UNDERSTANDING FACTORS INFLUENCING MATERNAL VACCINATION ACCEPTANCE IN THE GAMBIA

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TABLE OF CONTENTS

DECLARATION

I have read and understood the LSHTM's definition of plagiarism and cheating. I declare that this thesis is my own work, and that I have acknowledged all results and quotations from the published or unpublished work of other people.

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ABSTRACT

Background: Maternal vaccination has proven to be a successful intervention to protect pregnant woman and neonates from infectious diseases. Limited research has been published on the determinants of maternal vaccination acceptance and uptake in The Gambia. Given that additional maternal vaccines may be available soon, these factors are important to ascertain.

Aim: To gain a contextualized understanding of the supply and demand factors influencing antenatal care service utilization and maternal vaccination acceptance in The Gambia.

Methods: Qualitative focus group discussions and in-depth interviews as well as quantitative questionnaires were conducted across four regions of The Gambia (West Coast, North Bank, Central River and Upper River) identifying participants from both urban and rural settlements. Data analysis used inductive coding, wherein the unprocessed textual data was read and interpreted to create concepts and themes. The Strategic Advisory Group of Experts (SAGE) on Immunization Working Group framework was used to better understand and assess the findings within an analytical framework.

Results: The qualitative study population included 96 pregnant women and women with infants and 20 health care workers. The quantitative study population included nine health facilities data. Previous vaccination experiences, individual weighing of risks and benefits, vaccine literacy, accessibility, affordability, quality of care, immunisation schedule and recommendations from health care providers act as barriers and enablers to maternal vaccination acceptance. Health care workers and male partners were trusted local actors who shape perceptions of maternal vaccines and influence utilisation of antenatal care services. Maternal vaccination decision-making was not an autonomous choice but one dependent on social relations, more so male partner endorsement. These study findings are presented in a contextualized conceptual framework.

Conclusion: Antenatal care service utilization and maternal vaccination acceptance are overall influenced by individual, group, contextual, vaccine and vaccination-specific factors. Women's utilisation of antenatal care services depends on access dimensions of health services, health facilities and health care workers. Women's acceptance of vaccination during pregnancy is influenced by complex and intersecting individual, sociocultural, organizational, and structural factors.

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In acknowledgement and appreciation of all the unwavering support and guidance received from my supervisor, Professor Beate Kampmann, without whom this PhD would not have been possible. Thank-you for being a supervisor, a mentor and a mother figure who enabled and supported this wonderful opportunity to further my academic career. Indeed, you have nurtured my potential and provided platforms and opportunities for me to share my inherent talents and research outputs on national and international stages. My academic career would not be the same without you and I appreciate your involvement in my PhD journey, especially during the last stretch when I needed it the most. Your wise and firm counsel along with the email nudges kept me on schedule. My co-supervisor, Professor Heidi Larson, has also been an invaluable source of anthropological expertise, especially providing academic guidance and constructive suggestions during my PhD upgrading.

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Finally, I would especially like to thank Pfizer for funding my research via an educational grant awarded to Beate and to the Medical Research Council Unit The Gambia at the London School of Hygiene and Tropical Medicine training department for facilitating my financial support via a PhD studentship.

Personal acknowledgements

I would like to thank God Almighty for seeing me through my PhD journey in sound mind and good health. Adonai, your love and mercy are beyond comprehension and for that I am grateful.

Thank-you to my loving family for their endless love, care and reassurance. This PhD is dedicated to my parents, Ken and Jainaba Johm, without whom my academic career would not have begun. I love you profoundly and appreciate your efforts in raising me to become an accomplished and virtuous woman. To my brother, Faderr Johm, you are my oldest friend and a constant source of solace. Thank-you for checking in on my mental health over the years and always cheering me on.

To all my friends, thank-you for the kind-hearted, cheerful and encouraging calls and text messages during the completion of my thesis. I also cherish my colleagues in the office for the fun adventures and communal activities we shared over the years that helped to relieve my stress. I also feel privileged to have worked alongside many knowledgeable and dedicated social scientists who provided timely counsel during this journey.

Finally, this PhD is dedicated to all Gambians, with the hope that it will serve as encouragement and a reminder to be courageous in pursuing your dreams and dedicated in upholding commitments and reaching your goals.

In Memoriam

In loving memory of my Grandma

Sally P.C. Njie-Fowlis

1932 – 2020

Jigeen Jambaar

Because of you, I am.

A Lover of Culture, Education and Educating.

Chief Librarian of The Gambia National Library.

Compassionate and Kind to All God's Creatures.

May Your Soul Continue To Rest In Perfect Peace.

COVID-19 IMPACT STATEMENT

The COVID-19 pandemic has had direct and indirect impacts on my academic and personal life, including the conduct and completion of my PhD. My PhD research proposal was initially to conduct a mixed methods study to understand maternal vaccination acceptance in The Gambia as detailed and approved in my upgrading document in December 2018. By the end of 2019, I had collected and analysed my qualitative data and was set to finalize my questionnaire and begin quantitative data collection in 2020. However, due to the COVID-19 pandemic, I was unable to travel to the different regions of The Gambia to conduct face-to-face surveys. Other options were considered, however, most of my study participants had little to no formal education and so a self-administered questionnaire would not have been possible. I therefore decided to revise my quantitative data collection plan. Thankfully, I had collected survey data at the health centres in 2020 so my supervisor and I agreed it best I use this data to draft a paper on health system factors influencing maternal vaccination acceptance The Gambia.

Additionally, as the pandemic continued to evolve in 2020, myself and colleagues in The Gambia found it prompt and important to conduct COVID-19 research. We chose to research the experiences of individuals who completed the government mandated institutional quarantine to develop effective recommendations for the MoH in The Gambia to better support people in quarantine. Questionnaires were administered remotely via mobile phone calls with a pretested questionnaire to avoid any face-to-face contact due to the rising cases of COVID-19 at the time. These findings are presented as a research paper in my results section which was initially published on a pre-print server, medRxiv, in 2021, and is now reviewed, edited and prepared for submission in a peer-reviewed journal.

During the entire duration of my PhD, I was also a primary caregiver for my maternal grandmother up to her passing away in August 2020. It was a physically and emotionally challenging time for me and my family as she lived with us during her end of life. Although it was a difficult period, I am grateful for the opportunity to have spent the past few years and especially those final moments with my beloved grandma Sally who will always hold a very special place in my heart.

STATEMENT OF CONTRIBUTIONS

I, Penda Tutan Johm, took lead responsibility for every aspect of my PhD including research conception, ethics approvals, data collection, data management, data analysis and manuscripts. It must be noted that I was supported by wonderful contributors during this academic period. The specific contributions of others to the work in my thesis are listed below:

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LIST OF TABLES

Chapter 1 – Introduction

Chapter 3 – Objective 1

Chapter 4 – Objective 2

Chapter 5 – Objective 3

Chapter 6 – COVID-19 Study

LIST OF FIGURES

Chapter 1 – Introduction

Chapter 2 – Methodology

Chapter 3 – Objective 1

Chapter 5 – Objective 3

Chapter 6 – COVID-19 Study

Chapter 7 – Discussion

Chapter 8 – Research Dissemination

ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal Care
CBC	Community Birth Companion
COVID-19	Coronavirus Disease 2019
CHN	Community Health Nurse
EPI	Expanded Programme on Immunisation
FANC	Focused Antenatal Care
FP	Family Planning
GBS	Group B streptococcus
GDHS	Gambia Demographic and Health Survey
GDPR	General Data Protection Regulation
HIC	High-Income Countries
IWC	Infant Welfare Clinic
IgG	Immunoglobulin
LMIC	Low- And Middle-Income Countries
LSHTM	London School of Hygiene and Tropical Medicine
MCNHRP	Maternal and Child Nutrition and Health Results Project
MI	Maternal Immunization
MMR	Maternal Mortality Ratio
MNT	Maternal And Neonatal Tetanus
MNTE	Maternal And Neonatal Tetanus Elimination
MoH	Ministry of Health
MRCG	Medical Research Council Unit The Gambia
NGO	Non-Governmental Organizations
NMR	Neonatal Mortality Rate
NaNa	National Nutrition Agency

PBF	Performance-Based Financing
PHC	Primary Health Care
PPE	Positive Pregnancy Experience
PRMR	Pregnancy-Related Mortality Ratio
PROPEL	Protecting From Pneumococcus in Early Life
RBF	Results-Based Financing
RCH	Reproductive and Child Health
RDR	Research Degree Record
RHD	Regional Health Director
RHT	Regional Health Team
RSV	Respiratory Syncytial Virus
SARS-CoV-2	Severe Acute Respiratory Syndrome Coronavirus 2
SDG	Sustainable Development Goal
SPSS	Statistical Package of Social Science
TBA	Traditional Birth Attendants
TBA	Traditional Birth Attendants
TT	Tetanus Toxoid
TT2+	At Least 2 Doses Of Tetanus Toxoid Vaccine During Pregnancy
Td	Tetanus and Diphtheria
Td2+	At Least 2 Doses Of Tetanus And Diphtheria During Pregnancy
Tdap	Tetanus, Diphtheria, and Pertussis
UTG	University of The Gambia
VDC	Village Development Committee
VHS	Village Health Services
VHW	Village Health Workers
VPD	Vaccine-Preventable Diseases
VSG	Village Support Group
WHO	World Health Organisation

THESIS OUTLINE

This thesis is written in a research paper style, wherein each results chapter takes the form of a research paper that either has been published, submitted or will be submitted to a peer-review journal. The purpose of the thesis is to demonstrate a contextualized understanding of the factors influencing antenatal care service utilization and maternal vaccination acceptance in The Gambia.

Chapter 1 gives an indication of the global burden of maternal and neonatal mortality, importance of maternal immunization, determinant factors of maternal vaccination, an overview of the health care delivery system and antenatal care package, existing supply and demand-side factors and finally the importance of the PhD research. It also outlines the objectives of the PhD which were 1) to conduct a literature review on factors influencing maternal vaccination uptake and acceptance in sub-Saharan Africa, 2) to investigate health system factors that influence antenatal care service utilization in The Gambia and 3) to explore factors influencing acceptance of vaccination during pregnancy in The Gambia.

Chapter 2 details the PhD methodology including the research methods, study setting, sites and participants, ethical considerations, data collection, management and analysis. The research philosophy, positionality and reflexivity of the researcher are also detailed in this chapter.

Chapter 3 addresses Objective 1 via a detailed literature review of studies from 48 sub-Saharan African countries. There were in-depth findings on the many factors that influence women's uptake and acceptance of vaccines given during pregnancy.

Chapter 4 addresses Objective 2 by determining the health system factors that influence antenatal care service utilization in the Gambia. The research paper outcome is currently being prepared for submission and titled, "Access to Antenatal Care (ANC) Services across health facilities in The

Gambia" and includes surveys with health facility managers and qualitative interviews with health care workers.

Chapter 5 addresses Objective 3 by exploring the factors influencing the acceptance of vaccination during pregnancy in The Gambia. The research paper outcome was published in Vaccine, a notable peer-reviewed journal.

Chapter 6 presents the findings of a study conducted during the course of the PhD titled, "Knowledge of Coronavirus Disease 2019 (COVID-19) and experiences of individuals in mandatory institutional quarantine in The Gambia: a cross-sectional survey". Individuals in the study were asked vaccine-related questions on their perceptions of and willingness to take up a COVID-19 vaccine. This paper was initially published on medRxiv in 2021, and is now reviewed, edited and prepared for submission in a peer-reviewed journal.

Chapter 7 is a summary and discussion of the findings from objectives 2 and 3 which are then consolidated into a conceptual framework to show the factors that affect women's acceptance of vaccines given during pregnancy in The Gambia. The chapter goes on to detail the strengths and limitations during the research collection and conduct.

Chapter 8 presents the impact of the PhD research highlighting the dissemination of findings to study communities and regional health directorates for enhanced collaboration with the Ministry of Health.

Chapter 9 is an overall conclusion of the PhD, along with recommendations for policy, programmes and suggestions for future research.

CHAPTER 1 – INTRODUCTION

Chapter Overview

This introduction chapter gives an indication of the global burden of maternal and neonatal mortality, importance of maternal immunization, determinant factors of maternal vaccination, an overview of the health care delivery system and antenatal care package, existing supply and demand-side factors and finally the importance of the PhD research. It also outlines the aim and objectives of the PhD.

Maternal Mortality

The total number of women dying from complications due to pregnancy or childbirth in every 100,000 live births is known as the maternal mortality ratio (MMR). One of the Sustainable Development Goals (SDG) has been to reduce the global average MMR from 216 in 2015 to less than 70 per 100,000 live births by 2030, namely SDG 3.1. Maternal mortality is primarily caused by a lack of access to essential maternal healthcare services around the world, particularly in Sub-Saharan Africa, and by disparities in access to such services. Pregnant women die due to several factors including complications during pregnancy, labour, delivery and after delivery. These complications include haemorrhage, infections, hypertension, anaemia, obstructed labour, eclampsia, unsafe abortion and diseases such as malaria and AIDS (Hoestermann et al, 1996; Anya et al., 2008; Say et al., 2014; WHO, 2015). Vaccinations are recommended by the WHO for all pregnant women to prevent neonatal mortality. Neonatal mortality rate (NMR) is number of neonatal deaths per 1,000 live births. Almost all new-born deaths occur in the first week of life due to reasons such as infections, preterm birth and intrapartum-related complications (WHO 2017). Globally, the estimated number of maternal deaths decreased from 532,000 in 1990 to 303,000 in 2015, however, 66.3% of these deaths occurred in sub-Saharan Africa (WHO, 2015). The World Health Organisation (WHO) African Region bore the highest burden of global maternal deaths and the Gambia's MMR was one of the highest in the region. According to research, ensuring access to high-quality maternal health care is linked to decreased mortality and morbidity rates for the pregnant woman and her unborn baby (WHO, 2014; Konje 2018).

The indirect sisterhood method (Graham et al. 1989) and the direct sisterhood method (Rutenberg and Sullivan 1991; Stanton et al. 1997) are typically used to assess maternal mortality in developing countries. Maternal mortality was estimated using the direct technique in the 2019–20 Gambia Demographic and Health Survey (GDHS). According to estimates, over the seven years prior to the 2019–20 GDHS, the MMR in The Gambia was 289 maternal deaths per 100,000 live births, which is higher than the 2015 global average MMR of 216. This means around three women per 1,000 live births in The Gambia died during pregnancy, childbirth, or within 42 days after the end of a pregnancy from causes other than accidents or violence. The predicted age-specific mortality rate is lowest among women aged 15 to 19 and greatest among those aged 40 to 44 (0.07 and 0.97 respectively). In the seven years before the 2019-20 GDHS, 17% of all deaths among women aged 15 to 49 were related to pregnancy (The Gambia Demographic and Health Survey, 2019-20).

The estimates from the previous GDHS (2013) cannot be compared with the maternal mortality estimate for 2019–20 because the previous included deaths from accidents and violence in its definition of maternal mortality. The 2019–20 GDHS defines a pregnancy-related death as the death of a woman during pregnancy, during childbirth, or within two months of delivery or termination of a pregnancy, regardless of the cause of death, in order to create an indicator suitable for comparing estimates from the two surveys. Therefore, estimates of pregnancy-related mortality are primarily based on when the death occurred in relation to the pregnancy. What the 2013 GDHS referred to as a maternal death, the current GDHS refers to as a pregnancy-related death. This definition differs from the WHO definition of a pregnancy-related mortality, which places a 42-day time limit on the window.

Maternal Immunisation

One of the most successful public health interventions has been the introduction of maternal immunization (MI) to prevent maternal and neonatal morbidity and mortality. Although often implemented through the provision of antenatal care (ANC), the coverage and effectiveness of MI has been increased by its inclusion in the Expanded Programme on Immunisation (EPI) targeting all women

of childbearing age. Maternal immunization is an important addition to existing antenatal interventions and can protect both the pregnant woman and her unborn baby from specific infectious diseases, such as tetanus. This is due to protection of the woman by her own antibody response to the vaccine and through the transplacental transfer of vaccine-specific maternal immunoglobulin G (IgG) to the foetus and new-born. Maternal IgG provides passive immunity during the first 3-6 months of a newborn's life prior to their ability to fully respond to vaccination (Chu, 2014; Marshall et al., 2016; Fouda et al., 2018). In 2018, 5.3 million children below 5 years of age died as a result of infectious diseases and 700,000 died of vaccine-preventable diseases (VPDs). 99% of the children who died lived in low and middle-income countries. VPDs contribute to associated complications for both a pregnant mother and her baby (Frenkel, 2021). The previous few decades have seen an increase in interventions to curb morbidity and mortality related to VPDs and vaccination during pregnancy is one such intervention. Pregnant women are currently recommended one or more of three vaccines, namely tetanus toxoid (TT) (WHO Position Paper 2017), influenza (WHO Position Paper 2012) and pertussis (WHO Position Paper 2015), depending on their country of habitation (Sawyer et al., 2013; New et al., 2018; Larson Williams et al., 2019).

Maternal Immunisation Against Maternal and Neonatal Tetanus

Tetanus occurs when wounds or injured tissues are contaminated with Clostridium tetani spores (WHO 2017). Tetanus is a serious and common problem in areas where deliveries are practised without sterile procedures. It can also be a significant issue in areas with low immunisation coverage and unsafe cord care practices. Maternal tetanus is defined as tetanus occurring during pregnancy or within six weeks after pregnancy ends (WHO, 2019). The WHO guideline is that women should be given two doses of tetanus toxoid in their first pregnancy and one in each pregnancy that follows up to a maximum of five doses (Chu 2014). The purpose of giving the vaccine to women of childbearing age and to pregnant women is to protect them from tetanus and to protect their newborn's against neonatal tetanus. Mothers who are fully immunised develop protective antibodies against tetanus anywhere from one year to all their childbearing years. The WHO has advocated switching from tetanus toxoid (TT) to the tetanus-

diphtheria (Td) vaccination since 1998. Td can be used in place of TT to provide extra protection against diphtheria without significantly altering the immunisation schedule or programme. However, the transition from TT to Td vaccination has been uneven and gradual on a global scale (WHO, 2017). The percentage of reproductive-age women with at least 2 doses of tetanus and diphtheria during pregnancy (Td2+) or at least 2 doses of tetanus toxoid vaccine during pregnancy (TT2+) grew from 62% to 72% between 2000 and 2018. However, continuous efforts are required to improve routine immunisation, support life-course vaccination, and create cutting-edge approaches to reach underserved communities in order to maintain maternal and neonatal tetanus (MNT) eradication and to accomplish it in the remaining target nations (Njuguna et al., 2020).Neonatal tetanus refers to a case of tetanus infection in new-born babies (Roper et al., 2007; WHO, 2015; WHO, 2019). Global deaths from neonatal tetanus fell from 58,000 in 2010 (Thwaites et al., 2015) to 34,000 in 2015 (WHO, 2015). Tetanus related neonatal mortality reduced by 94% through immunization of pregnant and childbearing-age women with at least two doses of TT vaccination (Roper et al., 2007). TT vaccination therefore serves as a mechanism for the elimination maternal and neonatal tetanus (WHO, 2015; WHO, 2019). In order to reduce mortality and morbidity brought on by maternal and neonatal tetanus, the World Health Organization created the maternal and neonatal tetanus elimination (MNTE) initiative (Vandelaer et al., 2003; Messeret et al., 2018; WHO, 2015; WHO, 2019; Njuguna et al., 2020; Dhir et al., 2021). Despite the fact that the deadlines for obtaining MNTE globally have been repeatedly missed, there has been tremendous progress to date as seen by the 80% decrease in the number of nations needing MNTE validation (59 in 1999 to 12 in 2020). Significant improvements have been made in the global coverage of two doses of tetanus toxoid (13.79% to 65.27%), and the protection of newborn's at birth (12% to 88%) (Dhir et al., 2021). Other components of the MNTE initiative are achieving greater than 70% of deliveries by a skilled birth attendant and enhancing surveillance for neonatal tetanus cases (Vandelaer et al., 2003; WHO, 2015; Khan et al., 2015; Messeret et al., 2018; Dhir et al., 2021). The MNTE program has virtually eliminated neonatal tetanus and is the hallmark of successful maternal immunisation.

Maternal Immunisation Against Respiratory Pathogens

Maternal immunisation is important to protect against respiratory pathogens such as influenza, pertussis and Coronavirus Disease 2019 (COVID-19). Influenza infection in pregnancy can lead to spontaneous abortion, premature birth, and even maternal death (Omer et al., 2011). The influenza vaccine effectively induces an immune response in pregnancy, which is also observed in the newborn (Chu, 2014). Several recent systematic reviews have reported the safety of influenza vaccination during pregnancy (McMillan et al., 2015; Fell et al., 2015; Nunes et al., 2016; Giles et al., 2019). Pertussis, also known as whooping cough, is a highly contagious disease of the respiratory tract caused by *Bordetella pertussis* (Amirthalingam et al., 2016; Yeung et al., 2017; Engmann et al., 2020). In 2014, Africa had the highest burden, with an estimated 7.8 million cases (33% of all cases) and 92,500 deaths (58% of all deaths). Alarmingly, 5.1 million (21%) pertussis cases and 85,900 (53%) deaths out of the total number were in children below the age of one (Yeung et al., 2017; Engmann et al., 2020). In nations or settings where there is a high or rising infant morbidity or mortality from pertussis, the WHO recommends maternal pertussis immunisation as a combined tetanus-diphtheria-acellular pertussis (Tdap) vaccine. This should be used as a complementary intervention to timely infant immunisation. Although there are national variations to this suggestion, maternal immunisation should take place in the second or third trimester, or at least 15 days before the end of the pregnancy (WHO, 2015; Yeung et al., 2017; Engmann et al., 2020). Maternal Tdap immunisation in the third trimester was found to be over 90% effective in protecting infants against pertussis in a 2012-2013 case-control study estimating the effectiveness of maternal pertussis vaccination in protecting newborn infants in England and Wales (Dabrera et al., 2015). This finding is in agreement with studies which showed that maternal acellular pertussis vaccination in the third trimester is safe and effectively protects infants from pertussis (McMillan et al., 2017; Campbell et al., 2018). Several systematic reviews have also supported the safety of pertussis or pertussis-containing vaccines during pregnancy (McMillan et al., 2015; Furuta et al., 2017; D'Heilly et al., 2019; Vygen-Bonnet et al., 2020). The COVID-19 pandemic which is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has led to high morbidity and mortality worldwide. Pregnant women are a vulnerable group at high risk of developing COVID-19

associated adverse outcomes, such as preterm births, caesarean section, intensive care admission and death (Hoque et al., 2020; Mose and Yeshaneh, 2021; Hailemariam et al., 2021; Shikuku et al., 2021; Wanyana et al., 2021; Skjefte et al., 2021; Garg et al., 2021). Although a vulnerable group, pregnant women were not included in the clinical trials of the COVID-19 vaccinations despite being a population at higher risk for developing severe COVID-19, nor were they identified as a high-priority group for the distribution of COVID-19 vaccination early in the pandemic (WHO, 2020; Garg et al., 2021). The available evidence does however suggest that the COVID-19 vaccine is safe to administer during pregnancy, and many expectant mothers have chosen to accept the vaccine because of the increased risks of severe outcomes of COVID-19 during pregnancy (Garg et al., 2021; Blakeway et al., 2022).

Maternal Immunisations in The Gambia

The EPI began in The Gambia in 1979 covering diseases such as tetanus, diphtheria, tuberculosis, pertussis, yellow fever and polio (Lincetto 2006). According to the Gambia EPI, all women of childbearing age are expected to follow the WHO tetanus immunisation schedule (Figure 1). To be fully immunised, these women must receive five doses of the TT vaccine with each dose having an expected duration of protection. TT1 at first contact in pregnancy or as soon as possible, TT2 at least 4 weeks after TT1, TT3 at least 6 months after TT2, TT4 at least one year after TT3 or in subsequent pregnancies and TT5 at least one year after TT4 or in subsequent pregnancy. According to the 2019-20 Gambia Demographic and Health Survey, 71% of women received enough tetanus toxoid injections to protect their most recent live birth from neonatal tetanus. However, only 35% of mothers received two or more injections during pregnancy for their most recent live birth (The Gambia Demographic and Health Survey, 2019-20). Figure 1 presents The Gambia Expanded Programme on Immunization immunization's schedule for pregnant women, derived from the WHO tetanus toxoid immunisation schedule for women of childbearing age and pregnant women (WHO, 2007).

Table 1. Tetanus toxoid immunization schedule for women of childbearing age and pregnant women

Dose of TT or Td (according to card or history)	When to give	Expected duration of protection
1	At first contact or as early as possible in pregnancy	None
2	At least 4 weeks after TT1	1-3 years
3	At least 6 months after TT2 or during subsequent pregnancy	At least 5 years
4	At least one year after TT3 or during subsequent pregnancy	At least 10 years
5	At least one year after TT4 or during subsequent pregnancy	For all childbearing age years and possibly longer

Barriers and Enablers to Maternal Immunisation

Although the WHO encourages national immunization programmes to ensure all pregnant women are immunized, studies have shown that various factors exist which may impede the pregnant woman's uptake of maternal immunizations (MacDougall 2016, Pathirana 2015). Barriers to achieving optimal vaccine coverage include lack of access to marginal populations, lack of patient awareness and social mobilization, low ANC participation, low decision-making skills and low vaccine acceptance among pregnant women (PATH 2015). Other barriers include concerns about vaccine safety and efficacy, non-availability of vaccines, indirect costs, informal charges, fear of the pain associated with receiving injections, lack of information about vaccine benefits, and poor behaviour of health care workers (Nnebue et al., 2014; Ndimbii et al., 2018; Pugliese-Garcia et al., 2018; Fleming et al., 2019; Nganga et al., 2019; Otieno et al., 2020a; Godongwana et al., 2021; Nalubega et al., 2021). There is also the facet of vaccine hesitancy, where individuals refuse some vaccines and agree to others despite the availability of vaccine services or delay vaccination due to issues of convenience, complacency, or confidence (MacDonald, 2015; Larson 2014; Larson Williams et al., 2018). Wilson et al. 2015 conducted a literature review, which specifically focused on vaccine hesitancy in pregnancy. They found that the main factors reported to contribute to vaccine hesitancy were concerns about the safety of vaccination in pregnancy, low knowledge about vaccine efficacy, the diseases and availability of vaccine and a healthcare worker not recommending the vaccine (Wilson, 2015). In a recent study carried out in the United Kingdom (UK), the pertussis vaccine uptake during pregnancy was low, and

the main reason why women declined the vaccine was due to a lack of information and awareness of the vaccine together with a lack of encouragement from a healthcare professional they know. Other reasons included women's concerns about the side effects of the vaccine for them and their unborn baby, low perceived susceptibility to contracting the disease and the perception that over-medication could be dangerous during pregnancy (Donaldson, 2015). Contrary to those results from high-income countries (HICs), in low- and middle-income countries (LMICs) across sub- Saharan Africa, higher levels of maternal vaccination acceptance were found among pregnant women who reported having received tetanus vaccine during their current and/or most recent pregnancy (Materia et al., 1993; Anatea et al., 2018). It is important to note that vaccine uptake is not the same thing as vaccine acceptance, and vice versa. Although a vaccine may be made available, an individual or group can decide whether to accept or reject the offer (Dudley et al., 2020).

Several strategies have been found to be effective in increasing uptake of maternal vaccines by women in high-income countries (Bisset and Paterson, 2018). These include reminding women about vaccination on antenatal healthcare records, midwives providing the vaccines and providing education and information for healthcare staff and patients (Bisset 2018). Other enablers to maternal vaccine acceptance and ANC utilisation were employment, higher socioeconomic status (Haile et al., 2013; Nebeb et al., 2015; Olaitan et al., 2017; Bobo et al., 2017). The main vaccine routinely implemented in LMICs is the vaccine against tetanus. Maternal immunization programs in low- and middle-income countries have been found to have high uptake rates and be highly acceptable, although much less research has been conducted in such contexts. A study conducted in Eastern Ethiopia explored factors affecting the perceptions and uptake of tetanus toxoid immunization among women. They found that several socio-demographic, economic and cultural variables such as maternal age, occupation, education level and knowing vaccination dates were considerably related to the pregnant woman's TT immunization status (Anatea et al., 2018). Larson Williams et al. 2018 employed qualitative methods to identify what mothers in Zambia knew about whooping cough and their attitudes towards vaccines in general and maternal vaccines. Knowledge of pertussis and the vaccine was limited and women considered childhood vaccines to have similar risks and benefits as maternal vaccines. In addition,

although negative community rumours contributed to vaccine hesitancy, overall mothers were positive about maternal vaccines (Larson Williams et al., 2018). Another study using the 2008–2009 Kenya Demographic and Health Survey identified determinants of postpartum women's uptake of TT immunization. They found that women between the ages of 20 to 34 had the highest uptake of TT injections compared to women above the age of 34. Other characteristics they found to be related to women receiving sufficient TT immunizations included "lower birth order, having some education, being employed and/or making health related decisions jointly with a partner or other person" (Haile et al., 2013). Concurrent with findings of other studies, a woman's awareness of her immunization schedule was closely related to her uptake of TT immunizations (Bamidele and Umoh, 2004; Anatea et al., 2018). Although the majority of women in LMICs utilize MIs, there are some pregnant women who refuse immunizations. These women who are not vaccinated are often labelled as "defaulters" (Fairhead et al., 2004). An early study on this issue found that mothers' "default" due to poorer knowledge of the diseases the vaccines should prevent, and superstitions surrounding diseases aetiology and specific worries about vaccination delivery practices (Hanlon et al., 1988).

New Vaccines For Pregnant Women

New vaccines for pregnant women are becoming available, for example, vaccines against diseases such as Group B streptococcus (GBS), Respiratory Syncytial Virus (RSV) and Severe Acute Respiratory Syndrome Coronavirus 2 (SARSCoV2) (Glezen, 1999; Kaaijk 2013; Russell et al., 2017; Carreras-Abad et al., 2020; Garg et al., 2021). Group B streptococcus (GBS) is a significant pathogen that affects newborns, peripartum women, and the elderly globally. Neonatal GBS disease rates have decreased as a result of prenatal maternal GBS screening and antibiotic treatment, although immunisation remains the most effective long-term method of disease management (Johri et al., 2006; Bauserman et al., 2013; Heath, 2016; Lawn et al., 2017; Russell et al., 2017). The majority of cases of early-onset neonatal and young infant illness present within the first 24 hours (Madhi et al., 2013; Puopolo, 2014; Vekemans et al., 2019; Kobayashi et al., 2019). Many potential GBS vaccines have been created, including conjugate vaccines made by conjugating proteins to pure capsular polysaccharide. There are conjugate vaccines

available for six of the ten GBS serotypes that are currently known (Johri et al., 2006; Bauserman et al., 2013; Lawn et al., 2017; Carreras-Abad et al., 2020). Phase I and II testing of various combination vaccines in human clinical trials have been completed successfully with encouraging findings (Johri et al., 2006; Bauserman et al., 2013; Lawn et al., 2017; Carreras-Abad et al., 2020). Pfizer recently announced that the U.S. Food and Drug Administration (FDA) granted Breakthrough Therapy Designation to its investigational Group B Streptococcus (GBS) vaccine candidate, GBS6 or PF-06760805, for the prevention of invasive GBS disease caused by the vaccine serotypes in newborns and young infants by active immunisation of their mothers during pregnancy. GBS6 could assist in addressing a crucial global public health need by assisting pregnant women in protecting their unborn children from the devastating illnesses brought on by this disease, such as meningitis, pneumonia, and sepsis. Respiratory Syncytial Virus can lead to lower respiratory tract illness as well as death and hospitalisation of infants 0-5 months (Lozano 2012). Maternal vaccination is currently considered the most plausible strategy to protect these young infants. However, there have been significant challenges in developing such a vaccine, including poor immunological responses and reactogenicity to vaccines in this age group (Murphy et al., 1986; Kim et al., 1969; Karron et al., 2013). As a result, there are no licenced RSV vaccines for children as of yet, although the Pfizer study just published shows good results from the phase III trial (Pfizer, 2022). Several candidate maternal RSV vaccines are advancing in phase 2 and phase 3 clinical trials (Higgins et al., 2016). Pfizer recently released positive data from its bivalent RSV vaccine candidate's global maternal immunisation trial (Pfizer press release, 2022). The bivalent RSV prefusion vaccine candidate, RSVpreF is being studied in a phase 3 clinical trial (NCT04424316) by MATISSE (MATernal Immunization Study for Safety and Efficacy), to see if it can help protect newborns against RSV disease. Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) that causes the 2019 coronavirus disease, known as COVID-19, poses a serious threat to individuals all over the world including pregnant women. Historically, pregnant women have been excluded clinical trials with the aim of protecting them and their unborn babies from any potential risks due to a lack of evidence about safety and efficacy, however, this excludes women from any associated benefits and limits policymakers to make unnecessarily difficult decisions due to a lack of adequate evidence (Garg et al., 2021). The global narrative has changed thanks to ethicists and campaigners who advocated for

broader participation of pregnant women in clinical trials, moving from "protection from research" to "protection through research" (Beigi et al., 2021). For example, the Pfizer-BioNTech COVID-19 vaccine (BNT162b2) has been dosed to the first participants in a global Phase 2/3 study to further assess its safety, tolerability, and immunogenicity in preventing COVID-19 in healthy pregnant women 18 years of age and older (Pfizer, 2022).

Health Systems

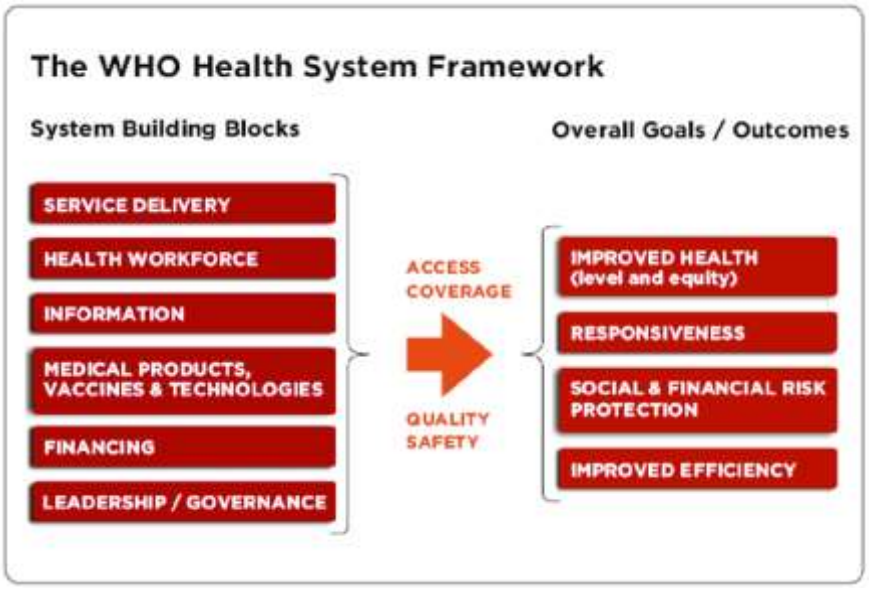

Figure 1. WHO Health Systems Framework.

