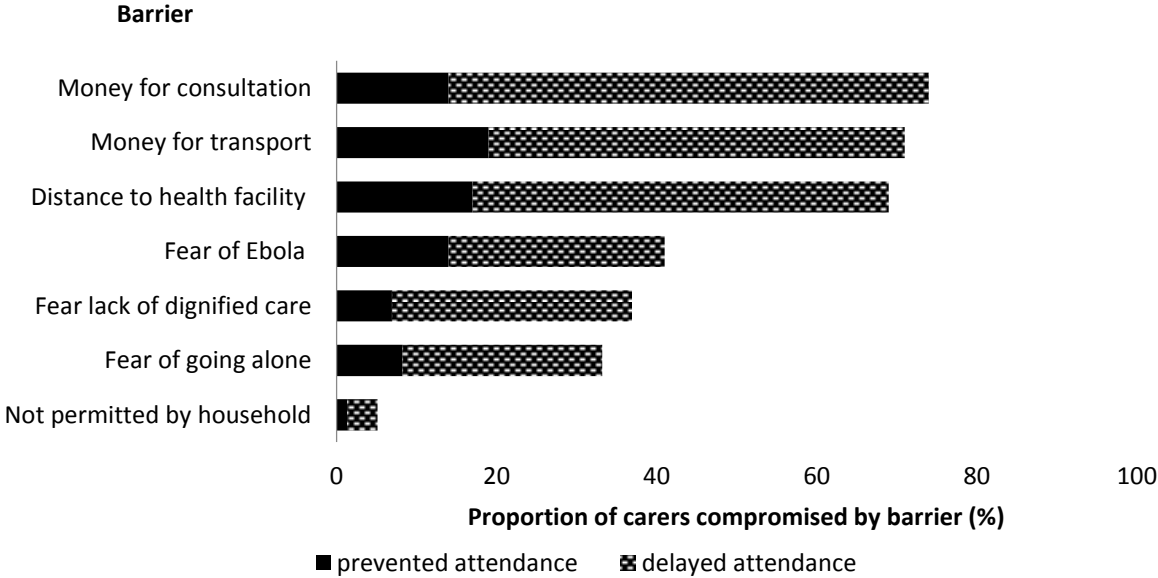


Figure 9: Factors delaying or preventing seeking/ reaching healthcare for febrile children <5 years in Yoni



Amongst carers who did not seek care for a child with febrile illness in Yoni (n=103), the most common reason provided was that the carer had traditional medicines and gave those (35% (95%CI: 15-63)) or that the distance to health facility was too far (27% (95%CI: 18-38)). In Magburaka, among the 22 carers who did not seek care for their febrile children, the most common main reason was that the child was not unwell enough to go for treatment (36% (95%CI: 14-67)) (Appendix 7, Table 7.3.3).

Qualitative analysis indicated several additional barriers including lack of medications and healthcare worker absences and corroboration or otherwise one of the above findings. Qualitative findings are discussed in the context of delay categories below.

4.5 CARE SEEKING AND DELAYS IN DECIDING TO SEEK CARE

Survey results

4.5.1 Health seeking during labour

86% (95%CI: 78-92) of women in Magburaka and 92% (95%CI: 81-97) of women in Yoni sought help (either skilled or unskilled) for labour/ childbirth.

The mean delay reported from the start of labour until women sought help/ assistance was 17.2 (95%CI: 14-21) hours in Magburaka and 16.3 (95%CI 12-20) hours in Yoni.

4.5.2 Health seeking for under 5 years febrile illness

95% (95%CI: 91-98) of carers in Magburaka vs 80% (95%CI: 63-90) of carers in Yoni sought advice or treatment when the child was unwell with (most recent) febrile illness.

4.5.3 Demographic factors associated with seeking care

More educated women were more likely to have sought help (either skilled or unskilled) for labour/ childbirth in Magburaka: the proportion of women who sought help increased by 2% (adjusted PR 1.02 (95%CI: 1.00-1.04), p=0.02) for each increasing level of their educational attainment (from none to primary, secondary and higher) (Appendix 7, Table 7.4.1). There were no similar observations for women in Yoni nor were there associations with seeking care by other demographic characteristics (age, marital status, number of previous childbirths).

In Yoni, more educated carers were more likely to have sought advice for child <5 years febrile illness, such that the proportion of carers who sought help increased by 10% (adjusted PR 1.10 (95%CI: 1.03-1.16), p=0.001) for each increasing level of their own educational attainment (Appendix 7, Table 7.2.2). However, in Yoni, those caring for more children were less likely to have sought care for the febrile child: the proportion of carers who sought care decreased by 14% (adjusted PR 0.86 (95%CI: 0.78-0.95), p=0.002) for each additional child they cared for (Appendix 7, Table 7.4.2). No such associations were identified for carers in Magburaka.

4.5.4 Factors delaying decisions to seek care

Concerns about practical barriers and poor treatment

In Magburaka participants explained that the main factors delaying decisions to seek care were concerns about costs associated with seeking care, long waiting times, and previous experiences of poor care – notably being given prescriptions and told to buy drugs, and being mistreated by health staff. All participant groups echoed the feeling that *'without money, you cannot go to the hospital'* [M_04_CL]. A lack of transport and open health facilities was also perceived to delay hospital attendance for women in labour and critically ill children during the night. Given the ready availability of other options (notably pharmacies and local off-duty nurses), participants explained they would often try these options first (often when symptoms weren't deemed to be severe), so delaying seeking care in formal health facilities.

'Some women are scared to go to the hospital; some of them are requested to pay money which they don't have, and because they don't have they will not be attended to.... free medical care is not reaching us. That is why I think most women are not going to the clinic. This fear they have will lead to complications and problems ... that is why many women die during pregnancy.' [M_43_Community Leader (CL)]

'When I don't have money I have to search around; this has delayed me a lot, to have the money before going to the hospital. [I have to take] at times ten thousand Leones... the money is paid for the drugs. Unless you have to show a token of gratitude to the person you meet in the clinic.' [Yoni (Y)_17_Mother (MO)]

'Your child is sick and you are preparing to go [to the clinic], but then person who has been there previously will tell you that the nurse is not around. When that information is given to me, I will not risk going there again because the distance is long.' [Y_18_MO]

In Yoni costs were also a major barrier to deciding to seek care, combined with distance to health facilities, lack of transport options and poor roads. Participants explained the necessary process of earning or borrowing money before they were able to seek care. Women also mentioned they feared travelling alone, particularly at night, and worried about leaving their family. Again, these practical barriers combined with concerns about the care they would find when they reached the facility (including the presence of and treatment by the nurse, and the availability of drugs) meant that women often sought treatment for their children locally (from traditional practitioners or drug peddlers). Women who went into labour at night or

who experienced 'a quick pain' (fast labour) explained they had no option other than to deliver at home.

Collective decision making processes

In both areas participants explained it could take time to reach a consensus about care, largely as decisions involved allocation of limited financial resources. For the majority of the

'For under-five children, wherein both parents are farmers and the child develops fever, the father will say he doesn't have money. Eventually because of the delay the illness will become worse since there is no money to take the child to the clinic as early as possible. By the time the father puts things in place to take the child to the clinic, the child might not make it because of the delay.'

[M_43_CL]

participants the husband/father had the final say on the choice of provider and moment of care seeking: *the responsibility lies on them for us women that are about to deliver.*' [Y_10_MO]. Mothers described their husband had to 'put things in place' before they could take their child to the clinic, and the particular challenges they faced when the father did not take a proactive role in caring for a child. Extended family (notably mothers and mothers-in-law), as well as other community members also played a role in advising women on appropriate care. Several participants indicated that the 'older generation' influenced mothers' care choices, often advocating for traditional care. In some instances women expressed a lack of control in the face of varied and often contradictory advice.

'You know when you are sick, any treatment that they prescribe for you, you just have to follow... anything they rub you just have to bear up... You should not deny your mother.'

[M_55_MO]

Waiting for severe symptoms

The narratives of many mothers and caregivers suggested limited knowledge about common illnesses, including causes, symptoms and early warning signs. Generally 'the cold' was considered to be the main cause of childhood illness, and the symptoms that prompted care seeking - convulsions and a

'We don't know [why children don't have enough blood (are anaemic)]; only God know. Sometimes when they are sick we give them medicines, we give them blood medicines, but only God knows.'

[Y_13_MO]

'lack/loss of blood' or severe anaemia – are suggestive of a critical status. Faith also played a role in care seeking behaviour, with several participants explaining that issues of health and sickness, life and death, were out of their control and in the hands of God.

'For some children we found out that they are pale, some have symptoms of malaria. And why I think they have malaria is because they are not cleaning their compounds, this is because some of them are not taken the advice we gave them...' [Y_26_HW]

'It was only at the heat of the Ebola we were worried about going to the clinic... Now that God has ended the Ebola, we go freely without fears or worries.' [Y_10_MO]

Participants explained that a fear of Ebola had deterred them from seeking care in health facilities during the outbreak. However, generally participants recognised that the outbreak is over and they were no longer concerned.

Particular challenges for young mothers

Several participants explained that teenage girls faced particular challenges in deciding to access care for pregnancy and childbirth due to the social stigma attached to their condition. Younger mothers described hiding their pregnancy and a lack of support from their family.

'When I was pregnant my parents never want me to get pregnant so they were angry at me. I beared up till the time I gave birth; when my pregnancy was due I was on my way to the hospital and I just gave birth there, by the road. And that baby never lived long; it was just two days - then the baby died...' [Y_19_Care Giver (CG)]

4.6 DELAYS IN REACHING HEALTHCARE FACILITIES

Survey results

4.6.1 Travel to health facility

Of 206 women who attended a health facility for labour/ childbirth in Magburaka 113 (55%) used a moto (motorbike taxi) or a taxi car. Of the 165 women who attended a health facility for labour/ childbirth in Yoni, 115 (70%) walked to get there despite the distance probably being greater in general than for women in Magburaka (Figures 10 and 11 and Appendix 7, Table 7.5.1). Just one person in each of the two areas reported using a government ambulance.

Figure 10. Mode of travel to health facility for labour/delivery in Magburaka

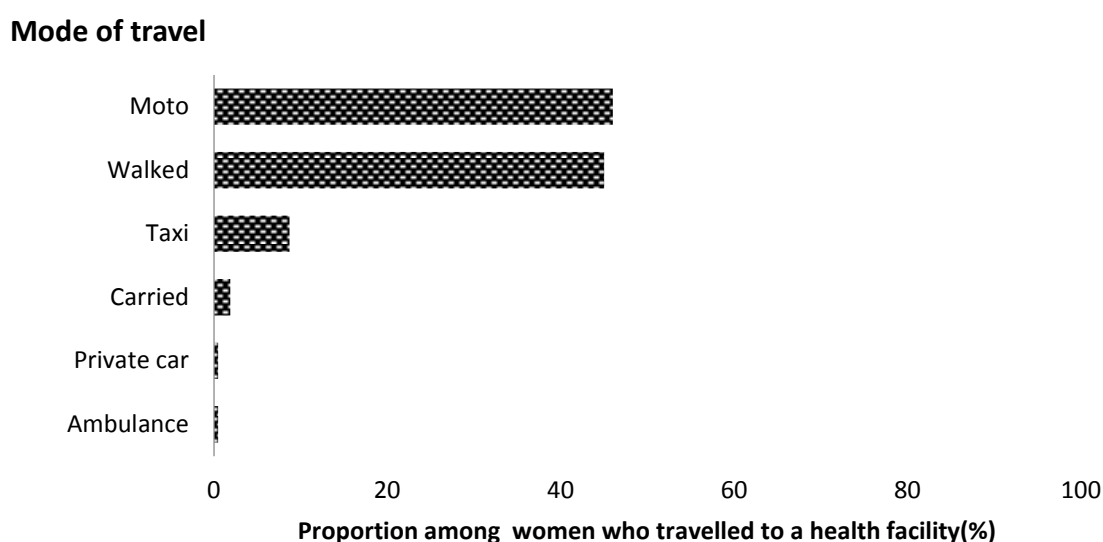
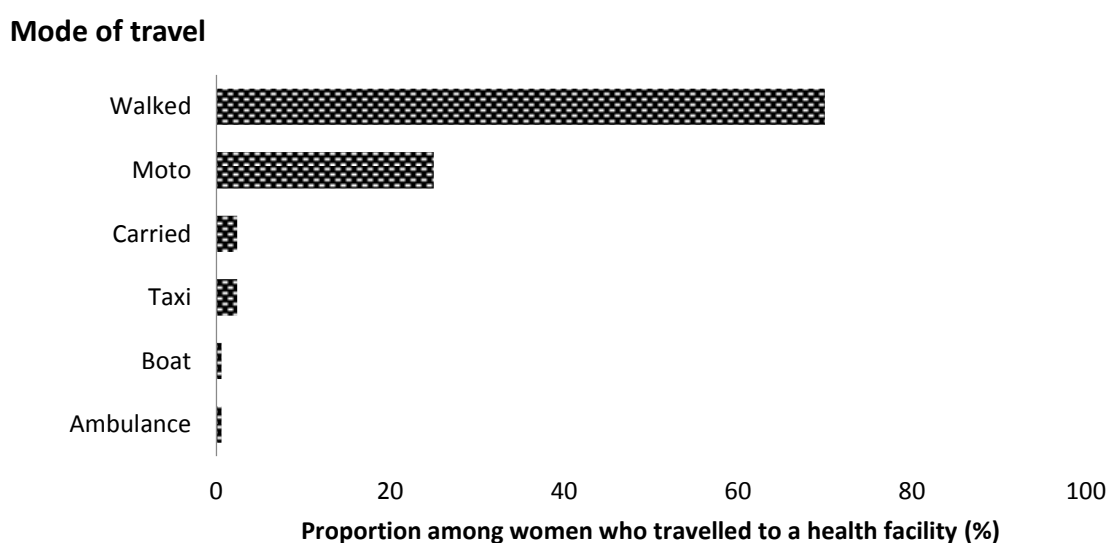


Figure 11. Mode of travel to health facility for labour/delivery in Yoni



Of women who reported paying for transport to attend a health for labour and childbirth, 16/22 (73%) in Magburaka and 14/20 (70%) in Yoni, reported that they were charged a higher than normal price by the moto/ taxi driver.

4.6.2 Hard to reach health facilities

In-depth interview participants explained that accessing care in rural areas was challenging due to a lack of transport, the costs of available transport, and bad or non-existent roads, particularly during the rainy season. In several villages far from a PHU participants described carrying pregnant women in a hammock to reach the nearest PHU, often several miles away.

Participants explained that these difficulties reaching health facilities resulted in negative outcomes, particularly for pregnant women: they miscarried, delivered at home or at the roadside, and were unable to access timely care when situations were critical. For our participants this was a clear contributor to preventable deaths.

4.6.3 Delayed referrals

Qualitative data suggests that referrals from rural areas were problematic and contributed to delays reaching health facilities. This was attributed in part to the lack of transport but also to a lack of knowledge and skills amongst rural health staff. PHU staff and TBAs were often perceived to 'not know their limits', trying to manage until the situation became critical and then referring – often when it was too late.