Source: De Savigny and Adam, 2009.

All the organisations, institutions, resources, and people whose main goal is to enhance health make up a health system (WHO, 2000; Indicators, 2010) This involves more direct actions for improving one's health as well as initiatives to affect health determinants. The health systems building blocks are service delivery, health workforce; information; medical products, vaccines and technologies; financing and leadership/governance (Figure 2) (De Savigny and Adam, 2009). The relationships and interactions that exist between the building blocks, specifically how they affect and impact each other, make these building blocks a system. A health system is therefore a sum of many different components that work

in synergy. People are at the centre as beneficiaries of and actors in health systems (Figure 3) (De Savigny and Adam, 2009).

Figure 2. Health Systems Building Blocks.

Source: De Savigny and Adam, 2009.

The Gambia Health Care Delivery System

Almost all (90%) of health care facilities in The Gambia are operated by the public health sector, with the remaining 10% being Non-Governmental Organizations (NGO) and privately-owned health facilities. The Greater Banjul Area is home to the vast majority of private healthcare institutions, leaving rural communities with little options for where to receive medical care. There are seven health regions in the nation, each with a regional health team (RHT) led by a regional health director (RHD). The RHTs are in charge of overseeing, managing, and administrating health services on a daily basis in their respective regions. They are in charge of the primary and secondary healthcare facilities, as well as their staff, in their respective regions. The Senior Administrative Officer, Regional Public Health Nurse, Regional Public Health Officer, and other support personnel help the RHDs. On the other hand, the tertiary level, which includes hospitals, has semi-autonomous boards that are separately led (Figure 4)

(The Gambia National Health Sector Strategic Plan 2014-2020; The Gambia National Development Plan 2018-2021; The Gambia National Health Financing Strategic Plan 2019- 2024).

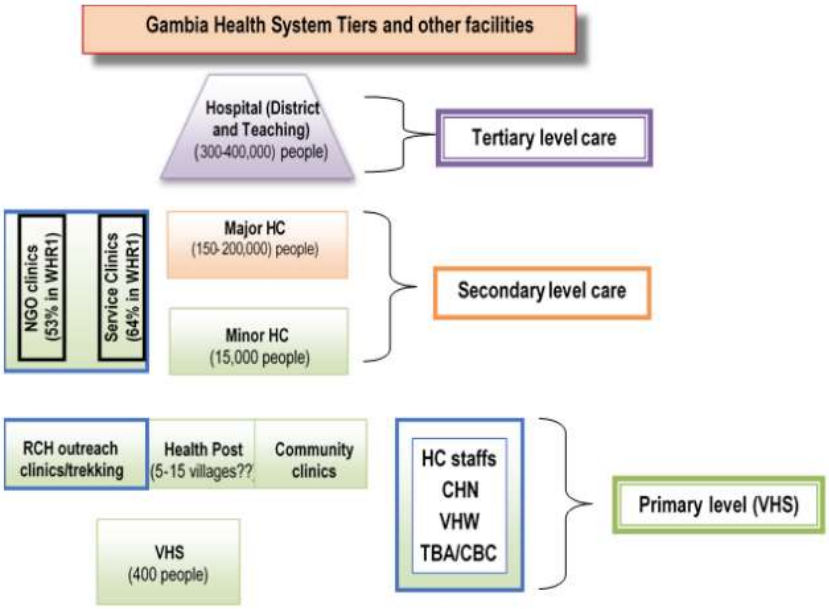

Figure 3. Tiers of The Gambia Health System.

Source: The Gambia National Health Financing Strategic Plan, 2019- 2024.

At the primary level, Infant Welfare Clinic (IWC) and prenatal care for expectant mothers are two services that are primarily provided by Reproductive and Child Health (RCH) clinics to children under the age of five. Trekking teams then make trips at least once a month to the catchment areas of each health facility as outreach clinics. The RCH team typically consists of a nurse midwife, Community Health Nurse (CHN) or CHN/midwife, community nurse attendant, public health officer for EPI activities, and a drug revolving fund collector. In primary health care (PHC) villages, the Village Development Committee (VDC) selects the village health workers (VHWs) and traditional birth attendants (TBAs). TBAs and VHWs are provided with weeks formal training and a modest start-up stock of equipment and drugs. Both TBA and VHW are expected to refer serious cases to the local health facility. The VHWs and TBAs are supervised and given continuing education by VHS/CHN who oversees circuits of 4 to 10 PHC villages. These VHS/CHNs in turn report through their nearest BHS

facility and is supervised by the OIC of that facility and by the Regional Health Team. There are 634 PHC villages organized into 69 circuits. The VHW serves as a primary healthcare provider for minor diseases and accidents. The VHW also serves as a health educator and advisor in the community. The TBA, as their name suggests, were already a part of the culture before the establishment of the official healthcare system. They serve as family planning providers, trained birth attendants, prenatal and postnatal counsellors, and health educators. The VHS/CHN supervises the VHWs and TBAs and provides them with ongoing education. The effective operation of primary healthcare in The Gambia depends on the VHS/CHNs who are therefore provided with motorcycles for trekking (The Gambia National Health Sector Strategic Plan 2014-2020; The Gambia National Development Plan 2018-2021; The Gambia National Health Financing Strategic Plan 2019- 2024).

At the secondary level of the national health system, the Basic Health Service is made up of both major and minor health facilities. Major health facilities typically have 110–150 beds available for every 150,000–200,000 residents. The following services are offered by minor health facilities: Reproductive and Child Health (RCH), Family Planning (FP), nutrition, control of common endemic diseases, health promotion and protection, and provision of essential drugs and vaccines. For every 15000 people, a minor health centre has 20–40 beds and ought to offer 70% of the essential medical services (The Gambia National Health Sector Strategic Plan 2014-2020; The Gambia National Development Plan 2018-2021; The Gambia National Health Financing Strategic Plan 2019- 2024).

At the tertiary level, there are currently five general public hospitals, including the Sheikh Zayed Regional Eye Care Centre in Kanifing, the Bansang Hospital in Central River Region, the Armed Forces Provisional Ruling Council hospital in Farafenni, North Bank Region, the Sulayman Junkung General Hospital in Bwiam, the Serekunda General Hospital in Kanifing, and the Jammeh Foundation for Peace Hospital in Bundung. There is also one teaching and specialised hospital, the Edward Francis Small Teaching Hospital. The hospitals are often not supplied by or under the supervision of the RHTs and have a semi-autonomous status with hospital management boards. They do, however, have certain significant duties to the RHTs, such as informing them on illness occurrences, maternal mortality, and

feedback on patients who have been referred to them by the village health services (VHS) and basic health facilities (The Gambia National Health Sector Strategic Plan 2014-2020; The Gambia National Development Plan 2018-2021; The Gambia National Health Financing Strategic Plan 2019- 2024).

More than 60 privately run, community-managed, and non-profit healthcare facilities supplement the public health system. The majority of NGOs and private practitioners are based in the Greater Banjul Area, however they also offer services. Additionally, a sizable number of private pharmacies, drug stores, and traditional healers provide various types of health services (The Gambia National Health Sector Strategic Plan 2014-2020). In addition to the government-run facilities, 18 NGOs also operate facilities under the supervision of the RHT. Clinical services are offered by the Medical Research Council Unit The Gambia at the London School of Hygiene and Tropical Medicine (MRCG at LSHTM) in Fajara, Keneba, and Basse. Additionally, 23 private health clinics and several pharmacies, especially in urban areas, diagnose and recommend treatments. They are not a part of the government system and therefore offer services for a fee to be paid by patients (The Gambia National Health Sector Strategic Plan 2014-2020; The Gambia National Development Plan 2018-2021; The Gambia National Health Financing Strategic Plan 2019- 2024).

The Gambia Health Care Financing

The Ministry of Health (MoH) entered into agreements with local health facilities under a results-based financing (RBF) programme with the aim of increasing coverage. The National Nutrition Agency (NaNA) reimburses the medical facilities for results that have been attained and confirmed. The VDC and Village Support Group (VSG) are also contracted by the MoH to offer health information and education services as part of the RBF programme. Given that all Gambians have access to a range of publicly supported services, The Gambia has a national pool of resources. The pool's capacity to influence financial protection and equity on a national level is constrained by the current purchasing practises, the availability of limited resources, and the underutilization of the Drug Revolving Fund. The MoH implemented mechanisms for a more strategic approach to purchasing. NaNA purchases

basic, secondary, and tertiary care services from MoH using results-based financing (The Gambia National Health Financing Strategic Plan 2019- 2024).

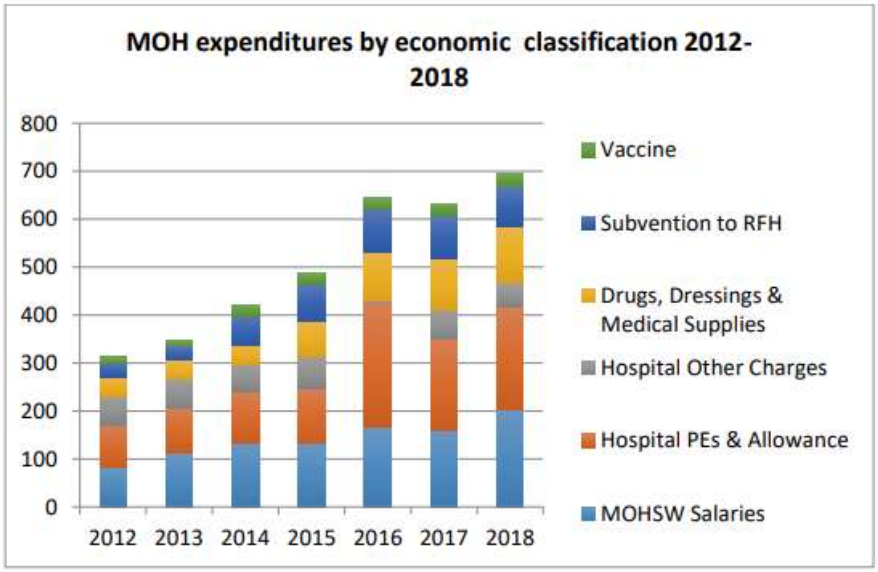

Figure 4. The Gambia Ministry of Health expenditures by economic classification 2012-2018.

Source: The Gambia National Health Financing Strategic Plan 2019- 2024.

Over time, the MoH budget allotment has grown, however, hospital personnel salaries and benefits (31%) and MoH salaries (29%) accounted for the majority of the budget in 2018 (Figure 5). Drug, dressing, and medical supply purchases have consistently increased from 9% of the budget in 2014 to 15% in 2018, but they still represent an unacceptably small portion of the budget when compared to the 60% allocated to wages and benefits. Although the health sector requires ample human resources, it is still important to make sure the tools are available to enable effective, high-quality health service coverage. Regarding revenue generation, there are issues with the low government budget allocation to the health sector, difficulties with programme planning, budgeting, and budget disbursement as well as unpredictable levels and priorities of outside funding. Strategies for reform of health financing arrangements have therefore been proposed based on identified key areas of intervention. The objectives are (1) to increase funding for health care, (2) to reduce the existing ten funding pools for health care to six virtual pools by 2024 and (3) to ensure that by 2024 quality healthcare services are strategically

purchased from accredited healthcare facilities and institutes (The Gambia National Health Financing Strategic Plan 2019- 2024).

Antenatal Care

Antenatal care can be defined as the care provided by skilled health-care professionals to pregnant women in order to ensure the best health outcomes for a pregnant woman and her baby by preparing her for labour and delivery (AbouZahr and Wardlaw, 2003; WHO, 2016). ANC can also allow for the early detection and prompt treatment of any complications that may arise during pregnancy, the prevention of diseases through immunizations, and for health promotion (Anya et al., 2008). According to the Gambia Demographic and Health Survey (2019-20), more than half (57%) of the pregnant women attended ANC after their first trimester. Some (21%) of the pregnant women attended ANC less than four times. Only 4% of pregnant women attended ANC eight or more times. Overall, ANC service uptake in The Gambia remains a number that is not absolute and compliance to the WHO recommendation is low. Regarding TT coverage, majority (71%) of women received a sufficient number of tetanus toxoid injections to protect their most recent live birth against neonatal tetanus. Less than half (35%) of mothers received two or more injections during the pregnancy for their last live birth and the percentage of women whose last birth was protected from neonatal tetanus was higher in rural areas (77%) than in urban areas (68%). Overall, TT coverage in The Gambia also remains a number that is not absolute.

To increase women's uptake of antenatal care, several policies have been proposed by the WHO. Pregnant women were first encouraged to make 16-18 visits during each pregnancy in order to be categorized as either low or high risk (Lincetto et al., 2006, WHO, 2016). This approach was flawed as more frequent antenatal visits did not necessarily improve pregnancy outcomes. Therefore, that approach was replaced by the Focused Antenatal Care (FANC) model in 2002. The goal of FANC was to promote the health of pregnant women and their unborn babies through targeted assessments and individualised care providing guidance on birth preparedness, nutrition, immunization, family planning

and more. The FANC service providers focused on each woman's individual situation rather than categorising women based on risk indicators. Although this approach was less costly and more time efficient than the first ANC model, only 64% of women around the world were taking up the four recommended visits (WHO, 2016). Thus, in 2016, the WHO published a new set of recommendations for a Positive Pregnancy Experience (PPE). Positive Pregnancy Experience is defined as maintaining a familiar physical and sociocultural environment for a healthy pregnancy, labour and delivery leading to a positive motherhood experience (Downe et al., 2016). Pregnant women are expected to make eight contacts in each pregnancy beginning with the first contact up to 12 weeks, second at 20 weeks, third at 26 weeks, fourth at 30 weeks, fifth at 34 weeks and every two weeks after that up to 40 weeks (WHO 2016). The WHO 2016 PPE model has been taken up in The Gambia and women are expected to follow this schedule. In the Gambia, most antenatal care is provided through government facilities (80–85%) and non-governmental organizations (NGOs) (15–20%). Pregnant women do receive care at private facilities; however, this percentage is much lower (3%). Government run antenatal clinics are open on weekdays from 08:00 onwards and are led by trained midwives (Anya, 2008).

Coverage for ANC is usually expressed as the proportion of women who have had at least one ANC visit (WHO, 2016). Although the global coverage is high with 71% of women worldwide receiving any ANC and 69% of pregnant women in sub-Saharan Africa making at least one ANC visit, coverage of at least four visits is lower at 44%. According to the 2019-20 Gambia Demographic and Health Survey, 79% of women aged 15 to 49 who gave birth to a live child in the five years prior to the study had at least four ANC visits, compared to 18% who had two to three visits and 2% who had just one. Another 1% of women had their most recent pregnancy without any antenatal care and eight or more ANC visits were made by only 4% of women. Compared to urban women (76%), more rural women (83%) had at least four antenatal care visits (The Gambia Demographic and Health Survey, 2019-20). However, poorer women have less access to the recommended ANC visits, and women in rural areas are even less likely to receive adequate health care. Traditional Birth Attendants usually receive some government supported training to recognize any complications that may arise during labour and delivery and refer the woman to the nearest health facility (Telfer et al., 2002). Three factors are frequently used to assess

the effectiveness of ANC: the quantity of ANC interactions, the timing of the first ANC visit (ANC should begin before 12 weeks), and the availability of all ANC services that are advised (WHO, 2016). The WHO makes the following recommendations for high-quality ANC: the provision of compassionate and respectful evidence-based care, including physical examinations, diagnostic tests, tetanus immunizations and iron supplementation (WHO, 2016).

Quality Of Care

To eliminate maternal and neonatal mortality, persistent health systems weaknesses such as poor availability and quality of services must be addressed. Quality of care is defined by the WHO as the extent to which health care services are offered in a people-centered approach to enhance health outcomes for pregnant women and their babies (WHO, 2015). By measuring and addressing disparities in healthcare access and outcomes, quality standards in healthcare help to improve population health. They also assist healthcare users in making educated decisions and choices, identify what works and what doesn't to promote improvement, and prevent the overuse, underuse, and misuse of healthcare services (Morris and Bailey, 2014). To assess, enhance, and monitor the care provided in medical facilities, it is necessary to pinpoint the important domains that should be the focus of attention because the quality of care is a multidimensional term. The WHO developed a quality-of-care framework that serves as a roadmap for managers, policymakers, and healthcare practitioners in order to raise the standard of care for expectant mothers and babies (Tunçalp et al., 2015). The quality framework contains eight dimensions and focuses on healthcare facilities while also taking into account how communities and service consumers perceive their own healthcare needs and preferences (WHO, 2015).

Quality of care is also defined as the extent to which maternal health services increase the likelihood of timely and appropriate treatment (Hulton et al., 2000, p9). The user's perceived quality of treatment based on their personal experiences and the quality of care provided by care providers at the health facility were both considered in this context. Quality of physical and human resources, referral system efficiency, equipped health facility, skilled staff, availability and efficiency of referral process, and

availability and accessibility of emergency services were all components of the quality of care (Hulton et al., 2000).The user perception of quality focuses on pregnant women and their opinions about the quality of the medical services, the products, and the overall care they received from healthcare providers. In other words, the quality of maternal services offered to expectant mothers depends on the care providers' training, expertise, working hours, and pay and incentives (Fawole et al., 2008; Birungi et al., 2009). The quality of health services is compromised in many nations due to inadequate health system functioning, insufficient funding, lack of health resources, poor use of available health resources and shortage of sufficient laboratory and pharmaceutical resources (WHO, 2000; WHO, 2010; Leslie et al., 2017; Bobo et al., 2021).

Supply and Demand Factors For ANC Utilisation

Several studies have been conducted to investigate the factors that influence the use of ANC in developing countries (Say and Raine, 2007; Simkhada, 2008; Tsegay, 2013; Chama-Chiliba, & Koch, 2015; Kuuire, 2017; Tekelab 2019; Mohammed et al., 2019; Addisu et al., 2022). In these studies, maternal education, urban or rural residence, household income, parity, women's age and occupation, cost and availability of services, shortage of health professionals, non-functional health facility and insufficient supplies and equipment are all characteristics shown to be linked to the utilisation of ANC. The most notable behavioural model of health service utilisation was revised by Ronald M. Andersen in 1995. His model explained that individual use of health services is a result of need for care, enabling factors such as distance to the health facility and pre-disposing factors such as socio-demographics (Anderson, 1995). Over the years, health economists have come to label these nuances as a demand versus supply side issue (Ellis, 1993; Jacobs et al., 2012). Demand side determinants include pre-disposing factors, need factors and enabling factors. Supply side determinants include resources such as staff and service infrastructure such as amenities (Aday & Anderson, 1994; Ensor & Cooper, 2004; O'Donnell, 2007).

Despite the increase in the utilisation of antenatal care services as well as better access to health care facilities, supply and demand factors such as health system, social, cultural and economic barriers still remain. Poor road infrastructure, inadequate transportation, distance to the health facility, duration of travel to health facility, long waiting times, drug and vaccine stock-outs and health care workers shortages are deterrents to attaining four or more ANC contacts during pregnancy (Simkhada et al., 2008; Haile et al., 2013; Nnebue et al., 2014; Lawry et al., 2017; Konje et al., 2018; Anatea et al., 2018; Lechthaler et al., 2018; Mamoro and Hanfore, 2018; Pugliese-Garcia et al., 2018; Nganga et al., 2019; Fleming et al., 2019; Kajungu et al., 2020; Gebremedhin et al., 2020; Konlan et al., 2020; Bobo et al., 2021; Bishop et al., 2021).The quality of antenatal care and distance between residence and healthcare facility were also key factors impacting vaccine utilization in a study on maternal healthcare dynamics in The Gambia (Oh et al., 2020). Another study conducted in The Gambia in 2012 assessed women's preferences and perceptions of antenatal healthcare services in six public and six private healthcare. They found that the satisfaction rate with antenatal services of the 502 pregnant women who participated in their descriptive cross-sectional survey was 79.9% for public facilities and 97.9% for private facilities. The public facilities were believed to have inadequate privacy, neatness and space (Jallow et al., 2012). Women's perceptions of the care and services they receive are positively influenced by their trust in health care workers. Trust is essential not only in the connection between pregnant women and health care personnel, but also in the health care system as a whole. Health care workers have proven to be reliable local players in shaping people's attitudes about vaccines and vaccination programmes. Patients trust in providers and the provider-patient relationship affects maternal vaccine acceptance among pregnant women (Armitage et al., 2018; Fleming et al., 2019; Nganga et al., 2019; Godongwana et al., 2021). Healthcare providers are one of the most trusted sources of vaccine information and one of the biggest influences on vaccine decision making. Pregnant women have trust and high expectations in health care providers and the safety of maternal vaccines despite rumours, community myths and misperceptions (Zhang et al., 2012; Wiley et al., 2013; Larson et al., 2014; Paterson et al., 2016; Pugliese-Garcia et al., 2018; Nganga et al., 2019; Fleming et al., 2019; Kajungu et al., 2020; Godongwana et al., 2021). Recommendations from trusted health-care providers promote antenatal care service utilisation and maternal vaccine acceptance and uptake.

Overall, antenatal care is positively associated with pregnant women's uptake of maternal vaccines (Yaya et al., 2019; Mohamed and Ahmed, 2022). Women have varied reasons for their acceptance and uptake of maternal vaccines offered to them at via antenatal care services. Reasons for receipt of maternal vaccines include importance of good health, disease prevention, benefit to the unborn baby and adherence to health-care provider recommendations (Otieno et al., 2020a). Reasons for non-receipt of maternal vaccines include forgetting appointment dates, lack of awareness of the risks and benefits, and fear of harm to self and/or baby (Awosan and Hassan, 2018). Reasons for incomplete TT immunization are unawareness of vaccination schedule, lack of desire, far distance of services, and fear of vaccine side effects (Haile et al., 2013; Nnebue et al., 2014; Mamoro and Hanfore, 2018; Ndimbii et al., 2018). Knowledge and awareness about maternal vaccines are important drivers of maternal vaccination acceptance. Pregnant women adequately understand the role of maternal vaccines in disease prevention for themselves and their unborn babies and the benefits of using ANC services (Bamidele and Umoh, 2004; Sule et al., 2014; Anatea et al., 2018; Awosan and Hassan, 2018; Konlan et al., 2020). However, social norms, religious beliefs and cultural dynamics do not always allow women to be key actors in their own healthcare. A study on maternal healthcare dynamics in Gambia found that the education of husband and role of mother in healthcare decision making were key factors impacting vaccine utilization (Oh et al., 2020). Additionally in The Gambia, the management of pregnancy was seen as a family affair, with the decision-making process dependent on the pregnant woman's family setting. Decision makers were often those who care for the pregnancy financially, usually the husband or woman herself if she earns an income.

Local vaccination cultures

As Nichter (1995) and Millward (2019) point out, discussions about public perceptions of vaccines have historically employed the idea of ignorance to explain both acceptance and reluctance. The public's ignorance is characterised by their lack of information and being limited by what they don't understand. Passive publics are thought to accept vaccines as a result of bowing to authority, whereas active publics

see the need for and benefits of vaccination and demand its provision. Passive acceptance is seen as a sign of compliance and refusal to vaccinate is based on individual weighing of costs and benefits (Nichter, 1995). According to this interpretation, ignorant publics may consent to vaccination without question because they believe in scientific authority and health messaging. It is therefore important to continually understand the micro-interactions and discourse between pregnant women and health system to improve understandings of local vaccination cultures, including public engagement with vaccines and vaccine-providing institutions. Local vaccination cultures are essentially defined as particular socio-cultural contexts, vaccination interaction with local knowledge and perceptions and experiences of interaction between health care providers and health care recipients (Nichter, 1995; Streefland et al., 1999). Understanding local vaccination cultures is crucial because vaccine acceptance and rejection are both extremely context dependent. People's attitudes towards and decisions on vaccination are influenced by social, cultural, historical, and political factors (Fairhead and Leach, 2012). Vaccine hesitancy and refusal can strengthen social identities in communities that lead unconventional lifestyles, while in low-income nations vaccine refusal can be seen as a means for economically and politically disadvantaged communities to express dissatisfaction with broader socioeconomic conditions (Streefland et al., 1999; Sobo, 2016).

Defining vaccine confidence, vaccine hesitancy, vaccine acceptance and vaccine uptake

Above all, the phenomenon of public trust underlies the public's confidence in vaccines. Confidence in the context of vaccination includes trust in the vaccine (the product), the vaccinator or other healthcare provider (the provider), and those who decide whether or not to administer the vaccine (the policymaker). These relationships of trust are important because in order for the public to accept vaccination, it must be confident in the honesty, competence, and good faith of public health and government officials, as well as in the ability of the private sector to produce safe, effective vaccines and of healthcare professionals to administer them properly. Understanding how people see vaccines requires both trust and confidence. Trust is essentially based on beliefs about competence and

motivation. The judgements of the competence and motivation of the provider as well as the legislators who set the policies are important since trust and confidence in vaccinations are dynamic and context dependent. The literature on vaccine confidence, which has increasingly examined vaccine hesitancy as a potential sign of declining trust, uses various terminology that are related to one another (Larson et al., 2011; Larson et al., 2013). Three important domains of impact driving vaccination hesitancy were identified through the SAGE working group research and discussions: complacency, convenience and confidence (Larson et al., 2014). For many different reasons, people could lack faith in the safety or effectiveness of vaccines. Due to poor interactions with the product, service providers, or people who decide on policy, they could lack confidence. They may adhere to religious or philosophical principles that motivate them to favour conventional rituals, prayers, or homoeopathic treatments over biological methods (Larson et al., 2015).

Several complex and multidimensional elements have an impact on vaccine acceptance and uptake. Vaccine acceptance is when an individual or group decides to accept or refuse vaccination and can be active (adherence) or passive (compliance) (Nichter, 1995). Vaccine uptake is the number of people vaccinated with a specific dose of a vaccine in a given time period (Rikitu Terefa et al., 2021). It is important to note that vaccine uptake is not the same as vaccine acceptance because it does not consider the individuals choice and reasoning on whether to accept or refuse. Therefore, vaccine uptake rates should not be used to assess vaccine acceptance as poor vaccine uptake does not mean low vaccine acceptability and high vaccine uptake does not mean high vaccine acceptability (Dubé et al., 2015). To increase vaccine coverage, it will be helpful to comprehend the complexity of the factors that affect vaccine acceptance and uptake.

Research Aim

To gain a contextualized understanding of the factors influencing antenatal care service utilization and maternal vaccination acceptance in The Gambia.

Research Objectives

Objective 1. To conduct a literature review on factors influencing maternal vaccination uptake and acceptance in sub-Saharan Africa.

Objective 2. To investigate health system factors that influence antenatal care service utilization in The Gambia.

Objective 3. To explore factors influencing acceptance of vaccination during pregnancy in The Gambia.

Importance of PhD research

As evidenced by my literature review, there is limited research on maternal vaccination acceptance in sub-Saharan Africa and more so in The Gambia. Only one peer-reviewed article has been published from research conducted in The Gambia and focused on women's acceptance of potential vaccines to be given during pregnancy (Armitage et al., 2018;). Armitage et al. (2018) explored women's willingness to accept potential influenza vaccination in pregnancy asking one vaccine intent statement, namely, *''I would get a flu vaccine in pregnancy if available for free"*. The majority (98.5%) of women in that study stated that they agreed with the vaccine intent statements for pregnancy (Armitage et al., 2018). Some studies were however conducted in other West African countries, including Benin (Ekholuenetale, 2020), Ghana (Abor, 2011; Konlan, 2020), Ivory Coast (Ymba, 2003; Yaya, 2019), Sierra Leone (Yaya, 2020) and Nigeria (Odumosu, 1982; Edet, 1998; Bamidele, 2004; Umoiyoho, 2010; Babalola, 2011; Adeyemi, 2013; Nnebue, 2014; Sule, 2014; Olaitan, 2017; Okafor, 2019; Nass, 2018; Awosan, 2018; Fidelis, 2019; Sato, 2020; Akwataghibe, 2021).

Recent years have seen the emergence of novel diseases and the simultaneous development of vaccines specifically intended to protect pregnant woman from diseases such as influenza, tetanus, diphtheria, whooping cough and lately SARS-CoV-2. Also there has been a global focus to protect neonates from congenital infections such as Zika virus (ZIKV), and from respiratory infections such as respiratory syncytial virus (RSV) and group B streptococcus (GBS). In light of the development of novel vaccines offered to pregnant women, it was timely to understand the current situation in The Gambia regarding the complex and intersectoral factors influencing maternal vaccination acceptance. Vaccine confidence has so far been important for the acceptance of routine immunisation programs although the global problem of vaccine hesitancy remains. One reason for sustained maternal vaccine hesitancy is the lack of provision of quality antenatal care. There remains a global concern on the persistent high maternal mortality rates that exist in sub-Saharan Africa including The Gambia due to inadequate and/or non-utilization of antenatal care services. If pregnant women do not utilize antenatal care, they forgo the available and beneficial services being offered for them and their children. This decision not only affects

their health but also the health of future generations, as children born to immunized mothers have better health outcomes. In addition, the effect of supply factors such as the nature of health facilities where antenatal care services are provided and the perceptions of health care workers providing antenatal care within these facilities remained poorly understood. Additionally, it is critical to further explore the effect of demand factors such as the actors involved in maternal health decision making, antenatal care utilization and barriers and enablers to the acceptance of maternal vaccines.

The novelty of my PhD is in its use of medical anthropology to explore how vaccine supply and demand dynamics in the context of The Gambia are shaped by structural and socio-cultural processes. Specifically novel is its focus on investigating the quality of antenatal care offered to pregnant women at different health facilities and exploring the acceptability of maternal vaccination from various sources, reflecting on the impact of each source on pregnant women's maternal health care utilisation, knowledge, decision-making and acceptance. It also highlights important policy and programmatic factors for the strengthening of existing ANC and EPI systems and for the introduction and uptake of new maternal vaccines in the country and includes recommendations for national maternal immunization planning.

CHAPTER 2 – METHODOLOGY

Chapter Overview

In this chapter, I provide a summary of the research strategy that was employed to achieve the study's aims and objectives. The chapter outlines the research methods, data collection tools, participants, data analysis methods, challenges in the field and ethical considerations. I also provide a positionality statement where I describe my personal, philosophical and theoretical beliefs through which I view and experience the world and the research process. I also reflect on how my personal and professional background influenced my choice of topic, my positioning in the research process, and my relationship with the participants. I consider the possible advantages and/or disadvantages that I had in terms of my personal history and professional competence. Finally, I deliberate on the influence of my knowledge, attitudes and beliefs on the formulation of my data collection tools.

Research methods

The study was a convergent parallel mixed methods design, using qualitative and quantitative data collection methods. A convergent parallel design involves the researcher simultaneously conducting the quantitative and qualitative elements during the same stage of the research process, giving equal weight to each method, analysing the two parts separately, and combining the findings (Creswell & Plano Clark, 2011). The researcher seeks to triangulate the methods by directly contrasting the quantitative and qualitative findings with the goal of corroboration and validation (Creswell and Plano Clark, 2011; Bernard, 2017). The main goal of qualitative methods is to obtain depth of knowledge, while the main goal of quantitative approaches is to achieve breadth of knowledge (Patton, 2002). The results of the quantitative and qualitative studies are merged in the discussion chapter of this thesis to answer questions on access to antenatal care services as well as maternal vaccination acceptance in The Gambia. Descriptive, facility-based, cross-sectional surveys were conducted with health facility managers (officers-in-charge) rather than self-completion questionnaires. Although cost effectiveness and anonymity are pros of using self-completion questionnaires, without an in-person interviewer in this context, survey participants may not have understood the questions or been motivated to complete

the survey on time. Therefore, structured interviews with facility managers were carried out to determine the accessibility of qualified staff, availability of essential drugs, physical infrastructure and human resources. The health facility survey included questions on the availability of essential components of ANC (Appendix 1). Individual, in-depth interviews (IDIs) were conducted during the same visit with community health nurse/midwives, nurses and officers-in-charge of health facilities to understand their knowledge, attitudes, and perceptions of the health system wherein they work. We also took the opportunity to document challenges faced along with their suggestions for improvements (Appendix 2). IDIs and Focus group discussions (FGDs) were conducted with pregnant women and women with infants in the communities. The aim was to determine their knowledge of maternal vaccines being offered at their respective antenatal clinics, their perceptions of vaccines in general and their willingness to accept potential new maternal vaccines. We also explored their interaction with the health system within which these vaccines are offered and their relationships with the health care workers (Appendix 3). Within each community, we asked women's groups to select ten of their members for a focus group discussion. A few in-depth interviews were conducted to gain the individual perspectives of women who could not partake in the focus group discussion due to the quota.

Qualitative researchers are more interested in the process than the results and in understanding how people interpret their experiences, lives, and worldviews. The key tool for gathering and analysing data is the qualitative researcher. Rather than through inventories, surveys, or robots, data are mediated through this human instrument. Fieldwork is a component of qualitative research as when a researcher wants to observe or document behaviour in its natural environment, they physically go to the participants, environment, site, or institution. Qualitative research is descriptive because the researcher is curious about the meaning, process, and comprehension that may be gleaned from words or images. Since the researcher constructs abstractions, concepts, hypotheses, and theories from specifics, qualitative research is an inductive process (Ochieng, 2009).

Data was collected through face-to-face interviews in one of three local languages (i.e. Mandinka, Fula, Wolof). Survey questions posed to health facility managers and the thematic guide for interviews with health care workers were developed using theories of healthcare access developed over the years (Ellis, 1993; Aday & Anderson, 1994; Anderson, 1995; Ensor & Cooper, 2004; O'Donnell, 2007; Jacobs et al., 2012; Levesque et al., 2013). A total of nine health facility assessments were conducted with an almost equal divide between urban and rural Gambia. PJ and AC visited each facility as a pair and recorded health facility managers responses on a pre-designed questionnaire.

- In-depth interviews provide rich insight into people's personal values, perceptions and feelings. They allow the researcher to build rapport with participants and therefore elicit a depth of information. Two semi-structured interview guides were developed for (1) pregnant women and women with infants, and for (2) health care workers. Open-ended questions were formulated including the main themes to be studied based on previous literature.
- Focus group discussions can help to understand social norms, attitudes and beliefs. They were conducted with a group of 6 to 10 pregnant women and women with infants in each community.

Data for both IDIs and FGDs were collected until the theoretical principle of thematic/data saturation was reached. Saturation occurs when adding more participants to the study does not result in additional perspectives or information (O'reilly and Parker, 2013). Audio recordings from all IDIs and FGDs were converted into transcripts for coding and analysis. For participants who did not give us permission to record, detailed notes of their responses were instead used in data analysis.

Study setting, sites and participants

Setting

The Gambia is a multi-ethnic society with the main ethnic groups being the Mandinka, Fula, Wolof, Jola and Serahule. About 95% of the population is Muslim with the majority of the remaining 5% identifying as Christian (Jaiteh and Saho, 2006). The country has two municipalities and five regions:

Banjul and Kanifing municipalities, and the West Coast, Lower River, North Bank, Central River and Upper River regions. In 2013, the population of The Gambia was estimated at 1.9 million. 50% of the country's residents lived in rural areas, and women accounted for 51% of the total population (The Gambia Bureau of Statistics, 2014). The Gambia has become more urbanized as a result of large-scale migration due to rural poverty and limited economic opportunities, with the highest urbanization rate in Banjul, Kanifing Municipal Council and Brikama Local Government Areas (The Gambia Bureau of Statistics, 2014). According to the 2013 Gambia Population and Housing Census, a settlement is considered urban if it satisfies most of the following conditions:

- It has commercial importance
- It has institutional importance
- The majority of the population should be non-agricultural in occupation
- The population should be 5000 and above
- The density should be high
- Some degree of infrastructure should be available

All settlements that do not meet the above conditions are considered rural (The Gambia Bureau of Statistics, 2014). Based on these criteria, my research was carried out in four regions of the Gambia (West Coast Region (WCR), North Bank Region (NBR), Central River Region (CRR) and Upper River Region (URR)), identifying participants from both urban and rural settlements. This selection of sites ensured maximum variation of the sample (e.g. different sociodemographic characteristics) to better understand the influence of urban and rural differences on participant responses.

Sites

The study was conducted across four regions in nine communities and nine health facilities running ANC clinics across The Gambia (Figure 7). These study sites were chosen after discussions with teams at the regional health directorates in each of the study regions. They informed us of the CHNs they had currently working in each region who had good rapport with the communities, including the village

chiefs and women's groups. The following health facilities were included: Brikama District Hospital, West Coast Region (WCR); Remis Health Centre, WCR; Nyofelleh community health post, WCR; Farafenni RMNACH clinic, North Bank Region (NBR); Jahaly health centre, Central River Region (CRR); Brikamaba minor health centre, CRR; Yero Bawol Minor Health Center, Upper River Region (URR); Baja kunda health center, URR and Basse Major District Hospital, URR. Health facilities were selected as they were named by women in the study as health care providers they have visited for antenatal and/or other health care.

Participants

The study population included nine health facility managers, 20 health care workers and 96 pregnant women and women with infants. Purposive sampling is a sampling strategy where the researcher selects a small number of people from the population who serve as primary data sources with rich information on the research question (Patton, 2002; Creswell & Plano Clark, 2011). Purposive sampling was used to ensure that health care workers were contacted and interviewed as they provide care to women attending antenatal clinic. It was also used to identify women for recruitment with the help of community health workers (CHWs) who also served as study facilitators. These CHWs were individuals who had a good knowledge of the communities they work in and were therefore able to advise on how and where to sensitize and recruit participants into the study. After discussions with CHW in each community, we recruited women from registered women's groups, locally known as kafoos. Kafoos have different purposes and activities including agribusiness, education, and entertainment.

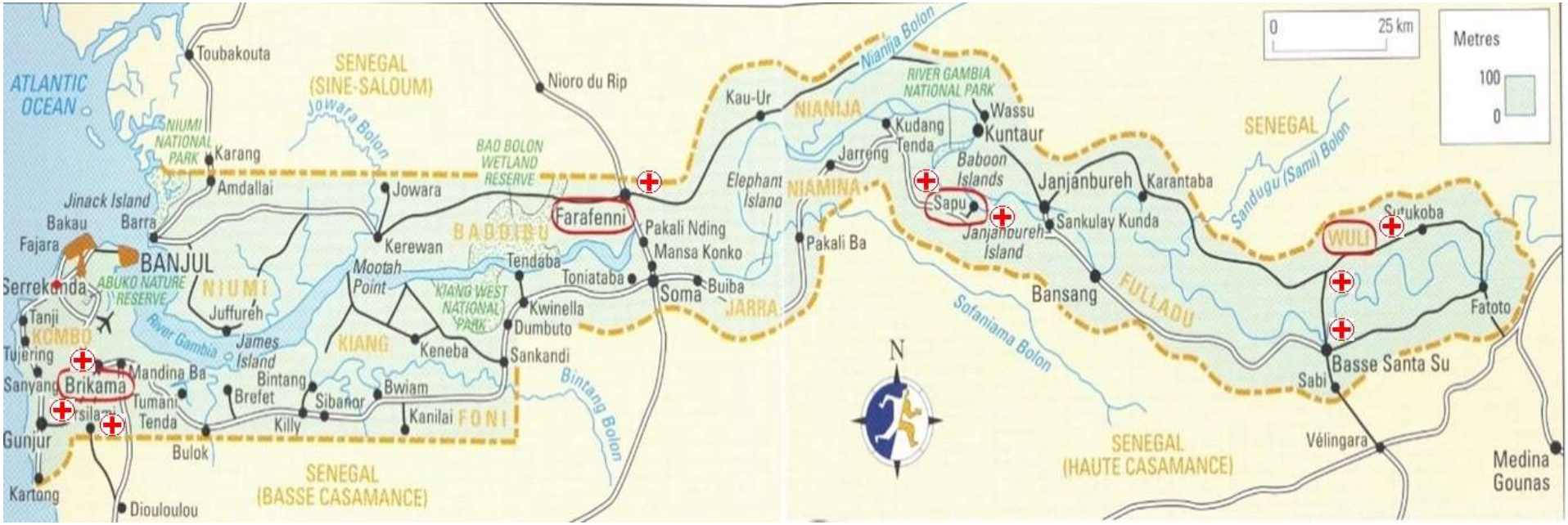

Figure 5. Large road map of The Gambia with nine study sites and nine study health facilities highlighted (amended from mapsland.com)

Source: https://www.mapsland.com/maps/africa/gambia/in-high-resolution-road-map-of-gambia.jpg

Ethical considerations

Ethics approvals

Full ethical approval was received from The Gambia Government/MRCG at LSHTM Joint Ethics Committee (Ref. 1568) and the London School of Hygiene & Tropical Medicine Research Ethics Committee (Ref. 15808) (Appendix 4). All study participants provided individual verbal informed consent which was witnessed by PJ and AC. Moreover, permission was also sought from the Regional Health Directorates and heads of health facilities. Health care workers were recruited voluntarily and reserved the right to stop or withdraw from the study at any stage. A total sum of GMD150.00 per person (~ USD 3) was given to each study participant as compensation for loss of time and/or earnings. It is vital for any research study that it upholds proper ethical standards, and therefore the study was conducted according to the guidelines in the Declaration of Helsinki (World Medical Association, 2001) and the code of ethics of the American Anthropological Association (Appendix 5).

Informed consent

All study participants received information before surveys, interviews and focus group discussions in their preferred language on the study details, including and potential discomfort and benefits they could expect, compensation amount, any potential consequences of their refusal to participate or withdrawal, safeguarding of their personal records and key study contacts for any queries. They were also given a hard copy of the information sheet to keep (Appendix 6). Participants who could read and write in English provided written informed consent. For others, oral consent was sought, and the interviewer signed the consent form to confirm the study objectives were read and explained to the participant in their preferred local language, that they were given the choice to participate voluntarily, that they had the opportunity to ask questions and were provide with answers, that they had enough time to think about whether they wanted to take part and they agreed to take part in the study (Appendix 7). PJ and AC were responsible for taking consent, with both being able to communicate fluently in English and Wolof. AC was particularly able to speak and understand two other local languages, Mandinka and

Fula. Both members of the study team data collectors possessed cultural awareness and sensitivity of the different ethnic groups in The Gambia.

For surveys, after consent was received and the participant agreed to be interviewed, their responses were recorded on a printed hard copy of the questionnaire template drafted in Excel. Their consent was documented manually by either PJ or AC on the oral consent form. For IDIs and FGDs, after consent was received and the participant agreed for the interview to be tape recorded, the confirmation of this consent was also recorded on tape. For participants who consented to take part but refused to be tape-recorded, rather than trying to summarize their responses, detailed notes of their answers to each question were written verbatim as possible. Their consent was documented on either a written or oral consent form. Oral consent is preferred when "(i) the formality of written consent shapes the interaction between researcher and respondent, potentially making the interview obtrusive and causing distrust, (ii) signing a document can be perceived as negating anonymity and confidentiality by respondents, (iii) part of the population might be illiterate and (iv) signing documents is not part of daily practice in local communities and therefore carries special meaning/significance that can bias interview data as it sets the scene for the interview" (Cloke et al., 2000; Israel and Hay, 2006; Stark and Hedgecoe, 2010). According to the 2002 International Ethical Guidelines for Biomedical Research Involving Human Subjects, in research involving women of reproductive age, whether pregnant or non-pregnant, only the informed consent of the woman herself is required for her participation. The permission of a spouse or partner should never replace individual informed consent (Council for International Organizations of Medical Sciences, 2002). These guidelines were the premise upon which any pregnant woman who consented to take part in the research study were recruited, whether below or above the age of 18. No extra measures were put in place for the selected vulnerable group of pregnant women as the study was non-interventional.

Patient confidentiality

Strict confidentiality of all information was maintained by removing the names of the respondents from the final database, prior to analysis based on individual identification numbers. The database was completely anonymous with each participant being designated a non-identifiable unique study number (e.g. WCR01), and all subject identifiable data were excluded from the study database. All study data were managed by PJ and AC. Although every effort was made to avoid the identification of study participants, within smaller knit communities such as Yero Bawol in URR, it was not possible to ensure full confidentiality as we were most likely seen discussing with participants under the mango tree in the village.

Data collection

All data was collected between March 2018 and March 2019. Surveys were conducted within health facilities in a room or space identified by the HCW, where they felt comfortable continuing with the interview. Data collectors would complete the surveys via a question-and-answer session which lasted anywhere from 10 to 30 minutes. IDIs were conducted in a comfortable setting for the women (home) and health care workers (health facility). To maintain their privacy and confidentiality, interviews normally took place in a private room in the house with only the research team and participants present. FGDs were conducted in a private setting identified by PJ and AC (i.e. under a mango tree, community hall, skills center). IDIs lasted anywhere from 15 to 83 minutes. The shortest FGD lasted 61 minutes and the longest 120 minutes. My qualitative data collection adhered to the Standards for Reporting Qualitative Research (SRQR) (Appendix 8) (O'Brien et al., 2014). These tools aim to increase the transparency of all elements of qualitative research and are intended to support editors, reviewers, and readers as they evaluate manuscripts for publication and readers as they critically evaluate qualitative studies.

Challenges faced in the field

During data collection, we faced several challenges including poor road infrastructure, time constraints and logistics challenges. Another challenge was the social politics in recruiting participants in one of our study sites in the Upper River Region. In that study village we had thoroughly sensitized the women's kafoos the day before in their preferred local language on what the study was about, what harm or discomfort they could expect, what benefits they could expect, whether they would be compensated, what would happen if they refused to take part in the study or changed their mind later, how their personal records would remain confidential, who would have access to them and who they should contact if they had any questions. The following day (the day of the focus group discussion), we noticed that we had a larger turnout of participants than required. We had sensitized the women's group and informed them that we only required a maximum of 10 women per discussion, however, 17 women showed up on the day of the discussion. We believe this was due to the women being aware of the monetary compensation of GMD150.00 per person (~ USD 3) that was to be given to each woman participating in our FGD. My field assistant and I along with our study community facilitator reminded them of the number required for each group discussion as well as the criteria for inclusion into our study (pregnant women ad women with infants). This cut down the number from 17 to 12 women. The last two women agreed to concede missing the discussion and we asked if they still wanted to take part in our study via individual interviews rather than a group discussion. They agreed, gave us their contact information, and asked us to visit them at home the next day, which we did. This resolved the matter, and we were able to proceed with our FGD without any external disturbances. Thanks to our ability to resolve the issue as soon as it arose and knowledge of who to consult for guidance when resolving such issues in communities, we were able to overcome this challenge and maintain good rapport with and within the study community.

Data management

Audio recorders, notebooks and printed surveys were used for data capture in the field. PJ designed and managed all questionnaires, thematic guides as well as Excel data entry logbooks. Following the UK

Data Service guidelines, PJ listed all textual qualitative data and context information in an Excel spreadsheet with key biographical characteristics such as the interviewer's name, interview date, location, language(s), setting, start and end time, participant number, sex, transcriber and audio file information. Quantitative data were documented at the level of variables, value and code labels in an Excel spreadsheet. All physical data were kept in a secure location which only PJ and AC could access. Computer-generated data were stored and backed up on the MRCG at LSHTM network server as well as the LSHTM OneDrive server and an encrypted external hard drive. All data were handled in accordance with the data management policies of the LSHTM and PJ and AC complied with the requirements of General Data Protection Regulation (GDPR) with regards to the collection, storage, processing and dissemination of the study participants personal information.

Data analysis

The survey data was coded, cleaned, and entered into Excel 2019 before being exported to Statistical Package of Social Science (SPSS) version 28 for analysis. Descriptive statistics such as frequencies and percentages were used to characterize our study population as appropriate. Nominal and categorical variables were presented in the form of text, tables and figures. Initial clarification and analysis were taking place daily among PJ and AC in the field as an opportunity to note any issues with the survey/interview questions and compare interesting findings arising to discover patterns and connections. Daily discussions of emergent themes helped support the formal analysis by PJ at the end of data collection. All data from interviews not conducted in English were translated from the local languages and transcribed into written English text in Microsoft Word by AC. Reliability was assured by PJ randomly selecting and reading through 50% of transcripts while simultaneously listening to the audio recordings. This process helped form initial ideas and identification of possible patterns. The data were then coded, collated and re-focused to generate categories and themes using NVivo 11 Qualitative Data Analysis software (QSR International Pty Ltd.) was used to assist analysis of all transcribed data. PJ used content analysis to classify the data into categories of similar meanings, consequently identifying themes and patterns (Bernard, 2017). An inductive approach was used, wherein codes,

categories and themes were drawn directly drawn from the data (Cavanagh, 1997). Coding is the naming and labelling of data segments to explain and provide theoretical insight into the data (Charmaz, 2006). Excel was used to log and analyse the sociodemographic data. Data entered in Excel logbooks were reviewed continually for quality control. Credibility was established with the use of methods triangulation (i.e. IDIs and FGDs) to check the consistency of the findings. To ensure validity, peer debriefing was used by PJ and AC after completion of all IDIs and FGDs. Debriefings allow for immediate reflection on emerging findings and identification of gaps in the collected data (McMahon and Winch, 2018).

Research philosophy

Ontology and Epistemology

Ontology is a branch of philosophy that studies the nature of reality, including what makes something real and how we can comprehend its existence. (Bryman, 2006; Scotland, 2012). From my perspective as a subjectivist, social phenomena and their meaning are created from the perceptions and consequent actions of social actors (Saunders et al., 2007). Epistemology is the area of philosophy that examines the reliability of knowledge, what qualifies as acceptable knowledge, and how knowledge is acquired (Bryman, 2006; Saunders et al., 2007). I see and experience the world as an interpretivist, believing that truth varies depending on the circumstances (Crotty, 1998), and I gain knowledge through subjective interaction with the social world, in this case study participants (Guba and Lincoln, 1994). The interpretative method examines individuals' perspectives as well as the historical and cultural circumstances they live in (Bryman, 2008; Creswell, 2009). Interpretivists believe that quantitative research methods are insufficient to understand social processes, therefore they prefer qualitative research methods. The qualitative aspects of these methodologies emphasize the use of people as the primary research tool. Some of these techniques include ethno-methodology, grounded theory, ethnography, case studies, historical and documentary research, and more (Shah and Al-Bargi, 2013).

Positionality and Reflexivity

Positionality is influenced by an individual's values and viewpoints, which are in turn influenced by their gender, sexual orientation, ethnicity, race, political and religious beliefs, etc. (Sikes, 2004; Holmes, 2020). Positionality asks the researcher to declare and express their beliefs, values, and opinions on the research design, collection, and results. They must constantly reflect on themselves and adopt a reflective mindset in order to be able to identify, construct, evaluate, and explain their positionality. Reflexivity is the idea that researchers should be honest and open about themselves in their work while trying to understand how they influenced or contributed to it. Reflexivity is an important process of quality checking oneself and prompting self-analysis on how one's knowledge is constructed and whether that knowledge is truly valid (Cousin, 2013). Reflexivity makes the research process as well as the research decisions transparent and rigorous as the research must explain, elaborate and deliberate on the way their research is contextualized theoretically (Engward and Davis, 2015; Palaganas et al.,, 2017). Reflexivity influences positionality. It requires an explicit self-awareness and self-evaluation on the part of the researcher regarding their ideas and perspectives and how they may or have influenced the study findings (Greenbank, 2003; May & Perry, 2017). Reflexivity must be accompanied with awareness of the researcher's cultural, political, and social context since the researcher's ethics, personal integrity, and societal values, in addition to their expertise, have an impact on the research process (Greenbank, 2003, Bourke, 2014; Bryman, 2016). It must be acknowledged that no matter how reflexive I am, I can never objectively describe reality and there will always be some form of bias or subjectivity as language is a human social construct.

In examining women in The Gambia's acceptance of vaccines given during pregnancy, I began to realize how my personal and professional background defined what I was learning from them. My personal history of being a Gambian national who has lived, studied and worked across three continents and five countries, including The Gambia, Ivory Coast, Tunisia, Canada and the United Kingdom, has shaped my perceptions of health in the global landscape. In 2015, I attained an MSc degree in Medicine, Science and Society from Kings College London's faculty of Social Science and Public Policy.

Undertaking this masters course propelled me into the field of social science and enlightened me on different philosophies and philosophers. My journey progressed with my moving back home in January 2016 to begin work at the MRCG at LSHTM as the lead social scientist on a clinical vaccine trial, which aimed to assess the effects of administering Prevenar13® (PCV13) in pregnancy and early life for carriage acquisition as a surrogate for disease (PROPEL). My social science study was carried out ancillary to the PROPEL trial and aimed to understand the uptake and acceptability of maternal and neonatal PCV13 vaccines. When the prospect to undertake a PhD arose, I saw it as not only an opportunity to further my academic career but to improve my competencies and make me more confident as a researcher. In January 2018, I began my PhD journey at the LSHTM and have since been exploring factors influencing maternal vaccination utilisation and acceptance in my home country of The Gambia. It has been personally rewarding to contribute to research being conducted in my homeland.

My PhD research team comprised of what I would call two medical anthropologists in training (myself and AC); myself a PhD candidate at the LSHTM with over 6 years of experience and AC being a BSc candidate at the University of The Gambia (UTG) with over 9 years' experience working in communities with non-governmental organizations. I had oversight responsibility of the study goals and outcomes, including data collection tools and field activities. Both AC and I had no relationship with any of the participants prior to, or outside of, the research study. Being that AC and I were both women, we found that this facilitated our entry into the communities and participants were more sympathetic to us being two single females traveling for data collection across the country. My ethnic group (Aku) was underrepresented as we moved further inland, away from WCR. This allowed me to appreciate the cultural diversities of other ethnic groups across the country, but also meant I had to be enlightened a few times regarding certain cultural norms.

CHAPTER 3 – OBJECTIVE 1: LITERATURE REVIEW

Chapter Overview

A literature review was conducted to gain a deeper understanding of current research in the field of maternal vaccination acceptance among women in sub-Saharan African countries, focusing on women's experiences with immunizations and immunization programs and who is involved in their decision-making to receive vaccines during pregnancy. The search was conducted in January 2022 and screening, assessment, analysis and synthesis were conducted from February to September 2022. Factors such as maternal vaccine coverage, uptake, refusal, hesitancy, information, barriers, enablers, trust, decision making, accessibility, rumours and confidence were also explored within the included full-text articles. EndNote reference management software package was used to upload, organise, analyse selected articles. Microsoft Excel and Word were then used to synthesize the final included articles.

Search Strategy

My search strategy was developed based on a previous a literature review (Wilson et al., 2015) and updated across these databases to be relevant to sub-Saharan African countries: Medline, Embase, PsycINFO, CINAHL Complete, Global Health, Web of Science, Scopus and Africa-Wide Information. These databases were chosen based on their subject relevance such as public heath, health policy, African health and social sciences, as well as their noted advantages and disadvantages. My search strategy included an extensive list of keywords (Table 1) to capture the many expressions of vaccine utilisation and acceptance. The list of 48 sub-Saharan countries was chosen from the World Bank List of Country and Lending Groups at http://data.worldbank.org/about/country-classifications/country-and-lending-groups (Table 2).

Table 1. Keywords used in search strategy for literature review

pregnan* OR maternal AND vaccin* OR immuni* AND accept* OR uptake* OR refus* OR hesitanc* OR *information OR barrier* OR enabler* *trust OR decision* OR access* OR rumo*r OR confiden* AND Sub-Saharan Africa OR Angola OR Benin OR Botswana OR Burkina Faso OR Burundi OR Cameroon OR Cape Verde OR Central African Republic OR Chad OR Comoros OR Democratic Republic of Congo OR Republic of Congo OR Ivory Coast OR Equatorial Guinea OR Eritrea OR Ethiopia OR Gabon OR Gambia OR Ghana OR Guinea OR Guinea Bissau OR Kenya OR Lesotho OR Liberia OR Madagascar OR Malawi OR Mali OR Mauritania OR Mauritius OR Mozambique OR Namibia OR Niger OR Nigeria OR Rwanda OR Sao Tome OR Senegal OR Seychelles OR Sierra Leone OR Somalia OR South Africa OR Sudan OR South Sudan OR Swaziland OR Tanzania OR Togo OR Uganda OR Zambia OR Zimbabwe

Table 2. Sub-Saharan African countries from World Bank List

Angola	Cote d'Ivoire or Ivory Coast	Madagascar	Seychelles
Benin	Equatorial Guinea	Malawi	Sierra Leone
Botswana	Eritrea	Mali	Somalia
Burkina Faso	Ethiopia	Mauritania	South Africa
Burundi	Gabon	Mauritius	Sudan
Cameroon	Gambia	Mozambique	South Sudan
Cape Verde	Ghana	Namibia	Swaziland
Central African Republic	Guinea	Niger	Tanzania
Chad	Guinea Bissau	Nigeria	Togo
Comoros	Kenya	Rwanda	Uganda
Democratic Republic of Congo	Lesotho	Sao Tome	Zambia
Republic of Congo	Liberia	Senegal	Zimbabwe

Methods

EndNote reference management software package was used to identify, screen and remove all duplicates. Field settings and filters settings were changed at the outset to optimize my EndNote configuration for de-duplication. I used Bramer et al. (2016) guide for the de-duplication of all my database search results in EndNote (Bramer et al., 2016). After searching in 9 different databases, I selected all the records to import and saved the file in the Research Information Systems (RIS) (.ris) format. The RIS files were then imported into EndNote for de-duplication. I imported my results in the order below because EndNote's removal of duplicates automatically leaves the first copy added to the library and removes any following copies. I imported my references in the following order to ensure complete records with author, year, title and abstract included.

1. Medline
2. Embase
3. PsycINFO
4. CINAHL Complete
5. Global Health
6. Web of Science
7. Scopus
8. Africa-Wide Information
9. Google Scholar

While importing, I simultaneously created and organized my references into a group set titled 'Databases' which contained groups with the 9 database names listed above as titles to keep track of where each reference came from. I dragged and dropped the search results into each group as I was importing. Once all references were uploaded and organised into the 9 database name groups, I found duplicates using a helpful 13-stage process guide. The first thing I did was to set the 'find duplicates' preferences to **Author, Year, Title, Journal**, sorted all references by Journal, ran 'Find Duplicates'

and clicked ‘Delete’ to move the highlighted items to the trash. The following 12 steps can be found in the link: https://blogs.lshtm.ac.uk/library/2018/12/07/removing-duplicates-from-an-endnote-library/

I then went on to organize the de-duplicated references by creating a new group set called ‘Screening’ which contained three groups listed below:

1. Exclude
2. Include
3. Not accessible

I ran the ‘Find Full Text’ function on EndNote and moved the inaccessible records to their right group. I then screened each of the retrieved articles by title and abstract according to my set of inclusion and exclusion criteria (Table 3).

Table 3. Inclusion and exclusion criteria applied to screened records

Inclusion criteria • Articles that include research on women’s (especially pregnant women’s) perceptions, acceptance and utilization of vaccines given during pregnancy • Publication years: any • Location: countries within Sub-Saharan Africa • Languages: any **Exclusion criteria to be applied to peer-reviewed studies** • Not about women’s (especially pregnant women’s) perceptions, acceptance and utilization of vaccines given during pregnancy • Non-peer reviewed articles such as editorials, opinion, pilot studies • Literature and systematic reviews

Results

A total of 4236 records were identified through database searches and 572 additional records were identified through Google Scholar making a total of 4808 articles. 2385 duplicates were removed after using the duplicate search function on EndNote leaving a total of 2423 records to be screened by title and abstract. Out of those, 2340 were excluded, leaving 83 records for which the full texts were downloaded and assessed based on the inclusion and exclusion criteria (Table 3). Out of the 83 records, 9 records were excluded based on the inclusion/exclusion criteria (Atuyambe, 2009; Agida, 2015; Jackson; 2016; McMorrow; 2017; Okafor; 2019; Kide, 2020; Ahmed, 2021; Nigussie, 2021; Zenbaba, 2021) and 9 full-text articles were not accessible (Odumosu, 1982; Edet, 1998; Diawara, 2009; Umoiyoho and Etuk, 2010; Abor, 2011; Babalola, 2011; Adeyemi, 2013; Atake, 2018; Fidelis, 2019).. This resulted in 65 articles being included in the summary descriptive analysis. A flow diagram for the literature review on factors influencing maternal vaccination acceptance in sub-Saharan African countries can be seen in Figure 1. Out of the 48 sub-Saharan African countries listed in my search strategy, 21 countries had no peer-reviewed research published on the topic (Angola, Botswana, Cape Verde, Cameroon, Central African Republic, Comoros, Republic of Congo, Equatorial Guinea, Guinea, Eritrea, Gabon, Lesotho, Madagascar, Mauritania, Mauritius, Mozambique, Namibia, Sao Tome, Seychelles, South Sudan and Swaziland).

The included peer-reviewed journal articles were published from 1993 to 2022 and focused on different vaccines including influenza, pertussis, tetanus toxoid, yellow fever and COVID-19. Study data were collected with both quantitative and qualitative methods, including semi-structured interviewers,, cross-sectional surveys, in-depth interviews and focus group discussions. The main characteristics of articles included in the summary descriptive analyses are listed in a table in Appendix 9.

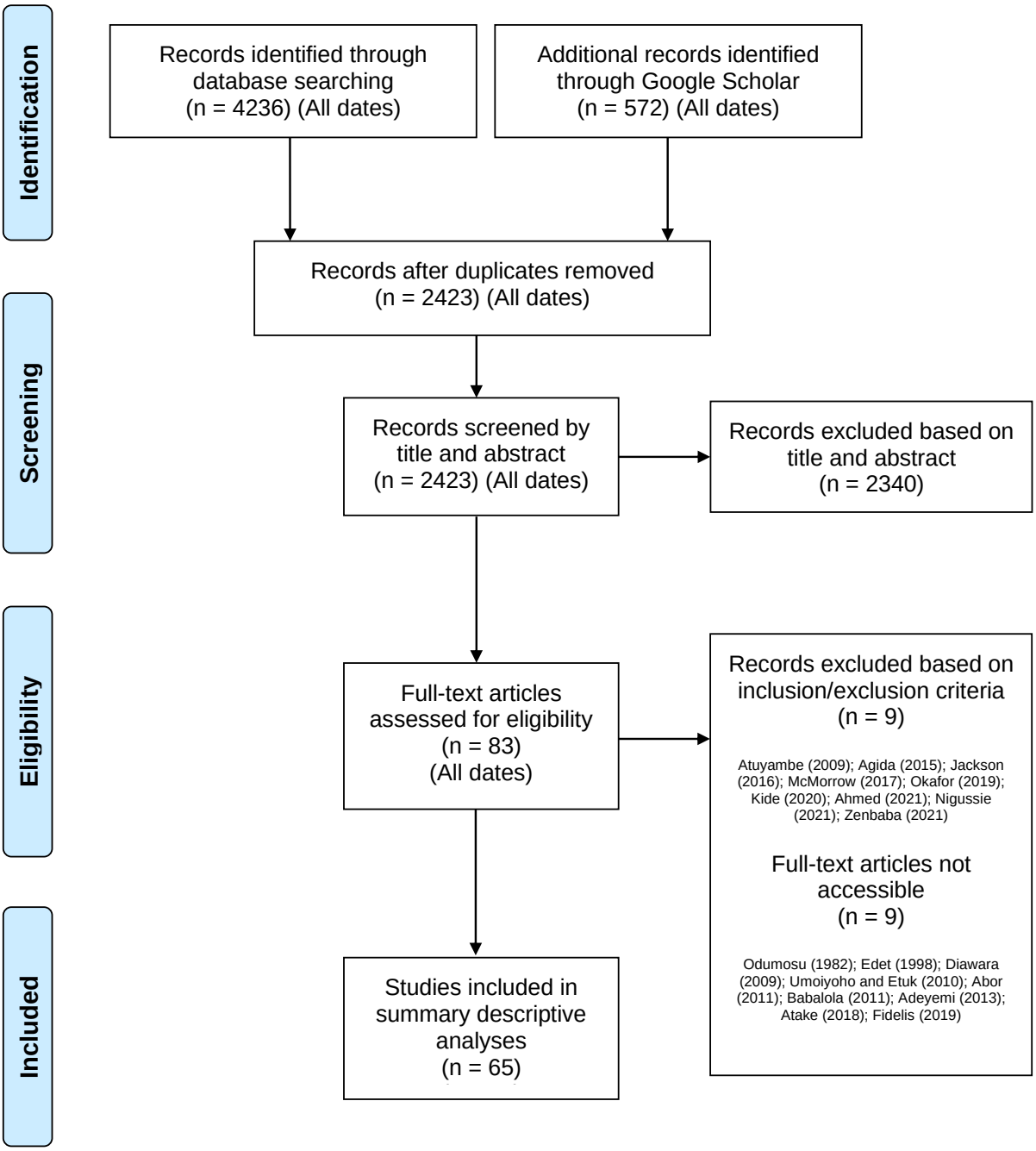

Figure 1. Flow diagram for literature review on women's acceptance of maternal vaccines in 48 sub-Saharan African countries.

Only one of the included studies was a cohort study, which is a quantitative research design that follows a group of individuals over a period to observe changes and risk factors for an outcome (Barrett and Noble, 2019). A quantitative cross-sectional design, which is a snapshot of a population's characteristics at a specific time, was employed by the majority of research studies (52/65 or 80%) (Wang and Cheng, 2020). Seven studies employed qualitative focus group discussions, which involves gathering people to talk about a particular subject or problem. Five studies used qualitative semi-structured interviews, which are one-on-one interviews with pre-written questions that enable in-depth research on a topic of interest (Figure 2).

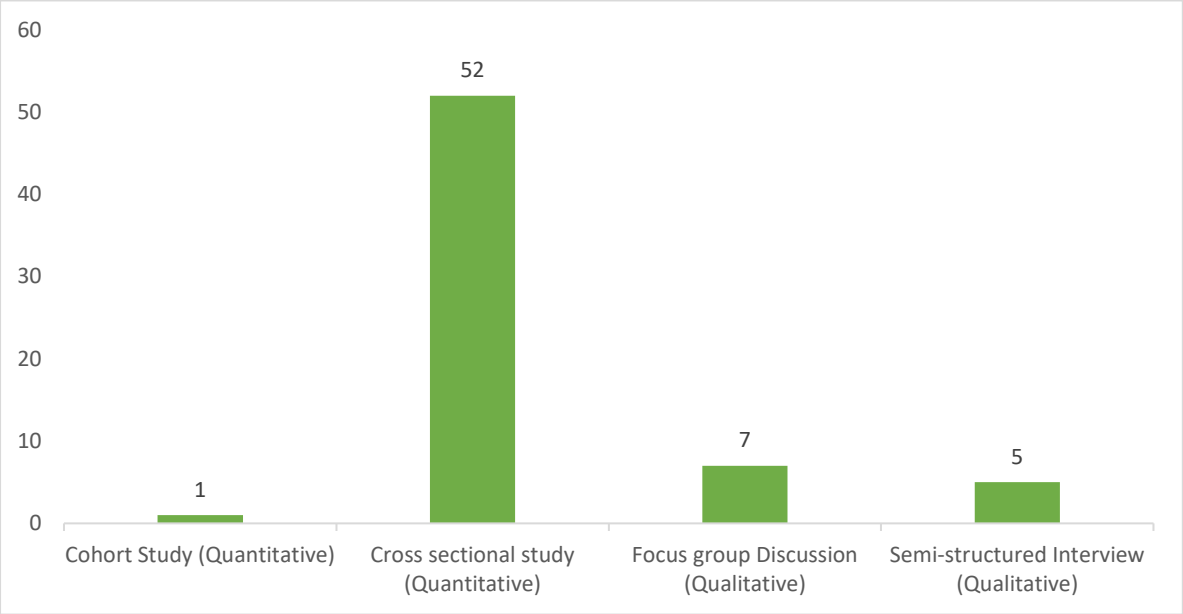

Figure 2. Study designs.

Out of the 65 included articles, 36 (55.4%) had no maternal vaccine of focus. For those that did have a vaccine of focus, tetanus toxoid vaccine was the most researched with 17 (26.2%) studies identified in my literature review. Although not a routine maternal vaccine, seven COVID-19 vaccine studies were included and accounted for 10.7% of all studies in my review. The influenza, pertussis and yellow fever vaccines were the least mentioned (Figure 3).

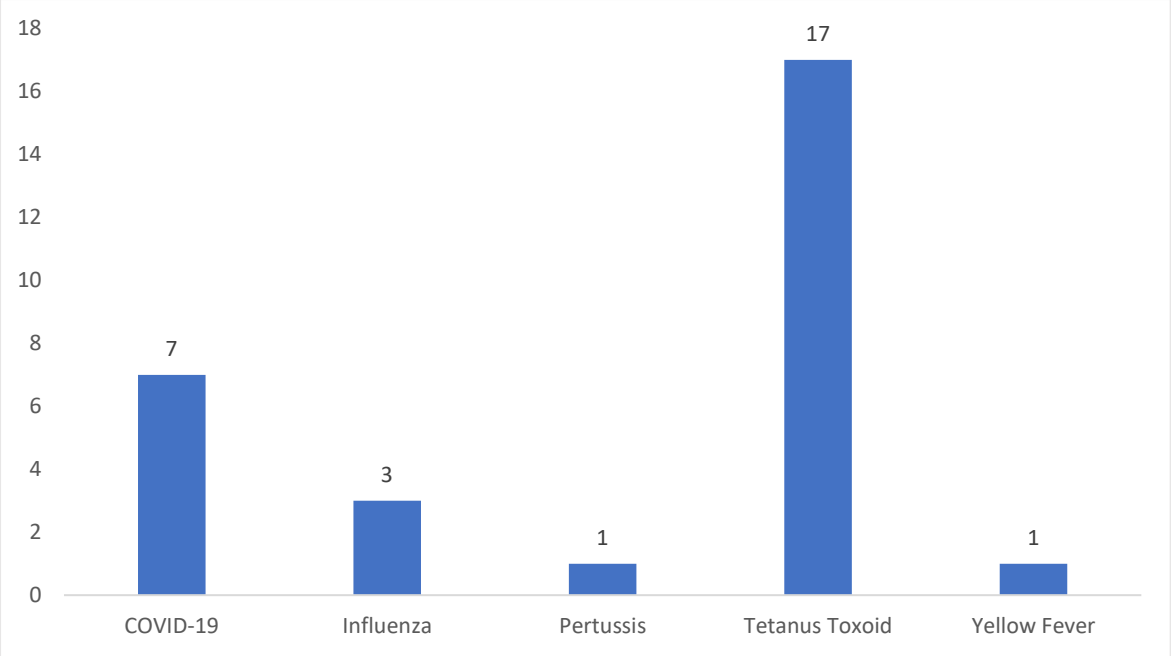

Figure 3. Vaccines of focus.