'If any problem arises within the village it's is difficult to find motorcycle; we use our bare feet to walk. Sometimes this leads to death of the individual. Sometimes it costs 10,000 Leones to go to the health facility, and also cost 10,000 Leones on the way back home. We normally pay 15,000 Leones when the problem arises in the night.' [Y_35_CL]

They only deliver at home because there is no option; if it we had a hospital closer to us here no woman would have delivered at home... Because some will be on their way to the hospital - like this woman [gesturing] - she delivered on the way, because there is no money for a motorbike... this is the hardship of the world...' [Y_39_HW]

'...the nurses, the health workers in the PHUs, will hold onto them for a while... The delay is: one, for them to make a decision at the PHU, and then: two, the means of transportation. This is what's making the referral come too late. They think it's something they can contain, so by the time they refer, the children come with severe anaemia. Any child they refer from the PHU, mostly comes with an HB of less than two... almost asking to die....' [M_71_HW]

'The wife comes [to the PHU] with the child, but she alone cannot give the go ahead to come [to the hospital]; she has to go back to inform the husband. If the husband is not there, she will go with the other person, or else she will not come. So, that again causes a delay.... They are worried about the transportation, they are worried about food when they come, because some people know nobody here [in Magburaka], where would they have money to purchase food? So, that is another problem in a list of problems.' [M_67_HW]

Health workers also explained that in some cases mothers or family members accompanying them delayed or resisted referral as they were unable to take the decision alone, were concerned about the financial implications of referral, and/or about leaving their families.

4.6.4 Lack of ambulances

Qualitative data suggests poor ambulance coverage and slow response time were critical factors delaying people reaching care, which participants perceived contributed to high maternal mortality rates.

'If we had a standby ambulance here [in Mile 91], when these PHU's call for an emergency, the ambulance can move from here pick them up very early and bring them here earlier. But because of that people come here very late. They come here with a lot of complications. ...because of that so many lives have been perishing.' [Y_65_CL]

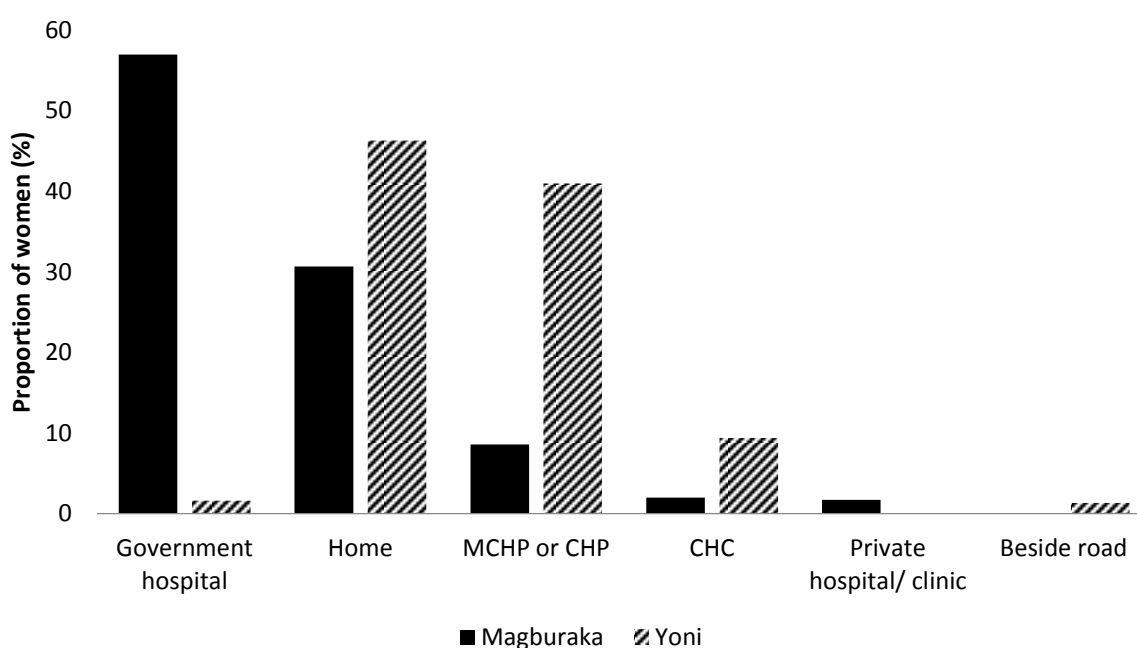
4.7 PLACE HEALTHCARE SOUGHT AND CARE PREFERENCES

Survey results

4.7.1 Place of delivery

Overall 39% of women reported giving birth at home: 31% (95%CI: 23-40) in Magburaka vs 46% (95%CI: 35-58) in Yoni (Appendix 7, Table 7.5.2). 69% (95%CI: 60-77) reported giving birth in a health facility in Magburaka and 52% (95%CI: 42-64) in Yoni. 57% (95%CI: 49-65) of surveyed women in Magburaka gave birth in the hospital compared with 1.6% (95%CI: 0.7-3.8) of women in Yoni.

Figure 12. Place at time of labour/ childbirth amongst women in Magburaka and Yoni



4.7.2 Birthplace preference

95% (95%CI: 92-98) of women in Magburaka and 88% (95%CI: 76-94) of women in Yoni stated that they would prefer to give birth in a health facility (with the remainder preferring to give birth at home).

4.7.3 Reasons for place of delivery and birthplace preferences

In-depth interview participants explained that their general preference for delivery in a health facility was due to several factors:

Shift from 'traditional' to 'biomedical'/' modern' medicine

A general shift from 'traditional' to 'biomedical' care was observed, and a corresponding increase in institutional births. Particularly younger generations explained that '*this is modern times*'

'The law is already being enacted at the hospital that no one should deliver at home.... Because it is known now that our delivery is being subjected to the modern medical ways. It is for our folks in those days that they would deliver without worries, but for us now, they say 'go to the hospital'... For us it is not just because of the law that is why people are rushing to the hospital, it's not like that. For us, we like visiting the hospital.' [Y_10_MO]

and 'delivery at home is no more' and TBA's noted a corresponding decrease in business.

Byelaws and health messaging

Byelaws prohibiting delivering at home and health education messaging promoting institutional birth clearly had a significant role in this. When asked why they preferred institutional deliveries, participants regularly stated 'because they told us...', referring to pervasive messaging from health workers, community leaders and the media. Participants' narratives suggested byelaws were more enforced and had a stronger impact in rural areas, whereas in urban areas messaging through the radio and health workers was more compelling. They also suggested that for some the line between health messaging and laws were blurred, as well as who could/would enforce byelaws: *'The law has been legalized by the nurse that nobody should give birth at home' [Y_10_MO]*.

Several participants noted that in Magburaka people had more access to health information and were better informed than their rural counterparts. Community leaders, health workers and the radio were most commonly referenced sources of health information in town whereas in Yoni conveying information through networks of local leadership was predominant. Participants explained that interpersonal information sharing was valued, given house-to-house or by trusted community leaders and local health workers. However, decisions were also strongly informed by past experiences and recommendations shared within families and communities, with negative or positive experiences of care having a significant impact on the choices of others in the future. Many participants in Magburaka explained that this had played an important role in increasing the uptake of services since MSF started supporting the hospital. In one village in Yoni participants described positive perceptions of 'lead mothers'; women linked to the PHU and charged with sharing information with others and encouraging them to come to the clinic.

Positive perceptions of biomedical care

[We prefer to go to the clinic] because we see that the clinic is the fastest... There are times when a person has a prolonged labour pain. In such situation in the hospital, they will give you some injections or drugs that will help to expedite the delivery process. That is why we are going there. In the hospital, when there are complications, they will give you injections that will help you, but at home, you will suffer until God naturally brings the time of delivery... Some foetuses are weak in the womb, but when some of these injections are given, the foetus will become strong for the delivery to be easily done.' [Y_18_MO]

This was combined with positive perceptions of medication, diagnostic tests, and treatment available at health facilities and seen to ensure a 'safer' delivery. Notably this included injections (oxytocin), perceived to speed up delivery or assist women who become 'tired' delivering 'the natural way'. Whilst women expressed some concerns about caesarean sections, there was an awareness that having this option when all else failed was positive.

'[With TBAs] sometimes they deliver safely, but there's more risk than at the hospital. At the hospital, when there's no way to deliver, the operation is there... If they are tired of delivering the natural way, [there is] no way, unless either the child lost their life or the mother lost their life. The doctor is the difference between the hospital and the home.' [M_57_CL]

Positive perceptions of MSF

In Magburaka the presence of MSF was a clear incentive for many women to deliver in the hospital due to the good quality, free care available. Participants emphasised the importance of 'encouragement' and holistic care, described as being treated and spoken to kindly, receiving explanations, as well as material support including three meals a day. Mothers explained that hearing about positive experiences of care from others also encouraged them to deliver in the hospital.

'Well, things have changed with your intervention. People prefer to go to the hospital, because you give them a lot of medicine and give them encouragement. Before there was no encouragement. When you went to the hospital, if you don't have money, 'We will not care about you.' [M_53_CL]

'When MSF encourage their staff, they will in turn also help the people that go to them. If you encourage your staff and pay them their salaries, then if they see anyone in the hospital, they will encourage us and treat us very well.' [M_42_CG]

Some participants also explicitly linked the presence of MSF with improved conditions and remuneration for staff, which they saw directly translated into improved attitudes and care.

'I delivered at home, but it was a bitter experience for me. It was raining heavily. I was having severe pain, meaning I could not even walk to the hospital.

So I had my nurse [TBA], who delivered me at home. I also had severe pain after my delivery; the afterbirth did not come earlier, so it was a bitter experience for me. I will never give birth at home... [The TBA] she tried, but she only has that ancient experience, I guess that was a problem. But she's my friend. Since she's lives locally I decided to use her. So even if I have a problem at midnight, she will see to my aid immediately, so that's why [she helped be deliver].' [M_54_MO]

Pragmatic choices based on barriers to formal sector care

Despite these preferences participants explained that in practice they often gave birth at home with the assistance of a TBA (in both rural and urban areas) or a 'local nurse' (in urban areas). The main reasons for this were proximity and availability: they were closer, could be called on at any time, and allowed flexible payment based on the means of their patients. They were also often known and trusted by pregnant women and their families, and perceived to offer good care. In some instances women described being assisted by multiple 'informal sector' workers either working in collaboration or consulted in sequence, for example TBAs working with 'quack' doctors or traditional practitioners. TBAs were also reported to administer drugs and injections in a minority of cases.

In some instances health workers in Magburaka explained that perceptions of poor care in health facilities would lead women to deliver at home, even when they lived close to the hospital, given the ready alternative of 'off duty' health workers or 'quacks' who could

assist them at home.

During Ebola the disease proved another reason for women to deliver at home due to practical constraints (travel restrictions; reduced income etc.) and fear (of contracting the disease; poor treatment in health facilities; receiving a positive diagnosis etc.). However, women explained this no longer influenced their choices around delivery as they perceived the outbreak to be over.

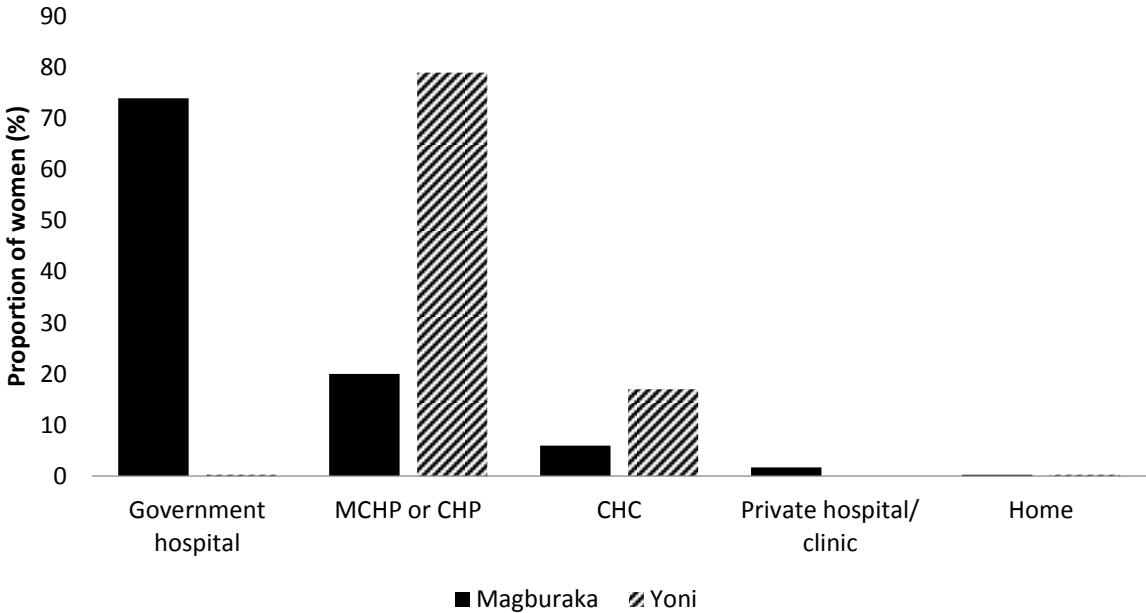
'Right inside this town, in Magburaka, where this hospital is based, as close as the back of the hospital here, even for deliveries, they prefer to deliver in their homes rather than come to the hospital. They just have a notion of 'don't want to come to hospital', until, the only thing, the hospital is the last resort. I want to repeat this, until there are complications, then they will come. Otherwise, they will not want to come to the hospital... We have a few health workers who are quacks, that go around and treat them at home.' [M_71_HW]

'[I decided to give birth at home during Ebola] because they made the thing so fearful; that when you went [to the clinic] they will put you into a vehicle and then go and kill you.' [Y_11_MO]

4.7.4 Place of antenatal care

Overall, 98% of women attended antenatal care (ANC) at least once and 99% of ANC consultations took place in government health facilities (Appendix 7, Table 7.5.3). In Magburaka, 99.7% (95%CI: 98-100) of women attended ANC with 74% (95%CI: 60-84) receiving ANC in the hospital. In Yoni, 96% (95%CI: 83-99) of women attended ANC with 79% (95%CI: 61-90) receiving ANC in a health post (Figure 13).