Seven of the studies that focused on the tetanus toxoid vaccine were carried out in Ethiopia. Tetanus vaccine related studies were primarily conducted in Ethiopia and Nigeria (5/17, 29.41%, and 5/17, 29.41%, respectively) (Figure 4). The majority of tetanus vaccine-related papers (8/17, 47%) were published between 2018 and 2020. There was also a surge in studies examining the factors that influence COVID-19 vaccine uptake, with six articles published in 2021 (Figure 4).

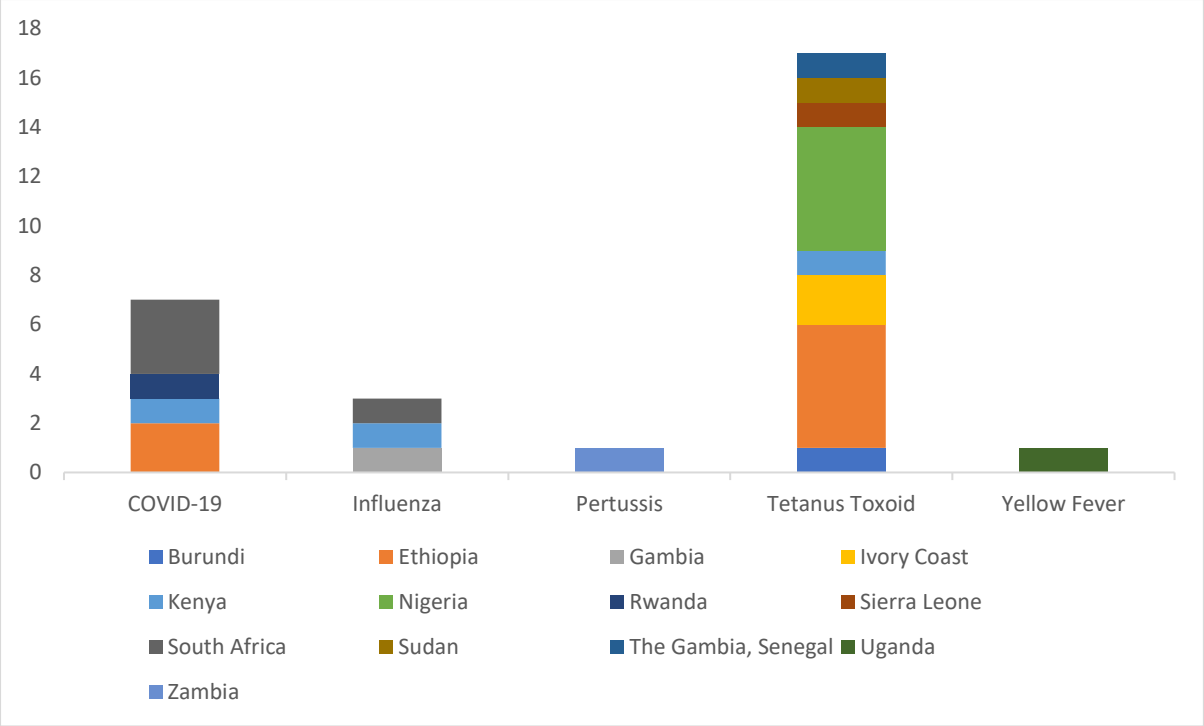

Figure 4. Vaccines mentioned by country.

Emergent themes in the literature

Acceptance, Refusal and Hesitancy

Vaccine hesitancy is a complex issue that arises from a range of factors, including individual beliefs and attitudes, social and cultural influences, and access to accurate information. Several studies have suggested that individuals with limited understanding or knowledge of vaccines may be more likely to experience hesitancy or delay in accepting vaccination (Materia et al., 1993; Anatea et al., 2018; Johm et al., 2021). In The Gambia and Senegal, women were overall confident about maternal vaccines and no instances of vaccine hesitancy were noted (Johm et al., 2021). A limited understanding of vaccines and overlap of knowledge on the difference between prevention and treatment has also been found to encourage vaccine hesitancy (Larson Williams et al., 2018; Pugliese-Garcia et al., 2018). Interestingly, in Sudan, pregnant women with low vaccine confidence were more likely to be involved in searching for additional vaccine information (Sabahelzain et al., 2021). However, misconceptions were found to stem from a lack of accurate information about maternal vaccines (Awosan and Hassan, 2018; Messeret et al., 2018; Kajungu et al., 2020; Godongwana et al., 2021). In a few studies, high levels of awareness

of maternal vaccines among pregnant women contrasted with low levels of compliance. Refusal of vaccines was due to a lack of information about the vaccine and its potential adverse effects (Bamidele and Umoh, 2004; Pugliese-Garcia et al., 2018; Otieno et al., 2020a). The majority (95.5%) of women in South Africa also reported vaccine stock-outs as the reason for non-vaccination and some refusal or indecision (25.8%) (Bishop et al., 2021). In Kenya, a few (4.3%) mothers reported having a negative experience with a vaccine in the past, mainly swelling at the injection site and out of those women, four also reported having refused a vaccine in the past (Otieno et al., 2020a).

Accessibility, Availability and Affordability

The distance to health facilities was identified as a significant barrier to pregnant women attending antenatal care (ANC) appointments in multiple studies conducted in different countries such as Tanzania, Ethiopia, Nigeria, and Gambia (Simkhada et al., 2008; Haile et al., 2013; Lawry et al., 2017; Konje et al., 2018; Anatea et al., 2018; Lechthaler et al., 2018; Mamoro and Hanfore, 2018; Gebremedhin et al., 2020; Konlan et al., 2020; Bobo et al., 2021; Johm et al., 2021)). Some women in Tanzania only attended ANC clinics in their third trimester due to the distance, resulting in a single visit throughout their pregnancy. A study in eastern Ethiopia found that the time spent to reach health facilities affected the uptake of tetanus toxoid vaccination doses, with mothers who travelled less than 30 minutes having better uptake compared to those who travelled more than one hour (Konje et al., 2018). A study on tetanus toxoid vaccination uptake and associated factors among mothers who gave birth in the last 12 months in eastern Ethiopia found that the overall time spent to reach the health facility determines vaccination uptake of TT doses, with mothers who travelled less than 30 minutes to reach a health facility having better vaccination uptake compared to those who travelled more than one hour (Gebremedhin et al., 2020). In north-western Nigeria, the majority (75.1%) of women were within 30 minutes reach of routine immunization services compared to 24.8% at more than 30 minutes reach (Nass, 2018). Long waiting times were experienced by women in Uganda and Gambia (Kajungu et al., 2020; Johm et al., 2021). This is different to findings in a study on what determines pregnant women in Ethiopia's uptake of tetanus toxoid immunization, wherein the majority (87.5%) of the participants indicated that they wait less than an hour for services at facilities (Anatea et al., 2018). Poor road

infrastructure as well as inefficient transportation systems have also been associated with fewer antenatal clinic visits facilities (Lawry et al., 2017; Fleming et al., 2019; Konlan et al., 2020; Johm et al., 2021). Finally, wealthier women living in better-off households were advantaged compared with those living in poor households showing an inequity in access to maternal health services (Dimbuene et al., 2018; Bobo et al., 2021). Challenges such as drug and vaccine stock-outs and health staff shortages were found in several studies (Nnebue et al., 2014; Konje et al., 2018; Lechthaler et al., 2018; Pugliese-Garcia et al., 2018; Nganga et al., 2019; Fleming et al., 2019; Kajungu et al., 2020; Johm et al., 2021; Bobo et al., 2021; Bishop et al., 2021). Healthcare workers therefore worked under pressure and in poor working conditions (Johm et al., 2021; Scanlon et al., 2021).

The economic status of women has a significant impact on their maternal healthcare-seeking behaviour, with women from poorer households having higher odds of poor tetanus toxoid (TT) immunization rates (Liyew and Ayalew, 2021). Studies showed that the provision of free influenza vaccines significantly increased vaccine coverage across several African countries, including Burundi, Ethiopia, Kenya, Malawi, Rwanda, Tanzania, Uganda, Zambia, and Zimbabwe. (Bobo et al., 2021). Cash incentives have also been found to be effective in increasing vaccine uptake among pregnant Nigerian women, with a two-dollar cash incentive more than tripling their odds of vaccine uptake (Sato and Fintan, 2020). Although maternal health services were provided free of charge in almost all of the countries, women incurred both direct costs such as laboratory tests and indirect costs such as transportation. Indirect costs and informal charges at health facilities were found to be barriers to women's utilization and uptake of maternal health care services (Lechthaler et al., 2018; Otieno et al., 2020a; Johm et al., 2021; Bobo et al., 2021).

Utilisation and Uptake

Knowledge and awareness about maternal vaccines were important drivers of maternal vaccine uptake. Pregnant women demonstrated an understanding of maternal vaccines' role in disease prevention for themselves and their unborn babies and were found to have adequate knowledge on the benefits of using ANC services as well as how many visits they should make during the course of their pregnancy

(Bamidele and Umoh, 2004; Sule et al., 2014; Anatea et al., 2018; Awosan and Hassan, 2018; Konlan et al., 2020; Johm et al., 2021). Women from urban areas in a study on inequalities in quality antenatal care in nine East African countries, namely Burundi, Ethiopia, Kenya, Malawi, Rwanda, Tanzania, Uganda, Zambia and Zimbabwe, were more likely to receive the quality ANC or six ANC services of blood pressure, urine sample, blood sample, tetanus vaccination, iron supplementation and other drugs compared to women residing in rural areas (Bobo et al., 2021). Antenatal care was found to be positively associated with pregnant women's uptake of maternal vaccines (Yaya et al., 2019; Mohamed and Ahmed, 2022). The majority of pregnant women in the included studies had received at least one dose of TT during pregnancy, while some had received two or more doses (Bamidele and Umoh, 2004; van Eijk et al., 2006; Haile et al., 2013; Owolabi et al., 2017; Awosan and Hassan, 2018; Ndimbii et al., 2018; Anatea et al., 2018; Gebremedhin et al., 2020; Johm et al., 2021; Bishop et al., 2021). Majority (≥97%) of pregnant women in Ethiopia and Sierra Leone received two doses of tetanus toxoid vaccine. (Tafere et al., 2018; Yaya et al., 2020).

Different results were found in Nigeria where less than a quarter of women (~23%) had received two or more doses of TT immunization meaning second-dose tetanus-diphtheria (Td2+) coverage level was low (Awosan and Hassan, 2018; Nass, 2018) and in rural Ethiopia where many women attending antenatal clinics did not receive two TT vaccines (Materia et al., 1993). Reasons for receipt of maternal vaccines were health importance, disease prevention, benefit to the unborn baby and adherence to health-care provider recommendations (Otieno et al., 2020a). Reasons for non-receipt of maternal vaccines were forgetting appointment dates, lack of awareness of the risks and benefits, and fear of harm to self and/or baby (Awosan and Hassan, 2018). Reasons for incomplete TT immunization were the mother being unaware that she needed to get the next dose, her lack of desire to get it, the provider failing to inform her of her vaccination schedule, far distance of services, and fear of vaccine side effects (Haile et al., 2013; Nnebue et al., 2014; Mamoro and Hanfore, 2018; Ndimbii et al., 2018). In two of the studies, mothers using ANC service follow ups were found to be more likely to take up TT immunization than those who did not follow ANC services (Haile et al., 2013; Anatea et al., 2018).

Higher maternal education was a significant predictor of the use of maternal health services including the antenatal care package in Nigeria, Ethiopia, Democratic Republic of the Congo, Ivory Coast, Egypt, Ghana, Ethiopia, Kenya and Zimbabwe (Ymba and Perrey, 2003; Bamidele and Umoh, 2004; van Eijk et al., 2006; Haile et al., 2013; Sule et al., 2014; Olaitan et al., 2017; Anatea et al., 2018; Dimbuene et al, 2018; Mihret et al., 2018; Mamoro and Hanfore, 2018). Mothers with formal education were over two times more likely to have been immunized with protective doses of TT than uneducated mothers (Ymba and Perrey, 2003; Bamidele and Umoh, 2004; van Eijk et al., 2006; Haile et al., 2013; Sule et al., 2014; Olaitan et al., 2017; Anatea et al., 2018; Dimbuene et al, 2018; Mihret et al., 2018; Mamoro and Hanfore, 2018). Pregnant women with secondary or higher education were found to have higher odds of observing the recommended ANC visits and receiving ANC services including tetanus vaccination, iron supplementation, etc. (Nsibande et al., 2020; Sabahelzain et al., 2021). Women who had their first ANC contact before 12 weeks of gestation were also more likely to receive all ANC services compared to women who had no or late ANC contact (Bobo et al., 2021). However, timely attendance of ANC in the first trimester of pregnancy was generally low with more women attending ANC for the first time either in their second or third trimester (van Eijk et al., 2006; Owolabi et al., 2017; Konje et al., 2018; Nyiro et al., 2020; Ahmed and Husein, 2020; Nyiro et al., 2020). TT vaccine uptake was lower among women from rural communities in Ethiopia (Liyew and Ayalew, 2021).

Coverage

Coverage of four or more ANC contacts and the six ANC services of blood pressure, urine sample, blood sample, tetanus vaccination, iron supplementation and other drugs varied across countries. Women in Zimbabwe, Tanzania, Benin, Burkina Faso, Ivory Coast, Gambia, Ghana, Guinea, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, Togo reported a high percentage (≥70% each) of four or more ANC contacts proving their adherence to the 4+ recommended intensity (Rai et al., 2014; Owolabi et al., 2017; Ekholuenetale et al., 2020; Natai et al., 2020). Similarly, in Uganda, majority (92%) of women had attended antenatal clinic at least twice (Tann et al., 2007). On the other hand, women in Ethiopia had a low percentage of four or more ANC contacts (31.8%) (Bobo et al., 2021) and only 8.0% of women in Benin had at least 8 ANC contacts during their last pregnancy (Ekholuenetale et al., 2020).

In Ethiopia, Malawi and Zimbabwe, four or more ANC contacts were higher among richer women (Bobo et al., 2021). Pregnant women in Ethiopia and Benin who were enlightened from listening to educational materials, news, television were more likely to have ≥ 8 ANC contacts (Regassa, 2011; Ekholuenetale et al., 2020; Bobo et al., 2021). A study on influenza vaccine coverage among pregnant women in South Africa found that most women (78.7%) were vaccinated after they increased the number of vaccine doses available and clinic staff who would inform them of the benefits of influenza vaccination. The majority of pregnant women (93.5%) were vaccinated on their first antenatal visit during the vaccine campaign (Bishop et al., 2021). Health care workers in Malawi had a strategy of requiring pregnant women to receive tetanus vaccine prior to being offered any other ANC services as a way of promoting high vaccination coverage (Fleming et al., 2019).

Sources of Information

Mass media have been found to be effective in promoting maternal vaccine uptake, particularly for tetanus vaccines. According to Sule et al. (2014), pregnant women in Nigeria who were exposed to mass media messages about tetanus vaccination were more likely to receive the vaccine than those who did not receive such messages. Similarly, a study in Nigeria by Sato and Fintan (2020) found that mass media campaigns, including radio announcements and text message reminders, significantly increased tetanus vaccine uptake among pregnant women. In Sierra Leone, the majority of women who reported receiving two doses of TT did not use or access mass media (Yaya et al., 2020). A study on vaccine information seeking behaviour among pregnant women in Sudan found that more than half of the pregnant women searched for information about vaccines, specifically topics related to vaccine schedules and side effects when they became pregnant (Sabahelzain et al., 2021). Information from health care workers was also found to positively impact maternal vaccine uptake. Health care workers providing ANC education were found to increase TT uptake (Ymba and Perrey, 2003; Mamoro and Hanfore, 2018). Better-informed women have also been found to be more demanding regarding the healthcare they need and are therefore more likely to make positive decisions regarding their uptake of antenatal care visits (Ntambue et al., 2012).

Confidence

Studies conducted in Nigeria, The Gambia, Senegal, and Zambia showed that women believe in the effectiveness of vaccines and trust the health system and its knowledgeable health care workers (Nganga et al., 2019; Kajungu et al., 2020; Godongwana et al., 2021; Johm et al., 2021). A majority (69.3%) of women in Nigeria believed Td+ was protective against maternal and neonatal tetanus compared to very few (3.2%) who believed it was harmful (Nass, 2018). Participants in The Gambia and Senegal echoed similar perceptions to participants in a study in Zambia, as both believed vaccines are effective and the health system is trustworthy with knowledgeable health care workers (HCWs) (Pugliese-Garcia et al., 2018; Johm et al., 2021). Recommendation for vaccination from trusted health-care providers promoted maternal vaccine acceptance, utilisation and uptake (Awosan et al., 2018; Otieno et al., 2020b; Johm et al., 2021). Women were willing to receive new maternal vaccines if only they would be given proper sensitization prior to roll-out. Women were interested in knowing the disease the new vaccine would prevent, how often and when they would need to receive it, and how safe it would be for themselves and their babies (Kajungu et al., 2020; Otieno et al., 2020a; Otieno et al., 2020b; Johm et al., 2021).

Decision Making

In many cultures, the husband's agreement and involvement were considered essential in his pregnant wife's decision to attend antenatal care (Ymba and Perrey, 2003; Haile et al., 2013; Konlan et al., 2020; Kajungu et al., 2020; Ahmed and Husein, 2020; Nyiro et al., 2020; Johm et al., 2021). Receiving two doses of TT injection was four times more likely for a mother who made a decision about her health together with her husband, possibly as a result of feeling more confident and socially supported (Haile et al., 2013; Nebeb et al., 2015; Mamoro and Hanfore, 2018). Rumours and misinformation about diseases and disease prevention were also found to influence women's decision to attend ANC clinics and accept vaccines. In some instances, women's expectations of vaccine efficacy were not met, leading to vaccine hesitancy. Studies conducted in different countries, including Uganda, Tanzania, and Zambia, found that community myths and misperceptions influenced maternal vaccine acceptance and utilization (Larson Williams et al., 2018; Kajungu et al., 2020; Johm et al., 2021). Misinformation was

related to vaccine hesitancy in instances where maternal expectations of vaccine efficacy were not met (Kajungu et al., 2020).

COVID-19

Seven articles were retrieved on research regarding COVID-19, most focusing on intended vaccine acceptance (Hoque et al., 2020; Bobo et al., 2021; Hailemariam et al., 2021; Mose and Yeshaneh, 2021; Shikuku et al., 2021; Skjefte et al., 2021; Wanyana et al., 2021). In South Africa, 63.3% of pregnant women reported that they would accept a COVID-19 vaccine as soon as it becomes available (Hoque et al., 2020). However, in Ethiopia, less than half (31.3%) of the participants had an intention to take the COVID-19 vaccine when available (Hailemariam et al., 2021). Interestingly, a study in southwest Ethiopia found that COVID-19 vaccine acceptance, if available, was high (70.7%) (Mose and Yeshaneh, 2021). A survey conducted in 16 countries found that half (52.0%) of pregnant women intended to receive COVID-19 vaccination during their pregnancy if an efficacy of 90% were achieved. Among non-pregnant women, the majority (73.4%) intended to receive vaccination (Skjefte et al., 2021). These findings suggest that vaccine hesitancy remains a challenge in some areas, but there is still a considerable proportion of pregnant women who are willing to accept the vaccine when it becomes available.

Discussion

A literature review was conducted to gain a deeper understanding of current research in the field of maternal vaccination acceptance among women in sub-Saharan African countries, focusing on women's experiences with immunizations and immunization programs and who is involved in their decision-making to receive vaccines during pregnancy. A quantitative cross-sectional design was employed by most of the studies that were examined (80%). This design is helpful for determining the prevalence and distribution of a specific condition or outcome in a population. Yet, using qualitative techniques can offer a better comprehension of people's experiences, viewpoints, and attitudes about a certain issue. Examples of these techniques are focus group discussions and semi-structured interviews. Hence, to provide a more thorough picture of the problem being studied, future research should think about combining both quantitative and qualitative methodologies. It is also interesting to note that tetanus toxoid was the most research. Tetanus is a serious condition that can be fatal if treated late, making the development of a vaccine and further study into the disease a top priority. The two countries that accounted for most of the research attention were Ethiopia and Nigeria. Moreover, starting in 2020, there has been an upsurge in studies examining the factors that influence COVID-19 vaccination uptake, reaching a peak of six articles in 2021. The majority of tetanus vaccine-related articles were released between 2018 and 2020. This indicates that there is an increasing need to comprehend the variables that affect vaccine uptake, particularly in light of newly emerging infectious illnesses.

Acceptance, Refusal and Hesitancy

Vaccine hesitancy is a complex issue that arises from a range of factors, including individual beliefs and attitudes, social and cultural influences, and access to accurate information. Several studies have suggested that individuals with limited understanding or knowledge of vaccines may be more likely to experience hesitancy or delay in accepting vaccination (Materia et al., 1993; Anatea et al., 2018; Larson Williams et al., 2018; Pugliese-Garcia et al., 2018; Johm et al., 2021). It is worth noting that vaccine hesitancy is not always associated with outright refusal or rejection of vaccination. Some individuals may fall along a spectrum of acceptance, with varying degrees of hesitancy or uncertainty. Several

studies indicated that although pregnant women may have high levels of awareness about maternal vaccines, this does not always translate into actual vaccine uptake. In some instances, pregnant women may refuse vaccines due to a lack of information about the vaccine and concerns about potential adverse effects. Bamidele and Umoh (2004), for instance, found that some women refused to receive vaccines during pregnancy because they were not informed about the vaccine and its safety.

Accessibility, Availability and Affordability

The distance to health facilities was identified as a significant barrier to pregnant women attending antenatal care (ANC) appointments in multiple studies conducted in different countries such as Tanzania, Ethiopia, Nigeria, and Gambia (Simkhada et al., 2008; Haile et al., 2013; Lawry et al., 2017; Konje et al., 2018; Anatea et al., 2018; Lechthaler et al., 2018; Mamoro and Hanfore, 2018; Gebremedhin et al., 2020; Konlan et al., 2020; Bobo et al., 2021; Johm et al., 2021). Overall, studies indicated that addressing the issue of distance to health facilities and improving transportation infrastructure can improve access to maternal health services, particularly for women in rural areas or those living in poor households (Konje et al., 2018; Dimbuene et al., 2018; Gebremedhin et al., 2020; Bobo et al., 2021). The economic status of women has a significant impact on their maternal healthcare-seeking behaviour, with women from poorer households having higher odds of poor tetanus toxoid immunization rates. Studies showed that the provision of free influenza vaccines significantly increased vaccine coverage across several African countries, including Burundi, Ethiopia, Kenya, Malawi, Rwanda, Tanzania, Uganda, Zambia, and Zimbabwe. (Bobo et al., 2021). Authors also found that addressing indirect costs and informal charges at health facilities is crucial in reducing barriers to accessing maternal health services and improving the overall quality of care provided.

Utilisation and Uptake

Women residing in urban areas were found to receive better quality ANC services than those residing in rural areas, and ANC was positively associated with maternal vaccine uptake. The studies found that pregnant women who had knowledge and awareness about maternal vaccines were more likely to receive them for disease prevention for both them and their unborn babies. They also had adequate

knowledge about the benefits of ANC services and the number of visits required during pregnancy (Bamidele and Umoh, 2004; Sule et al., 2014; Anatea et al., 2018; Awosan and Hassan, 2018; Konlan et al., 2020; Johm et al., 2021).

The studies highlighted the importance of ANC services in maternal vaccine uptake, as mothers using ANC service follow-ups were found to be more likely to take up TT immunization than those who did not follow ANC services. This underscores the importance of ensuring that all pregnant women receive regular ANC services, which can provide education and reminders about maternal vaccines (Haile et al., 2013; Nnebue et al., 2014; Anatea et al., 2018; Mamoro and Hanfore, 2018; Ndimbii et al., 2018; Awosan and Hassan, 2018; Otieno et al., 2020a). According to the studies cited, mothers value the health benefits of vaccines and see them as important for disease prevention, benefiting both themselves and their unborn babies. Additionally, adherence to healthcare provider recommendations is also an important factor in maternal vaccine uptake.

Studies suggest that women with higher levels of education are more likely to use maternal health services, attend ANC visits regularly, and receive recommended ANC services including TT vaccination, iron supplementation, and other interventions. Women who have their first ANC visit before 12 weeks of gestation are also more likely to receive all ANC services (Ymba and Perrey, 2003; Bamidele and Umoh, 2004; van Eijk et al., 2006; Haile et al., 2013; Sule et al., 2014; Olaitan et al., 2017; Anatea et al., 2018; Dimbuene et al, 2018; Mihret et al., 2018; Mamoro and Hanfore, 2018; Nsibande et al., 2020; Sabahelzain et al., 2021). It is revealed that timely attendance of ANC in the first trimester is generally low, with more women attending ANC for the first time in their second or third trimester. This highlights the need for increased awareness and education among women about the importance of early ANC attendance and the benefits of maternal health services.

Coverage

It is worth noting that attendance of four or more ANC contacts is crucial for ensuring the provision of the six ANC services of blood pressure, urine sample, blood sample, tetanus vaccination, iron

supplementation, and other drugs (Tann et al., 2007; Rai et al., 2014; Owolabi et al., 2017; Ekholuenetale et al., 2020; Natai et al., 2020; Bobo et al., 2021). The importance of healthcare workers in promoting ANC services is highlighted by the example from Malawi, where healthcare workers required pregnant women to receive tetanus vaccine before offering any other ANC services. Health care workers in Malawi had a strategy of requiring pregnant women to receive tetanus vaccine prior to being offered any other ANC services as a way of promoting high vaccination coverage (Fleming et al., 2019).

Sources of Information

Mass media have been found to be effective in promoting maternal vaccine uptake, particularly for tetanus vaccines. According to Sule et al. (2014), pregnant women in Nigeria who were exposed to mass media messages about tetanus vaccination were more likely to receive the vaccine than those who did not receive such messages. Similarly, a study in Nigeria by Sato and Fintan (2020) found that mass media campaigns, including radio announcements and text message reminders, significantly increased tetanus vaccine uptake among pregnant women. Information from health care workers was also found to positively impact maternal vaccine uptake. Health care workers providing ANC education were found to increase TT uptake (Ymba and Perrey, 2003; Mamoro and Hanfore, 2018). Better-informed women have also been found to be more demanding regarding the healthcare they need and are therefore more likely to make positive decisions regarding their uptake of antenatal care visits (Ntambue et al., 2012).

Confidence

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roll-out. Women are interested in knowing about the diseases that the new vaccine would prevent, how often and when they would need to receive it, and how safe it would be for themselves and their babies (Kajungu et al., 2020; Otieno et al., 2020a; Otieno et al., 2020b; Johm et al., 2021).

Decision Making

In many cultures, the husband's agreement and involvement was considered essential in his pregnant wife's decision to attend antenatal care (Ymba and Perrey, 2003; Haile et al., 2013; Konlan et al., 2020; Kajungu et al., 2020; Ahmed and Husein, 2020; Nyiro et al., 2020; Johm et al., 2021). Studies conducted in various countries, including Ethiopia, Kenya, and Tanzania, found that women were more likely to attend ANC and receive recommended vaccinations, such as the tetanus toxoid (TT) injection, if their husbands were involved in the decision-making process.

Rumours

Rumours and misinformation about diseases and disease prevention were also found to influence women's decision to attend ANC clinics and accept vaccines. In some instances, women's expectations of vaccine efficacy were not met, leading to vaccine hesitancy. Studies conducted in different countries, including Uganda, Tanzania, and Zambia, found that community myths and misperceptions influenced maternal vaccine acceptance and utilization (Larson Williams et al., 2018; Kajungu et al., 2020; Johm et al., 2021).

COVID-19

The findings on COVID-19 vaccine acceptance and uptake suggest that vaccine hesitancy remains a challenge in some areas, but there is still a considerable proportion of pregnant women who are willing to accept the vaccine when it becomes available.

Conclusion

This literature review suggests that pregnant women and women who have had children in sub-Saharan Africa generally have positive attitudes towards maternal vaccines and their uptake is high. It was observed that higher education levels of women resulted in increased knowledge, leading to a better decision-making process and higher uptake of maternal vaccines. However, socio-demographic, economic and cultural variables were found to play a significant role in a woman's TT immunization status. Despite the existing literature on maternal vaccines, there are still gaps in knowledge regarding vaccine utilization, refusal, hesitancy, sources of information, and barriers and enablers across sub-Saharan Africa. Specifically, there is a lack of data on maternal vaccine acceptance in The Gambia, which warrants further investigation. The literature review also suggests that the perception of antenatal health care services available to women is closely linked to maternal vaccine uptake as these services are one of the interventions delivered through ANC. Therefore, improving access to ANC services and providing proper education and counseling on maternal vaccines may enhance vaccine uptake in sub-Saharan Africa. Furthermore, the role of socio-demographic, economic, and cultural variables in a woman's TT immunization status suggests that interventions to improve maternal vaccine uptake should be context-specific and tailored to local populations. One potential strategy for improving vaccine uptake is to focus on improving access to antenatal care services and providing proper education and counselling on maternal vaccines. This approach may help address misconceptions or concerns about vaccines and ultimately improve vaccine uptake rates in sub-Saharan Africa. Further research is needed to better understand the factors that influence maternal vaccine uptake in this region and to develop effective interventions that can improve vaccine coverage and ultimately reduce maternal and neonatal morbidity and mortality.

CHAPTER 4 – OBJECTIVE 2: TO DETERMINE THE HEALTH SYSTEM FACTORS THAT INFLUENCE ANTENATAL CARE SERVICE UTILIZATION IN THE GAMBIA

Research Paper Cover Sheet

RESEARCH PAPER COVER SHEET

Please note that a cover sheet must be completed <u>for each</u> research paper included within a thesis.

SECTION A – Student Details

Student ID Number	LSH1704904	**Title**	MISS
First Name(s)	PENDA TUTAN		
Surname/Family Name	JOHM		
Thesis Title	UNDERSTANDING FACTORS INFLUENCING MATERNAL VACCINATION ACCEPTANCE IN THE GAMBIA		
Primary Supervisor	BEATE KAMPMANN		

If the Research Paper has previously been published please complete Section B, if not please move to Section C.

<u>SECTION B – Paper already published</u>

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Where is the work intended to be published?	BMC HEALTH SERVICES RESEARCH
Please list the paper's authors in the intended authorship order:	Penda Johm, Amie Ceesay, Beate Kampmann
Stage of publication	**Not yet submitted**

SECTION D – Multi-authored work

For multi-authored work, give full details of your role in the research included in the paper and in the preparation of the paper. (Attach a further sheet if necessary)	PJ and BK conceived the study idea and designed data collection tools. PJ and AC conducted surveys/interviews and PJ analysed the data. PJ led the writing up of the manuscript. All authors read and approved the final manuscript.

SECTION E

Student Signature	P.JOHM
Date	01/11/2022

Supervisor Signature	B.KAMPMANN
Date	01/11/2022

Access to Antenatal Care Services across health facilities in The Gambia

Draft manuscript: Access to Antenatal Care Services across health facilities in The Gambia

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Keywords: (7)

Accessibility; Availability; Affordability; Acceptability; Antenatal care services; Maternal health; The Gambia

Abstract

Background: Antenatal care (ANC) is defined as the care provided to pregnant women by trained health-care professionals in order to promote the best possible health outcomes for both mother and child. However, not all pregnant women attend the minimum recommended ANC contacts for reasons that need to be further analysed. The aim of the study was to identify supply factors in The Gambia that influence the utilisation of the antenatal care services.

Methods: Interviews were conducted using a structured questionnaire with health facility managers and face-to-face interviews with health care workers. The study was a convergent parallel mixed methods design, using quantitative and qualitative data collection methods. Between March 2018 and March 2019, a total of nine health facility assessments were held with health facility managers and 20 in-depth interviews conducted with health care workers.

Results: Several supply barriers to antenatal care service utilization were found. They included organizational level factors such as shortage of health care workers, impractical health facility, insufficient supplies and equipment and infrequent and ineffective communication of HCWs. Women's uptake of ANC services was therefore found to be inadequate with supply barriers responsible. Facilitators and barriers to utilization of antenatal care services were HCWs perceptions of maternal vaccines, health talks from HCWs, delegation of vaccine knowledge sharing to public health officers and challenges faced by HCWs at health facility.

Conclusion: The main supply-side barriers were accessibility, availability, affordability and acceptability of antenatal care services. These affected the quality of ANC services and led to missed opportunities for pregnant women. Closing the gap between contact and content of services remains a challenge and ensuring timely, adequate, and high-quality access to maternal health services requires further efforts.

Introduction

Pregnant women, new-borns and infants remain significantly affected by illness and untimely death due to infectious diseases and other causes, in particular in low-resource settings. Sustainable Development Goal (SDG) 3.1 was established by the UN in 2015 with the aim of bringing the maternal mortality rate (MMR) to less than 70 per 100,000 live births by 2030 (UN, 2015). In 2015, around 303,000 women lost their lives to pregnancy-related problems and 99% of these fatalities happened in low- and middle-income countries (WHO, 2012; Owili et al., 2017). The Gambia's MMR remains one of the highest in sub-Saharan Africa (SSA) at 289 maternal deaths per 100,000 live births (The Gambia Demographic and Health Survey, 2019-20). Factors contributing to the high MMR include but are not limited to obstructed labour, haemorrhage, malnutrition, poverty and a lack of basic health care. The current design and management of the health system in The Gambia only partially addresses these challenges (Cham et al., 2005). Eight in ten babies (84%) are delivered in a medical facility, mostly ones run by the public sector (76%), however, the likelihood of giving birth at a medical institution is lowest among women with minimal education and those from the poorest households (The Gambia Demographic and Health Survey, 2013).