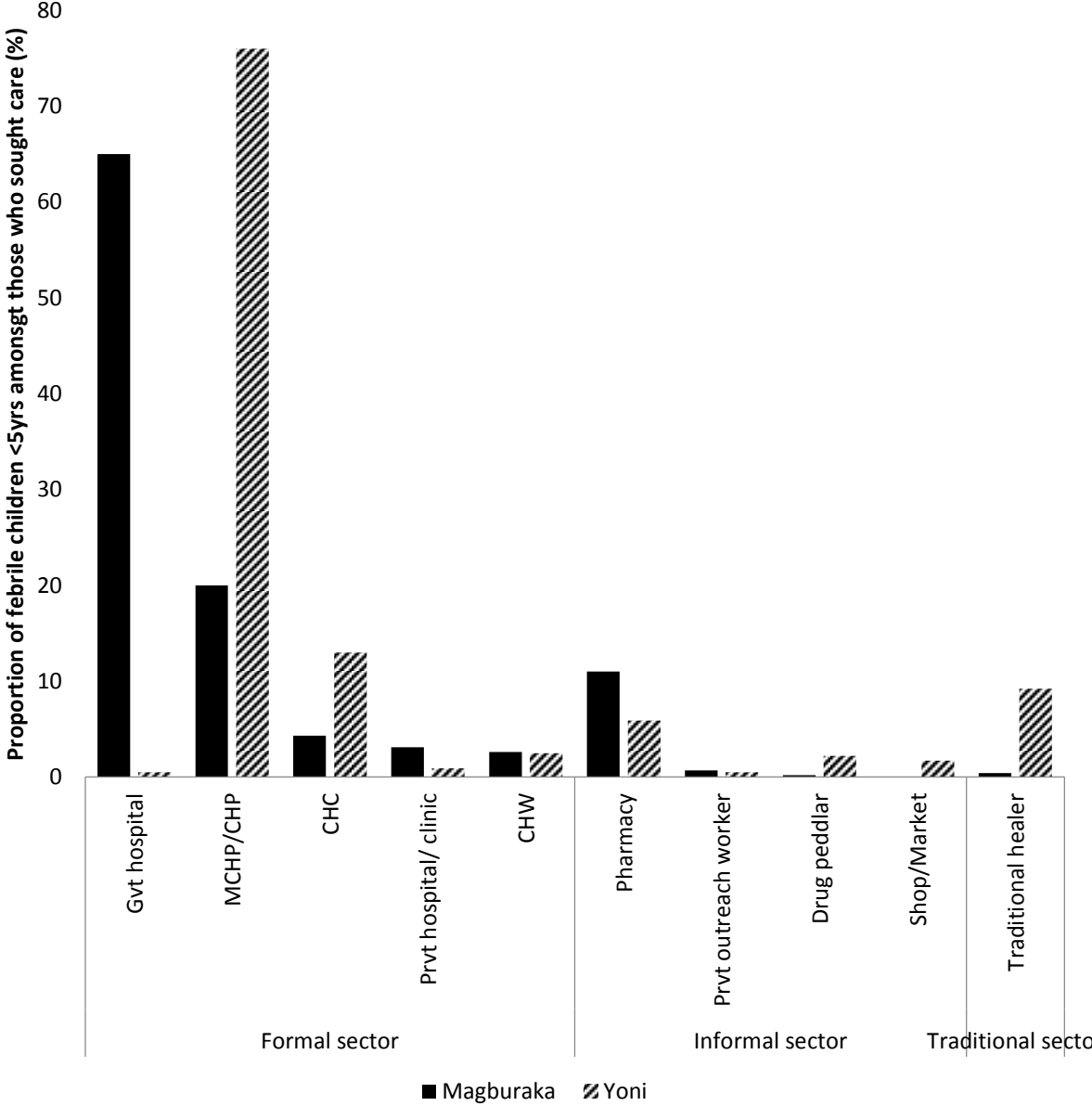
Figure 13. Proportion of women receiving ANC by place



4.7.5 Place care sought for under 5 years febrile illness

There were differences in the place/ person where care for child febrile illness was sought and the type of health facility attended in the two areas (the government hospital is located in Magburaka and there is a CHC located in Yoni) (Figure 14). Overall, 94% (95%CI: 90-96) of carers in Magburaka and 91% (95%CI: 81-96) in Yoni sought care for the child in the ‘formal sector’ (health facility or government community health worker) at any time respectively. 12% (95%CI: 6.9-19) of carers in Magburaka and 10% (95%CI: 5.2-20) in Yoni sought care for the child in the ‘informal sector’ (pharmacy, shop, market, ‘private outreach worker’, drug peddler/Pepa doctor) (Appendix 7, Table 7.5.4. Only two carers in Magburaka reported using traditional healers, though in Yoni use of the traditional healers was substantially higher (Appendix 7, Table 7.5.4).

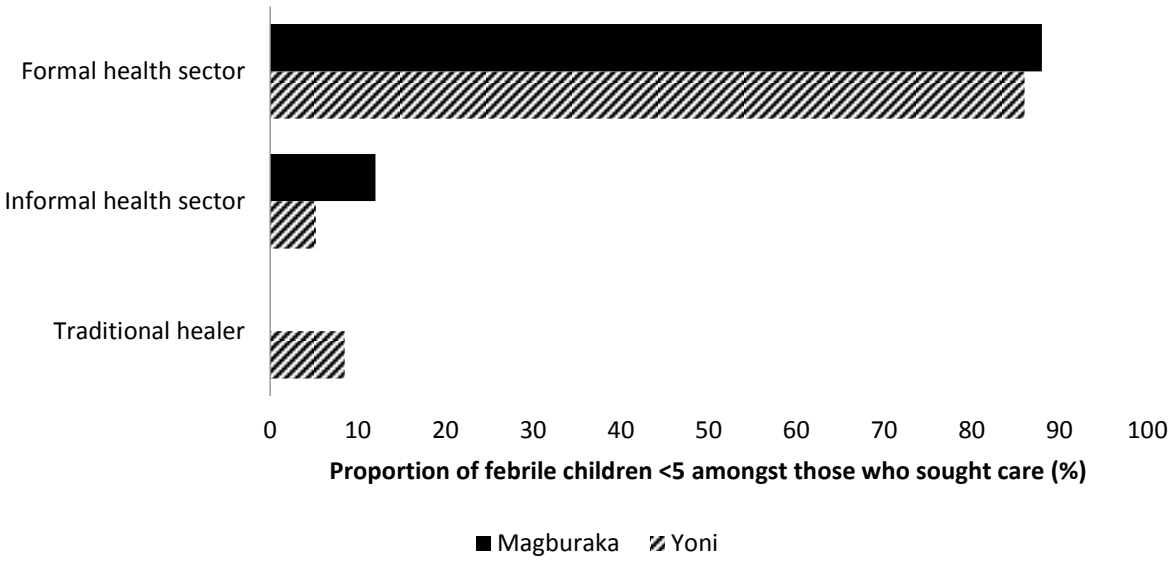
Figure 14. Place(s) sought advice or treatment at any time during the most recent under 5 years febrile illness*



*May be multiple places

Of carers, 88% (95%CI: 82-93) in Magburaka and 86% (95%CI: 77-92) in Yoni) sought care for their febrile child in the ‘formal sector’ first. In Magburaka no carers reported using a traditional healer as the first pattern of resort for advice/ treatment of the febrile child; in contrast, in Yoni, 34 (8.5% (95%CI: 3.8-18)) carers took their febrile child to a traditional healer first (Appendix 7, Table 7.5.5).

Figure 15. First place sought advice or treatment during the most recent under 5 years febrile illness



4.7.6 Reasons for care choices and preferences for children under 5

For children under five, participants explained that they preferred to seek care in the ‘formal’ sector for the same reasons outlined above for women during labour. Notably, health messaging and byelaws were mentioned that prohibited the use of ‘native herbs’ and the sale of drugs from peddlers, and carers were very familiar with health messages that encouraged them to go straight to the health facility when their child was sick.

Pragmatic choices based on barriers to formal sector care

The numerous barriers to accessing ‘formal’ sector care often meant that, in contrast to the findings of the survey, carers often chose another option first, resorting to biomedical care if this was not effective and/or when symptoms were deemed to be serious. Many health workers and stakeholders in Magburaka perceived that people saw hospital care as ‘the last resort’.

‘Some of these cases, they don’t choose the hospital as the first point. The hospital is always the last point for them. They go, they take native herbs. If they don’t, they don’t get alright and then they go to the quack. After the quack, the last session is the hospital, which should have been the first point of contact, so this is the problem we have.’
[M_72_HW]

‘Most time when the children are sick you see the drug peddler passing, they will ask you to pay some amount of money; because your child is sick you will go all ways just to get that medicine, even to borrow... when we don’t have money to buy medicine we use our native herbs to wash them and give them some to drink... Not for all sickness; headache: we will manage, stomach-ache: we will manage. If it is not okay then we have no option, just to go to the clinic and let the nurse see the sickness in the child.’ [Y_31_CL]

In Magburaka the waiting time required to go the hospital/MCHP (and subsequent time away from work) combined with the lack of medication available meant that mothers often went to the pharmacy first when facing familiar symptoms.

‘Some are saying that they don’t give enough drugs, so they don’t see a reason to go to the hospital... Some will decide to go to the pharmacy and buy their drugs. You get it immediately and come back and do your domestic job. As for us women, we have a lot of things to do at home, so some will not go to the hospital. They say, ‘If I go there I’m just going to waste my time, at the end of the day they will just give me paracetamol so I would prefer to go to the pharmacy and buy my drugs and go back home.’ [M_54_MO]

In Yoni the inaccessibility of health facilities, cost, and lack of medication meant that women often tried home treatment, either with herbal remedies or drugs bought from mobile peddlers, or consulted a traditional practitioner.

As with assistance during delivery, participants explained that during Ebola they had avoided health facilities and sought care from pharmacies and traditional practitioners due to fear of the disease.

Persisting traditional aetiologies

Whilst seeking care from a traditional practitioner was generally pragmatic, some participants also acknowledged certain conditions were perceived to require traditional treatment (such as anaemia and convulsions). A minority of participants attributed ill health to 'bad breast' (impure breast milk) or to evil spirits or 'devils'. Others explained they would turn to herbal or spiritual remedies when biomedical solutions failed. However, many participants countered this, reflecting a shift in preferences to biomedical care: *'Let the devil now meet us in the hospital.'* [M_44_CG]

'[People in rural areas] they have their perception that their first line of contact is the traditional healers, because they are always available to them in the community. They actually accept whatever [people] have, in terms of money, they are less expensive, and there is no-one that can arrange for a better system. If they have chickens, they can give in exchange for care.' [M_67_HW]

'When my son was sick I was afraid of Ebola. Sometimes they may say your son has Ebola; that why am afraid to go to the hospital... so I prefer buying drugs from the pharmacy rather than going to the hospital, so bought different kinds of drugs but later he passed away.' [M_56_MO]

'Some people when their child is sick they take the child to traditional healers and some give them native herbs... some do that, they think the illness has to do with evil spirit so they go to traditional healers... Like the child that just past here just now when he was sick and short of blood [anaemic] they said it's an evil spirit...' [M_44_CG]

'Because there are certain sicknesses in our own culture they ascribe it to be devilish. Like convulsion, they see convulsion like is an act of witchcraft... They believe that. Is not until the situation get worse, they know that oh! they need medical attention.' [M_04_CL]

4.7.7 Demographic associations with attending healthcare facilities

In Yoni, the proportion of women who attended a health facility for labour/childbirth increased by 19% (adjusted PR 1.19 (95%CI: 1.04-1.37), p=0.01) for each additional level of woman's education (i.e. none, primary, secondary) (Appendix 7, Table 7.5.7). There were no other associations between attending a health facility and age, marital status or number of previous children. There were no statistically significant associations noted for Magburaka though a similar association with educational attainment almost reached statistical significance (Appendix 7, Table 7.5.6).

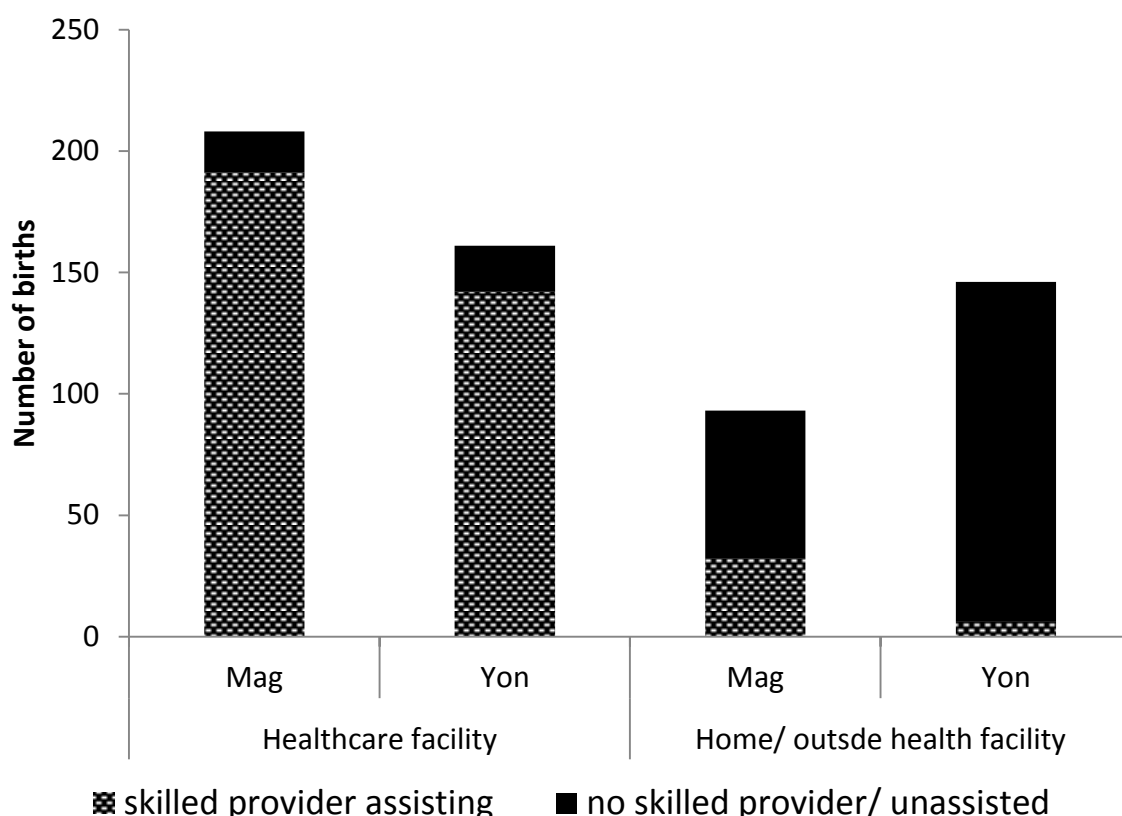
Similarly, in Yoni the proportion of carers who attended a health facility with a febrile child increased by 9% (adjusted PR 1.09 (95%CI: 1.01-1.18), p=0.03) for each additional level of their own educational attainment. The proportion of carers who attended a health facility with a febrile child decreased by 17% (adjusted PR 0.83 (95%CI: 0.75-0.92), p=0.001) for each additional child the carer was responsible for (Appendix 7, Table 7.5.8). There were no other associations between attending a health facility with a febrile child and age, sex and marital status of the carer and no statistically significant associations noted for Magburaka.

4.8 HEALTHCARE EXPERIENCE AND DELAYS IN RECEIVING QUALITY CARE

4.8.1 Skilled assistance for labour/ childbirth

Overall, 74% (95% CI: 65-81) of women reported having assistance from a skilled provider (HCW aside from TBA) in Magburaka compared with 48% (95%CI: 38-59) in Yoni. In Magburaka, of 208 who gave birth at a health facility 191, 92% (95%CI: 83-96) had assistance from a skilled provider; of 93 who gave birth at home 32, 34% (95%CI: 21-51) had skilled assistance. In Yoni, of 161 who gave birth at a health facility, 141, 89% (95%CI: 76-95) had assistance from a skilled provider; of 146 who gave birth at home 6, 4% (1.3-12) had skilled assistance (Figure 16).

Figure 16. Skilled assistance during labour/childbirth by place



4.8.2 Demographic associations with having skilled assistance for labour/ childbirth
 More educated women were more likely to have had skilled assistance during labour in both Magburaka (adjusted PR 1.08 (95%CI: 1.01-1.15), p=0.02) and Yoni (adjusted PR 1.28 (95%CI: 1.11-1.48), p=0.001). In Magburaka women with more children were less likely to have obtained skilled assistance (adjusted PR 0.95 (95%CI: 0.90-1.00), p=0.05), though older women were more likely to have had skilled assistance (1% more likely for each additional year of woman's age) (adjusted PR 1.01 (95%CI: 1.00-1.02), p=0.01) (Appendix 7, Tables 7.6.1-7.6.2).

4.8.3 Caesarean section

26/301 (8.6% (95%CI: 6.0-12)) women received a Caesarean section in Magburaka and 3/307 (1.0% (95% 0.3-3.0) women received a Caesarean section in Yoni (Appendix 7, Table 7.6.3).

4.8.4 Use of native herbs and medications to assist labour

Use of native herbs to assist labour was reported by 12% (95%CI: 7.2-19) of women in Magburaka vs 45% (95%CI: 34-57) of women in Yoni (Appendix 7, Table 7.6.3). Less educated women were more likely to use native herbs in both Magburaka (adjusted PR 0.95 (95%CI: 0.92-0.98), $p=0.002$) and Yoni (adjusted PR 0.89 (95%CI: 0.84-0.95), $p<0.001$) (Appendix 7, Tables 7.6.4-5).

In Yoni, the proportion of those who used native herbs was 32% (adjusted PR (0.68 (95%CI: 0.53-0.88), $p=0.003$)) lower among those who had assistance of a skilled provider for labour/ childbirth, after adjusting for a number of demographic characteristics including educational attainment (Appendix 7, Tables 7.6.6). This association was not observed among women in Magburaka.

Reported use of Pepa Pepa exceeded 30% in both areas although this was not differentiated from oxytocin in questioning.

4.8.5 Payment for services in labour/ for childbirth

In Magburaka, 14% of women were required to pay for something in labour/ for childbirth. However, in Yoni, 49% (95%CI: 38-60) of all women were required to pay for something in labour/ childbirth and 29% (95%CI: 19-42) were subject to a delivery charge. The services that women had to pay for are detailed in Table 7, Appendix 7.6.7 and summarised in Figure 17.

In Yoni, 12% (35/305) of women volunteered 'payment in kind' as a problem (this was reported spontaneously- it was not directly asked).

4.8.6 Investigations, treatment and payment at health facilities for febrile illness

In Magburaka, amongst children under 5 years who were taken to health facilities for febrile illness: 397/418 (95% (95%CI: 93-97)) had a blood test performed and in 6 (1.5% (95%CI: 0.5-4.9)) cases the carer was obliged to pay for the blood test; 389/421 (92% (95%CI: 88-95)) received medications and in 19 (4.9% (95%CI: 2.9-8.2)) cases the carer was obliged to pay for the medications.

In contrast in Yoni, amongst children under 5 years who were taken to health facilities for febrile illness: 329/365 (90% (95%CI: 84-94)) had a blood test performed and in 110 (33% (95%CI: 23-46)) cases the carer was obliged to pay for the blood test; 352/365 (96% (95%CI: 93-98)) received medications and in 145 (41% (95%CI: 29-55)) cases the carer was obliged to pay for the medications.

In both Magburaka and Yoni, mothers and caregivers participating in qualitative data collection reported that paying for medication and treatment was common practice, and in some instances prevented them receiving the care they needed. In addition in Yoni participants explained routine charging for other aspects of care such as under-5 vaccination cards and 'registering' a baby born at home. People often felt obligated to 'show a sign of appreciation' to the nurse; generally money or food was seen as necessary to keep him/her sweet and ensure good care in the future. In Magburaka, participants explained it was common to pay a small amount to be seen quickly in the under-5 clinic, and that rather than being given necessary medication, they were given a prescription and then had to go and buy drugs in a specified pharmacy. For women delivering in the hospital many fees were detailed, including paying for drips, tests, cannulas, and blood, although participants agreed that this had improved significantly with the presence of MSF.

'During my last pregnancy, I was having problems.... I was visiting the hospital frequently.... The care was not good. Before your intervention, if you went there as a pregnant woman, they would ask for money. They would demand money frequently. If the doctor prescribed medicine for you they would just go to the drugstore and come back and say, 'We don't have that medicine unless you buy it.' ... If you want to be treated earlier, unless you buy their drugs they won't see to you. Even syringes, they will tell you, 'Syringes have finished. I have them for sale,' and their prices are very special. Outside, if they sell this thing for 1,000 Leones then they will say its 2,000 Leones....That was a bitter experience; if you don't have money you may even lose your life. ' [M_54_MO]

Participants expressed particular frustration with these charges in the context of promises of 'free healthcare'.

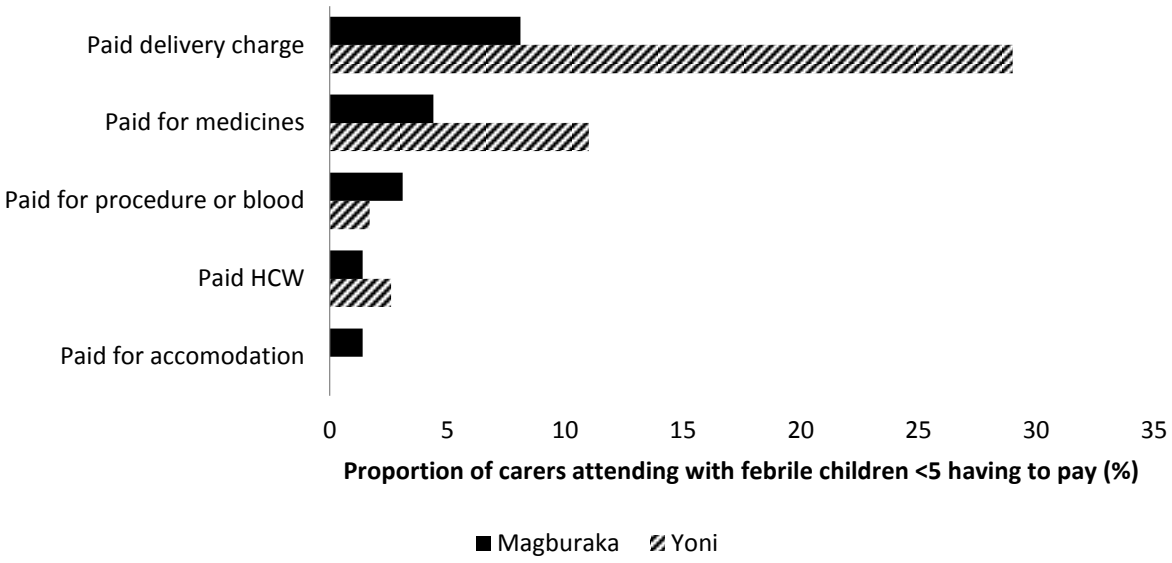
'Well you see, they are saying free health care for pregnant and lactating women, but when we get there we will not see the free health care they are talking about. They are saying if your child is sick go to the hospital, you the mother when you are sick go to the hospital, but we understand that the free health care is not operating.' [M_03_CG]

Several health workers explained the practice of charging for care in the context of their own limited or non-existent salaries, inconsistent drug supply and a lack of other basic equipment. Particularly when 'free healthcare' drugs ran out, health workers explained that they would buy 'cost recovery' drugs and sell them to patients. A lack of clarity between what medication should be 'free' and what should be 'cost recovery', and why drugs were charged for led to misunderstandings between health workers and patients/communities. Participants also explained that 'volunteer' workers would charge for care or services in order to support themselves, and in some cases would continue to do so once salaried in order to 'make up for' unpaid years.

'Whenever the free health drug are not there or some of the free health drugs are not there, [nurses] have their own that they would come and buy in Magburaka here and sell to the community people...then the community people are complaining that nurses are selling the free health care drugs.... our people don't understand [that the nurses buy the drugs] and the nurses also didn't educate people, so the there is a misunderstanding between the nurses and the people.' [M_23_HW]

'Some of my colleagues, health workers, with the free health, you come to work, and sometimes, you don't have transportation. So, when we had a huge number of volunteer nurses that was a problem. They had to sell one or two drugs so that they could have their transportation to go home... Even those of us on the salary, it's a very small salary here; a million or less, a million per month. Imagine what that can do for you? This has the tendency to make people corrupt, to ask for payment for services, because you have to also keep yourself and take care of your family.' [M_71_HW]

Figure 17. Payment for services in labour/ for childbirth



4.8.7 Absence of medications and refusal of care

In Magburaka, when attending health facilities during pregnancy 7.6% (95%CI: 4.4-13) of women were told there were no medicines available for them and 1.7% (95% CI: 0.5-5.3) were reportedly refused care by HCWs (Appendix 7, Table 7.6.9). In contrast, in Yoni, when attending health facilities during pregnancy 38% (95%CI: 26-52) of women were told there were no medicines available for them and 17% (95% CI: 9.8-28) were reportedly refused care by HCWs (Appendix 7, Table 7.6.9).

In both rural and urban areas being given inadequate medication or ‘not enough drugs’ was a common complaint, most notably in Magburaka. Mothers and caregivers spoke about how they felt they were given small quantities of medicine, or were only given basic drugs (paracetamol) and were expected to buy others from a pharmacy (notably blood tonics and syrups). Some participants felt that individual gain was behind this tendency, as nurses were seen to prescribe and refer to their own pharmacies.

‘I, as a lactating mother, when I came with my baby to the clinic, the drugs that they were supposed to give my child were not around, so they gave me a prescription and I went and bought it to give the baby. It also happened to my colleagues. They would say ‘today I went to the clinic but there were no drugs, only Panadol and that malaria drug. But my child’s body is pale; I expected to get blood syrup.’ So the ladies complain that the illness that I come for is not the medicine that gave to the baby.’ [M_23_HW]

‘When the stomach of a pregnant woman aches [she goes into labour], she should be taken to the hospital, because this is what they tell us; that we should not deliver at home.... If you don’t join clinic you will not be attended to since you don’t have a clinic card, because that is the evidence you should show to prove you do attend clinic, but if you don’t produce it you will not be attended to even if your stomach is aching you will not be attended to...’ [M_44_CG]

Some participants also explained certain ‘rules’ which may result in mothers and carers not receiving care, for example some mothers who delivered at home in rural areas explained they would have to pay 50,000 Leones to ‘register’ their child at the local clinic or they would not receive vaccinations; in urban areas that you had to attend ANC or you would be refused delivery in the hospital.

Whilst not included in quantitative data

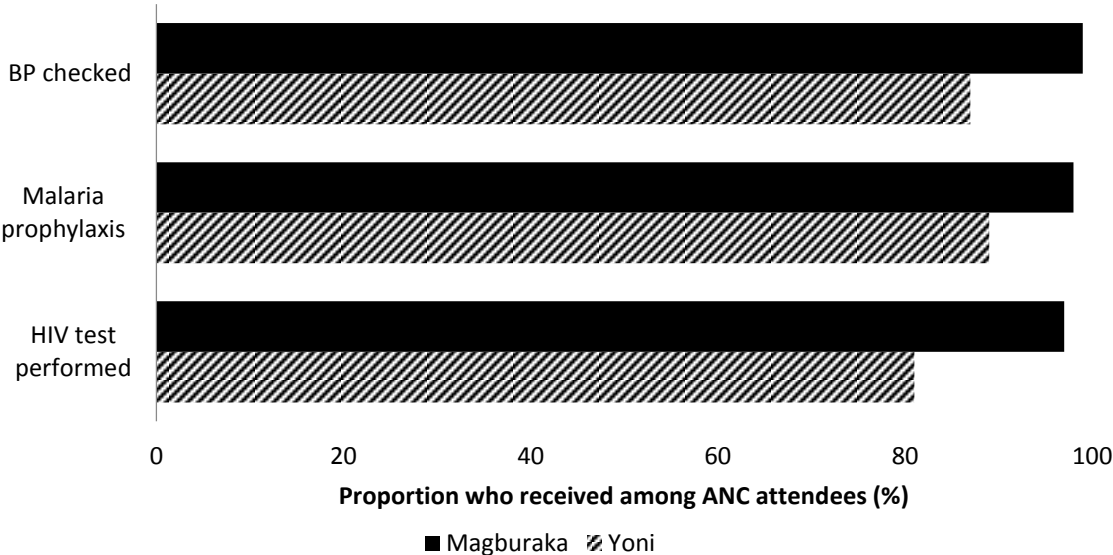
‘For me, if not for the elder people [TBAs] that were there in the PHU and that helped me when I was in labour I would have died, because [the nurse] was not there until I was finished’ [Y_27_MO]

collection, particularly in Yoni mothers and caregivers participating in interviews reported that healthcare workers were absent from the facility when they visited. As a result they had to travel on to the next health facility if they had the means or rely on less qualified staff present at the facility. In both areas, getting care at night was presented a particular challenge.

4.8.8 Composition of antenatal care

94% (95%CI: 89-97) of women attending ANC in Magburaka received blood pressure check and HIV testing and were provided with malaria prophylaxis for pregnancy. In contrast, 68% (95%CI: 57-78) of women attending ANC in Yoni received blood pressure check and HIV testing and were provided with malaria prophylaxis for pregnancy. Composition of ANC is summarised in Appendix 7, Table 7.6.10 and in Figure 18).

Figure 18: Composition of antenatal care received by pregnant women (selected results)



4.8.9 Timing and frequency of antenatal care

39% (95%CI: 32-47) of women first attended for ANC in the first trimester in Magburaka and 55% (95%CI: 47-62) of women first attended for ANC in the first trimester in Yoni. Of those attending ANC less than 2% waited until their third trimester in either area (Appendix 7, Table 7.6.11).

The mean number of attendances to ANC was 4.3 (95%CI: 4.0-4.6) in Magburaka and 4.3 (95%CI: 4.0-4.5) in Yoni.

4.8.10 Postnatal checks

In Magburaka, 94% (95%CI: 87-97) of women reported that a healthcare worker checked on the health of their baby after childbirth and for 65% (95%CI: 54-74) this postnatal check was performed the same day or the next day. In Yoni, 80% (95%CI: 69-88) of women reported

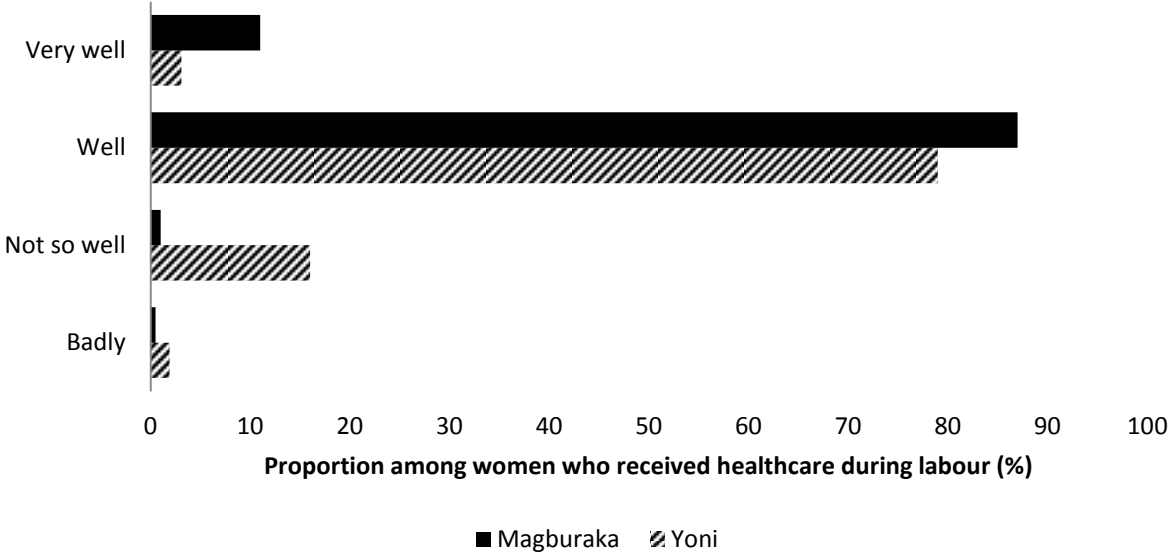
that a healthcare worker checked on the health of their baby after childbirth and for 51% (95%CI: 39-64) this postnatal check was performed the same day or the next day.

In Magburaka, 89% (95%CI: 81-94) of women reported that a healthcare worker checked on their health after childbirth and 80% (95%CI: 72-86) received this postnatal check the same day or the next day. In Yoni, 69% (95%CI: 59-78) of women reported that a healthcare worker checked on their health after childbirth and 56% (95%CI: 45-67) received this postnatal check the same day or the next day.

4.8.11 Perception of dignified and respectful care provided by healthcare workers

In terms of their perception of dignified and respectful care provided by HCWs, overall 91% of women who were treated at health facilities reported that were treated well or very well by HCWs during labour/ childbirth. However, whilst only 1.5% (95%CI: 0.5-4.4) of women in Magburaka reported that they were treated either “not so well” or “badly”, in Yoni 18% (95%CI: 9.8-31) of attending women reported this (Figure 19 and Appendix 7, Table 7.6.13). The most frequent complaints amongst women in Yoni were: not being attended to/ excessive waiting time (10/ 28 (36%) respondents) and being verbally abused by HCWs (11/28 (39%) respondents).