The 5th Millennium Development Goal (MDG) placed a strong emphasis on the continuum of care and expanding access to specialised healthcare for pregnant women. Antenatal care (ANC) is a crucial component of the continuum of care via monitoring the health of the mother and unborn child and the early identification and treatment of any danger signs associated with pregnancy (Kerber et al., 2007; Birungi et al., 2009; Oh et al., 2020; Addisu et al., 2022). Antenatal care is defined as the care given to pregnant women by qualified health-care professionals to provide the best health outcomes for the mother and her baby by preparing her for labour and delivery. ANC can also help with the early detection and treatment of any pregnancy-related problems, as well as illness prevention through vaccinations and health promotion (WHO, 2016). The recommended ANC package consists of tetanus toxoid vaccination, identification and management of infections such as HIV, syphilis, and other STIs, intermittent preventive treatment for malaria during pregnancy (IPTp), and identification and management of obstetric complications like preeclampsia (Lincetto et al, 2006). It also includes giving

pregnant women information on maternal health so they can learn how to recognise danger indicators and take appropriate action when they do (Lincetto et al, 2006).

Government facilities (80-85%) and non-governmental organizations provide the majority of ANC in The Gambia (15–20%). Although private facilities provide care for pregnant women, the percentage is much lower (3%). According to the 2019-20 GDHS, nearly all women (98%) between the ages of 15 and 49 who gave birth to a live child in the five years prior to the survey received ANC at least once from a skilled practitioner (doctor, nurse, or midwife). A few (12%) women received treatment from a doctor, while the majority (86%) received ANC from a nurse or midwife (Gambia Demographic and Health Survey, 2019-20). A study on antenatal care in The Gambia found that "90% of those interviewed had attended the antenatal clinic more than once and 52% four or more times" (Anya et al., 2008). The components of focused ANC services include but are not limited to health history and pregnancy monitoring, screening for blood pressure, diabetes, anaemia, sexually transited infections and HIV, provision of intermittent preventive treatment of malaria in pregnancy using sulfadoxine-pyrimethamine (IPTp-SP) and immunization with tetanus toxoid (TT) (McCauley et al., 2022).

Several studies have been conducted to investigate the factors that influence the use of ANC in developing countries (Say and Raine, 2007; Simkhada, 2008; Adair-Rohani et al., 2013; Tsegay, 2013; Chama-Chiliba, & Koch, 2015; Kuuire, 2017; Tekelab 2019; Mohammed et al., 2019; Addisu et al., 2022). In these studies, maternal education, urban or rural residence, household income, parity, women's age and occupation, cost and availability of services, shortage of health professionals, non-functional health facility and insufficient supplies and equipment are all characteristics shown to be linked to the utilisation of ANC. The most notable behavioural model of health service utilisation was revised by Ronald M. Andersen in 1995. His model explained that individual use of health services is a result of need for care, enabling factors such as distance to the health facility and pre-disposing factors such as socio-demographics (Anderson, 1995). Over the years, health economists have come to label these nuances as a demand versus supply side issue (Ellis, 1993; Berman, 1999; Jacobs et al., 2012). Demand side determinants include pre-disposing factors, need factors and enabling factors. Supply side

determinants include resources such as staff and service infrastructure such as amenities (Aday & Anderson, 1994; Ensor & Cooper, 2004; O'Donnell, 2007).

In The Gambia, limited research has been conducted on the supply factors that determine women's choices and perceptions of antenatal healthcare services (Jallow, 2012; Oh et al., 2020). The purpose of this mixed-methods study was to identify supply-side factors in The Gambia that influence the utilisation of the antenatal care package, wherein maternal vaccines are also offered. Our data source comprises information about several key indicators of antenatal care service provision, including the views of the service providers.

Methods

Study setting

The study was conducted in four regions and nine health facilities running ANC clinics across The Gambia in order to have geographical representation. The following facilites were included: Brikama District Hospital, West Coast Region (WCR); Remis Health Centre, WCR; Nyofelleh community health post, WCR; Farafenni RMNACH clinic, North Bank Region (NBR); Jahaly health centre, Central River Region (CRR); Brikamaba minor health centre, CRR; Yero Bawol Minor Health Center, Upper River Region (URR); Baja kunda health center, URR and Basse Major District Hospital, URR. Health facilities and health care workers interviewed were identified by women who participated in our previous qualitative study. The women had accessed one or more of the nearby respective facilities during their pregnancy, and health care workers were recruited from health centres and in the communities.

Study Population

The study population included nine health facility managers and 20 heath care workers. Convenience sampling was used to recruit health facility managers as they oversaw the day-to-day operations. HCWs were recruited based on the criterion of data saturation, where the researcher noted that they were receiving the same information from the participants. Purposive sampling was used to ensure that only

health care workers were contacted and interviewed as they provide care to women attending antenatal clinic.

Study Design

The study was a convergent parallel mixed methods design, using quantitative and qualitative data collection methods. The collection, analysis and interpretation of the quantitative and qualitative data were carried out at the same time (Creswell, 2014; Bernard, 2017). The results of the quantitative and qualitative studies were subsequently merged to answer questions on access to antenatal care as well as HCWs perceptions of antenatal care in The Gambia. The descriptive, facility-based, cross-sectional survey was conducted in 2018 with health facility managers (officers-in-charge). Structured interviews with facility managers were carried out to determine the accessibility of qualified staff, availability of essential drugs, physical infrastructure and human resources. The health facility survey included questions on the availability of essential components of ANC. Individual, in-depth interviews were conducted with community health nurse (CHN)/midwives, nurses and officers-in-charge of health facilities to understand their knowledge, attitudes, and perceptions of the health system wherein they work. We also took the opportunity to document challenges faced along with their suggestions for improvements.

Data collection tools

A pretested, close-ended and structured questionnaire was developed in English and administered to HCWs by PJ and/or AC through face-to-face interviews. Survey questions posed to health facility managers and the thematic guide for interviews with health care workers were developed using theories of healthcare access developed over the years (Ellis, 1993; Aday & Anderson, 1994; Anderson, 1995; Ensor & Cooper, 2004; O'Donnell, 2007; Jacobs et al., 2012; Levesque et al., 2013).

Data collection and analysis

Between March 2018 and March 2019, a total of nine health facility assessments were conducted with an almost equal divide between urban and rural Gambia. PJ and AC visited each facility as a pair and

recorded health facility managers responses on a pre-designed questionnaire. Audio recordings from interviews with health care workers were converted into transcripts for coding and analysis. NVivo 11 Qualitative Data Analysis software (QSR International Pty Ltd.) was used to assist analysis of all transcribed data. 10 participants did not give us permission to record them, therefore, we took detailed notes of their responses to each question. PJ and AC wrote as much verbatim as possible, rather than trying to summarize what was said by respondents.

Data analysis

Initial clarification and analysis were taking place daily among PJ and AC in the field as an opportunity to note any issues with the survey/interview questions and compare interesting findings arising to discover patterns and connections. Daily discussions of emergent themes helped support the formal analysis by PJ at the end of data collection. Findings from each study method were compiled on the key questions or major themes that emerged during the study. All data from interviews not conducted in English were translated from the local languages and transcribed into written English text in Microsoft Word by AC. Reliability was assured by PJ randomly selecting and reading through 50% of transcripts while simultaneously listening to the audio recordings. This process helped form initial ideas and identification of possible patterns. The data were then coded, collated and re-focused into the broader level of themes via thematic analysis (Braun and Clarke, 2006).

Ethics

Full ethical approval was received from The Gambia Government/MRCG at LSHTM Joint Ethics Committee (Ref. 1568) and the London School of Hygiene & Tropical Medicine (LSHTM) Research Ethics Committee both gave their approval to the project (Ref. 15808). All study participants provided individual verbal informed consent which was witnessed by PJ and AC. Moreover, permission was also sought from the Regional Health Directorates and heads of health facilities. Health care workers were recruited voluntarily and reserved the right to stop or withdraw from the study at any stage.

Results

Quantitative surveys with health facility managers

The majority of the health facilities were health centres (55.6%), located in rural Gambia (55.6%) and public sponsored (77.8%). For the health facility survey, availability of services was measured by opening hours and number of health staff. Most facilities (66.7%) opened at 08:00 and closed at 16:00 (44.4%). All facilities had suitable physical infrastructure (waiting area, examination table, private rooms) and provided essential vaccines (e.g. tetanus toxoid) and drugs (e.g. folate/iron supplementation). Regarding affordability, free maternal care was said to be provided at all the facilities, however, other costs were incurred to cover laboratory fees and medicines. Nurses were found to host 'health talks' wherein they would advise pregnant women about maternal health including the importance of ANC and benefits of the services offered within the package.

Table 1. Characteristics of participating health facilities

Location	n (%) n = 9
Urban	4 (44.4)
Rural	5 (55.6)
Sponsorship	
Public	7 (77.8)
Private	2 (22.2)
Health facility type	
Hospital	2 (22.2)
Health centre	5 (55.6)
Health post	2 (22.2)
Opening hours	
08:00	6 (66.7)
09:00	2 (22.2)
10:00	1 (11.1)
Closing hours	
14:00	3 (33.3)
16:00	4 (44.4)
18:00	2 (22.2)

Average number of women who access antenatal clinic per month	
01 to 100	4 (44.4)
101 to 500	2 (22.2)
501 to 1000	3 (33.3)
Average number of health staff working in the facility on a daily basis	
1 to 10	2 (22.2)
11 to 50	5 (55.6)
>50	2 (22.2)

Qualitative interviews with health care workers

We interviewed a total of 20 Gambian health care workers. Over two-thirds (80%) were married and 40 years of age or older (70%). Among these 20 HCWs, five (25%) were midwives, five (25%) were village health workers, five (25%) were community birth companions, three (15%) were community health nurses and two (10%) were nurses. More than half (60%) of the HCWs had received formal education beyond primary school. Eight out of nine (89%) of HCWs who participated in the qualitative interviews were working in health facilities visited in the surveys (Table 2). The other one was working at a community health post in Chamoi Bunda, URR.

Table 2. Socio-demographic characteristics of participants (n = 20)

Characteristic	**Frequency**	**Percent (%)**
Nationality		
Gambian	20	100
Age		
20-29	2	10
30-39	4	20
40-49	8	40
>49	6	30
Gender		
Female	12	60
Male	8	40
Marital status		
Married	16	80
Widowed	3	15

Not married	1	5
Ethnic group		
Jola	6	30
Fula	5	25
Mandinka	5	25
Wolof	3	15
Serahule	1	5
Occupation		
Midwife	5	25
Community birth companion	5	25
Village health worker	5	25
Community health nurse	3	15
Nurse	2	10
Religion		
Islam	19	95
Christianity	1	5
Highest level of education		
Primary or no formal education	9	45
Secondary	2	10
Tertiary	9	45
Number of children		
0	3	15
1 to 3	5	25
4 to 6	8	40
7 to 9	4	20

Facilitators And Barriers to Utilization of Antenatal Care Services

HCWs Perceptions of Maternal Vaccines

All HCWs knew that women of childbearing age receive vaccines during pregnancy and believed the benefit of injection is it gives good health. Regarding their own personal views about maternal vaccines, HCWs believed that both the pregnant woman and her baby mutually benefit from her receipt of maternal vaccines. Maternal vaccines were thought to protect against diseases as well as to cure diseases in a similar way to medicines (Table 3).

Table 3. Selected Examples of HCWs Perceptions of Maternal Vaccines

Illustrative Quote	Participant
"It is good for the mother because if the mother has good health of course, her unborn child will also be healthy… Anything that enters the mother's body the unborn child will benefit from it."	HCRR01, Brikamaba, CBC
"For me personally, I think the vaccine is good and every woman should take it. I think antenatal mothers should take it so that it wouldn't only prevent them but the unborn babies too. It's very important for people to be taking it. It's not only important for you to take it but you should take it at the right time. But some of them will take it then after so many years they will take the next dose which is not good. I think they should take it so that it will be effective in the system."	HNBR04, Farafenni, CHN midwife
"Maternal vaccine the one I know is tetanus toxoid. I know tetanus toxoid prevents the mother and baby from tetanus."	HURR02, Baja kunda, Midwife

Health talks from HCWs

The majority of interviewed health staff noted that most women who attend antenatal clinic appear reserved when it comes to asking questions during health talks. They believe that this could be due to women feeling ashamed or afraid to ask questions in a group setting, versus when having one on one discussions with a HCW. The health talk was deemed as a flexible conversation between women and HCWs once an initial assessment of their reason for a visit had been done. We asked one of the HCWs to give us a small extract of a health talk, including any topics followed (Table 4).

Table 4. Selected Examples of Health talks from HCWs

Illustrative Quote	Participant
"Most of the times you know we are also seeing antenatal, we at look at their problems and then we discuss about that. If it is early ANC booking then we will discuss about that, if we have anaemia than any other disease condition then we discuss about it. So that's the way I do it. And first trimester booking is also a	HNBR04, Farafenni, CHN midwife

problem, we must check what the problem is most of the time and we discuss about it."	
"I offer many services at the facility. I do not only stop at RCH and labour, but these are my main places. I also conduct deliveries. I sometimes give family planning services; you know RCH is where family planning services are conducted. We also conduct health talks and we admit."	HURR02, Baja kunda, Midwife
"For us here we just write immunization and ask them to go to the public health office for vaccination. I know they sensitize them before giving them. I know they tell mothers the vaccines they give to their infants. Maybe some don't give information because of their workload."	HNBR04, Farafenni, CHN midwife

Challenges Faced by HCWs At Health Facility

We asked about any challenges HCWs face at their respective health facilities. Complaints included a shortage of health staff at the facility and an infrequent water and electricity supply from the National Water and Electricity Company (NAWEC) (Table 5).

Table 5. Selected Examples of Challenges Faced by HCWs at Health Facility

Illustrative Quote	**Participant**
"Yeah, maybe with beds, staff too, yes water too because we have only one dispenser and that one is for the outpatient department our antenatal are drinking from the taps."	HNBR04, Farafenni, CHN midwife
"My daily work is very hectic as I told you earlier, because we are understaffed. We are many here but most of them are volunteers and others are not trained staff. The place is handicapped because it is only few of us that are trained staff. I must help others at the outpatient ward even after doing night duty."	HURR02, Baja kunda, CHN Midwife
"Mansa kunda" (government) they should help us a lot… Increase our labour ward and employ more health staff because here when one or two nurses are on duty they will work for the whole day. You know this happens due to lack of enough health staff and our wards are also very small."	HCRR01, Brikamaba, CBC

Discussion

This study aimed to identify supply-side factors in The Gambia that influence the utilisation of the antenatal care services, wherein maternal vaccines are offered. It has been found that when pregnant women are satisfied with maternal health care services, they are more likely to have positive views and therefore effectively utilize the services (Fawole et al, 2008; Srivastava et al, 2015). Based on quantitative surveys with health facility managers, factors influencing ANC service utilization were accessibility (location of health facility), availability (opening hours, number of health care workers, physical infrastructure, essential vaccines and medicines) and affordability (costs and prices of facility ANC services, costs of vaccines and medicines). Based on qualitative interviews with health care workers, facilitators and barriers to utilization of antenatal care services were HCWs perceptions of maternal vaccines, health talks from HCWs and challenges faced by HCWs at health facilities.

A recent study in Ethiopia found several supply and demand side barriers for ANC utilization. Supply side barriers included a shortage of health professionals, non-functional health facility and insufficient supplies and equipment (Mohammed et al., 2019). These organizational level factors affected the quality of ANC services and influenced the accessibility and acceptability of ANC service utilization. ANC is also facilitated or hindered by HCWs ability to communicate effectively. Women may be less likely to attend appointments in the future if there are poor communication styles such as giving unhelpful or unedifying information (Ndimbii et al., 2018). Our interviews with HCWs revealed that women in The Gambia attend health talks, however, their utilisation of ANC is still sub-optimal. Confirmed by this finding is a study by Amu and Nyarko, which indicated that the majority of women in their sample did not conform to the health education given to them. They believed this to be a contributing factor to the continued high maternal mortality rates at the hospital in Ghana (Amu & Nyarko, 2016).

Other supply side barriers have been cited in numerous studies. One being accessibility, specifically, the long distance to health facilities (Simkhada et al., 2008; Konlan et al., 2020). Long waiting times

also lead to delays in accessing maternal care (Amu & Nyarko, 2016). Availability also affects ANC utilisation with low manpower noted in our study along with another study from the Gambia, wherein facilities did not have adequate HCWs in the clinic to deliver vaccine services. Staff shortages were found to be stressful for both HCWs and pregnant women, resulting in long waiting times, poor service delivery and dissatisfaction (Nkereuwen et al., 2021). The Directorate of Human Resources for Health in the Gambia implemented a health system strengthening project to increase the availability, development and retention of skilled and motivated staff into the workforce (The Gambia National Health Sector Strategic Plan 2014-2020). Regarding affordability, removing any direct costs of antenatal care services at health facilities has been found to increase the number of women who utilise ANC (Simkhada et al., 2008). In addition, quality of care can either hinder or enable pregnant women's acceptance of healthcare services (Hulton et al., 2000; Simkhada et al., 2008; Srivastava et al., 2015; Addisu et al., 2022).

In The Gambia, the government, donors, non-governmental organizations, and private individuals' own funds are the main sources of funding for health care. Although public health financing has increased over time, it has primarily favoured tertiary care investments. The Global Fund for AIDS, TB, and Malaria (GFATM) and other development organizations like UNICEF, UNFPA, and WHO have become more and more important sources of funding for the health sector, with the share of general government spending on health still below the Abuja Declaration Target of 15%. (The Gambia National Health Sector Strategic Plan 2014-2020). Although health facility managers in our study confirmed that free maternal care was being provided in their facilities, other costs were being incurred by women to cover lab fees and medicines. According to The Gambia National Health Account (NHA), the livelihood of regular Gambians is still significantly impacted by out-of-pocket costs (The Gambia National Health Sector Strategic Plan 2014-2020).

Women's uptake of ANC services was found to be inadequate in a study on the determinants of maternal health services utilization in urban settings of the Democratic Republic of Congo. The number of women who had received tetanus vaccines and insecticide-treated mosquito nets (ITN), taken

intermittent preventive treatment of malaria in pregnancy using sulfadoxine-pyrimethamine (IPTp-SP), iron and folic acid supplementation, or been tested for HIV was low. Supply barriers such as access were partly to blame and led to missed opportunities for pregnant women (Ntambue et al., 2012). A gap between contact and content of ANC that pregnant women receive was also found in my study and is consistent with similar studies from across sub-Saharan Africa, namely, Burundi, Ethiopia, Kenya, Malawi, Rwanda, Tanzania, Uganda, Zambia and Zimbabwe (Bobo et al., 2021). In these studies, the gap between contact and content of services was partly due to the challenges related to shortages of medical equipment and supplies. Health facilities in sub-Saharan African nations also revealed a lack of basic supplies and equipment for collecting urine and blood samples and measuring blood pressure (Kruk et al., 2016; Leslie et al., 2017). Another factor for the gap in ANC services in those studies is the lack of sufficient healthcare workers with the necessary set of skills, commitment, care, and respect for women (WHO, 2016; Sumankuuro et al., 2018). Contrary to situations when there is a staff shortage and unfavourable working conditions, it is plausible that competent and motivated healthcare professionals will treat and address the healthcare needs of pregnant women when they seek services.

Strength and Limitations

A strength of the study was our choice of triangulation of both quantitative and qualitative research was essential for obtaining a better understanding of the supply-side factors, and we went further to compare and combine both results to reach a more comprehensive conclusion on factors influencing the utilization of ANC across The Gambia. Although we interviewed HCWs face-to-face, we cannot say for certain that our chosen method was able to elicit a comprehensive description of supply-side determinants due to the limited sample size. It could be that HCWs feared any negative repercussions that could arise from being critical of their employer. We made a point of assuring health staff that they were not being evaluated or criticized, but rather, the purpose of our questions was to learn about their experiences to improve antenatal services. We interviewed them in a location and at a time that was convenient for the participants. Although facility managers informed us of the availability of different components of care, we obviously cannot ascertain how they were provided including whether they were provided in accordance with quality standards.

We were unable to conduct qualitative interviews with HCWs at the health facilities in Jahaly and Basse due to their unavailability on the days we visited. In future research, EPI public health officers should be interviewed in addition, as they are in charge of vaccinating pregnant women at health facilitates. This could provide further insights into their role and influence on pregnant women's uptake of vaccines during pregnancy. Another limitation is that we were unable to collect data on the coverage and uptake of ANC at health facility level and whether the challenges found were associated with this.

Conclusion

This study supports published evidence that the utilisation of ANC by expectant mothers across urban and rural locations is influenced by access to care factors such as accessibility, availability and affordability of human resources, physical infrastructure and essential vaccines and medicines. To improve maternal vaccine utilisation, efforts should focus on increasing resources and improving services within and beyond health facilities.

Abbreviations

ANC – Antenatal Care

CHN – Community Health Nurse

CRR – Central River Region

EPI – Expanded Programme on Immunization

GDHS – Gambia Demographic and Health Survey

GFATM – Global Fund for AIDS, TB, and Malaria

HCW – Health Care Worker

IPTp-SP – Intermittent Preventive Treatment of Malaria in Pregnancy using Sulfadoxine-Pyrimethamine

MMR – Maternal Mortality Ratio

MoH – Ministry of Health

NAWEC – National Water & Electric Company

NBR – North Bank Region

NHA – National Health Account

RHD – Regional Health Directorate

SDG – Sustainable Development Goals

SSA – Sub-Saharan Africa

TT – Tetanus Toxoid

URR – Upper River Region

WCR – West Coast Region

Competing interests

The author(s) declare that they have no competing interests.

Author contributions

PJ and BK conceived the study idea and designed data collection tools. PJ and AC conducted surveys/interviews and PJ analysed the data. PJ led the writing up of the manuscript. All authors read and approved the final manuscript.

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CHAPTER 5 – OBJECTIVE 3: TO EXPLORE FACTORS INFLUENCING MATERNAL VACCINATION ACCEPTANCE IN THE GAMBIA

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Primary Supervisor	BEATE KAMPMANN		

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SECTION E

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Factors influencing acceptance of vaccination during pregnancy in The Gambia and Senegal

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Factors influencing acceptance of vaccination during pregnancy in The Gambia and Senegal

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ABSTRACT

Background: Vaccination during pregnancy can protect pregnant women and their babies from infectious diseases. Tetanus vaccine, also known as tetanus toxoid, is the only vaccine given to pregnant women in The Gambia and Senegal, where it is given by antenatal care providers as part of the Expanded Programme on Immunization. A qualitative study was undertaken to explore factors influencing acceptance of vaccination during pregnancy in The Gambia and Senegal.

Methods: Focus group discussions and in-depth interviews were conducted across urban and rural settlements of The Gambia and Senegal. We explored the knowledge, attitudes, and perceptions of 152 women who were either pregnant or with an infant. NVivo 11 Qualitative Data Analysis Software was used for management and thematic analysis of the data.

Results: Women had sufficient knowledge of the need for tetanus vaccine from different information sources but insufficient knowledge of tetanus causes, signs and symptoms. Tetanus vaccine was perceived to be safe and side effects such as pain and swelling at site of injection did not deter uptake of future doses. Women overall had confidence in their sources of vaccine information and the health care workers who administered maternal vaccinations. Their willingness to accept vaccination during pregnancy was particularly influenced by their husbands and trusted healthcare workers. Women across all sites mentioned they would accept new maternal vaccines if they are sensitized beforehand about any potential risks and benefits to them and their babies.

Conclusion: Vaccine acceptance can be influenced by several factors including contextual, individual or group influences and vaccine or vaccination-specific issues. Women across The Gambia and Senegal are generally vaccine acceptors with confidence in the health care workers who vaccinate them and few concerns about maternal vaccines. Women's acceptance of vaccination during pregnancy is based on previous vaccination experiences and individual weighing of risks and benefits.

1. Background

Vaccinating women during pregnancy, also called maternal immunization (MI) is an increasingly accepted strategy to prevent maternal and neonatal morbidity and mortality. Globally, this strategy has already been applied to the prevention of pertussis, influenza, and tetanus [1,2]. To prevent maternal and neonatal tetanus, the World Health Organization (WHO) recommends giving women five doses of tetanus vaccine, also known as tetanus toxoid (TT), throughout their life course. The guidance is for pregnant women who do not know their immunization history or have not taken up all previously required doses to receive two doses of TT with the first dose being given to them in their first trimester and the second at least four weeks after [3]. In The Gambia and Senegal, TT is currently the only vaccine given to pregnant women by antenatal care (ANC) service providers as part of the Expanded Programme on Immunisation (EPI) [4]. According to the 2013 Gambia Demographic and Health Survey (GDHS), 78% of mothers who had a live birth in the five years preceding the survey met the previous WHO recommendation of four or more antenatal visits before delivery, with no major difference between urban and rural women and 71% reported that they

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had received vaccination against tetanus in their last pregnancy [5]. In Senegal, this number was similar at 69% and almost six in ten women (57%) reported to have received two or more doses of tetanus vaccine in their last pregnancy [6]. Evidence from studies has shown that immunization of pregnant women with two or more doses of TT protects the mother and the new-born baby from tetanus, with 94% reduction in mortality from neonatal tetanus [7,8]. Although the WHO encourages national immunization programmes to ensure all pregnant women are immunized, studies have shown that various factors may impede their uptake of the recommended vaccines [9–11]. Studies conducted across sub-Saharan Africa have found several determinants of TT immunization uptake including but not limited to maternal socio-demographic characteristics, knowledge of vaccination schedule and perceptions of vaccine safety and efficacy [12–16]. Vaccine hesitancy has been reported from several low- and middle-income countries (LMIC), where individuals refuse some vaccines and agree to others despite the availability of vaccine services or delay vaccination due to issues of convenience, complacency, or confidence [17–20]. Little is known about the perceptions of maternal vaccines and vaccination among pregnant women in The Gambia or Senegal. To date only one peer-reviewed article exploring women's willingness to accept influenza vaccination in pregnancy has been published from The Gambia. The two vaccine intent statements were *"I would get a flu vaccine in pregnancy if available for free"* and *"I would get a flu vaccine for my child under 5, every year, if it was free"*. Almost all respondents in that study stated that they agreed with the vaccine intent statements (98.5% for pregnancy and 98.7% for children under 5) with no difference in vaccine intent between groups [21]. As new vaccines for pregnant women are being developed, such as against Group B streptococcus (GBS) and Respiratory Syncytial Virus (RSV) [22,23], it is timely to ascertain the attitudes and beliefs of women in regions of the world where such vaccines could potentially have the biggest impact. We explored knowledge, attitudes and perceptions around maternal vaccines and vaccinations in The Gambia and Senegal. We also determined key sociocultural and health system factors that influence maternal vaccination acceptancy in both contexts. This data will be useful to inform social and behavioural change communication for pregnant women as part of national strategies aimed at improving uptake of current and future vaccines for pregnant women, including in times of pandemics.

2. Methods

2.1. Setting

In the Gambia, participants were recruited from urban and rural areas, with urban settlements being defined according to the 2013 Gambia Population and Housing Census Spatial Distribution report [24]. The study was carried out in ten sites in four regions of The Gambia: West Coast (Marakissa and Kassa kunda), North Bank (Farafenni, Numu kunda and Yallal ba), Central River (Jahaly and Brikama ba) and Upper River (Barrow kunda, Chamoi bunda and Yero Bawol). In Senegal, participants were from urban and peri-urban areas, defined according to the 2015 Senegal Demographic and Health Survey [6]. The study was carried out in five sites in four regions of Senegal: in the South (Kolda and Medina Gounas), North (Louga), North bank of the Saloum river (Kaolack) and West (Diamniadio). Study participants in both countries were representative of the general population according to the Demographic and Health Surveys in The Gambia (2013) and Senegal (2015) [5,6].

2.2. Sampling

Identical qualitative methods were used in The Gambia and Senegal to recruit pregnant women and women with infants. Women were selected purposefully to answer the research question [25]. To maximize the diversity of other people relevant to the research question, key informant interviews were conducted with women's family members, formal and informal health care workers (HCW), community leaders and institutional actors. Data was collected until thematic/data saturation was reached [26]. Family members and community leaders were recruited via snowball sampling, wherein the women would identify and recommend those we should interview [27]. Formal and informal HCW were recruited from health centres and in the communities, respectively. Institutional actors such as EPI and Ministry of Health (MoH) staff were recruited purposefully to address the experiences and concerns arising from the women in the study. In the Gambia, women were identified for recruitment with the help of community health workers (CHW) who had good knowledge of their communities and also served as study facilitators. After discussions with CHW in each community, we recruited women from registered women's groups, locally known as *kafoos*. *Kafoos* have different purposes and activities including agribusiness, education, and entertainment. The final sample included ten communities, five urban and five rural (Fig. 1). In Senegal, women who lived in the neighbouring communities were recruited directly from the health centre on antenatal visit days with recruitment facilitated by health personnel, particularly those in charge of maternal and neonatal health and community health workers, following permission from the regional Chief Medical Officer. The final sample included five communities, three urban and two *peri*-urban (Fig. 1).

2.3. Data collection

In-depth interviews (IDIs) and focus group discussions (FGDs) were used to explore individual and community motives for maternal vaccine acceptance and actors in the decision-making process. A semi-structured interview guide was developed from existing theory on vaccine acceptance and included a framework of themes to be explored (Appendix 1). The key areas of enquiry included perceptions of pregnancy, attitudes towards vaccines in general and maternal vaccines in particular, knowledge of tetanus disease and tetanus vaccine and factors related to the health system. Each IDI or FGD lasted no less than 30 min and no more than 120 min and were recorded on digital voice recorders. In The Gambia, IDIs and FGDs were carried out by the principal investigator (PI) (PJ) fluent in English and *Wolof* and field assistant (AC) fluent in English, *Wolof*, *Mandinka*, and *Fula*. In Senegal, IDIs and FGDs were carried out by the PIs fluent in French (NN) and able to understand French and *Wolof* fluently (EM) and field assistants. Women participated in either one IDI or a FGD and there was no overlap. Participant responses during IDIs and FGDs were transcribed from local languages into written English (The Gambia) and French (Senegal) text by field assistants. The PIs were either interviewing or always present during IDIs and FGDs to monitor and to aid with interview probes. Key qualitative interview characteristics such as the anonymised participant ID, interviewer name, interview date, site, language, setting and duration, transcriber name and audio file information were listed in an Excel spreadsheet.

2.4. Data analysis

Data were cleaned and managed concurrently with data collection. Transcripts were processed in their textual form and coded to generate categories and themes using NVivo 11 Qualitative Data Analysis software (QSR International Pty Ltd.). We used qualitative content analysis to classify our data into categories of similar meanings, consequently identifying themes and patterns [28]. We used an inductive approach, wherein codes, categories and themes were drawn directly drawn from the data [29]. Excel was

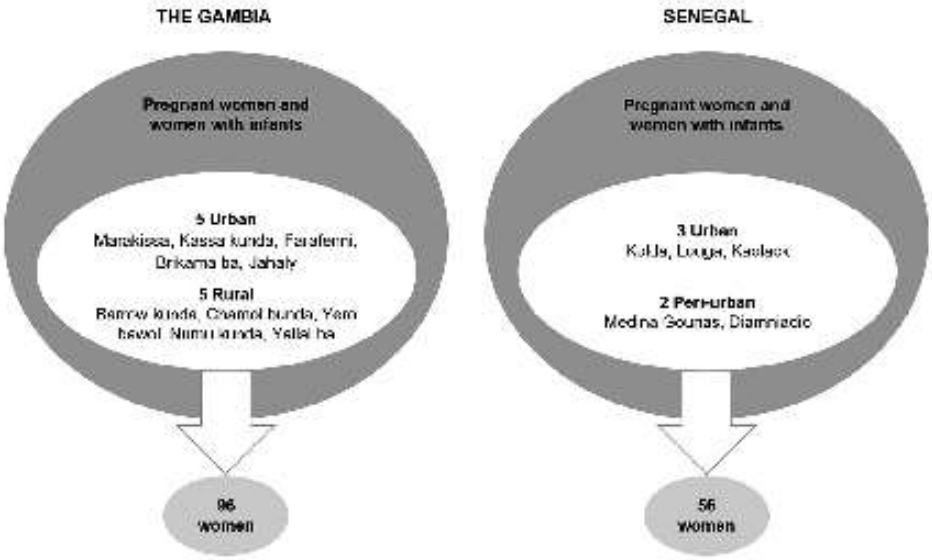

Fig. 1. Study sampling frames in The Gambia and Senegal.

used to log and analyse the sociodemographic data. Data entered in qualitative and participant Excel logbooks were reviewed continually for quality control. Credibility was established with the use of methods triangulation wherein IDI, FGD and observation were used to check the consistency of the findings. To ensure validity, peer debriefing was used by the investigators after completion of all IDIs and FGDs. Debriefings allow for immediate reflection on emerging findings and identification of gaps in the collected data [30].

2.5. Ethical considerations

The Gambia study received ethics approval from the Gambia Government/MRC Joint Ethics Committee (Ref. 1568) and the London School of Hygiene & Tropical Medicine (LSHTM) Research Ethics Committee (Ref. 15808). The Senegal study was approved by the National Ethics Committee for Research (CNER) of the Ministry of Health and Social Action (MSAS) (Ref. SEN 17/37). Interviews conducted in both countries followed the Code of Ethics of the American Anthropological Association (AAA) [31]. Study participants in The Gambia and Senegal were read the information sheet in their preferred local language before each FGD or IDI. Participants who could read and write in English or in French provided written informed consent and other participants provided oral consent [32,33]. All IDIs and FGDs were recorded with permission of each participant and the confirmation of their consent was captured at the beginning of the audio recording. For participants who did not consent to the interview being tape-recorded, we proceeded with the interview with a handwritten note of responses.

3. Results

In The Gambia, 11 IDIs and 12 FGDs with a total of 96 pregnant women and women with infants were carried out by the PI and field assistant (AC). The mean age of the population was 27.8 years (range: from 15 to 49). In Senegal, 7 FGDs with a total of 56 pregnant women and women with infants were carried out by the PIs. The mean age of the population was 19.9 years (range: 15 to 37). In both countries, 5 to 10 women were present in each FGD. Table 1 summarises the main sociodemographic characteristics of the women. The codes that appeared throughout data analysis were divided into four main themes and six categories.

3.1. Theme 1: Awareness of vaccines

3.1.1. Knowledge of vaccines

Women across all sites in The Gambia and Senegal believed that vaccines in general can protect and prevent diseases in adults and children. Vaccines were thought to prevent diseases such as hypertension, tetanus, measles, malaria and whooping cough (Table 2). Women credited education and an increase in medical doctors to be a reason for the experienced effectiveness of vaccines compared to previous generations, wherein infectious diseases like polio, meningitis and measles were rampant and used to negatively

Table 1
Sociodemographic characteristics of women interviewed in The Gambia and Senegal.