Figure 19 Perceptions of how they were treated in terms of dignity among women who received healthcare during labour and childbirth



‘This last time I was in labour I was feeling torment, and I didn’t want lie down in the bed because I am not used to it. So I told the nurse to take me [off the bed]. She told there is no chance for that, and told me to leave the hospital so I left. Some of my friends took me to their place and I gave birth there...’
Y_28_MO

In both areas poor treatment by healthcare staff was described as a significant barrier to quality care during qualitative data collection. Many mothers and caregivers spoke about their experiences of health workers being disrespectful, aggressive and insulting, for example being criticised by nurses for lack of ‘smart’ clothing; for coming too late or with evidence of use of tradition remedies; and for their age (being too young or too old to be a mother). These attitudes were described as particularly inappropriate from health staff as people perceived this should be a ‘caring profession’.

In some instances in Yoni participants explained this issue had escalated into a clash between the community and PHU nurse, where the relationship broke down to the extent that people would refuse to go to the local clinic necessitating the intervention of community leaders to mediate and find solutions with health workers (either improving or being replaced).

In Magburaka, mothers reported long waiting times to be seen, which was viewed negatively and meant other care options were often sought first.

'You come and across some nurses, they would shout "go sit don yan da", you know? "Go and sit down". If you say "please can you wait here, I am coming, I will attend to you", you'll give that patient more courage. Tomorrow she will run to come back if there is any issue. But [parents] are thinking "I am a master of myself in my own house... when I come to the hospital, I am just treated like I am a small boy". And when you look at some of these nurse, or doctors, you are older than them. They just talk to you anyhow...And some mothers become shy, you talk to them like small child; when she goes [home], she will never come back.' [M_04_CL]

'The nurses that are in the various PHUs, sometimes they would have problem with the community people, they may have clash, so that would prevent the people attending the clinic.' [M_HW_23]

'...when you go [to the hospital] they will not see you quickly. They are busy doing other things while you are waiting... They sit and talk, talk, talk, talk, instead of treating the patient. That is my experience.' [M_54_MO]

'I went with [my son] because he was sick.... They would not explain [what the problem was]. They will only give you drugs. They test for malaria; that is the only test they will do for babies. Take the temperature. They will not tell you what is wrong with the baby, they just give you medicine. I didn't feel good, because when I went home, if they asked me what was wrong with the baby, I had no explanation...' [M_54_MO]

Mothers and caregivers in both locations also stated they often did not get a diagnosis or clear explanation from health workers, and felt ill-informed about the health of their child.

4.8.12 Explanations for poor attitudes of health workers

When exploring the attitudes and behaviour of health workers during in-depth interviews various explanations were suggested. For some participants this was a manifestation of hierarchy and social distance between health workers and 'poor village people', and the complex interplay of fear and respect this entailed. For others, it reflected the 'negligent' or 'lackadaisical' attitude of health staff due to their 'lack of motivation', referring also to poor financial incentivisation); 'if they are not motivated, either they are corrupt or they work less....' [M_71_HW]

'Some [health workers] they grow up like that, to be harsh. They don't know how to talk to people politely. And some of them think that, because those people are coming from the villages, any way you treat them they will just appreciate. Of course people are afraid of nurses... Whenever you are in the villages and you say, 'This is a nurse,' they have high respect for you. In fact they are afraid; if a nurse tells you something and you don't do it, the next time if you come to them, they will not help you.' [M_66_HW]

Health workers themselves acknowledged they could be aggressive, but explained this was due to difficulties working with ‘stubborn’ communities where patients consistently presented too late. In both Yoni and Magburaka they discussed the challenges of working with limited resources. They described limited infrastructure and equipment, specifically small facilities lacking adapted spaces

for delivery as well as energy and equipment necessary to maintain a cold chain; interrupted drug supplies; and difficulties maintaining hygiene standards in PHUs without an accessible water supply. Participants also explained that working in these tough environments had a negative effect on their wellbeing, taking a particular toll on their mental health. Again, this was seen to have significantly improved in Magburaka and Mile 91 facilities due to MSF’s presence.

‘...sometimes I get annoyed when people delay in bringing their patients to the hospital which sometimes may cause me to refer; I don’t normally want to be referring patients, that is why I always want them to come to the health centre earlier’ [Y_08_HW]

‘Some women say they are used to giving birth without going to the hospital ... children nowadays are stubborn; they will still not come [to the clinic] unless we use some force and force them like goats...’ [Y_62_HW]

‘When I worked here with all those challenges, I cannot express how I was feeling. I was feeling guilty over every child that died. That’s because I did not have this [basic equipment]... So, it was horrible for me, and having to do rounds alone, I was the only CHO on the ward.... It was not easy. I used to come here and work; I would forget that I have to eat, because I was just buried under the job. Working with few resources, and not having the right equipment, it’s so strenuous. It can be so frustrating. I was really frustrated, yes. So, it’s not easy. Mentally, I was always feeling guilty for every child that I would not be able to save. It was really not easy.’ [M_71_HW]

4.8.13 Challenges staying in hospital

‘Most of this constraints do normally come from the referrals... some of them when they came here they have nobody to visit them, they will be alone... they think of a lot of things, they think of the children they left behind them, they think of their home, their husband... when it takes a while they want to go. The biggest thing is that they leave a lot of children and they have nobody to take care of them. They sometimes want to go back... they say, ‘I’ve got to go and take care of my husband, if I’m not there, my husband will not be mine.’ [M_66_HW]

During in-depth interviews, health workers and community leaders in Magburaka noted that staying in hospital was particularly challenging for women referred from rural areas, as they had to ensure basic provisions (food, soap etc.) with very limited resources in an unfamiliar area where they often had no family or connections, and at the same time had to leave their family at home. Health workers described challenges convincing both rural and urban mothers to remain in hospital for the duration of their child’s treatment. In Magburaka, several participants explained that only one caregiver per patient was allowed in the hospital, which was seen as negative both in terms of practical and social support.

4.8.14 Impact of experiences of unsatisfactory care

All participant groups emphasised that a bad experience in a health facility would deter an individual from seeking care in the same facility in the future, and result in them looking for alternatives, for example a pharmacy, drug peddler or traditional practitioner.

‘After they have been treated badly if any other person is sick they will decide to find a quack doctor instead of wasting their time at the health centre. Or they would prefer going to the pharmacy if someone has gone there before with a child and the child got healed they too will go there instead of going to hospital.’ [M_54_CL]

Moreover, such experiences were described to have a 'multiplier effect', as women based their decisions on where to seek care on the experiences of others, both good and bad.

'...when [women] come back they explain some of the wrong things that have been going on in the hospital, and that will hinder others not to go.' [M_04_CL]

'The trust, initially, is very difficult... when I started working here most of them the drugs I thought were very much important, the equipment, like an oxygen machine, were lacking.

If you know you come to a particular hospital, you have the human resources, the equipment, you want to come. Whereas, if you come and they don't have the human resources, or the equipment, or the drugs and you have to pay for it, people they don't actually have a trust...[M_67_HW]

Poor experiences of care were also suggested to contribute to a breakdown of trust between health workers and the communities they served.

4.9 VACCINATION AND BED NET COVERAGE

Survey results

4.9.1 Vaccination coverage among children under 5 years

Vaccination cards were available for 56% (294/529) and 53% (297/ 563) of children <5years in Magburaka and Yoni, respectively.

4.9.1.1 Measles vaccination coverage

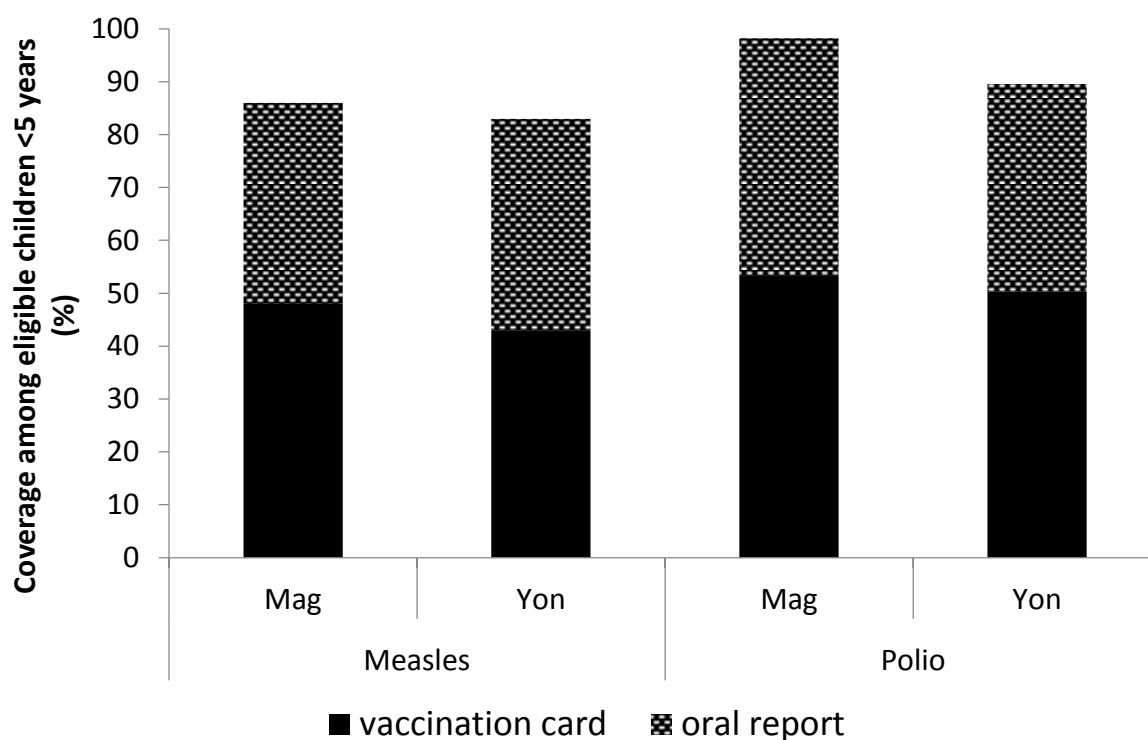
Amongst children <5 years eligible for the measles vaccine, 86% (95%CI: 80-90) in Magburaka had received at least one dose (either evidenced by vaccination card or oral report of carer) and 83% (95%CI: 59-94) in Yoni (Figure 20 and Appendix 7, Table 7.7.1).

Among children ≥ 18 months and <5years, 94% (171/181; 95%CI: 90-97) in Magburaka and 91% (153/168; 95%CI: 84-95) had received two doses of measles vaccine (either evidenced by vaccination card or oral report of carer).

4.9.1.2 Polio vaccination coverage

98% (95%CI: 97-99) of children <5 years in Magburaka had received at least one dose of polio vaccine (either evidenced by vaccination card or oral report of carer) was and 90% (95%CI: 62-98) in Yoni (Figure 20 and Appendix 7, Table 7.7.2).

Figure 20. Vaccination coverage among eligible <5years for measles and polio (≥ 1 doses) and how evidenced



4.9.1.3 *Timing of vaccination in relation to recent mass vaccination campaigns*

Of eligible children <5 years who had received at least one dose of measles vaccine, 64% (274/425) and 45% (185/411) had received the vaccine during the period of the mass measles vaccination campaign (May and June 2016) in Magburaka and Yoni, respectively.

Of children <5 years who had received at least one dose polio vaccine, 94% (488/520) and 93% (469/504) had received the vaccine during the period of the mass polio vaccination campaign (September and October 2016) in Magburaka and Yoni, respectively.

4.9.2 Demographic associations with obtaining childhood vaccination

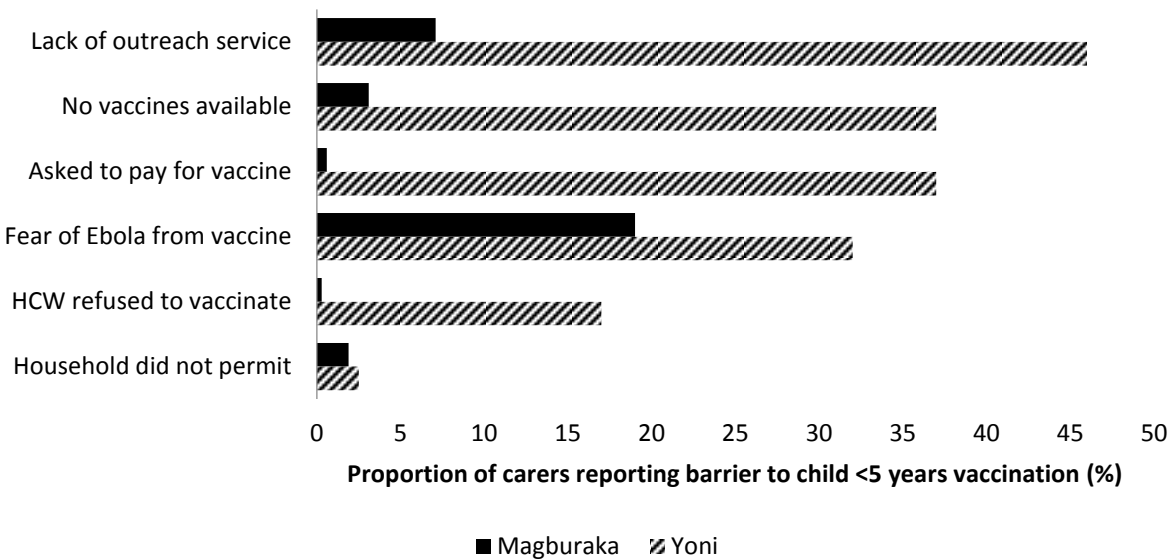
For Yoni, first dose measles and polio vaccination coverage of children decreased by 14% (adjusted PR 0.86 (95%CI: 0.79-0.94, p=0.001) and by 12% (adjusted PR 0.88 (95%CI: 0.82-0.95), p<0.001) respectively for each additional child cared for by the carer (Appendix 7, Tables 7.7.3-4) X). This association was not observed in Magburaka. There were no statistical significant associations between age, sex, marital status or educational attainment of the carer and vaccination in either area (Appendix 7, Tables 7.7.3-4).

4.9.3 Barriers to receiving childhood vaccination

Whilst in Magburaka, 25% (95%CI: 17-35) of carers reported one or more barrier to getting their children vaccinated, in Yoni, 75% (95%CI: 60-84) experienced at least one problem.

Lack of availability of vaccines was reported by 37% (95%CI: 24-52) of carers in Yoni. 38% (95%CI: 26-51) of carers in Yoni reported that they had had to pay for vaccines for their child/ children and 17% (95%CI: 8.9-30) complained that HCWs had refused to vaccinate their child/ children; in contrast this was rarely reported in Magburaka (Appendix 7, Table 7.7.5). 19% (95%CI: 11-30) of carers in Magburaka and 32% (95%CI: 22-45) of carers in Yoni reported that they were worried that their child/ children would catch Ebola from the vaccine (Figure 21). Lack of outreach services to deliver vaccinations was a problem for 46% (95%CI: 32-60) of carers in Yoni and 7.1% (95%CI: 3.4-14) in Magburaka (Appendix 7, Table 7.7.5). There were rarely problems in getting permission from head of households to obtain vaccination for children (Appendix 7, Table 7.7.5, and summarised in Figure 21).

Figure 21. Barriers to receiving vaccination for children under 5 years



Generally in-depth interview participants expressed a high acceptance of and adherence to vaccination. Many mothers delivering at home emphasised they went to the clinic after labour to register and vaccinate their baby. However, participants described cost; distance to health facilities; lack of vaccines and cold chain as major barriers to vaccination.

‘If we remain in the village, we do not have doctor who comes direct to give our children this marklate. Sometimes [they come] once in a year; unless we went to Makagbrah or Magbasha for treatment they are not vaccinated...’ [Y_35_CL]

‘We go to Magburaka [to collect vaccines] and after collecting them we have to leave them at Makeni Rokefula because we don’t have a refrigerator here. Early in the morning we have to pay and go to pick them up, so the people have to wait for a long time...For the vaccination cards if you do not give money you will not be given any card. We have to pay for transportation where we keep the vaccines, so that is why we are not releasing these cards without asking for a small amount.’ [Y_62_HW]

Health workers explained that the same barriers also compelled them to charge for vaccines and vaccination cards, as they sought recompense for costs incurred collecting

and storing vaccines.

Some health workers and community leaders mentioned that fear of Ebola had been a challenge for vaccination acceptance, but generally this was perceived to be improving, in part due to ongoing sensitisation efforts. In some instances confusion between Ebola vaccine trials and routine vaccination had led to concerns and rumours.

However, some concerns about the side effects of vaccines were evident, as health workers and community leaders explained a degree of resistance from communities and receiving complaints from mothers about the after effects of immunisation (notably rashes and bumps or abscesses). This

‘The health workers are said to have been fond of giving Ebola to people, that is what people were saying... When the study came for this Ebola vaccine, people are saying they will not take it, because they told people it’s the virus that they have transformed to another type, and that virus is going to be put into your body. People were saying, ‘I won’t take that, they want to give us Ebola, that’s why.’ So, we have people that are opting out, refusing immunisation for their child. The main problem with immunisation is people’s perception; the child is not sick, so if the technique is not too good, then that child has a swollen leg. Then the mother will go around and tell a companion: ‘don’t take your child for vaccination, that child is not sick. Mine was playful, but now they’ve given her a bad leg.’’ [M_70_HW]

was particularly evident in areas where there were concerns about vaccine supply and the integrity of the cold chain.

4.9.4 Household bed net and LLITN coverage

The median number of bed nets possessed by households in Magburaka and Yoni was identical: median of 2 (range 0-9) bed nets and median of 2 LLITN (range 0-9) per household in each area. However, the proportion of households possessing one or more intact LLITN (with no holes) was low in both areas: 31% (95%CI: 27-36) in Magburaka and 12% (95%CI: 9.1-16) in Yoni.

The proportion of pregnant women who slept under an intact LLITN the night before the survey was 23% in Magburaka and 7.4% in Yoni (Table 8). 28% of children <5 years slept under an intact LLITN the night before the survey in Magburaka and 7.8% in Yoni (Table 8).

Table 8. Intact LLITN coverage

	Magburaka				Yoni			
	# sleeping under intact LLITN	Total	%	95%CI	# sleeping under intact LLITN	Total	%	95%CI
Pregnant women	13	57	23	14-35	7	95	7.4	3.6-15
Children <5 years	195	688	28	24-33	62	786	7.8	6.0-10

Bednets were not a specific theme for qualitative data collection, and relatively few participants mentioned them when discussing common illnesses, causes and prevention. However, when the issue was raised it was usually as an example of the shortfalls of the health system; bednet distributions were described as insufficient and inequitable. Some community leaders also felt that awareness of the value of bednets was low and needed to be improved in order to decrease rates of malaria.

‘The first thing when you’re pregnant, after four-five months, you go to join the clinic. In other areas they give bed nets but for us here they did not give anything, no bed nets... they give them to another community.’ [Y_27_MO]

‘How can we combat malaria? Some have ... they are affected by malaria.... And to be candid some of these parents do not use bed nets. And before, they were giving bed nets by houses, but it has taken some time now, no bed nets. You see? No bed nets. So this is a problem. And the kind of awareness raised about the use of bed nets is another thing. Some people use bed nets to do other things; some use it for fishing, some use it on their gardens...’ [M_04_CL]

5 DISCUSSION

5.1 SUMMARY AND INTERPRETATION OF KEY RESULTS

A summary and interpretation of key results is provided in boxes below.

5.1.1 Health outcomes

Summary and interpretation of key results

- Women experienced a high frequency of difficulties/ complications in labour/ during and after childbirth, such as bleeding.
- The proportion of pregnancies reported as resulting in stillbirth was very high (6.5% in Magburaka and 2.5% in Yoni). Even allowing for potential misclassification of some miscarriages the stillbirth rate is probably above the expected rate in sub-Saharan Africa and considerably higher than the WHO stillbirth target of 1.2% (29). The higher reported stillbirth in Magburaka compared with Yoni is at odds with the pattern exhibited for other results (indicators generally worse for Yoni); however, reasons for this observation were not apparent, though possibility of measurement bias (Appendix 8) should be considered.
- Our findings suggest that obstetric fistula is relatively common and there is poor availability of corrective services for women in Yoni.
- Findings suggest an extremely high incidence of febrile illness affecting children <5 years in both areas. This reflects an expected high burden of infectious disease of multiple aetiologies, including: malaria, gastrointestinal and respiratory tract infections.
- There was a high prevalence of actively unwell/ unimproved children suffering febrile illness in Yoni and so whilst incidence of febrile illness may be similar in both areas the burden of morbidity is probably greater in Yoni.
- There was high estimated child mortality in Yoni approaching the 'emergency threshold' of 2.0/10,000/ day (30). Estimates derived from this study probably underestimate the true mortality burden.
- There was evidence of avoidable maternal mortality: it is perceived that deaths reported were potentially preventable with adequate access to quality healthcare.
- Death reporting was not systematically performed in Yoni.
- Qualitative data suggests mortality is likely to be underreported as health workers were reticent to report deaths due to the recriminatory and punitive approach to death reporting and investigation.

5.1.2 Delays in deciding to seek care

Summary and interpretation of key results

- The large majority of women in both areas sought help/ assistance (from a skilled or unskilled provider) in labour/ for childbirth
- There was a long mean delay from onset of labour until actually seeking care in both

areas

- Whilst the majority of carers sought care for febrile children <5years in both areas, there was a discrepancy in health seeking behaviour between Magburaka and Yoni: health seeking was almost universal in Magburaka but in Yoni around 1 in 5 carers did not seek advice/ treatment.
- Perceived barriers to accessing care (notably cost, lack of medication and the poor attitudes of health staff) resulted in delayed care seeking. Distance was a particular barrier in Yoni; waiting time more an issue in Magburaka.
- Barriers also prompted people to seek care from other (closer, cheaper, quicker) providers, notably TBAs and traditional practitioners in rural areas and traditional practitioners and local 'off duty' nurses in Yoni.
- Decision making around care seeking usually relied on the husband/head of household as controller of family resources. Other family/community members also advised on appropriate care. Weighing up options and gaining approval often delayed care seeking.
- Seeking care in formal facilities was delayed until severe symptoms were apparent (anaemia, convulsions) and a lack of knowledge about causes and symptoms of common diseases was suggested.
- A degree of fatalism linked to faith in 'God's will' was evident.
- Whilst fear of Ebola had delayed care seeking during the outbreak this was no longer perceived to be an issue.

5.1.3 Delays in reaching healthcare facilities and healthcare workers

Summary and interpretation of key results

- A high proportion of women reported giving birth at home or outside of health facilities in both Magburaka (31%) and Yoni (48%).
- This proportion is less than reported by DHS 2013 pre-Ebola, (stated that 22% of urban women and 50% of rural women gave birth outside of institutional settings). However, births outside health facilities are probably underestimated in this study. Qualitative data collection suggests significant social desirability bias (Appendix 8) as participants were likely to have felt pressure to report institutional births due to byelaws and strong health messaging prohibiting home births.
- The vast majority of women stated a preference for attending a health facility for their next childbirth suggesting that for most giving birth at home was not out of choice, rather as a default when healthcare was inaccessible/ unavailable.
- A large proportion of women walked to healthcare whilst heavily pregnant and or during labour, to reach healthcare for childbirth. A higher proportion of women walked to health facilities in Yoni compared with women in Magburaka despite distances being generally greater than for women in Magburaka.
- Transport is largely unavailable for women and carers in Yoni. Women using moto or taxi car were frequently over-charged.
- Use (availability) of ambulances was minimal and slow response times were perceived to be problematic.
- Delayed referrals were seen to contribute to delays reaching care, either as health workers held on to patients in rural facilities or patients refused to be referred due to concerns about the financial implications of referral.
- The vast majority (>95%) of women attended antenatal care at health facilities at least once. This is consistent with DHS 2013 suggesting both high motivation to attend and accessible service provision.
- The survey indicated a clear preference for biomedical/ modern healthcare over traditional remedies (no carers in Magburaka and few carers in Yoni reported going to a traditional healer as first option for care of a febrile child). Qualitative data also indicated that people preferred biomedical/ modern healthcare but suggested that use of traditional healers was more common than reported by the survey. In interviews several carers described seeking care first from a pharmacy or traditional practitioner, largely as they were closer and cheaper than formal health facilities.
- In Yoni, more educated women were more likely to attend healthcare for labour (though education may also reflect higher socio-economic status) and carers responsible for more children were less likely to take febrile, unwell children to healthcare. That these associations were not noted for Magburaka may reflect greater challenges for carers living in more rural areas.
- Delays in reaching care were perceived to contribute to future delays in deciding to seek care, and deciding to seek care elsewhere in the future, and roadside deliveries;
- Delays in reaching care were considered a major contributor to preventable maternal and child deaths.

5.1.4 Delay in receiving quality healthcare and healthcare experience

Summary and interpretation of key results

- Less than half of women in Yoni had assistance from a skilled provider compared with three quarters of women in Magburaka.
- Almost all women who gave birth at home in Yoni did so without skilled assistance whilst around one third of women in Magburaka who gave birth at home were able to obtain skilled assistance. 'Off duty' local nurses were reportedly available for many women in Magburaka.
- Better educated women were more likely to obtain assistance from a skilled provider (may also reflect higher socio-economic status).
- In Magburaka women with more children were less likely to obtain skilled assistance; this may reflect active choice amongst some more experienced women.
- A low proportion of women received Caesarean sections, and in Yoni the proportion (1%) was well below the 10% threshold internationally considered minimal to avoid excessive maternal death (31).
- Use of native herbs to facilitate labour/ childbirth was common in Yoni. This may reflect belief in efficacy of traditional methods and or lack of faith in healthcare. The nature and potential adverse effects of native herbs is uncertain.
- Payment to HCWs or to the health facility (either in monetary terms or in kind) for services rendered during labour/ for childbirth was common practice in both areas, and almost the norm in Yoni. 'Unsolicited' payments such as 'showing a sign of appreciation' in Yoni and paying a small amount to be seen quickly in Magburaka were also common.
- Payment was seen as particularly problematic as it was contrary to promises of 'free healthcare' for pregnant women, lactating mothers, and children under 5.
- Health workers acknowledged they would charge to manage shortages in drug supplies and to complement their own meagre or non-existent salaries.
- A common barrier to healthcare in Yoni was lack of medicines and being turned away from healthcare. Qualitative analysis revealed a lack of medication was also a major issue reported in Magburaka. In some instances this was due to health workers issuing prescriptions and instructing patients to buy drugs from a pharmacy; in others participants felt the type or quantity of drugs given by the health provider was insufficient.
- Mistrust of health professionals was evident from interviews- for example suspicions of personal gain were often behind allegations concerning payments and lack of free healthcare provision
- The absence of health workers in rural areas was a barrier described during qualitative data collection.
- A large proportion of women first attended antenatal care beyond the first trimester, the period recommended by WHO for women to first present (32).
- The ANC received by women in Yoni overall was inferior to that of Magburaka with essential components of care (BP check, HIV test and provision of malaria prophylaxis) comparatively under-provided.
- There was a relative lack of receipt of postnatal care in Yoni, thus increasing the risk of death after birth for both women and new-born. The reasons for this were not elucidated though lack of provision might be assumed.
- Whilst rarely reported in Magburaka, lack of dignified treatment by healthcare workers was reported commonly in Yoni compatible with findings that concern about potentially offensive and or undignified care was a major barrier leading to delayed presentation in Yoni. A substantial improvement was reported in Magburaka since the presence of MSF.

- Bad attitudes of health workers were attributed to social distance between them and 'poor villagers' and also a lack of motivation, both in terms of their approach to work and their financial incentivisation.
- Health workers explained that working in challenging conditions combined with frustrations with parents and caregivers presenting late for care could result in them becoming angry or tough with patients.
- Most ($\geq 90\%$) febrile children reportedly underwent a blood test and/or received medications in both areas which is suggestive of appropriate care.
- Payment was commonly required for tests and treatment for children < 5 years in Yoni.
- Staying in hospital was a particular challenge for patients and carers referred from rural areas due to the financial implication of a stay in an unfamiliar town and concerns about leaving family at home.
- Experiences of poor care were described to have a significant impact: they deterred people from seeking care in the same facility again and encouraged them to find another option – often in the informal sector. Moreover they also discouraged others from seeking care in the same place.

5.1.5 Barriers and enablers influencing care seeking and access to healthcare

Summary and interpretation of key results

- A large proportion of women and carers in both areas reported problems which delayed or prevented them accessing healthcare for themselves during pregnancy and for their children < 5 years.
- There were significant differences between areas with individuals in Yoni experiencing barriers to a much more substantial degree- almost all women and carers in Yoni experienced problems which delayed them or prevented them accessing healthcare.
- A substantial number of barriers to accessing healthcare were reported, indicating reasons for delayed healthcare seeking or access may be due to a single or multiple barriers at any given time.
- Barriers included but were likely not confined to: requirement for money for consultation (for direct or indirect payments to HCW or for care); money for transport; distance to healthcare facilities; travelling alone in rural areas; a fear of catching Ebola; a fear of receiving undignified treatment by healthcare workers.
- The reasons provided by carers in Yoni for not seeking care related to difficulty in accessing care in over half of cases, although one third preferred traditional medicine; rarely was the child deemed well enough that care was not required.
- In Yoni better educated carers were more likely to seek care for febrile children, though carers with more children were less likely to seek care when a child was sick. However, higher educational status may also reflect higher socio-economic status.

5.1.6 Vaccination and bed net coverage

Summary and interpretation of key results

- Only around half of carers possessed vaccination cards for children so reducing confidence in vaccination coverage estimates.
- Estimated one dose measles vaccine coverage was below the threshold of 95% required to achieve herd immunity in both areas
- Estimated one dose polio vaccine coverage was below 95% in Yoni.
- Results indicate a high degree of success of recent mass vaccination campaigns with the vast majority of vaccinations provided during the campaigns.
- An estimate of baseline vaccination coverage before the mass campaigns cannot be derived from this study
- Fear of Ebola was commonly reported as a reason for not vaccinating children in both areas, although this was not reported as a significant concern during qualitative data collection.
- Concerns about side effects were seen to deter carers from vaccinating their children.
- Generally carers in Magburaka reported few barriers in obtaining vaccination for children
- Carers in Yoni reported multiple barriers to obtaining vaccination for children including requirement to pay for vaccines and absence of vaccines.
- Health workers in Yoni also explained charging for vaccines and vaccination cards in order to recover the costs they incurred in collecting and storing vaccines, particularly in facilities without cold chain facilities.
- Lack of outreach vaccination activities was perceived as a major barrier to vaccination for children in Yoni.
- Most households possessed a bed net however few of these bed nets were intact LLITNs.
- LLITN coverage amongst pregnant women and children <5 years was low in both areas and negligible in Yoni.
- Qualitative data suggests that bednets were not considered a major factor in disease prevention.
- Bednet distributions were seen as insufficient and inequitable.

5.2 KEY THEMES IDENTIFIED

5.2.1 Inequity in access to health care and inequalities in health

There were clear differences between Magburaka and Yoni both in terms of access to care and health outcomes.