Variable	The Gambia	Senegal
	N = 96 (%)	N = 56 (%)
By site		
Rural	55 (57.3)	11 (19.6)
Urban	41 (42.7)	45 (80.4)
Religion		
Islam	91 (94.8)	56 (100)
Christianity	5 (5.2)	0 (0)
Age group		
<20	4 (4.2)	11 (19.6)
20–30	62 (64.6)	45 (80.4)
31–40	28 (29.2)	0 (0)
>40	2 (2.1)	0 (0)
Marital Status		
Married	93 (96.9)	56 (100)
Not Married	3 (3.1)	0 (0)
Maternal Status		
With Infant	67 (69.8)	13 (23.2)
Pregnant	29 (30.2)	43 (76.8)

Table 2
Themes, categories and quotes of women's perceptions in The Gambia and Senegal.

Themes and categories	The Gambia	Senegal
Theme 1: Awareness of vaccines		
Knowledge of vaccines	"There are different types of vaccines, which also prevent different diseases. There are vaccines for preventing malaria, hypertension, tetanus, measles [nas] and whooping cough [njaamburan]." "All the diseases I mentioned have now minimised since our children started receiving injections. Now when our children fall sick, they will recover immediately after visiting the hospital". – FGD Barrow kunda "There is medicine inside injections [penda]. I don't know the type of medicine inside it, but I believe doctors inject us because they know these injections will help to protect us from diseases". – FGD Kassa kunda	"I think the vaccine contains vitamins and many other things". – FGD Kaolack "If a child comes into the world, he or she must be vaccinated and follow the schedule until the end. It is the only preventive measure to protect him from disease. It is to immunize him against certain diseases". – FGD Diamniadio "If a child comes into the world, he or she must be vaccinated, follow the schedule until the end. It is the only preventive measure to protect them from disease…and also, I have never met anyone who says that it is not beneficial, that there is no benefit". – FGD Kaolack
Perceptions of tetanus vaccine	"That injection given to us during pregnancy protects us from tetanus". – FGD Barrow kunda "They call it pregnancy injection [kono-mu penda]". – FGD Chamoi Bunda "This injection is given to prevent one from tetanus. Since tetanus is a very bad disease as we are told… When a woman receives these three tetanus injections during pregnancy, she will be protected from getting tetanus for a period of five years, even if she happens to be wounded. The unborn child will also be protected from tetanus for five years even if she [the child] is wounded, she [the child] would not be infected with tetanus". – FGD Marakissa	"My child may be injured by a metal object that causes tetanus, but he was already vaccinated. So, if you are vaccinated, you are safe from certain diseases". – FGD Kolda
Theme 2: Confidence in vaccines		
Vaccine information and providers	"We trust both vaccines and those administering it because we know they would not give us harmful vaccines". – FGD Yallal ba "We believe in information we hear from hospitals or radio talk shows. We also trust those providing us with information". – FGD Numu kunda "We believe vaccines are beneficial to both the mother and unborn child". – FGD Jahaly	"We were never told where the vaccines came from. If we come to the hospital, they inject us with it and we go home. But all we know is that they will not hurt us, that it is for good health. I think it is a good thing because they are the ones who have the skills to take care of health. They only do good for us. That is why we do not ask them for anything at all". – FGD Kaolack "The first time I was vaccinated, I was told that it protects you from certain diseases. It is to protect children and for you. Vaccines are a good thing because it helps us for our health". – FGD Kolda
Health care workers	"Health workers also keep saying that vaccines are good for us and our unborn babies. We receive whatever health care workers gives us whether drugs or injections because we trust what they give us, and we believe they will never give us harmful medicines or injections. Even you, being a stranger, if you want to inject us or our children we will agree because we trust you, after telling us that you are from the MRC, we believe you would not give us injections that will harm us". – FGD Jahaly	"We do not need to know what is in the vaccines when the vaccination is carried out by a health staff we trust, especially the midwives who are at the health centers and posts. Routine immunization is the place where we can see the midwives who are close to us and whom we trust almost blindly". – FGD Louga "These are questions that doctors have mastered. They are here because they have learned it. So that is why we trust them". – FGD Kolda
Theme 3: Motivation for vaccination		
Decision influencers	"A woman should inform her husband before going for antenatal care even if she has money to pay for herself. How so ever rich a woman could be, she should inform her husband when going for antenatal care. It is found in both religion [dilne] and tradition [mosan]. It is forbidden for a woman to do anything without informing her husband. When she intends to do something, she should inform her husband about it before doing it. A woman has no complete independence. She belongs to her husband, and he should be aware of everything about her. It is from our religion (Islam). A woman should be under control from birth to death". – FGD Numu kunda	"Sometimes it is the husband, sometimes it is the mother-in-law, sometimes it is me, sometimes it is the sisters-in-law". – FGD Kolda "For most of my antenatal visits, it is my husband who reminds me of them. And since he is the one who buys the prescriptions, he makes sure the medication is taken". – FGD Diamniadio "Whether it is the mother-in-law or the sisters-in-law, they all participate in the appointment reminder. It is the whole family matter; the husband and the others are all concerned. You just have to inform them for the calendar". – FGD Diamniadio
Sufficient sensitization	"Before receiving an injection, we must be sensitised about it. We must be informed about what the vaccine will prevent, who should receive it and how many should be given". – FGD Yallal ba "Proper sensitizations should be done before introducing a new maternal vaccine…The village head [Alkalo] should be the first person to receive the information, and then share it at the mosque with the use of a loudspeaker; this allows everyone to hear it…announcing it at group [kafoo] meetings will be very effective because those present will spread the message to others who were not around". – FGD Brikama ba	"Integrate this new vaccine into the ANC package associated with prior continuous and well-organized awareness. This introduction must be done preferably as part of routine vaccination and not in vaccination campaigns with a clear, transparent and continuous communication and a good knowledge of the content". – FGD Kolda
Theme 4: Vaccine hesitancy		
	"Now all of us go for immunizations and even those who don't want to go will be forced to go. Now we start antenatal clinic at two months, and we continue going up to five years. When a woman wants to refuse to go for antenatal clinic, she will be reported to the CDC and anything that comes for the villagers, she would not benefit from it. Meaning it is like by force for every woman to join antenatal clinic when pregnant. If not, when she delivers, people will not go to her naming ceremony". – FGD Yallal ba	"If we have very clear information, we will go for vaccination. But if it is not clear in our minds, we are reluctant. You have to be sure of what you do. I do not do something that is not clear to me. It must always be clear. That is why we ask. If the doctor explains, we will do it if we are convinced. Otherwise, we do not do it". – FGD Diamniadio "Personally, we do not use them [social media] much… it is now that we really start to listen to them. But we realized that they are very harmful… There is a portion of the population who are very difficult to change and who quickly believe [rumours]." – FGD Kolda

affect their children. In both countries, women were asked where they thought vaccines originate from and the unanimous response was that vaccines come from white people and are given at the hospitals and health centres.

3.1.2. Perceptions of tetanus vaccines

In The Gambia and Senegal, women believed tetanus was caused by sharp or rusted materials such as needles, nails, razor blades and iron sheets. Women had been encouraged by HCWs to attend ANC and receive all their required doses of TT during pregnancy to prevent them and their child from contracting tetanus. In both countries, women assumed TT to be safe as no serious side effects were experienced after receiving the vaccine and to protect mother and child from tetanus disease (Table 2.). Perceived side effects such a dizziness, swollen arm and nausea were mentioned; however, they did not deter tetanus vaccine uptake. Women in The Gambia and Senegal admitted to not knowing exactly where the tetanus vaccine comes from and how it prevents tetanus. They said they have never thought about it either because they trust the knowledge of the frontline health care workers such as nurses.

3.2. Theme 2: Confidence in vaccines

3.2.1. Vaccine information and providers

In The Gambia and Senegal, women identified formal and informal health care workers, local women's groups, community meetings, television, and social media as sources of information on maternal vaccines (Table 2). In urban sites, the Gambia Radio and Television Services (GRTS), Brikama Community Radio (FMB) and Radiodiffusion Télévision Sénégalaise (RTS) were named as trusted sources of information on maternal vaccines. In rural sites, community health nurses (CHN) and CHW resembling traditional midwives or cultural aunts in Senegalese culture (*Badienu goxx*) were reported as trusted providers of information during reproductive and child health (RCH) clinic visits. Although some women in the rural Gambian sites owned and used smartphones, they confessed to hardly using social media platforms such as Facebook and WhatsApp. Regarding rumours, women in both countries did not trust rumours around maternal vaccines and preferred to trust information given to them by doctors, nurses and CHW. Women in The Gambia believed that any information on vaccines must come from the mouth of the village head or another trusted person in the community such as the CHN and VHW.

3.2.2. Health care workers

Women in The Gambia and Senegal mentioned that they hardly thought to ask questions about the offered maternal vaccines because they trusted messages from HCW such as doctors and nurses on the safety of vaccines. Women had trust that the HCW administering vaccines would not allow the use of harmful or dangerous vaccines in the population (Table 2). In The Gambia, women reported differing experiences with ANC nurses. Some were deemed to be rude during ANC visits and delivery and others were described as friendly and even encouraging. In Senegal, women said they especially trusted the midwives because of how they welcomed and cared for them (Table 2).

3.3. Theme 3: Motivation for vaccination

3.3.1. Decision influencers

We found that in both countries, husbands and mothers-in-law played a central and decisive role in the decision-making process during pregnancy. During a FGD conducted in rural Gambia (Numu kunda), participants pointed out that a woman should always ask her husband for permission before going for ANC, which is where she receives maternal vaccines. This rule was said to be found in both their religion and tradition, wherein a married woman has limited autonomy as she belongs to her husband (Table 2). In Senegal, the decision-making process was said to be divided between the husband and mother-in-law of the pregnant woman (Table 2), however, in the special case of Medina Gounas, all aspects of everyday life were being regulated by Islamic religion and the religious leader made major health care decisions. Regarding the cost of a new maternal vaccine, women in both countries believed it should be given for free, just like the tetanus vaccine. Overall, women believed that health is priceless, and they would therefore always do their best to protect their child and themselves no matter the price.

3.3.2. Sufficient sensitization

In The Gambia and Senegal, women had varied preferences for the introduction of new maternal vaccines. When asked which diseases they would want a vaccine for, women in The Gambia said they would prefer a vaccine for anaemia, malaria, HIV/AIDS, and hypertension. They also believed that the village head should be the first person to receive information about new maternal vaccines and then disseminate it at the mosque with the use of a loudspeaker to reach the masses (Table 2). The use of pictures and words on posters (infographics) were said to be another way of sensitizing and that the uneducated could look at the images and ask an educated person to narrate the written information on the poster. Announcing it at group meetings was also thought to be effective as those present would disseminate any messages to others not present. Women in a settlement in rural Gambia (Jahaly) were the only ones to suggest a vaccine trial is needed to test the efficacy of any new maternal vaccine. In Senegal, women suggested that new maternal vaccines should be introduced as part of the ANC package (Table 2). With regards to sensitization, women in both countries stressed the need for use of local languages to communicate and suggested a combination of informal channels such as community dialogue, home visits, one-to-one dialogue, women's groups, and formal channels such as TV, national and community radio. Key stakeholders such as well-known doctors, midwives, nurses, *Badienu goxx*, Imams and other religious and traditional leaders were also trusted information sources.

3.4. Theme 4: Vaccine hesitancy

To explore issues of vaccine hesitancy, women in The Gambia and Senegal were asked if they or anyone they knew had ever rejected a maternal vaccine, delayed uptake, or not attended ANC for tetanus vaccination. Across all sites in The Gambia women reported there were no known refusals, delays, or non-attendees to ANC. In a settlement in rural Gambia (Yallal ba), this was accredited to the community reporting mechanism for any woman who wanted to refuse ANC; wherein she would be reported to the community birth companion (CBC) and in turn would not benefit from any conditional cash transfers (CCTs) that comes for the villagers as a result of the World Bank funded Maternal and Child Nutrition and Health Results Project (MCNHRP) [34] and no one would attend her new-born's naming ceremony after delivery (Table 2). In Senegal, urban or *peri*-urban areas were a hub of drivers of reluctances against vaccines. Participants revealed that their relatives living in the diaspora with higher levels of education (secondary or tertiary) were more often the breadwinners and therefore any of their negative vaccine opinions held significance in their families and subsequently increased vaccine hesitancy. Rumours circulated via social media were also believed to be a possible hindrance to vaccine uptake (Table 2). Although most women believed receiving vaccines for free is helpful, two Fulani communities located in the South (Kolda) and North East (Louga) regions of Senegal were

found to be reluctant to receiving vaccines free of charge due to their cultural norms and beliefs. These communities had a high sense of honour in being able to provide for the needs of their family, making them particularly reluctant to receiving vaccines at no cost. Senegalese women also believed that formal and informal HCW could not provide them with clear or accurate tetanus vaccine information due to the complexity of the available information. For instance, the chemical components of the vaccine could not be translated effectively by HCW into the local languages or French given the level of maternal education.

4. Discussion

In The Gambia and Senegal, the Ministry of Health provides maternal vaccinations at no cost as part of the antenatal care package which includes examination, screening, treatments, and preventive measures such as TT vaccination and health education and counselling [4,35]. By taking up the ANC package, women in these countries generally accept the maternal vaccines offered. Antenatal care has also been found in a similar West African context to be positively associated with uptake of tetanus vaccine during pregnancy [36]. Other factors that have been found to facilitate vaccination during pregnancy are disease prevention, vaccine benefit to the baby and recommendation by a health-care provider [37]. Cash incentives were also found to significantly increase the uptake of TT among women in The Gambia and women in a study in Nigeria [38]. It is worth mentioning that although an enabler, providing maternal vaccines free of charge does not always trigger vaccine acceptance. Whilst most women agreed that it is helpful to receive vaccines at no cost, other opinions differed, saying it depends on the cultural norms and beliefs of the communities. One most noted deterrent to uptake of maternal vaccines was accessibility to ANC as women across both The Gambia and Senegal complained of insufficient public transportation as well as long waiting hours at their nearest health centres and hospitals. This is like findings in Ethiopia and South Sudan, where distance from health facilities was shown to affect the perceptions and uptake of TT immunization among women [12,39,40].

It is important to understand the broader contexts in which different kinds of maternal vaccine information emerge and thrive. In both countries, women reported having received information on TT, including when to be vaccinated throughout their pregnancy from nurses during ANC visits, from CHN and from *Badienu gooxx*. They accredited the knowledge gained from their sensitization messages to their sustained uptake of TT. However, when probed, we found the women had low knowledge of tetanus disease and how the tetanus vaccine prevents tetanus disease. Instead, they compared the perceived benefits and risks of vaccination to justify uptake of maternal vaccines. In both countries, women noted differing TT vaccination schedules, and this is most likely a result of their different antenatal registration dates. Those who registered for ANC in the first trimester would receive up to three injections (TT1, TT2 and TT3), whereas those who registered after three months gestation would have recorded only one or two received TT doses. Studies in sub-Saharan Africa have suggested that women's knowledge of their TT immunization schedule affects their uptake of TT immunizations [12,41]. Regarding the introduction of any new maternal vaccine, women in both countries strongly emphasised the importance of adequate sensitization prior to their administration at ANC visits. Sufficient sensitization implied good communication of detailed information on the effectiveness, origin, contents, potential costs, and any potential risks of adverse effects following vaccination.

Confidence in formal and community health care workers was a recurrent theme in The Gambia and Senegal and this relationship of trust positively influenced women's perceptions of the care and services they offered. Trust is key not only to the relationship between pregnant women and health care workers but with the health system at large. This finding resonates with the 2020 Maternal Immunization and Antenatal Care Situation Analysis (MIACSA) report, wherein having a strong CHW system in place increased trust in the health system and vaccination campaigns in general [42]. In a study in Malawi, 46% of pregnant women similarly identified community health workers as their main source of information and influence on whether to receive vaccines, followed by friends or neighbours (34%) and doctors or nurses (29%) [43]. Health care workers have proven to be trusted local actors who shape people's perceptions of vaccines and vaccination programmes.

Regarding decision influencers, the management of pregnancy is seen as a family affair, with the decision-making process dependent on the pregnant woman's family setting. Decision makers in The Gambia and Senegal are often those who care for the pregnancy financially and this is predominantly the husband or woman herself if she earns an income. Payment of ANC is primarily seen as the responsibility of the husband because of his social role and status. Mothers-in-law were also mentioned as decision influencers in instances where the husband was not around, and this could be due to the religious and cultural norm of respecting your in-laws or the nature of intra-household hierarchies in these contexts. In both countries, especially in the rural communities, religion and tradition propagate patriarchy and restrict a woman's autonomy. Essentially, all decisions regarding a woman's life and important decisions taken therein are not hers to make alone. These findings are in line with Fleming et al. [43] wherein it was commonly expected that a pregnant woman would have a discussion with her husband or male partner of her intent to seek care. However, it has been found that several social and cultural factors can discourage men from participating in maternal and child health care and related decisions [44].

The Strategic Advisory Group of Experts (SAGE) on Immunization Working Group developed a model of determinants of vaccine hesitancy that grouped factors into three different influences: contextual such as history, culture, religion and gender, individual/-group such as knowledge, beliefs, attitudes and motivation and vaccine/vaccination specific such as risk/benefit, mode of administration and the role of health care workers [45,46]. Contextual influences are influences that arise due to historic, sociocultural, institutional, economic, or political factors. Individual and group influences are influences that arise from personal perception or influences of the social environment. Vaccine and/or vaccination specific influences are influences directly related to the vaccine or vaccination. These determinants were used to guide our analytic induction to refine and categorize themes grounded in our data into a conceptual model (Fig. 2). In general, due to the geographical proximity, sociocultural and ethnic similarities of The Gambia and Senegal, we had similar findings in both countries for almost all the variables. For example, there was similar awareness and local beliefs of pregnancy and immunizations, similar knowledge and perceptions on existing and potential immunizations during pregnancy, similar decision makers for uptake of ANC and vaccines and similar trust/distrust in the health system and vaccine providers.

In Senegal, associated factors of vaccine hesitancy were a higher level of education of the Senegalese diaspora who had a strong influence on their families living in Senegal, exposure to social media, scepticism to receiving free vaccines and insufficient information received about TT from HCW. In a systematic review by Larson et al. 2014, it was also found that higher education could either be a barrier or promoter to vaccination uptake [18]. Social media such as Facebook is an up and coming medium for information sharing and therefore, the government in Senegal uses the

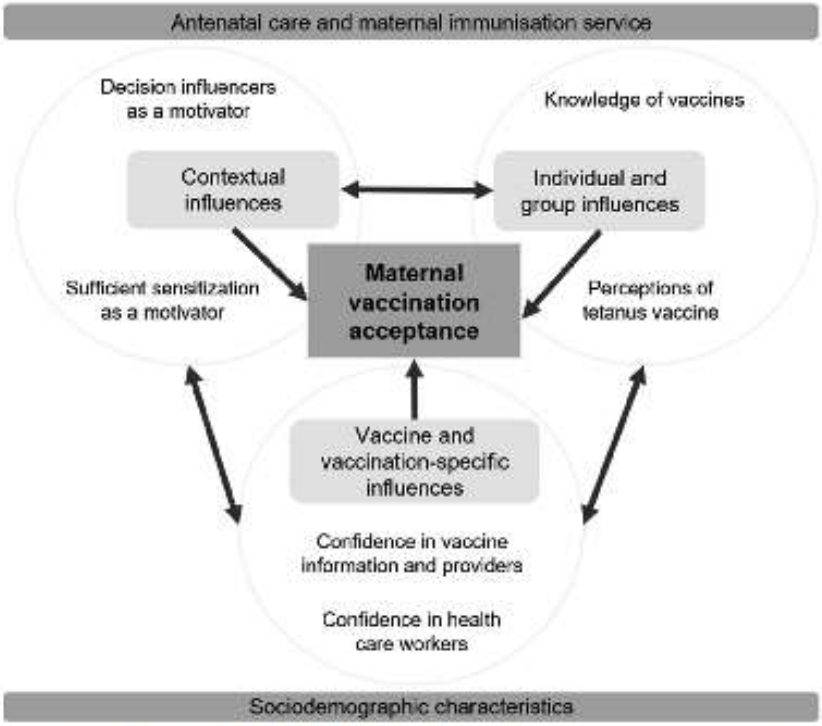

Fig. 2. Conceptual model for factors influencing acceptance of vaccination during pregnancy in The Gambia and Senegal based on The SAGE Working Group "Model of determinants of vaccine hesitancy".

medium to disseminate health messages and attempt to monitor any infodemics. Although increased social media use has increased vaccine hesitancy via circulated rumours and therefore impacting on individual decision making, mass media has generally been found to play an important role in women's increased uptake of adequate doses of tetanus vaccine [38,47]. Findings in The Gambia and Senegal were similar to those of a qualitative study in Zambia, which found that although negative community rumours can contribute to vaccine hesitancy, overall mothers were positive about receiving maternal vaccines [48].

Our study has some limitations: being a qualitative study, the prevalence of factors influencing acceptance of vaccination during pregnancy in The Gambia and Senegal cannot be quantified. Also, our chosen method of purposive sampling has been criticized for having a low level of reliability and high level of bias with an inability to generalize research findings. To reduce researcher bias, our judgements were guided by a clear theoretical framework and we established confirmability by providing an audit trail, highlighting every step of our data collection and analysis to provide a rationale for the decisions made. Although we aimed to recruit similar numbers of women across both countries, our sample sizes, mean ages, site characteristics and maternal status of the women differed, therefore limiting any possible inferences. We were only able to interview few husbands in each country due to their daytime working hours coinciding with the timing of data collection. We were also unable to recruit any co-wives, as the few we contacted from snowball sampling refused to be interviewed. Their views could have highlighted intra-household hierarchies which may influence maternal vaccination decision-making, accessibility, and acceptance. We also found that due to our chosen qualitative method, our study results cannot be extrapolated to other regions in The Gambia and Senegal or to other countries. However, FGDs were homogeneous and there was always one predominant ethnic group in each of our study settlements, therefore it is likely our findings have practical application to similar settlements beyond our sampling frame. Lastly, we acknowledge that social desirability bias occurred during interviews although we had informed participants prior to IDIs and FGDs that there were no acceptable or unacceptable answers and any opinion they provided would be invaluable to our study assuring them of confidentiality and anonymity. Also, during interviews, we at times used indirect questioning to make participants feel more comfortable. However, with all our efforts, we acknowledge that it is impossible to completely negate social desirability effects.

5. Conclusion

Vaccine acceptance can be influenced by many factors including contextual, individual or group, and vaccine- or vaccination-specific issues. Women across The Gambia and Senegal are generally vaccine acceptors with few concerns about maternal vaccines and confidence in the health care workers who provide them. However, accessibility and negative health staff attitudes are potential barriers to uptake of antenatal care where women receive maternal vaccinations. Women's acceptance of maternal vaccines is based on their previous vaccination experiences and individual weighing of risks and benefits. Thus, it is important to ensure that adequate and appropriate information is shared about maternal

vaccines as this will be particularly important for the introduction of new maternal vaccines in The Gambia and Senegal and in the context of novel vaccines to combat pandemics.

6. Availability of data and materials

All anonymised data generated or analysed during this study are available upon reasonable request from the corresponding author with approval from The Gambia Government/MRCG Joint Ethics Committee.

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Authors contributions

BK conceived the study idea. PJ, NK, EM and BK designed the study protocol. PJ and NK designed the thematic guide and collected data with AC and the field team under the supervision of EM and BK. PJ and NK did the data analysis and wrote the first draft of manuscript. BK gave substantial input into all versions of the manuscript and all authors including HL approved the final manuscript.

CRediT authorship contribution statement

Penda John: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Software, Supervision, Validation, Visualization, Writing - original draft, Writing - review & editing. **Nicole Nkoum:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Software, Supervision, Validation, Visualization, Writing - original draft, Writing - review & editing. **Amie Ceesay:** Data curation, Investigation, Writing - review & editing. **El Hadji Mbaye:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Supervision, Writing - review & editing. **Heidi Larson:** Supervision, Validation, Writing - review & editing. **Beate Kampmann:** Conceptualization, Funding acquisition, Investigation, Supervision, Validation, Writing - original draft, Writing - review & editing.

Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: PJ, NK, AC, EM and HL declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. BK receives institutional funding from a variety of sources for the conduct of vaccine studies, including in pregnant women and directs the UKRI-GCRF funded IMPRINT network www.imprint-network.org.

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Appendix A. Supplementary material

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CHAPTER 6 – COVID-19 STUDY

Bridging section

In my 2018 upgrading report, it was planned that my PhD research would follow a mixed-methods exploratory approach. Data from Objective 3 (chapter 5) which had been analysed in 2019 would have been used to design a questionnaire that would then be piloted before being rolled-out to pregnant women and women with infants in similar communities across The Gambia. However, the onset of coronavirus disease 2019 (COVID-19) and its rapid spread since emergence led to a global pandemic in 2020. Due to the uncertainty of the COVID-19 pandemic and after discussions with my supervisor, in November 2020, I updated my LSHTM Research Degree Record (RDR) to highlight changes to my research method. My revised quantitative data collection instead used antenatal care service data which had been collected during my qualitative data collection phase to determine the health systems factors affecting women's acceptance of maternal vaccines in The Gambia.

Moreso, as the pandemic continued to evolve in 2020, myself and colleagues in The Gambia found it timely and important to conduct COVID-19 research. We chose to research the experiences of individuals who completed the government mandated institutional quarantine to develop effective recommendations for the MoH in The Gambia to better support people in quarantine. These findings are presented in this chapter as a research paper which was initially published on medRxiv in 2021, and is now reviewed, edited and prepared for submission in a peer-reviewed journal. At the time of this study, no COVID-19 vaccines were available and no clinical vaccine trials were underway globally. It was also unclear whether and when a COVID-19 vaccine would become available, and/or if it would be rolled out to pregnant women. Therefore, we could not research the impact of the pandemic on pregnant women's uptake and acceptance of COVID-19 vaccination during pregnancy, which would have been more closely related to my PhD objectives. We did however recruit 38 females in our study, regardless of their maternal status, and below is a breakdown of the gender divide responses to questions regarding a COVID-19 vaccine and vaccination trial sentiments.

Do you consider vaccination an important action to prevent the spread of coronavirus disease?

Female (n =38)	Male (n = 167)
27 Yes	111 Yes
11 No	56 No
71% consider vaccination important	*66.4% consider vaccination important*

If a coronavirus disease vaccine were available today, would you agree to be vaccinated with it?

Female (n =38)	Male (n = 167)
19 Yes	94 Yes
19 No	73 No
50% would agree to be vaccinated	*56.3% would agree to be vaccinated*

Would you agree to take part in coronavirus disease vaccine trial wherein the trial vaccine would be tested on you?

Female (n =38)	Male (n = 167)
10 Yes	48 Yes
28 No	119 No
26.3% would agree to take part in vaccine trial	*28.7% would agree to take part in vaccine trial*

Research Paper Cover Sheet

RESEARCH PAPER COVER SHEET

Please note that a cover sheet must be completed <u>for each</u> research paper included within a thesis.

SECTION A – Student Details

Student ID Number	LSH1704904	**Title**	MISS
First Name(s)	PENDA TUTAN		
Surname/Family Name	JOHM		
Thesis Title	UNDERSTANDING FACTORS INFLUENCING MATERNAL VACCINATION ACCEPTANCE IN THE GAMBIA		
Primary Supervisor	BEATE KAMPMANN		

If the Research Paper has previously been published please complete Section B, if not please move to Section C.

<u>SECTION B – Paper already published</u>

Where was the work published?			
When was the work published?			
If the work was published prior to registration for your research degree, give a brief rationale for its inclusion			
Have you retained the copyright for the work?*	Choose an item.	Was the work subject to academic peer review?	Choose an item.

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SECTION C – Prepared for publication, but not yet published

Where is the work intended to be published?	BMC HEALTH SERVICES RESEARCH
Please list the paper's authors in the intended authorship order:	Penda Johm, Oluwatosin Nkereuwem, Aji-Matty Manjang, Omar Ceesay, Lamin Leigh, Amie Ceesay, Mustapha Bittaye, Adeyemi Roberts, Buba Manjang, Sana M. Sambou, Sainey Sanneh, Lamin Saidy, Binta Saidy, Beate Kampmann
Stage of publication	**Submitted**

SECTION D – Multi-authored work

For multi-authored work, give full details of your role in the research included in the paper and in the preparation of the paper. (Attach a further sheet if necessary)	PJ conceived and designed the study with feedback from ON, AMM, OC, LL, AC, BK, MB, BM, SMS and SS. AMM, OC, LL, AC, ON, PJ collected data. AMM, PJ along with LS resolved data queries and cleaned the dataset. PJ led data analysis and the literature search, wrote the first draft of the manuscript, and updated subsequent versions of the paper with co-author comments and inputs. PJ, ON, BK, AMM, OC, LL, AC contributed to the interpretation of results, revised the manuscript, suggested policy implications from the findings and edited the final draft. All authors read and approved the final manuscript.

SECTION E

Student Signature	P.JOHM
Date	01/11/2022

Supervisor Signature	B.KAMPMANN
Date	01/11/2022

Knowledge of COVID-19 and experiences of individuals in mandatory institutional quarantine in The Gambia

Draft manuscript: Knowledge of COVID-19 and experiences of individuals in mandatory institutional quarantine in The Gambia

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Abstract

Objective: To control the spread of the novel Coronavirus disease 2019 (COVID-19) caused by Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), governments around the world implemented several public health measures, including the adoption of quarantine for close contacts. This study explored the knowledge of COVID-19 and experiences of individuals in mandatory institutional quarantine in The Gambia.

Method: Questionnaires were administered via mobile phone call with data collectors calling and directly recording participant responses on a tablet in an electronic online form developed in Research Electronic Data Capture (REDCap). Data was coded, cleaned, and imported into Excel 2019 before being exported to Statistical Package of Social Science (SPSS) version 28 for analysis.

Results: In total, 205 adults who observed the mandatory institutional quarantine were interviewed. Social and mass media were identified as the most reported first source of information regarding COVID-19. While a majority reported positive experiences such as friendly interactions with staff, some expressed prominent dissatisfaction related to the provision of essential services and quality of care. Participants also experienced different forms of stigma before, during and after their quarantine.

Conclusion/Policy implications: This study provides important information on COVID-19 quarantine experiences in The Gambia. The Ministry of Health in The Gambia and other countries could improve the experience of quarantined individuals by providing more contact with relatives, compensation for loss of earnings, and timely provision of SARS-CoV-2 test results. Furthermore, stigma experiences and practices should be addressed during and after individuals stay in quarantine via the provision of psychosocial support.

Keywords: (7)

COVID-19; quarantine; healthcare; behaviour; acceptance; stigma; The Gambia

Introduction

On the 11th of March 2020, the World Health Organization (WHO) declared Coronavirus disease 2019 (COVID-19) a pandemic. COVID-19 is a novel disease caused by Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) (1). As of the 20th of August 2022, there have been more than 590 million cases and over 6.3 million deaths recorded worldwide (2). The African Region reported slightly more than 11,000 new cases from the 8th to 14th of August 2022, a 38% reduction from the previous week (3). In The Gambia, according to the Ministry of Health (MoH), 445th Situation Report, there were 12,197 total confirmed cases, 11,733 recoveries and 368 deaths as of the 4th of August 2022. According to the age-sex distribution of confirmed COVID-19 cases, about 59% were males and about 58% were below the age of 40 (4). The number of people in hotel quarantine was 19 and the total number who had completed hotel quarantine was 5,240. Gaps and challenges addressed in the report included suboptimal support for innovative countrywide COVID-19 risk communication, declining compliance with mask-wearing requirements, denial, misinformation, stigma and discrimination against COVID-19 affected families and low COVID-19 vaccination coverage rates (4).

Several public health measures have been put in place globally to reduce the transmission of COVID-19 and to minimize the impact of the disease. This includes risk communication, surveillance, contact tracing, social/physical distancing and mandatory institutional quarantine. Contact tracing has been used to quickly determine whether any secondary cases of COVID-19 had occurred due to an infected person encountering other people. Those contacts are then given information on how to maintain preventive measures during quarantine and what to do if they develop symptoms of COVID-19, including where to be tested (5). Institutional quarantine has been used to restrict the activities of individuals who are not ill with COVID-19 but may have been in close contact with a person with signs and symptoms of COVID-19 or travelled from an area with high transmission of COVID-19, with the aim of protecting unexposed members of the community from contracting the disease (6).

In The Gambia, at the time of this study, quarantined individuals were being isolated from others at hotels identified by the government for a mandatory period of 14 days. Those held at the hotels were provided with food, shelter, and medical assistance at the expense of the government. All quarantined individuals were required to be tested twice during quarantine, and if found positive, they were transferred to an isolation centre identified by the MoH. If found negative after 14 days, they were discharged and provided with a medical certificate. A recent study in China highlights the success of institutional quarantine in minimizing the risk of community spread of COVID-19 (7).

Stigma is a powerful element in determining how individuals respond to disease prevention guidance and is one reason for social isolation and exclusion. Stigma stems from individual characteristics as well as context-specific cultural values, norms, and attitudes. Once a stigma is applied, it manifests in a range of stigma experiences and practices such as verbal abuse or gossip (8). As the pandemic continues to evolve, it is important to understand what people know about coronavirus disease along with their experiences before, during and after quarantine. Taking these factors into consideration, we documented the experiences of individuals in The Gambia who completed the government mandated institutional quarantine to develop effective recommendations for the MoH in The Gambia to better support people in quarantine.

Methods

Ethical considerations

This study received approval from the Gambia Government/MRC Joint Ethics Committee (Ref. 22271) on the 11th of August 2020 and the London School of Hygiene & Tropical Medicine (LSHTM) Observational/Interventions Research Ethics Committee (Ref. 22271) on the 17th of August 2020. Joining the study was voluntary and participants personal information remained confidential. Unique identifiers were allocated to each person prior to being sensitized about the study and names were not recorded on study documents but only on encrypted databases. After sensitization and before consenting, data collectors asked participants if they understood everything read out to them and gave

them the opportunity to ask questions and discuss answers. The survey had an introductory text stating the survey was completely anonymous, and consent was implied by respondents agreeing to participate and completing the survey. Participants also carried out an Assessment of Understanding (AoU), wherein they needed to answer at least three out of four questions correctly with 89.76% success rate at first attempt and 10.24% success rate at second attempt.

Study setting

The Gambia is the smallest country on mainland Africa, specifically located in West Africa, and bordered by Senegal on three sides. The nation has two main religions and eight main ethnic groups (9). According to The Gambia Multiple Indicator Cluster Survey (MICS) 2018 (10), the percentage of women and men aged 15-24 years who were able to read a short simple statement about everyday life or who attended secondary or higher education was 64.3 and 68.0 respectively. 74% of women and 85% of men aged 15-49 years owned a mobile phone. In the latest Gambia Demographic and Health Survey (GDHS) 2019-20 (11), a total of 11,865 women and 4,636 men were interviewed, representing a response rate of 95% female and 87% male respectively. 47% of women and 67% of men aged 15-49 were literate. Only 2% of women and 7% of men accessed the newspaper, television, and radio on a weekly basis. These indicators affect how Gambian people respond in a pandemic such as COVID-19 that requires knowledge and effective communication.