Health differences between Magburaka and Yoni cannot be wholly attributed to differences in health services; rather there is complex interaction between social determinants of health. The difference in health care access and provision is probably attributed in part to good service provision for people living in Magburaka relative to the rest of the population of Tonkolili. MSF with MoHS has aimed to provide quality free healthcare to pregnant women and children <5 years resident in Tonkolili District. The study area in Magburaka town is in the immediate catchment area for the hospital so is best served in comparison to the rest of the district so easier access and higher quality care from a secondary healthcare facility should be expected. Although Yoni is served by Mile 91 CHC this study suggests for the

majority of women and children in Yoni the CHC may not be accessible. As a result, findings from Magburaka are likely to be the exception and the rest of Tonkolili is likely to be more similar to Yoni. .. It is also possible that they are not representative of other similar urban areas where government health facilities are unsupported.

Whilst the hospital is intended as the secondary care provider for the district, at the present time it is likely that it is not sufficiently accessible for a large part of the population in the district.

The most important evidence for the impact of inequity in health service provision is that whilst the extent of morbidity is similar between Magburaka and Yoni (for example similar incidence of febrile illness and similar frequency of obstetric complications); health outcomes are different (such as child mortality, C-section rate and suspected obstetric fistula).

Accessing care for those based in rural communities generally is a far greater challenge than for those in urban settings. As such, caregivers often wait until the onset of more severe symptoms before navigating the logistical, social, financial and geographic barriers to care, and pregnant women must make difficult choices about whether they choose to deliver at home or risk not reaching a health facility, being turned away, or being met with insufficient staff or resources to facilitate a safe delivery. Disparities in health indicators between urban and rural settings are not uncommon, and a recent systematic review has called for greater attention to be paid to the regional variability of maternal and child health services in sub-Saharan Africa (33).

The difficulties accessing villages in rural areas of Yoni chiefdom are particularly problematic, with poor roads and some villages being only accessible by boat in the rainy season. Interviewees also expressed how they feared to travel to a health facility at night because of security concerns. Previous studies have viewed a women's decision to deliver at home through a risk aversion lens, stating that *"a women's choice to deliver in the village is not a result of passive inaction or lack of knowledge about the potential risks she may face, but rather an active choice to reduce risks that she perceives as being of more importance"* (34), a statement with which, our findings are aligned.

Previous studies have linked distances to health facilities and extended travel times to increases in maternal death and under 5 mortality in low-middle income countries (35–37), and so, in the absence of alternative options innovative strategies have to be explored to reach these communities. For example, other districts of Sierra Leone have adopted 'maternity waiting homes' – a facility in which a woman 'waits' for childbirth to ensure she can have a skilled birth attendant present (38).

5.2.2 Pluralistic health system

Interviewees described a pluralistic approach to healthcare – with members of society consulting both biomedical and traditional practitioners, despite a general preference for biomedical care. The community has multiple care seeking strategies that are often sought concurrently or in sequence and the use of traditional treatments was often interchangeable, pragmatic and based on the (often limited) options available. Different therapeutic pathways are chosen, particularly by carers of children under 5, and indicate that people will often have multiple interactions within the plural health system before finally reaching a 'formal' health facility.

For children under 5, caregivers often used native herbs in a first instance, with biomedical providers being consulted if symptoms persisted or worsened. For some, the decision was based on previous interactions with the health system or existing beliefs about disease aetiology, with some symptoms being related to a spiritual illness requiring a traditional

intervention, versus a biomedical illness requiring clinical care (39). For pregnant women, a TBA might accompany the women to the health facility to give birth, or deliver the child herself if reaching a health facility is not possible.

This syncretistic approach to health seeking behaviour has been found in other studies from west Africa (34). The shifting social norms around care seeking 'in modern times' was evident in our research, with traditional practitioners often stating that younger generations were uninterested in learning their techniques and favoured 'modern' medicine.

This contradicts much published work from Sierra Leone which largely states that for childbirth, pregnant mothers prefer visiting TBAs (34,40). However, this is the first study of its kind post-Ebola, and so the outbreak could have contributed to a shift in which type of care patient's favour. It is also likely to reflect recent health messaging encouraging institutional deliveries and byelaws prohibiting home births, and/or an increasing preference for institutional delivery after the implementation of the FHCI (41).

Despite the preference for 'modern' medicine, there was an undercurrent mistrust of the formal health service. This was either based on previous experience of poor care or hearsay from other community members, and was expressed through frustrations with knowledge that care was supposed to be free but in practice rarely was, feeling poorly treated by staff, poor drug supply/equipment and patients feeling that they did not receive 'enough medicines'.

5.2.3 Complexity of financial barriers

It is clear that despite financial barriers to healthcare supposedly being removed by the FHCI, in practice there are many costs that pregnant women and caregivers, particularly those in rural areas, have to bear. Payment could be requested at each interaction with the health system – for consultations, prescriptions, vaccination, birth registration etc. In addition, the costs for transport are significant and often prohibit patients from reaching care. This finding is supported by other studies which found that the beneficiaries of the FHCI often had to pay for supplies and drugs (42).

If payment is necessary the community must find ways to generate income if money is not immediately available, and/or offer 'signs of appreciation' such as food. Alternatively, they seek cheaper options, such as going to pharmacies, drug sellers, or traditional healers. Although there is an awareness that healthcare for pregnant women and children should be free under the FHCI, individuals seek (or do not seek) care in anticipation of costs. However, the costs incurred in the formal health system are unknown and this uncertainty contributes to the mistrust apparent between communities and health workers. Other studies conducted in Sierra Leone found financial costs to be a primary barrier for women accessing maternal health care (34) and other countries where free healthcare has been implemented have found this action alone does not ensure access to care for all (43).

Health workers are often unsalaried and work in challenging conditions where stockouts and poor infrastructure are the norm (44). A loss of income from user fees could further reduce the already small human resources for health workforce (45). Despite an Amnesty International report stating that in Sierra Leone '*whether paid or unpaid [staff], would unilaterally and illegally charge fees and keep the money*' (46), it is clear that it seems counter intuitive to offer free healthcare whilst relying on a largely voluntary workforce who are forced to recoup costs by alternative means.

5.2.4 Value of community health workers and TBAs

Due to the limited skilled staff available in rural areas, the Government of Sierra Leone has sought to address this issue by bringing care into the community via community health

workers who can monitor for childhood diseases and refer those who need medical attention. Despite commitment to integrating CHWs into the national health workforce (demonstrated by the Government's Policy for Community Health Workers, 2012) in practice their limited training and absent or interrupted supply of drugs and diagnostics means in practice the care they are able to provide is limited.

Despite our research showing that mothers and caregivers generally have a preference for biomedical care, the community trust for traditional practitioners such as TBAs remains. This trust could be related to the continuous presence of traditional providers throughout years of conflict and epidemic versus the often interrupted or unreliable formal healthcare service (44).

After the FHCI was introduced, Sierra Leone made it illegal for TBAs to assist deliveries. However, our study found that TBAs in Sierra Leone still play a very active role in a woman's journey through pregnancy and childbirth, often serving an 'auxiliary' role, providing assistance in health facilities and/or offering advice and accompanying pregnant women to hospital.

Further focus should be put on strengthening the role of CHWs and ensuring they have the capacity and means provide care in their communities. In addition it must be recognised that TBAs are another important bridge between the community and the health system, and alongside CHWs, could be used more effectively, particularly in hard to access areas (47). As respected members of the community and in the absence of rural health workers, inaccessible health facilities and poor perceptions of the healthcare staff that are available; bringing them into the health system more formally could present a very real opportunity to enhance community based care. This is corroborated by other studies that have found those who had poor quality care at a health facility were more likely to receive treatment from a CHW (42). It is understood that some interventions including CHW training and TBA inclusion are being developed for implementation or are under consideration.

5.2.5 Need for tailored health promotion messaging

CHWs, TBAs and other community leaders are also an important source of health promotion messaging. Our study revealed a number of gaps, with participants stating the need 'to keep their house clean' as a way to keep themselves and their children healthy instead of knowing common signs and symptoms of disease and ways to prevent illness e.g. using bednets. Health promotion messaging also needs to go beyond 'go straight to the health facility'. Communities have a sound awareness of what they 'should do' in terms of care-seeking, but this is often impossible in the face of the many practical constraints they face. Health promotion messaging should also target husbands/partners and whole families, not just women, given the role of others in decision making.

5.2.6 Consultative decision-making/ candidacy of care and disempowerment of women

Our findings suggest that the husband places a critical role in decision making regarding health care, alongside older respected members of the community, particularly mothers in laws or TBAs. Mothers and female caregivers consult their husbands as they need money to travel to and/or pay for care, whereas TBAs are consulted for support during delivery and childbirth. This consultation with multiple individuals might be necessary as they negotiate their family situation, such as finding childcare for their other children.

Given that mothers and caregivers were found to rarely seek care without consultation and this lack of agency may account for some delays to seeking care. Scott and colleagues (44) state that '*choosing not to access health facilities immediately does not reflect a passive failure to act or an absence of knowledge but instead active engagement of resources to find the best care strategy in constrained circumstances*'.

Our study found that participant's faith played an important role in how they perceive health, with frequent references to the inevitability that you're 'in God's hands'. Although it was unclear how much this influenced individual care-seeking, this fatalistic view has also been referenced in other qualitative work where God is the 'ultimate decision-maker' (34).

Other authors have discussed the notion of constructing 'candidacy' in healthcare i.e. the mother or caregiver being able to articulate what they want and assert what they need (48). Given that Sierra Leone is a patriarchal society, with women in rural areas having particularly low education levels this 'candidacy' might be limited. Ricketts and Goldsmith (49) also suggest that *'care seekers develop competencies to avoid interactions that negatively affect their self-worth and sense of trust'*, and so it is clear that the negative attitudes of health workers would also have an impact on individual care seeking. This is also supported by our findings which found that although health workers were generally respected members of the community, they often showed their social standing by being authoritative and 'punishing' patients for e.g. presenting late. Health workers also have pride in their work and feared 'messing up', resulting in them often trying to solve medical challenges beyond their capabilities as they do not want to admit certain situations are unmanageable. With this in mind, through training and supportive supervision of health workers, there is an opportunity to try and shift from a culture of blame and punishment to an environment where patients feel welcomed and health workers do not fear retribution for their mistakes.

Findings above are suggestive of widespread female disempowerment including poor educational attainment, and polygamous marriages. Whilst educational attainment was found to be statistically associated with health behaviour this study indicates that many factors indicative of disempowerment (such as lack of power in decision making, lack of financial means) contribute to delays or prevent access to healthcare.

5.2.7 Defining quality care

Although we describe one of our delays in receiving quality care, few studies have articulated what indicators should be used to measure this for maternal and under 5 health in settings such as Sierra Leone. Our qualitative findings revealed that from the perspective of mothers and caregivers, quality care is perceived to be accessible, affordable, with an uninterrupted supply of drugs, vaccines and diagnostics. Kind, timely treatment by healthcare staff, with full explanations of diagnosis and treatment is valued. If a hospital stay is required, provisions such as food, somewhere to sleep (if accompanying a child) and greater flexibility in terms of number of visitors and visiting hours is also viewed positively.

5.2.8 Challenging the three delays model – presenting a fourth delay

The three delays model was initially conceived by Thaddeus and Maine (14) but this is the first time this framework has been applied to examine health seeking behaviour maternal and under 5 health in parallel. In Thaddeus and Maine's framework they focus on delays that *"affect the interval between the onset of an obstetric complication and its outcome"* however, we apply this to look at delays from the onset of labour or under 5 sickness. The three delays model has been a useful lens through which to examine why pregnant women and children present late to formal health facilities. Other studies have aimed to quantify which delay presents the most issues for the health service in order to assign resources to prevent this particular delay. However, our research shows that each stage is not mutually exclusive from another and so examining it in this linear way is over-simplistic and does not adequately present an individual's pathway to care.

This is also the first study using the conceptual framework of the three delays that we have seen that incorporates health worker perspectives. Although from the patient perspective the health worker was often seen as a barrier to getting quality care, we feel this under represents the impact of a weak health system to enable the health worker to deliver

good care. We challenge the three delays model and feel our findings fit more clearly into a conceptual model of four delays. This fourth delay recognises the failings of the health system to provide the healthcare workers in post with adequate training, an uninterrupted supply of drugs, diagnostics and vaccines, and offer salaries commensurate with the cost of living so health workers aren't forced to recover costs from patients.

5.3 STRENGTHS AND LIMITATIONS OF THIS STUDY

5.3.1 Strengths

A perceived major strength of this study is its sequential and integrated design. The study draws on complementary strengths of three study designs and using mixed methods provides mitigation against some of the limitations of individual components of the study. Many of the limitations of the survey and potentially contentious findings were identified upon preliminary survey analysis and directly informed the design and implementation of the in-depth interview study. Triangulation of findings meant that we could identify consistencies and inconsistencies in findings and allowed us to draw robust conclusions in which we have a high degree of confidence.

This is the first mixed methods study that has applied the three delays model in this way to both maternal and under 5 health. It is also one of the only studies that incorporates the perspectives of health workers and participant's engagement with the plural health system. Although other studies into maternal and child health have been conducted in Sierra Leone (34,44), this is the first study that has been conducted post-Ebola and where the findings can be considered alongside the framework of the President's Recovery Plan.

5.3.2 Limitations

A full description of potential study limitations is provided in Appendix 8. Key limitations are summarised in Table 9 below.

Table 9: Key potential study limitations

Description	Potential bias/ issue	Practical limitation(s)	Implication(s)	Potential impact on results
Population denominators for Tonkolili were unreliable	Selection bias	1.Clusters in Yoni were not selected with probability proportional to size 2.Unable to weight in the analysis	Individuals residing in smaller villages may be over-represented in survey	Potential for worse observed health indicators in Yoni and greater difference between Magburaka and Yoni.

Study conducted by MSF in collaboration with MoHS	Response bias/ social desirability bias	-	May have influenced responses of interviewees- e.g. Under-reporting estimation of socially undesirable behaviours and outcomes	Underestimation of: e.g. birth at home, child mortality, use of traditional healers, maternal death Overestimation of: child attendance to health facility, vaccination, birth at health facility
Period of recall long	Recall bias	-	Recall of events potentially limited	e.g. maternal deaths underestimated
Study conducted in relatively small geographical area	Generalisability		Some uncertainty as to how generalisable findings are to rest of the country	Caution applying results to rest of country. Whilst Yoni is likely to be representative of most of rural Sierra Leone, Magburaka is likely to have better healthcare services than most District centres.

In addition, it did not prove practical to estimate maternal mortality from information provided by structured interviews. An adequate denominator was not achieved in view of uncertainties in population estimates and absence of information on numbers of live births (Appendix 8).

6 CONCLUSIONS

The study findings indicate that since the start of the Ebola outbreak health indicators in both Magburaka and Yoni are poor. Stillbirth rate was considerably above the WHO target and incidence of <5 years febrile illness appears extremely high. Under 5 years mortality in Yoni was close to the emergency threshold and probably underestimated by this study. This study also provides evidence for avoidable maternal morbidity and mortality and for chronic under-recording of maternal deaths.

A high proportion of women gave birth at home or outside health facilities. This finding must be explicitly recognised in order to develop interventions especially given the finding that home births are usually unsupported, particularly in Yoni, and therefore considered unsafe.

That the vast majority of women did seek assistance (skilled & unskilled) in labour/ childbirth, and many did not subsequently receive it suggests that help was unavailable/ inaccessible to a substantial proportion of women particularly in Yoni. The vast majority of women stated a preference for attending a health facility for their next childbirth suggesting that for most giving birth at home was not out of choice, rather as a default when healthcare was inaccessible/ unavailable. The vast majority of carers also sought care for febrile children <5years. There was a clear general preference for biomedical care over alternatives in both areas. However, substantial barriers delayed and prevented people from accessing and receiving healthcare. Practical problems faced in reaching a health facility (delay phase 2) and receiving adequate and appropriate healthcare (delay phase 3) were often critical to deciding to seek healthcare (delay phase 1). This suggests that if free quality healthcare was accessible then generally there would be no delay or minimal delay in deciding to seek care.

Decisions to seek care are frequently made hierarchically or collectively, indicating chronic disempowerment of women in particular and often entailing delay. The decision to seek care for children may be delayed until a child is seriously unwell. Barriers drive people to look for alternatives to biomedical healthcare. Though traditional practices remain reasonably common, use of informal care providers is sometimes considered more convenient, and some preference for traditional means to treat certain conditions/ presentations are persistent, biomedical healthcare is generally considered safer and more effective than alternatives particularly in pregnancy and for management of labour/ childbirth. This is a salient finding and runs contrary to a widely held stereotype that people prefer traditional therapies; the implication is that if quality healthcare is available and accessible people will come. Distance to health facilities and associated costs appear particularly critical to health behaviour especially in Yoni. Young mothers/ teenagers are more likely to face additional barriers and be stigmatised, and exploitation of pregnant women by moto and taxi drivers was evident. Practical constraints in urgent/ emergency situations especially at night mean that in many situations it is simply not practical to get to a health facility for many people. Participants linked delays and aborted attempts to reach healthcare resulting from barriers with severe consequences including death.

There were many barriers to receiving quality care at primary healthcare facilities. Lack of or absence of healthcare workers, lack of medications and cost of “free healthcare” were major barriers. Indeed findings suggest that free provision of healthcare for pregnant women and children<5years is not available to a large proportion of the population in Yoni. Lack of trust between people and healthcare workers was evident. Lack of trust during the Ebola outbreak is well documented, though this study indicates deep seated issues primarily concerning payment of healthcare workers and suspicion of personal gain from sale of “free healthcare” but also exacerbated by attitudes, suboptimal communication and poor treatment and mistreatment by healthcare workers. In turn poor morale amongst healthcare workers was evident primarily in view of pay and working conditions. Lack of pay and insufficient pay were associated with charging patients for “free healthcare” and supplementing income by selling

drugs to patients. Lack of support, isolation and lack of training for healthcare workers were reported. Poor referral mechanisms and lack of ambulances were substantial issues. The importance of building trust and addressing these limitations cannot be overstated. It should be highlighted however, that participants were generally very satisfied with care provided by the MSF supported Magburaka hospital, which was described as free and perceived to be good quality.

Measles vaccination coverage is below the threshold for herd immunity; though the mass vaccination campaign appeared largely successful given the proportion of children who received vaccination during the period of the campaign, the routine vaccination programme is probably far less effective. There are many contributing factors: routine charging for vaccines and vaccine cards, concern about side effects and poor administration technique were all reported. Very poor LLITN coverage especially in Yoni represents an urgent public health issue in a highly malaria endemic region.

Overall, findings of the study indicate little progress towards the PRPs especially in Yoni. In particular according to interviewed health workers there are major gaps in the MoHS payroll. Poor drug supply and interrupted cold chain were common problems presenting barriers to patients and suggesting little progress towards the PRP of securing the supply chain to date. The needs of pregnant teenagers do not appear to be met by current services suggesting little progress towards PRP teenage pregnancy objectives in the study area. Likewise progress towards objectives concerning ambulance service and emergency obstetric service was not evident. Further progress towards the PRP of Maternal Death Surveillance and Response is required.

There is evident inequity in access to and receiving free quality healthcare: whilst people in Magburaka appear well served by the government hospital, those in Yoni generally lack quality free healthcare. There is inequality in child mortality between Magburaka (where mortality is relatively low) and Yoni though there are likely to be broad social determinants (such as poverty, access to clean water and sanitation, and education) not just access to healthcare. Indeed higher educational status was associated with care seeking and caring for more children (potentially associated with poverty) with less care seeking; these differences at population level are relevant. Nevertheless clear differences in access to free healthcare must be addressed. The presence and sustained commitment of MSF, working with MOHS, is perceived by people to be critical to achieving change.

7 RECOMMENDATIONS

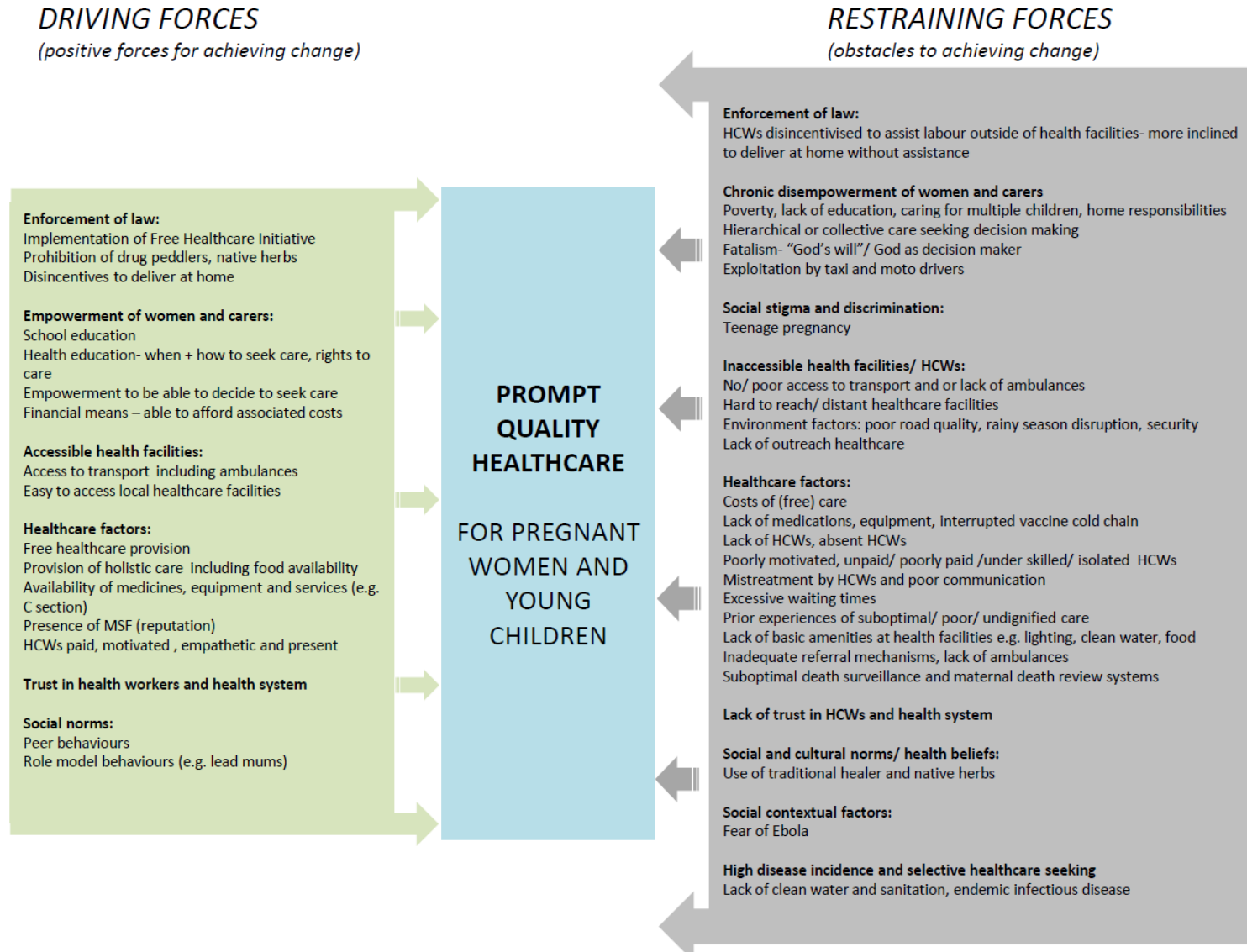
7.1 ACHIEVING CHANGE

The aim of this study was to describe health seeking behaviour and to identify barriers to accessing and receiving quality healthcare in order to facilitate improvements and change, to enable prompt quality healthcare for pregnant women and young children. We have identified many barriers to achieving this and we have also identified enablers which may be facilitative. It is useful to consider driving forces and restraining factors. We need to maximise the driving forces and minimise the restraining forces in order to achieve the desired change (achieving prompt quality healthcare for pregnant women and children). These factors are summarised below (Figure 22).

Urgent action is needed; only by tackling barriers to care can preventable deaths be realistically reduced. This must include a focus on upgrading health facilities; building the capacity and competency of health workers (specifically those in rural health facilities and communities); reinforcing transport and referral systems; and building links and trust between communities and health workers.

Recommendations are proposed to address barriers through achievable, realistic and time bound actions and are detailed below.

Figure 22: Forces for and against change



7.2 RECOMMENDATIONS

The following recommendations are derived from study findings and are intended for consideration for action by MSF, MOHS and partners. We perceive Yoni to be representative of rural Sierra Leone and so consider that the following recommendations are applicable beyond the boundaries of the study area.

1. Undertake community engagement, health education and health promotion for maternal and child health, in line with the MoHS' Health Promotion Strategy 2017-2021	
<i>Specific recommendation</i>	<i>Details/examples</i>
i. Increase community-level ownership and responsibility for maternal and child health, including developing practical measures to enable care-seeking	<ul style="list-style-type: none"> • Community transport and /or transport funds • Community assistants to accompany pregnant women/carers to health facilities
ii. Strengthen the health promotion role of community and religious leaders, and community level groups (e.g. CAGs, SMPWs, 'lead mothers' and care groups), in collaboration with local health staff to encourage healthcare seeking	<ul style="list-style-type: none"> • Develop and provide guidance and tools • Facilitate/provide support for community-led meetings
iii. Target and prioritise health education and health promotion based on identified gaps	<ul style="list-style-type: none"> • Development of labour plans (including knowing when to seek help, danger signs and planning means of reaching health facility) • Need for early presentation to antenatal care • Causes, prevention and quick recognition of symptoms of common childhood illnesses • Risks and appropriate use of native herbs • Vaccination and misperceptions • Sex, family planning, STIs, and pregnancy (emphasising non-judgemental, non-punitive messages)
iv. Target and prioritise audiences for health education and health promotion	<ul style="list-style-type: none"> • Men and senior family members (particularly concerning care seeking decisions) • Young people and families (particularly concerning sex, family planning and pregnancy)

2. Facilitate access to healthcare, particularly in hard to reach areas	
i. Develop a transport plan for pregnant women and children, considering innovative strategies	<ul style="list-style-type: none"> • Incentivising or reimbursing moto/taxi drivers (e.g. Marie Stopes voucher scheme³) • Community-led transport schemes
ii. Strengthen the ambulance service and improve access for emergencies in hard to reach areas	<ul style="list-style-type: none"> • In line with MoHS strategy (minimum of one ambulance per chiefdom)
iii. Ensure effective referral pathways and include children in national referral services	<ul style="list-style-type: none"> • Functioning communication mechanisms (radio/mobile phone) between health facilities and with ambulance services
iv. Provide maternity waiting homes for late pregnancy/identified complex pregnancies, within close proximity to the District Hospital or CHCs	
v. Monitor and enforce implementation of the FHCI	<ul style="list-style-type: none"> • Prioritise interventions to combat known charges (e.g. charging to 'register' children born at home, and for vaccination booklets and prescriptions) • Monitor prescriptions; what are people being asked to buy in addition and why? (especially syrups, linked to private pharmacy business) • Build community accountability networks, combined with a clear definition of 'free' drugs to inform communication around the FHCI • Support trust building between health workers and communities through facilitating/supporting community-led engagement activities

³ MSL (Marie Stopes Sierra Leone) has been using the voucher system for pregnant women brought from far place to deliver at health facilities with funding from DFID, but this 5 years programme ended last week due to withdrawal of DFID.

3. Strengthen rural health services/hard to reach areas to meet the needs of women and children		
i.	Ensure rural/hard to reach facilities have basic infrastructure, amenities and supply	<ul style="list-style-type: none"> • E.g. essential medications, water, cold chain
ii.	Improve access to care during childbirth through upgrading CHCs to provide Basic Emergency Obstetric Care (BEmONC) services	<ul style="list-style-type: none"> • As per MoHS priority target (minimum 1 per chiefdom)
iii.	Support and prioritise community outreach activities by health workers	<ul style="list-style-type: none"> • Facilitate planning and ensure supportive supervision • Provide essential resources
iv.	Prioritise training of and support to the rural health workforce, particularly CHWs and those serving in remote PHUs	<ul style="list-style-type: none"> • Ideally staffing levels should be met, but until then the focus should be on developing skills of existing staff • E.g. through mobile training teams to provide on-the-job support, training and supervision
v.	Implement the CHW programme in line with MoHS strategy, develop a clear plan for the integration of CAGs/SMPWs (former TBAs) within the health workforce, and ensure robust supervision and support mechanisms linked to health facilities	<ul style="list-style-type: none"> • Including issues of transport, incentives, training, drug/equipment supply, potential of performance-based financing hampering PHU staff distributing limited medication to CHWs
vi.	Establish/consolidate links between communities and health facilities to build trust and accountability, patient orientation of services and facilitate peer-driven quality improvement	<ul style="list-style-type: none"> • E.g. through village health committees and/or 'quality circles'
vii.	Actively search for cases of obstetric fistula during community engagement and outreach work and refer for corrective surgery	

4. Provide quality training, support and supervision for healthcare workers to deliver free quality healthcare	
i. Focus on holistic care provision, practical skills and procedural training	<ul style="list-style-type: none"> • Communication skills, empathetic and respectful patient care and accompaniment • Antenatal and postnatal care, vaccination, Caesarean section (to appropriate cadres), and appropriate referral
ii. Support the DHMT to provide supervision and monitoring and facilitate peer support networks	<ul style="list-style-type: none"> • Provide practical support where necessary to facilitate supportive supervision visits • Provide practical support to peer support events and networks (for example set up and fund bimonthly meetings and or trainings) •

5. Advocate on behalf of women, children and healthcare workers	
i. Raise awareness of the unmet needs of women in pregnancy and childbirth, particularly of teenage pregnant women and young mothers, and of children under 5	<ul style="list-style-type: none"> • Advocate for removal of punitive measures for women delivering outside health facilities
ii. Raise awareness of challenges accessing free healthcare faced by pregnant women and children under 5	<ul style="list-style-type: none"> • Advocate for monitoring and enforcement of the FHCI • Advocate against exploitation of pregnant women by taxi and moto-taxi drivers
iii. Raise awareness of challenges faced by health workers	<ul style="list-style-type: none"> • Advocate for improved pay and working/living conditions, particularly for current 'volunteer' staff • Advocate for sufficient resources, supplies, training and supervision for health workers

6. Support EPI programming, vaccination strategy development, and LLITN distribution	
i. Increase routine vaccination activities	<ul style="list-style-type: none"> • Outreach and fixed strategy
ii. Consider a campaign based vaccination strategy	
iii. Ensure supply and free provision of vaccines, and a secure cold chain	<ul style="list-style-type: none"> • Fridges, cold boxes and transportation
iv. Perform community engagement and education to address concerns about vaccine side effects and misperceptions	<ul style="list-style-type: none"> • E.g. regarding Ebola
v. Undertake opportunistic vaccination of children when presenting at health facilities for other reasons	<ul style="list-style-type: none"> • 'Making every contact count'
vi. Conduct regular 'catch up' mass LLITN distribution campaigns, combined with community engagement and health promotion around use, maintenance and benefits	

7. Strengthen maternal death surveillance and death review procedures	
i. Provide death registration books and training on their use	
ii. Ensure robust arrangements are in place for recording and reporting	<ul style="list-style-type: none"> • E.g. consistency in terms of person responsible
iii. Ensure robust and validated procedures for maternal death review	<ul style="list-style-type: none"> • Incorporating root cause analysis and using non-punitive learning approaches
iv. Include child mortality surveillance	<ul style="list-style-type: none"> • Consider integrating paediatric death in the Surveillance and Response system

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