Study design and population

We conducted a cross-sectional mobile phone survey to capture quantitative data from a list of individuals who had been institutionally quarantined. This password-protected person list and contact details were obtained through the MoH with approval from the Director of Health Services. The list included the name, arrival date, gender, age, address, phone number, room number, nationality, country and date of departure of every individual known to had come into The Gambia by air or land travel and through contact tracing. During this time, a total of 863 individuals were put in compulsory institutional quarantine in accordance with the government regulation in The Gambia, accommodated in four hotels usually housing tourists and based at the coast. We filtered the list based on study inclusion criteria and

attempted to reach every single individual through phone calls. Due to exclusion and/or unavailability of persons reached via mobile phone call, we ended up recruiting less than the 863 listed and contacted individuals.

Criteria for sample selection

We enrolled all individuals who completed compulsory quarantine for COVID-19 in The Gambia from the beginning of the pandemic to the date we retrieved the list from the MoH, aged 18 or above, residing in The Gambia, with a valid phone number, and documented consent to take part in the study.

Data collection

Questionnaires were administered via mobile phone calls with participant responses recorded on a tablet in an electronic online form developed in REDCap (Research Electronic Data Capture) and hosted at the Medical Research Council Unit The Gambia at the London School of Hygiene and Tropical Medicine (MRCG at LSHTM) in the Gambia. Data collectors (5 males, 4 females) with experience conducting surveys in The Gambia and fluent in English and at least one local language called every person fitting inclusion criteria to sensitize and recruit them, noting those who refused to participate or were unreachable. During this initial call, a summary of the study information sheet in either English, Mandinka, Wolof, or Fula were read out and the full study information sheet was sent to retain via WhatsApp. The study interviewer would re-attempt the phone call two more times on two separate days if initially unreachable. A third unsuccessful attempt was noted down as a non-response. At the time of data collection, all persons had been discharged the quarantine centres and were interviewed only once by our study team. Questionnaire answers were collected remotely with a pretested questionnaire to avoid any face-to-face contact due to the rising cases of COVID-19 at the time. The survey was pre-tested and included questions covering individual knowledge and quarantine experience. Demographic characteristics were also captured including sex, age, and highest level of education.

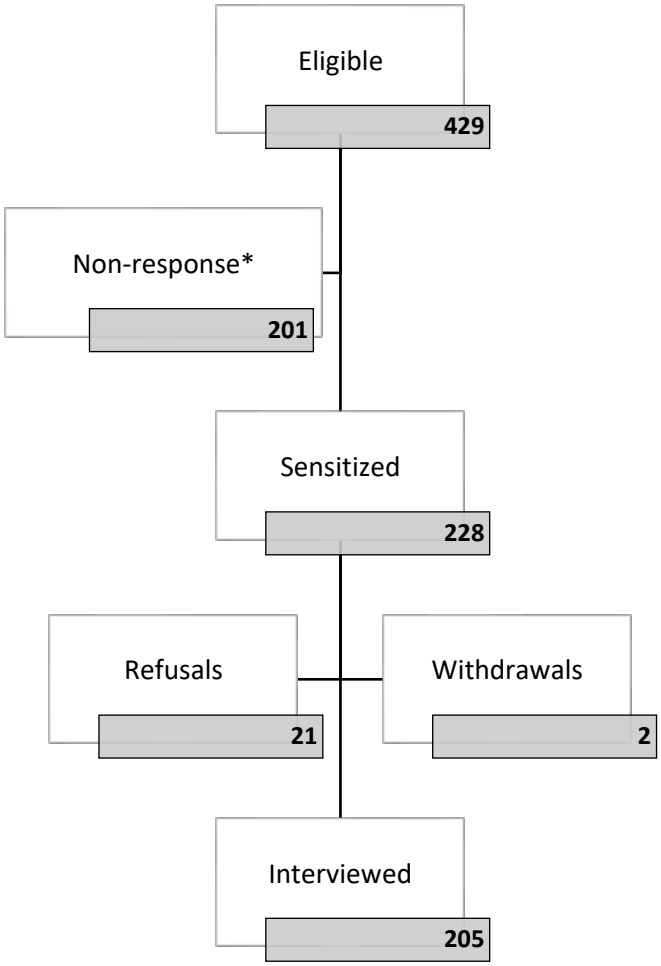
Variables and data analysis

The REDCap data dictionary codebook contained a total of 76 survey questions/fields with items of different formats; closed-ended (multiple choice, dichotomous, Likert scale, self-assessment with an alternative titled "other") and open-ended to obtain in-depth information on opinions and attitudes (Supplementary File 1). "Other" responses were evaluated and reclassified into one of the existing categories or newly created ones. Data was coded, cleaned, and imported into Excel 2019 before being exported to Statistical Package of Social Science (SPSS) version 28 for analysis. Nominal and categorical variables were presented in the form of tables and figures.

Results

Participant characteristics

Out of the 429 individuals eligible, 201 were categorized as non-response (123 switched off, 51 no answer, 13 wrong numbers, 12 unavailable, 1 died, 1 one mentally unstable), 21 refused, 2 withdrew and 228 were sensitized. A total of 205 adults accepted and were interviewed between September to December 2020 (Figure 1). Participants were mostly males (81.1%), Gambian nationals (84.4%) and Muslims (92.7%). The socio-demographic characteristics of participants are shown in Table 1.



*Switched off 123; No answer 51; Wrong number 5; Busy/unavailable 12; Died 1; Mentally unstable 1; Wrong person 8

Figure 1. Participant recruitment process based on study inclusion criteria.

Table 1: Socio-Demographic Characteristics of Participants (N=205)

Characteristic	N	%
Gender		
Male	167	81.5
Female	38	18.5
Nationality		
Gambian	173	84.4
Non-Gambian	32	15.6
Age group		
18 – 29	63	30.7
30 – 39	55	26.8
40 – 49	49	23.9
>49	38	18.5
Religion		
Islam	190	92.7

Christianity	15	7.3
Marital status		
Married	156	76.1
Not married	49	23.9
Highest level of education		
None	21	10.2
Primary (Grades 1-6)	24	11.7
Junior Secondary (Grades 7-9)	17	8.3
Higher secondary (Grades 10-12)	43	21
Tertiary (University education)	44	21.5
Other	56	27.3
Ethnicity		
Mandinka	52	25.4
Fula	36	17.6
Wolof	48	23.4
Other	69	33.7
Occupation		
Non-fixed income (e.g. petty trader)	147	72
Fixed income (e.g. nurse, teacher)	58	28
Quarantine Hotel		
Hotel A	79	38.5
Hotel B	78	38
Hotel C	38	18.5
Other	10	4.9
Days spent in quarantine		
<14	12	5.9
14	153	74.6
15	19	9.3
>15	21	10.2

Knowledge of coronavirus disease 2019, COVID-19

The first questions probed our participants knowledge base (Table 2). They had varied knowledge of the symptoms of COVID-19, with fever (78%) and coughing (76%) being predominantly identified as symptoms of COVID-19 (Figure 2). Regarding how coronavirus disease spreads, 65% stated droplets from infected people when they cough or sneeze, 70% stated direct contact with an infected person and 50% stated touching objects/surfaces contaminated by an infected person (Figure 3). The most frequently cited first source of information on COVID-19 was found to be social and mass media, and practically all participants believed this source. Most of our participants (88.3%) said they believed that COVID-19 was deadly, and half identified elderly people as the most at-risk population of being infected with the disease (Figure 4). Almost all participants (79%) said they worried that they were at risk of contracting coronavirus disease.

Table 2: Knowledge of Coronavirus Disease 2019, COVID-19 (N=205)

Variable	Category	N (%)
Source of first information on COVID-19	Mass media/Social media	158 (77)
	Other	47 (23)
Trust in source of first information on COVID-19	Yes	168 (82)
	No	37 (18)
Belief that COVID-19 is deadly	Yes	181 (88.3)
	No	24 (11.7)
	Other	12 (5.9)
Worry about contracting COVID-19	Yes	162 (79)
	No	43 (21)

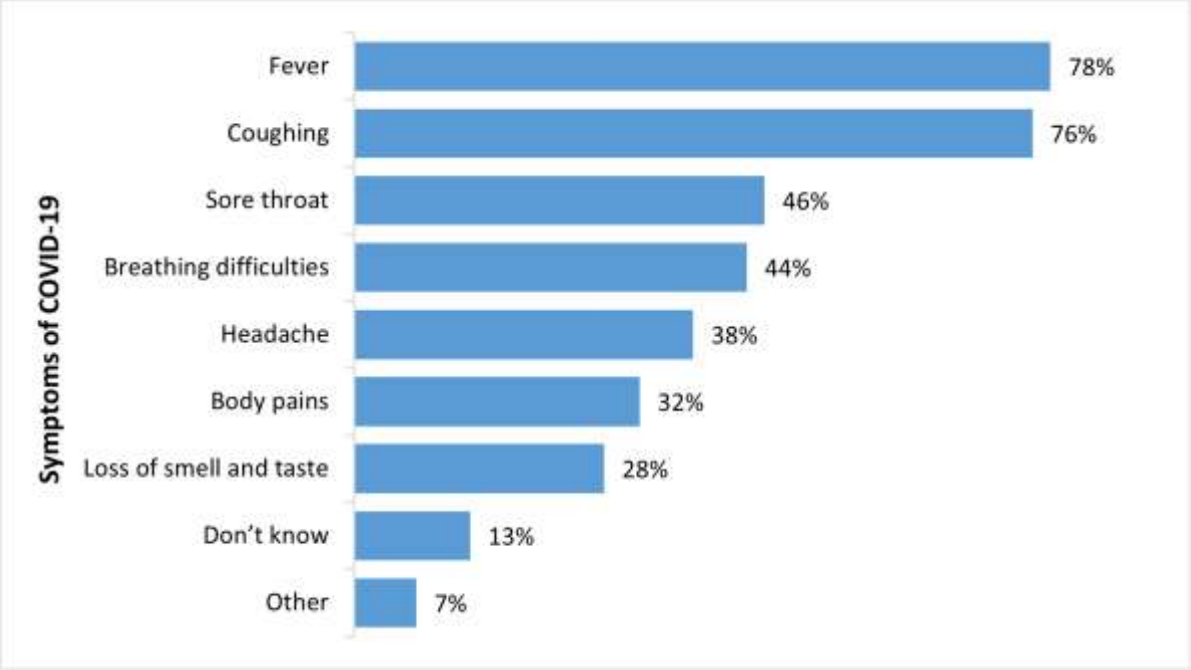


Figure 2. Knowledge of symptoms of COVID-19

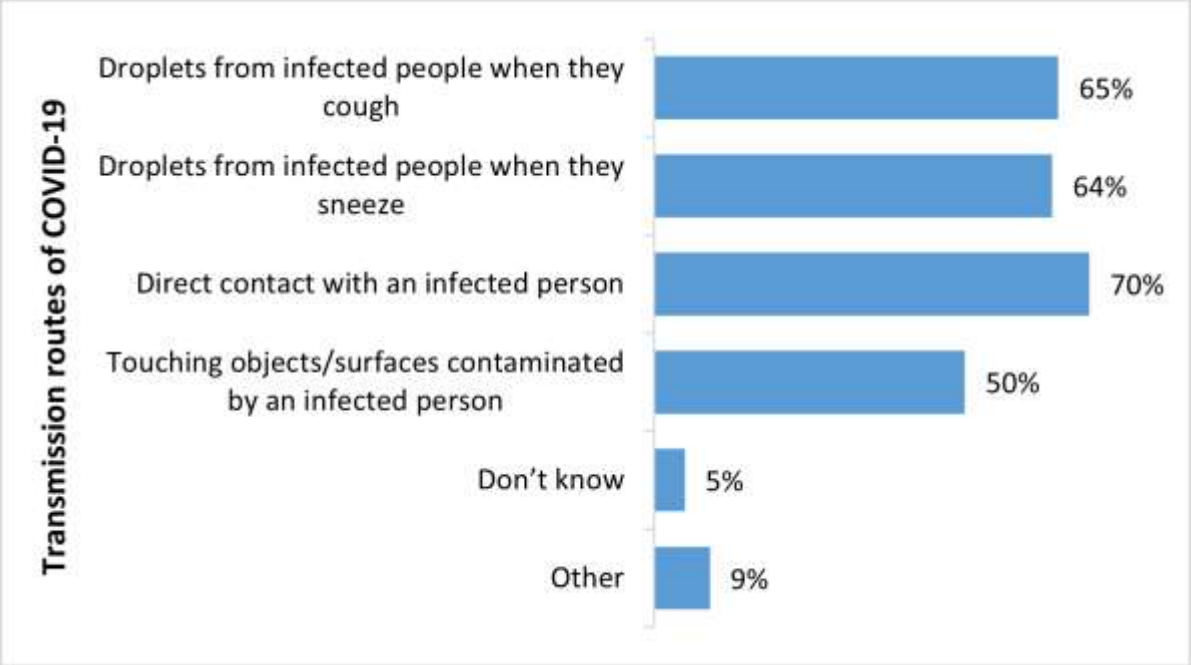


Figure 3. Knowledge of transmission routes of COVID-19

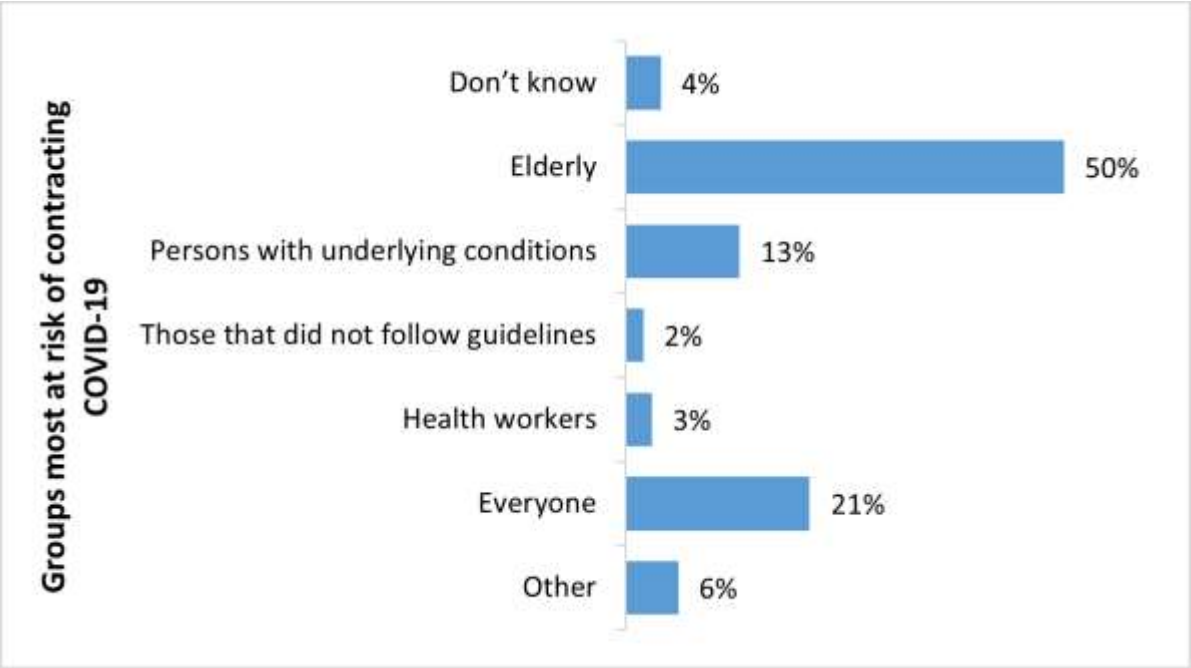


Figure 4. Groups perceived to be most at risk of contracting COVID-19

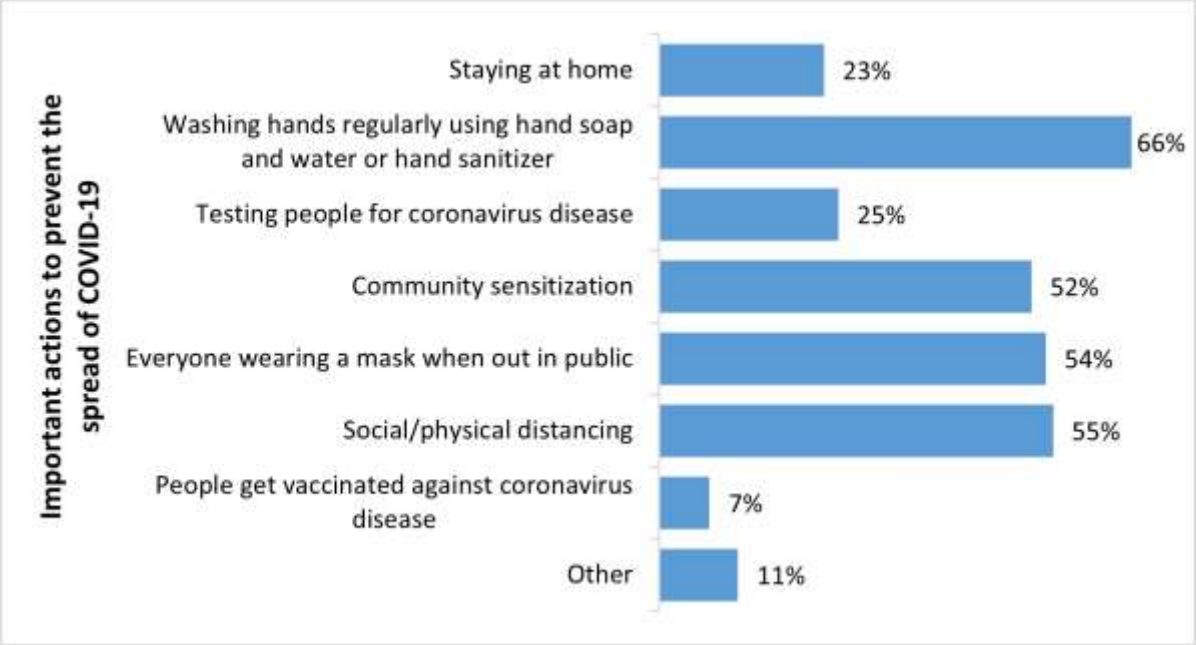


Figure 5. Knowledge of important actions to prevent the spread of COVID-19

Institutional Quarantine Experiences

Participants were asked via open-ended questions to describe their quarantine experience and what they thought were the benefits and disadvantages of quarantine. Most participants (68.29%) shared positive quarantine experiences in the facilities where they were accommodated. Some considered their stay a pleasant experience as they had time to relax from work, others had time for spiritual activities and most commended the efforts of the hotel staff who they considered friendly (Table 3). Listed benefits of quarantine were testing for and knowing their COVID-19 status; separating potentially positive cases from others in the community; reading the Quran and having more time to worship God; care provided by health workers and hotel staff; relaxation; adequate food and housing; and receiving a certificate after completion of quarantine. However, almost a third (29.27%) expressed negative experiences to our team. For some it was like a prison being restricted to their room and others complained of a lack of psychosocial support. Disadvantages of quarantine were cited as being away from and missing family; not being able to provide financially for the family as the household head; poor taste and limited quantity of food served at the hotel; loneliness, lack of socialisation and social activities; no receipt of COVID-19 test results; lots of mosquitoes and no bed nets; and time wasted with no remuneration.

Table 3: Selected Examples of Perceptions of Quarantine Experience

Positive experiences	**Negative experiences**
"It was a good experience for me due to the quarantine services received from health care workers and supporting staff in Hotel B." **(50-59 Gambian man, identified via contact tracing)**	*"It was painful leaving my family behind; horrible; traumatised; like a prison."* **(18-29 Gambian man, identified via contact tracing)**
"I relaxed a lot. In my 20 years of work experience, I have not just had a break. I slept a lot and did some paperwork as well." **(40-49 Senegalese man, came in via land travel)**	*"The contact tracing team promised to pick us up, but they never did. We were later informed that there was no fuel available to pick us up."* **(40-49 Gambian man, identified via contact tracing)**
"It was ok with me, and the entire health staff and hotel staff were friendly in their services." **(60-69 Gambian man, came in via air travel)**	*"Very frustrating; I needed medications for body pains and could not get them in time even though I requested from the Ministry of Health staff… they kept delaying the arrival; No psychosocial support."* **(30-39 Gambian man, identified via contact tracing)**

Participants were also asked questions about any related stigma experiences before, during and after their time in quarantine (Table 4). COVID-19 related stigma was hardly experienced during quarantine. However, a significant number (40%) had people suggesting they were to go into quarantine prior to being admitted. More experienced stigma after quarantine, with people gossiping about them (38%), family and friends refusing to visit them at home (19.5), anyone who called thinking they had been treated for coronavirus disease (27.8%), and even being called names to make them feel ashamed (25.4). Participants also experienced enacted stigma (overt discrimination against the stigmatized) after quarantine leading to feelings of shame, self-blame, loneliness, stress, anger and withdrawal from daily activities (Appendix 1).

Table 4: Experienced COVID-19 Stigma (N=205)

Variable	Category		N	%
While in quarantine	People kept gossiping about you	Yes	36	17.6
		No	169	82.4
	People keeping their distance (out of fear)	Yes	53	26
		No	152	74
	People had a judgmental attitude	Yes	31	15.1
		No	174	84.9
	Anyone who called thought you were being treated for coronavirus disease	Yes	40	19.5
		No	165	80.5
	Other	Yes	5	2.4
		No	200	97.6
After completing quarantine	People kept gossiping about you	Yes	78	38
		No	127	62
	Family and friends refused to visit you at home	Yes	40	19.5
		No	165	80.5
	Anyone who called thought you had been treated for coronavirus disease	Yes	57	27.8
		No	148	72.2
	Being called names to make you feel ashamed	Yes	52	25.4
		No	153	74.6
	Other	Yes	12	5.9
		No	193	94.1

Attitudes Towards COVID-19 Stigma

A Likert scale was used to rate participants levels of agreement with different COVID-19 stigma statements (Figure 6). Over 80% strongly agreed or agreed that judging and shaming is hurtful and can negatively affect mental health. Almost 90% strongly agreed or agreed that recovering from coronavirus disease is nothing to be ashamed about or blamed for. Over 80% strongly agreed or agreed that people may refuse to go into quarantine for fear of being accused of having coronavirus disease. There was discrepancy regarding whether public judgement or shaming of others is caused by the publics fear of being infected with coronavirus disease. 70% strongly agreed or agreed whereas 28% disagreed. There was also discrepancy regarding whether people who recover from coronavirus disease will be shamed and blamed for having it. More than half strongly disagreed or disagreed compared to over 40% who strongly agreed or agreed.

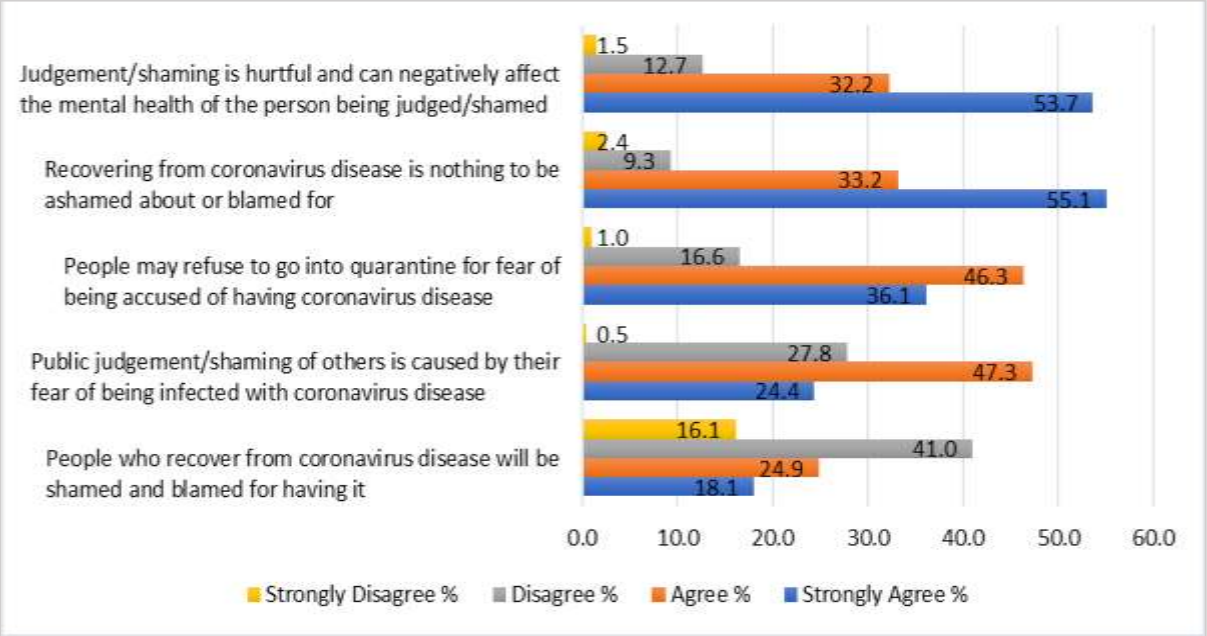


Figure 6. Likert scale gauging attitudes towards COVID-19 stigma.

Discussion

While exploring knowledge, we found considerable similarities to data from a recent online survey on the knowledge, attitudes, and practices of Sudanese people towards COVID-19 (12), with top listed sources of knowledge acquisition of COVID-19 being mass media and social media. Predominantly listed COVID-19 related symptoms identified by our participants such as fever, coughing, breathing difficulties and sore throat were consistent with widespread information circulating at the time. Over 60% of participants identified droplets from coughs and sneezes as sources of infection. This finding is in line with a study conducted in Ethiopia on community COVID-19 risk perception and health-seeking behaviour (13), wherein 60.3% respondents said COVID-19 could be transmitted via inhalation of a droplet from infected people and 58.0% reported airborne as a transmission route for COVID-19. Regarding perceived severity of COVID-19, 88.3% of our participants believed that coronavirus disease was deadly, like a recent study in Ethiopia (14) and in Sudan where 85.6 % and 89.5% respectively understood COVID-19 to be a dangerous disease (12).

To nudge the public towards positive epidemic prevention behaviours, individuals must perceive their susceptibility to and the severity of COVID-19 (15). Risk perceptions give us important insight into how individuals view personal risks, which in turn is an important determinant of their behaviour and adherence to protective measures (16, 17). When gauging personal risk perceptions, it was evident that 79% of our respondents worried that they were at risk of contracting coronavirus disease, similar to 81% in a recent study in Ethiopia (13). Exactly half of our participants said the elderly were most at risk of being infected with coronavirus disease, followed by everyone else, again like a study in Sudan wherein 81.7% said those at risk of developing a severe form of COVID-19 were the elderly, followed by everyone else (36%) (12). In contrast, in another study in Ethiopia examining myths, beliefs, and perceptions about COVID-19, 45.1% and 62.2% of respondents perceived that children and youth, respectively, are at a moderate risk of COVID-19 (18). This variation may be due to the difference sources and timely access of risk information of respondents.

Looking at hotel related factors during quarantine, there was prominent dissatisfaction reported by most of our participants regarding the environment, specifically cleanliness and the services provided, specifically meals. Our findings are similar to the experiences of persons in COVID-19 institutional quarantine in Uganda (19). In The Gambia, all quarantine related costs were covered by the government and therefore our study participants were not financially burdened with the cost of accommodation, food, testing and certification. Nevertheless, a predominant dissatisfaction related to cost noted by our study participants was specifically the desire to have been provided with compensation in the form of cash, food and/or transport for their time spent in quarantine, which would have benefited their families. A study by Vieira et al. (2021) found that public employees had lower losses in financial security and lower perceptions of financial fear (20). In other countries, support measures such as financial aid, employment benefits and/or practical aid were adopted to enable people to follow self-isolation or quarantine guidance. In Germany, all employed people in mandatory self-isolation who tested positive were provided with 100% remuneration of their salary for up to six weeks and in South Korea, any person required to quarantine for 14 days was provided with daily necessities, sanitary kits and financial

support (21). Although these findings are from high and middle-income countries, similar measures could be adapted in LMICs such as The Gambia.

The Health Stigma and Discrimination Framework shows the stigmatization process as it unfolds across the social ecological spectrum, including drivers and facilitators such as race, gender, sexual orientation and occupation. Once a stigma is applied, it manifests in a range of stigma experiences and practices. Stigma experiences can include experienced discrimination, which refers to stigmatizing behaviours that fall within the purview of the law, or stigmatizing behaviours that fall outside the purview of the law such as verbal abuse or gossip. Another experience of stigma is self-stigma, wherein a stigmatized person adopts society's negative beliefs regarding their status (8). Stigma experiences such as discrimination and behaviours such gossip can negatively affect the mental health of the stigmatized individual and lead to social exclusion. Stigma practices can include stereotypes, prejudice, stigmatizing behaviours, and discriminatory attitudes (8). In this study, COVID-19 related stigma was hardly experienced before and during quarantine but rather following on from quarantine. Some participants reported people gossiping about them, family and friends refusing to visit them at home and even being called names to make them feel ashamed. Others had people call them thinking they were being treated for coronavirus disease at the quarantine facility, and misunderstandings such as these stem from public fears of being infected by people in quarantine (7). Our participants also experienced overt discrimination (enacted stigma) after quarantine leading to feelings of shame, self-blame, loneliness, stress, anger and withdrawal from daily activities (felt stigma). Unfortunately, this is a reality many other individuals in self-isolation and quarantine have faced worldwide as found in recent studies (22, 23). It is therefore important to continually uncover and mitigate the many drivers of stigma to improve the lives of quarantined individuals.

Study strengths and limitations

One of the key strengths of this study was carrying out interviews via mobile phone call guided by our REDCap questionnaire displayed on tablets. This method seemed most appropriate over traditional face-to-face interviewing due to the rise of new cases at the time and government COVID-19 preventive

mandates such as social/physical distancing. Our chosen method ensured we generated rapid first-hand evidence and helped us save on travel costs. Another key strength of our study was conducting interviews soon after participants left quarantine to minimise their recall bias after changing environment. Regarding limitations, it is important to note that our study population does not represent the diverse demographics of The Gambia. Most of our participants were Gambian males who were more likely to travel than women during the pandemic and therefore were more frequently identified for institutional quarantine. Secondly, our chosen method of phone call surveys reduced our opportunity to take note of participants' nonverbal communication.

Conclusion

This study sheds light on the lives of those who had been in institutional quarantine in The Gambia and provides evidence that can be used to inform the Gambia MoH, policy makers and other key stakeholders working on epidemic preparedness and response. Such information was missing in the literature in general at the time this study was conducted. Mass and social media remain top sources of knowledge acquisition and therefore targeted messaging via information campaigns should be used to increase coronavirus disease awareness. To improve the experience of individuals in designated institutional quarantine facilities, public health responses must align with individuals lived realities. Recommendations include daily provision of quality food and healthcare, timely provision of SARS-CoV-2 test results and negligible or complimentary associated costs of quarantine. Furthermore, stigma experiences and practices should be addressed during and after individuals stay in quarantine via the provision of psychosocial support.

Declarations

Ethics approval and consent to participate

All methods were performed in accordance with the Declaration of Helsinki and approved by the Gambia Government/MRC Joint Ethics Committee (Ref. 22271) on the 11th of August 2020 and the London School of Hygiene & Tropical Medicine (LSHTM) Observational/Interventions Research

Ethics Committee (Ref. 22271) on the 17th of August 2020. Informed consent was obtained from all study participants, joining the study was voluntary and their personal information remained confidential. Unique identifiers were allocated to each person prior to being sensitized and names were not recorded on study documents but only on encrypted databases. After sensitization and before consenting, data collectors asked participants if they understood everything read out to them and gave them the opportunity to ask questions and discuss answers. The survey had an introductory text stating the survey was completely anonymous, and consent was implied by respondents agreeing to participate and completing the survey.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

None declared.

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Authors' contributions

PJ conceived and designed the study with feedback from ON, AMM, OC, LL, AC, BK, MB, BM, SMS and SS. AMM, OC, LL, AC, ON, PJ collected data. AMM, PJ along with LS resolved data queries and cleaned the dataset. PJ and ON led data analysis and the literature search, wrote the first draft of the manuscript, and updated subsequent versions of the paper with co-author comments and inputs. PJ, ON, BK, AMM, OC, LL, AC contributed to the interpretation of results, revised the manuscript, suggested

policy implications from the findings and edited the final draft. All authors read and approved the final manuscript.

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List Of Abbreviations

AoU	Assessment of Understanding
COVID-19	Coronavirus disease 2019
GDHS	Gambia Demographic and Health Survey
MICS	Multiple Indicator Cluster Survey
MoH	Ministry of Health
MRCG at LSHTM	Medical Research Council Unit The Gambia at the London School of Hygiene and Tropical Medicine
REDCap	Research Electronic Data Capture
SARS-Cov-2	Severe Acute Respiratory Syndrome Coronavirus-2
WHO	World Health Organization

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Supplementary Table.

Table 5: COVID-19 Related Stigma (N=205)

Variable	Category		N	%
Did you experience any of these before going into quarantine?	People kept suggesting you go into quarantine	Yes	82	40
		No	123	60
	Family and friends refusing to visit you at home	Yes	38	18.5
		No	167	81.5
	Being called names to make you feel ashamed	Yes	35	17.1
		No	170	82.9
	Feeling ashamed because of how you were taken into quarantine	Yes	41	20
		No	164	80
	Other	Yes	13	6.3
		No	192	93.7
Did you experience any of these effects of stigma after completing quarantine?	Shame	Yes	30	14.6
		No	175	85.4
	Self-blame	Yes	15	7.3
		No	190	92.7
	Loneliness	Yes	46	22.4
		No	159	77.6
	Stress	Yes	38	18.5
		No	167	81.5
	Anger	Yes	34	16.6
		No	171	83.4
	Withdrawal from daily activities	Yes	30	14.6
		No	175	85.4
	Strained relationship with family	Yes	19	9.3
		No	186	90.7
	Other	Yes	101	49.3
		No	104	50.7

CHAPTER 7 – DISCUSSION

Chapter Overview

In this chapter, I summarize how my main PhD findings respond to my research objectives and consider them within the context of existing research. I present my newly developed conceptual framework, which builds on existing theories. I also reflect on the strengths and limitations of my PhD, including the methodology. The implications of my findings are then used to make recommendations for policy, future research and potential interventions for better integrated and a higher uptake of antenatal care service and maternal vaccination delivery strategies.

The 5 As

Utilization is often used as a synonym for access and is influenced by both the supply and demand for services. The public's use of medical services is a significant factor in maintaining public health for national development. It has been proposed that access to healthcare should be unrestricted by factors such as cost, physical accessibility, or acceptability of treatments (Gulliford et al., 2002; Obrist et al., 2007). In exploring the concept of access, Penchansky and Thomas (1981) reflected on the characteristics and expectations of health care providers and patients. They grouped these characteristics into five areas of access to care: accessibility, availability, affordability, acceptability, and accommodation. Accessibility is when the location of health services aligns with the location of patients. Availability is when the volume and types of health services meets the patient's needs. Affordability is when the prices of health services meet the patient's ability to pay. Acceptability is when the health care provider accepts all patients regardless of their sociodemographic characteristics. Accommodation is when the delivery of health care accommodates the patient's needs. To answer objective 2, these five areas of access to care were used to reflect on and categorize my findings on the health system factors that influence antenatal care service utilization in The Gambia.

Another 5 As model was developed by Thomson et al. (2016) to facilitate an understanding of the complex individual, sociocultural, organizational, and structural factors that influence vaccine uptake.

The 5 As are access, affordability, awareness, acceptance and activation. When it comes to recommended vaccines, access refers to a person's capacity to receive them. Adequate financial and non-financial resources must be available for people to be able to afford immunization. The level of knowledge people have about the need for and availability of recommended vaccines, as well as their certain advantages and disadvantages, is referred to as awareness. Individuals' level of acceptance, questioning, or rejection of vaccination is referred to as acceptance. The degree to which people are urged to accept vaccines is known as activation (Thomson et al., 2016). Vaccine acceptance is when an individual or group decides to accept or refuse vaccination and can be active (adherence) or passive (compliance) (Nichter, 1995). It is important to note that vaccine uptake is not the same as vaccine acceptance because it does not consider the individuals choice and reasoning on whether to accept or refuse. Rather vaccine uptake is simply the percentage of the population that has received a given vaccine. Therefore, vaccine uptake rates should not be used to assess vaccine acceptance as poor vaccine uptake does not mean low vaccine acceptability and high vaccine uptake does not mean high vaccine acceptability (Dubé et al., 2015). To answer objective 3, the 5 As model was used to reflect on and categorize my findings on the demand side factors that influence maternal vaccination acceptance in The Gambia. I will also explore the phenomenon of vaccine hesitancy, which categorizes behaviour on a spectrum ranging from active demand to delay to a complete refusal of all vaccines (MacDonald, 2015).

Accessibility

Distance

Accessibility to antenatal care services is a widely noted deterrent to the utilisation of maternal vaccines. Women in my study complained of insufficient public transportation as well as long waiting hours at their nearest health centre and/or hospital. Long waiting times have also been noted in Ghana (Craymah et al., 2017) and in Uganda where it was attributed by health workers to a large gap between existing staff-to-patient ratios (Kajungu et al., 2020). Another well-known access barrier that has been cited in numerous studies is the long distance to health facilities (Haile et al., 2013; Lawry et al., 2017; Anatea

et al., 2018; Malande et al., 2019; Gebremedhin et al., 2020; Konlan et al., 2020). Distance affects the utilisation of health services more when combined with lack of a convenient mode of transportation (Say and Raine, 2007; Simkhada et al., 2008; Lechthaler et al., 2018; Ali et al., 2018). Distance still remains a problem for pregnant women trying to reach important antenatal care services at a health facility. The overall time spent to reach a health facility can limit maternal vaccination uptake. Distance to the health facility was not systematically measured in my study although we did ask some women in conversation how long it took them to get to their nearest health centre. We also inquired about their modes of transportation and in urban areas commercial vehicles were used while in rural areas donkey carts or horse carts were used when attending antenatal clinic. Almost all these women stated that there were not enough commercial vehicles that frequent their communities and therefore they usually walked when going for antenatal care. Most women in sub-Saharan Africa have been found to walk to access the health center. In a study in Kenya, the majority of women (93%) had walking times that ranged from a minute to three hours with a median time of 40 minutes (Van Eijk et al., 2006). In a study in Nigeria, over half (52%) of the women took ≤ 30minutes to reach their chosen health facility (Nnebue et al., 2014). Mothers in Ethiopia who walked less than an hour to their nearest health facility were almost three times more likely to receive two doses of tetanus vaccine during the course of their pregnancy than their counterparts who walked more than an hour (Mamoro and Hanfore, 2018). A study on the distance determinants of utilisation of maternal health services in Ethiopia measured the straight-line distance between women's homes and their nearest health facility. They calculated the distance to the nearest health centre for antenatal care and facility delivery and labelled them short, medium and long. Women living a long distance away from the health centre were less likely to have attended antenatal clinic four or more times (Defar et al., 2021). Ethiopian mothers in a study on tetanus toxoid vaccination uptake who travelled less than 30 minutes had better TT vaccination uptake than their counterparts (Gebremedhin et al., 2020). In thinking how best to bring women closer to quality maternal health care especially in rural and remote areas, the idea of maternity waiting homes (MWHs) was born. MWHs are residential homes located near health facilities where women can stay at no cost until they are due for delivery, which will be attended to by a skilled birth attendant who will also provide postpartum services (Stekelenburg et al., 2006; Lori et al., 2013; Lori et al., 2016; Lori et al., 2019).

MWHs are a potential solution to the distance barrier and their utilisation have been found to lead to improved maternal and newborn health outcomes via pregnant women making four or more visits during pregnancy (Chandramohan et al., 1995; Bhutta et al., 2009; Lori et al., 2013; Lori et al., 2016). However, evidence of the effectiveness of MWHs is limited and could be research further. Other suggested initiatives to improve access to vaccines include door-to-door campaigns and mobile phone calls (Schaetti et al., 2012; Kumar et al., 2016; Crocker-Buque et al., 2017).

Availability

Antenatal care availability is positively associated with pregnant women's uptake of antenatal care services, specifically tetanus toxoid vaccination (Yaya et al., 2019; Mohamed and Ahmed, 2022). All the health facilities in my study had suitable physical infrastructure (i.e., waiting area, examination area, toilet) and provided essential vaccines and drugs (i.e., tetanus toxoid vaccines, antimalarial drugs, ferrous sulfate, folic acid). At times, medicines were out of stock and therefore had to be procured by pregnant women at a cost. Similarly, a qualitative study in Uganda found that some pregnant women had experienced different instances of stock outs for drugs and vaccines (Kajungu et al., 2020). A lack of vaccine availability was also cited as the main reason for non-receipt of tetanus vaccination in Nigeria (Nnebue et al., 2014). Healthcare workers in my study were also found to work under pressure due to a shortage of other healthcare staff and poor working conditions such as infrequent water and electricity supply. In other low-income countries, health workers held strikes wherein they protested the safety of working conditions and complained about their salaries (Russo et al., 2019). Such strikes were found to disrupt health care service delivery and reduce the utilization of ANC by pregnant women in Kenya (Njuguna, 2015; Irimu, 2018; Kaguthi et al., 2020; Scanlon et al., 2021). These findings imply that although antenatal care services were mostly available, other health system factors can impact pregnant women's uptake of the available antenatal care services.

Affordability

Antenatal care services, including maternal vaccines, are provided free of charge in all health facilities in The Gambia (Anya et al., 2008; WHO, 2016). Removing the direct cost of maternal health services at health facilities has been found to increase the number of women who utilise ANC (Simkhada et al., 2008; Edu et al., 2017). It is important to keep ANC services affordable with minimal to no indirect costs to ensure consistent use and improve uptake rates (Godongwana et al., 2021). Free maternal care was said to be provided at all the facilities in my study, however, other indirect costs and informal charges were incurred. Indirect costs and informal charges at health facilities were found to be barriers to women in Nigeria, Kenya and Tanzania's utilization of maternal health care services (Edu et al., 2017; Otieno et al., 2020; Binyaruka et al., 2021). In Tanzania, the practice of informal payments was common amongst health workers below the age of 35. This was thought to be a result of younger staff finding informal payments to be a compensating mechanism for higher salaries being paid to more senior colleagues (Binyaruka et al., 2021). These findings imply that although there are minimal direct costs to women for antenatal care and the services offered therein, other indirect and informal charges can negatively affect acceptance of those services.

Cash Incentives

Cash incentives have been found to somewhat compensate for direct and indirect costs if participants incurred costs are less than the cash received (Sato and Fintan, 2020). In my study, women received a GMD300.00 (~USD 6) cash incentive when they booked in for ANC during their first trimester. This cash payment was facilitated via the Results-Based Financing (RBF) mechanism under the Maternal and Child Nutrition and Health Results Project (MCNHRP) being managed by the National Nutrition Agency (NaNA) and Ministry of Health (MoH). The supply side intervention of the RBF mechanism paid out conditional cash transfers to pregnant women for their uptake of ANC (World Bank, 2015). Cash incentives were actually found to significantly increase tetanus vaccine uptake among pregnant Nigerian women, with a two-dollar cash incentive more than tripling their odds of vaccine uptake (Sato and Fintan, 2020). It is suggested that cash incentives should be given to pregnant women with the aim

of increasing their uptake of antenatal care services, as seen in successful initiatives such as the RBF, which was found to encourage sustainable early antenatal care booking as well as continued ANC uptake.

Direct and Indirect costs

Transportation costs and lack of convenient modes of transport are considerable barriers to the uptake of maternal vaccines, with higher transportation costs being strongly associated with less probability of uptake (Sato and Fintan, 2020). Issues regarding direct costs of maternal vaccines can be avoided by ensuring the elimination of user fees and keeping maternal healthcare free. Indirect costs such as transportation fees and buying of medicines should be minimised (Nnebue et al., 2014; Ndimbii et al., 2018) and informal charges should be restricted. In mobile pastoralist communities in Chad, issues with the ability to pay for ANC services were sometimes related to health workers requesting bribes in exchange for better services (Lechthaler et al., 2018). Studies on corruption and mistrust in health care institutions in Sub-Saharan Africa have found that informal payments lead to consequences such as inability to access care, low satisfaction with the care received, mistrust and poverty (Cho and Kirwin, 2007; Lewis, 2007).

Acceptability

Sociodemographic characteristics

The WHO recommends that pregnant women receive antenatal care, especially attending during their first trimester in order to detect and treat any complications that arise due to the pregnancy (AbouZahr and Wardlaw, 2003). In my study, pregnant women had a high level of acceptance for antenatal care and maternal vaccines offered therein. Most women were within the age groups of 20-30 (64.6%) and 31-40 (29.2%), with age at marriage being mostly under 18 (49.0%) and 18-24 (46.9%). Older mothers were naturally more aware of antenatal care service provisions and the recommended maternal vaccination schedule than younger mothers due to a longer history of engagement with the health system. Older mothers also seemed to be more confident in their knowledge of maternal vaccines and

discussed their experiences more easily. It is therefore necessary to ensure that younger mothers are empowered to ask questions regarding their bodies and health and that safe and conducive environments are in place to respond to their queries in an effort to increase their utilization and acceptance behaviours. Most women reported having received tetanus vaccine during their current and/or most recent pregnancy, and nearly all reported favourable views on the importance and effectiveness of maternal vaccines. In my study in The Gambia along with studies conducted in Nigeria (Muhammad-Idris et al., 2017) and Ethiopia (Anatea et al., 2018), pregnant women mainly cited protection against tetanus as their reason for accepting tetanus vaccine during pregnancy. The main reason cited for maternal vaccine importance was the prevention of diseases for themselves and their unborn babies.

Decision-making

Acceptance of vaccination is a behaviour that is the consequence of a difficult decision-making process that is influenced by a variety of factors. Factors associated with pregnant women's timing of antenatal care visits include their decision-making power regarding their reproductive health (Gudayu et al., 2014; Gebremeskel et al., 2015; Tolefac et al., 2017; Yaya et al., 2017; Ekholuenetale et al., 2020). Most (70.8%) pregnant women in my study were in monogamous marriages and few in polygamous marriages (28.1%). They all recognized the influence of their husbands on their decision to take up antenatal care services. Across all sites, women believed that their husbands should be the first person consulted on all matters involving their pregnancies. This was considered a safeguarding mechanism in marriage to maintain trust, basically preventing the husband doubting the legitimacy of the pregnancy. In a study in Kenya on the determinants of utilization of sufficient tetanus toxoid immunization during pregnancy, women were found to jointly make health related decisions with their husband (Haile et al., 2013). Another finding in urban areas of my study was that most of the women live alone with their children and/or in-laws as their husbands live and work in other villages, therefore any decisions around ANC were often taken by the woman herself. Increasing women's decision-making power increases their autonomy and subsequently increases their uptake of at least 8 ANC contacts during pregnancy (Ekholuenetale et al., 2020). Likewise in Somalia, the majority (85.7%) of women who made health seeking decisions on their own, received antenatal care in their first trimester (Ahmed and Husein,

2020). My study found that in Islam, a woman never has complete autonomy from birth to death, instead she is always under the dominion of a man. First, she is under her father's care, then when married she belongs to her husband and his family and if her husband should die, she is under her son's care. Maternal vaccination decision-making was therefore not an autonomous choice but one dependent on a husband's endorsement. Most husbands in a study in Uganda were found to engage in their wife's uptake of ANC services by providing reminders for vaccination. However, other women have argued that their husbands do not play an important role in their uptake of maternal immunizations, as the husbands would at times not provide transport fare or accompany them to the health facilities (Kajungu et al., 2020). Pregnant women in Ghana who first sought permission from their husbands before using FANC services were less likely to make the required number of ANC clinic visits (Konlan et al., 2020). However, in Ethiopia, receiving two doses of TT injection was four times more likely for a mother who made a decision about her health together with her husband, possibly as a result of feeling more confident and socially supported (Nebeb et al., 2015; Mamoro and Hanfore, 2018). In Kenya and Ethiopia, employed mothers who made health-related decisions by themselves or jointly with their partner or another person, were found to have a higher number of antenatal care visits than housewives (Haile 2013; Nebeb et al., 2015). In order to avoid negative effects and maximize desired outcomes, male dominance in decision-making on women's reproductive health needs to be given more consideration. Therefore, women should also ask their husbands to participate in antenatal care services rather than simply asking for permission.

Routine vs. New Maternal Vaccines

A cost-effective method for controlling diseases that can be prevented by vaccination is routine immunisation. A strong routine immunisation system is necessary for the long-term success of vaccinations and the prevention of diseases. The WHO defines routine vaccinations as the sustainable, reliable, and timely interactions between the vaccine, those who give it, and those who receive it to ensure every individual is adequately immunised against vaccine-preventable diseases (CDC, 2019). In The Gambia, the high acceptability of TT is definitely attributed to the longevity of its existence in the routine immunisation package. However, it is important to consider if new and epidemic vaccines would

also be highly accepted and how their introduction in the health system would impact routine immunisation uptake. Women in my study were willing to receive new maternal vaccines if only they would be given proper sensitization prior to roll-out. Similar willingness was expressed by women in Uganda who were specifically interested in knowing the disease the new vaccine would prevent, how often they would need to receive it, and how safe it would be for themselves and their babies (Kajungu et al., 2020). Additionally, in Kenya, the majority (83.7%) of women agreed that they would accept an influenza vaccine during pregnancy if offered vaccine (Otieno et al., 2020b). Contrarily, however, another study by the same authors in Kenya explored the drivers and barriers of vaccine acceptance among pregnant women and found that a little over half (50.8%) of women reported that trial vaccines should not be used on pregnant women and some (27%) felt that new vaccines are riskier than old vaccines vaccine (Otieno et al., 2020a). Regarding COVID-19 vaccination intent, a survey in 16 countries found that among pregnant women, half (52.0%) intended to receive COVID-19 vaccination during their pregnancy if an efficacy of 90% were achieved. Among non-pregnant women, most (73.4%) intended to receive vaccination (Skjefte et al., 2021). It is however important to note that a recent systematic review on the impact of the COVID-19 pandemic on the uptake of routine maternal and infant vaccines globally provided a thorough analysis of the pandemic's effects on routine vaccination and how they might vary between LMICs and HICs. Their review found that there has been a drop in the availability of routine immunisation programmes and services, with LMICs suffering more than HICs (Yunusa et al., 2022). This shows that there remains hesitancy regarding new maternal vaccine uptake and so lessons should be learned from what is established in the routine maternal immunisation system as any existing barriers are likely to influence the uptake of vaccines for emerging pathogens.

Trust

Trust and confidence are equally important in understanding public and individual perceptions of vaccines and the competence and motive of vaccine providers. "Trusting relationships are important because in accepting vaccination, the public relies on the integrity, competence, and good faith of public health and government authorities to recommend appropriate vaccines, of private-sector actors to

manufacture effective and uncontaminated products, and of health providers to administer them safely" (Larson et al., 2015). Trust is essential for the uptake of antenatal care services as well as vaccines given therein as the public should have faith in the intentions of their governments and public health authorities (Martin et al., 2020; Larson, 2020). The findings from my study along with those of previous research indicate that healthcare providers are one of the most trusted sources of vaccine information and one of the biggest influences on vaccine decision making. Pregnant women generally had trust and high expectations in health care providers and the safety of maternal vaccines despite rumours, community myths and misperceptions (Nganga et al., 2019; Fleming et al., 2019; Johm et al., 2021). Trust is a significant predictor of pro-vaccine behaviours and healthcare providers have been found to be highly trusted (Zhang et al., 2012; Wiley et al., 2013; Larson et al., 2014; Paterson et al., 2016). Both pregnant and non-pregnant women in my study echoed similar perceptions to women in Zambia and South Africa citing that they did not ask questions about immunization during antenatal visits because they trusted in the knowledge and experience of health care workers. These women also believed HCWs would not provide them with any vaccines or drugs that would harm their unborn babies (Pugliese-Garcia et al., 2018; Johm et al., 2021; Godongwana et al., 2021). Women in Kenya and in The Gambia also highly trusted healthcare staff as a reliable source of vaccine information (Nganga et al., 2019; Johm et al., 2021). These findings imply that there is a strong significant correlation between trust in healthcare providers and vaccine confidence.

Safety and efficacy concerns

Concerns about vaccine safety and side-effects during pregnancy remain the main deterrents to women not accepting or receiving vaccination during pregnancy (Eppes et al., 2013; Wilson et al., 2015; MacDougall et al., 2016; Otieno et al., 2020). Injection site reactions such as pain, swelling, itching and redness were the most frequently reported side-effects by women in my study as well as in several studies on vaccine reactogenicity (Munoz et al., 2014; Hoang et al. 2016; Petousis-Harris et al 2016; Regan et al., 2016; Fortner et al., 2018). However, previously experienced side-effects did not deter the majority of women in my study from accepting TT immunization as they believed it was safe and effective in protecting from tetanus. This is consistent with findings in Nigeria where majority of

women believed tetanus vaccine is effective and safe for both mother and baby (73.3% and 79.2% respectively) (Awosan and Hassan, 2018). Interestingly in a study in Malawi, almost all (95%) pregnant women interviewed reported that they had no concerns regarding the safety of maternal vaccines (Fleming et al., 2019). These findings have important implications for vaccine acceptance given that safety concerns and scepticism about vaccine effectiveness have been recognised as barriers to the uptake of TT vaccination. A mixed methods study in Malawi found that although most women accepted maternal vaccines, those who experienced adverse events such as swollen hands or a sore arm questioned the severity of symptoms for two vaccines given at the same time. Overall, there was a preference for receiving a combination vaccine instead of multiple single vaccine injections (Fleming et al., 2019). Pregnant women in my study were not questioned about their preference for multiple or combination vaccine injections, but it would have been interesting to note such a finding in The Gambia. In Kenya and South Africa, maternal vaccination was hindered by worries about vaccine safety and adverse effects (Nganga et al., 2019; Otieno et al., 2020; Godongwana et al., 2021). Safety and efficacy concerns have also been found in other studies to influence the decision to vaccinate (Pugliese-Garcia et al., 2018; Nalubega et al., 2021) with women in Kenya being concerned about the possible serious adverse effects of vaccines which could lead them to refuse vaccination (Otieno et al., 2020a). Globally, concerns regarding the safety of vaccines given during pregnancy are a well-known barrier to maternal vaccination uptake (Larson et al., 2011; MacDougall and Halperin, 2016). An interesting finding regarding religious leaders that we did not observe in The Gambia, which was found by Oller (2017) in Kenya, was that the Kenya Conference of Catholic Bishops questioned the safety of tetanus vaccine and suspected that it was being used to sterilize women. However, their perceptions did not deter women from receiving tetanus vaccine during pregnancy (Oller, 2017). Overall, findings have shown that although pregnant women have been found to have concerns about the potential harm of vaccines, the perceived benefits seemed to outweigh their fears as most of these women continued to exhibit a positive attitude.

Male Involvement

Studies on determinants of male involvement in maternal health care in sub-Saharan Africa found that most husbands do not take an active role in reproductive health activities (Ditekemena et al., 2012; Lowe, 2017; Craymah et al., 2017; Bougangue and Ling, 2017; Davis et al., 2018; Maluka et al., 2020; Konlan et al., 2020; Kajungu et al., 2020). It is important for male partners to be involved in antenatal care for moral support as well as to increase the uptake of maternal health services (Mamo et al., 2021). A study in Tanzania on male involvement during antenatal care found that almost half (45.6%) of the men did not take part in antenatal care activities (Natai et al., 2020). However, this was different to findings in my study wherein women boasted of their husband's active involvement in their maternal health care. Husbands were said to escort their wives to the hospital for ANC if they were free or available. This accompaniment was looked on favourably by the women as nurses would not allow them to queue for long on days they attended ANC with their husbands, collecting their ANC cards and serving them first compared to women who attended alone. In Tanzania (Peneza and Maluka, 2018), Kenya (Pell et al., 2013) and Malawi (Kululanga et al., 2011; Mamba et al., 2017; Manda-Taylor et al., 2017), strict measures were used to promote male involvement in antenatal care, with women being refused services and sent back home if they attended ANC without their partner. Rights-based activities would rightly argue that refusing women access to health services in this case is unfair, especially as it puts more pressure on them to attend ANC with their partners, considering that cultural gender norms have long excluded men from maternal and child health responsibilities. Barriers to male involvement in maternal health care include ineffective communication between husband and wife, unfavourable cultural norms, demanding job schedules, money issues, fear of mockery, competition among co-wives and traditional gender roles (Lowe, 2017; Craymah et al., 2017; Bougangue and Ling, 2017). Men are viewed as breadwinners whose main role during the pregnancy is to support their wife financially (Bougangue and Ling, 2017; Maluka et al., 2020). Men are therefore usually constrained by their work obligations and unable to escort their wives for antenatal clinic visits (Lowe, 2017; Maluka et al., 2020). There is also a lack of communication between husband and wife regarding pregnancy issues, with men being unaware of their wife's pregnancy and needs therein until later stages (Maluka et al., 2020). On a positive note, male involvement has been found to be higher among those in monogamous marriages

who live together (Craymah et al., 2017). According to polygamous men, the toxic rivalry among co-wives in their households limits their active involvement in pregnancy-related concerns. To maintain peace and stability in their marriages, and to not be seen as favouring one wife over the other, they rather choose to avoid attending ANC visits altogether (Lowe, 2017; Davis et al., 2018; Maluka et al., 2020). Cultural norms also influence and limit the roles that husbands can play, with men who assist with home duties often facing ridicule from their friends, family and the community at large. This mockery and social stigma associated with males who perform household duties consequently becomes a significant barrier to male involvement in maternal health (Lowe, 2017; Maluka et al., 2020). These findings imply that it is important for male partners to be involved in antenatal care, however, the above-mentioned barriers to male involvement need to be addressed for sustained positive outcomes to maternal and neonatal health.

Vaccine hesitancy

Individuals who are hesitant about getting vaccinated fall inside a spectrum of entire acceptance to utter rejection. Variable levels of uncertainty, scepticism, or worry regarding a particular vaccine or all vaccines are held by vaccine-hesitant people (MacDonald, 2015: Jarrett et al., 2015; Kumar et al., 2016; Paterson et al., 2016; Pugliese-Garcia et al., 2018; Dubé et al., 2021). In my study, women were overall confident about maternal vaccines and no instances of vaccine refusal were noted. Vaccines in general were believed to be medicine for protection, therefore generating unrealistic expectations about effectiveness. Believing in medicines as prevention and vaccines as treatment can act as a foundation of vaccine hesitancy for immunized individuals who become infected (Nichter, 1995; Kumar et al., 2016). A limited understanding of vaccines and overlap of knowledge on the difference between prevention and treatment has also been identified across studies in Zambia with some women refusing vaccines to avoid pain (Larson Williams et al., 2018; Pugliese-Garcia et al., 2018). Interestingly, in Sudan, pregnant women with low vaccine confidence were more likely to be involved in searching for additional vaccine information (Sabahelzain et al., 2021). This finding is supported by different studies on information seeking behaviour, vaccination beliefs, trust on vaccination practices and vaccine decision making, which suggest that people might be motivated to search for additional information to

satisfy their needs if they have a lack of trust or low satisfaction in the vaccine information provided by their healthcare staff (Glanz et al., 2013; Gilkey et al., 2014; Opeyemi et al., 2018). Regarding vaccine rejection, pregnant women in a study in South Africa cited contraindication, vaccine stock-outs and uncertainty as reasons for not accepting influenza vaccination (Bishop et al., 2021). Drivers of vaccine hesitancy are influenced by previous experiences with vaccines and distrust towards western medicine and include fear of injections, prior negative experiences, low perceived need, religious beliefs and traditional remedies (Pugliese-Garcia et al., 2018).

Accommodation

Accommodation is when the delivery of health care accommodates the patient's needs (Penchansky and Thomas, 1981). Regarding opening hours, majority of health facilities in my study opened at 08:00 (66.7%) and closed at 16:00 (44.4%) and there were no notable complaints from our study participants. Likewise, a study on the constraints to utilization of maternal health services in Nigeria found that majority (60%) of respondents accessed antenatal care services and majority (79.3%) reported the opening hours were convenient for them (Nnebue et al., 2014). It is important to note however that although antenatal care services may be open, poor quality of care has been found to hinder pregnant women's utilization of healthcare services (Hulton et al., 2000; Mathole et al., 2004; Say and Raine, 2007; Simkhada et al., 2008; Srivastava et al., 2015; Addisu et al., 2022). Positive care experiences and high-quality ANC are likely to increase women's adherence to the recommended maternal immunization schedules subsequently resulting in positive pregnancy outcomes (Yaya et al., 2017; Kochhar et al., 2019; Kajungu et al., 2020). Some concerns that have been described to hinder pregnant women from attending antenatal clinic include the behaviour of health care workers, preferential treatment, personal hygiene and dress code. The behaviour of a few of the health care workers in my study was termed as harsh, rude and abusive towards pregnant women attending ANC. This is consistent with findings in Ghana, Ethiopia and Tanzania (Craymah et al., 2017; Gebremichael et al., 2018; Kruk et al., 2018; Maluka et al., 2020). Consequently, the attitudes of health care workers in South Africa and Kenya were found to hinder pregnant women from receiving antenatal care (Ngomane and

Mulaudzi, 2012; Mason et al., 2015). More respectful treatment by health care workers can encourage women to seek and accept antenatal care services offered during their pregnancy (Fleming et al., 2019). A few women in my study mentioned that preference is given to pregnant women who are accompanied by their husbands for antenatal clinic. This perception was also expressed by women in rural Uganda who believed that giving preference can discourage pregnant women from attending antenatal clinic wherein they access vaccination services (Kajungu et al., 2020). Some pregnant women have been found to feel that health workers mishandle them if they appear unwashed while others were not able to come with their husbands to the clinic because they felt unkempt (Abimbola et al., 2016; Chimatiro et al., 2018). These findings imply that the attitudes and behaviours of health care workers can either encourage or hinder pregnant women from receiving antenatal care.

Awareness

Knowledge

Insight into vaccination acceptance and demand requires an understanding of local vaccine literacy. Vaccine literacy is how much someone can find available vaccine services and comprehend available vaccine information to help them make informed decisions about their health (Ratzan, 2011). Knowledge about maternal vaccines is an important part of vaccine literacy and an important driver of maternal vaccination uptake (Larson Williams et al., 2019). Pregnant women have been found to highly value maternal and neonatal vaccines although they have limited knowledge of the causes of diseases and how vaccines work (Sule et al., 2014; Alex-Hart and Okoh 2015; Larson Williams et al., 2018). The pregnant women in my study demonstrated a generic understanding of maternal vaccines role in disease prevention for themselves and their unborn babies and were found to have adequate knowledge on the benefits of using ANC services as well as how many visits they should make during the course of their pregnancy. High levels of awareness of tetanus toxoid immunization were found among women in studies across Nigeria (Sule et al., 2014; Enuku and Orru, 2016; Awosan and Hassan, 2018). This was different to findings in a study in South Africa wherein the importance of maternal vaccination was largely unknown and women were unaware of the purpose of their receipt of maternal vaccines

(Godongwana et al., 2021). It is important to note however that knowledge of how many ANC visits should be made does not always translate into utilization of focused antenatal care services (Konlan et al., 2020). Knowledge does however increase a woman's opportunity to accept TT vaccination during her childbearing years (Gebremedhin et al., 2020) as also seen in a literature review on factors influencing vaccination acceptance during pregnancy globally, wherein low knowledge about vaccines was one of the main barriers against tetanus vaccine acceptance (Wilson et al., 2015). Majority of women in my study in The Gambia as well as two studies in Nigeria were aware of tetanus disease and believed vaccination was the best method for tetanus disease prevention (Bamidele and Umoh, 2004; Sule et al., 2014). Those Nigerian women's level of awareness of tetanus and compliance of tetanus vaccine was also positively associated with their education level and occupation (Bamidele and Umoh, 2004; Sule et al., 2014).

Information channels

Access to reliable maternal health information affects pregnant women's maternal health literacy levels. In my study, women normally heard information on vaccines given during pregnancy from healthcare staff at the antenatal clinics and also on radios such as Gambia Radio and Television Services (GRTS), QCell TV (QTV) and local community radios. Mass media has also been found across studies conducted in other sub-Saharan African countries to play an important role in sensitizing the public about TT immunization and consequently in women's increased uptake of adequate doses of tetanus vaccine, with there being an association between owning a radio or television and uptake of two or more TT doses (Sule et al., 2014; Togora et al., 2014; Anatea et al., 2018; Sato and Fintan, 2020). Contrary to that finding, a study in Nigeria found that little to no women obtained information on TT immunization through the mass media (Awosan and Hassan, 2018). Women living in urban areas or near cities have been found to mainly receive antenatal care information through the internet, television and radio, whereas those living in rural areas mainly received information through community health care workers (Edu et al., 2017; Konlan et al., 2020; Ekholuenetale et al., 2020). In the rural communities in my study, the community health nurse (CHN) normally gave sensitization messages during Reproductive and Child Health (RCH) clinic days. Village support group (VSG) members also sensitized pregnant women

on health matters such as nutrition and immunization. There were two community birth companions (CBCs) within every VSG who would advise pregnant women on booking their first antenatal clinic visit in the first trimester of pregnancy. Comparably in a study in Malawi, community health workers were identified as a main source of information on whether to receive vaccines, followed by friends/neighbours and doctors/nurses (Fleming et al., 2019). A study on vaccine information seeking behaviour among pregnant women in Sudan found that more than half of the pregnant women searched for information about vaccines, specifically topics related to vaccine schedules and side effects when they became pregnant (Sabahelzain et al., 2021). This was different to findings in my study wherein women did not take an active role in seeking for vaccine related information. Better informed women have been found to be more demanding regarding the healthcare they need and are therefore more likely to make positive decisions regarding their uptake of antenatal care (Ntambue et al., 2012). Home visits from health care workers wherein they provide ANC education have also been found to positively impact TT immunization status, and visited mothers were seven times more likely to receive two doses of tetanus vaccine (Mamoro and Hanfore, 2018). Access to reliable maternal health information affects pregnant women's maternal health literacy levels. These findings imply that correct and consistent information on maternal health care and services improves maternal health literacy levels.

Education

In developing nations, it has been demonstrated that a significant predictor of the use of maternal health services is maternal education (Say & Raine, 2007; Simkhada et al., 2008; Okafor et al., 2019; Ahmed and Husein, 2020). The Gambia has a relatively poor education system, with many women being illiterate from not attending school during their lifetime (Armitage et al., 2018). In my study, most women had no formal education (35.4%) or only Islamic school education (29.2%) with others having primary (19.8%), secondary (6.3%) and senior secondary (7.35) as their highest levels of education. A study examining the relationship between women's education and utilization of maternal health services used the Demographic and Health Surveys (DHS) of six African countries, namely the Democratic Republic of the Congo, Egypt, Ghana, Kenya, Nigeria and Zimbabwe. The authors found that women's education is positively and significantly associated with maternal health service utilization (Dimbuene

et al, 2018). This finding is in line with studies done across sub-Saharan Africa (Magadi et al., 2007; Rai et al., 2014; Bobo et al., 2021), and specifically in Ethiopia where mothers with formal education were over two and three times more likely to have been immunized with protective doses of TT than uneducated mothers (Mihret et al., 2018; Mamoro and Hanfore, 2018). In South Africa, pregnant women with tertiary and secondary education were found to have higher odds of observing the recommended ANC visits (Nsibande et al., 2020). In Sudan, pregnant women who attended secondary school were twice as likely to search for extra vaccine information compared to university attendees (Sabahelzain et al., 2021). This may be because information is readily available, mothers are knowledgeable about immunisation programmes, and education tends to boost their confidence. However, in a study in Ghana, no significant relationship was found between education and the utilization of focused antenatal care services, but this may be due to most of the women having low education (Konlan et al., 2020). Education has also been found to increase women's autonomy as well as awareness on the benefits of immunization, which in turn leads to more confident and capable decision-making (Acharya et al., 2010; Sule et al., 2014; Ali et al., 2028; Ahmed and Husein, 2020; Mohamed and Ahmed, 2022). In Ivory Coast, education was found to be a key way to empower women as it made them more competent and confident to make decisions regarding their use of health care services (Denise et al., 2019). These findings align with the results of my study, where women with formal education had greater understanding of the importance of accepting ANC and the vaccines offered therein.

Misconceptions

Fears and misconceptions continue to exist regarding vaccines in general and maternal vaccines in specific. The majority of the respondents in my study reported low knowledge of the nationally mandated TT immunization schedule, specifically the number of doses required in pregnancy and for life protection. This is consistent with findings across Nigeria where few women had good knowledge of the WHO TT immunization schedule (Alex-Hart and Okoh 2015; Madubuike et al., 2017). In another study in Nigeria there was a lack of accurate information about the schedule for tetanus vaccine with a circulating misconception that a single dose of tetanus vaccine offers protection for some years while

two or more doses offer protection for life (Awosan and Hassan, 2018). The inaccurate perception of protection from a single dose of tetanus vaccine could be a reason for pregnant women's incomplete uptake rates of tetanus vaccine doses. Conflicting local terminology for vaccines and a lack of understanding of how vaccines work were also found to lead to misunderstandings and erroneous perceptions (Pugliese-Garcia et al., 2018). In some parts of sub-Saharan Africa, the prevalence of witchcraft-related myths associated to pregnancy have resulted in women making less FANC visits (Mathole et al., 2004; Konlan et al., 2020). My study as well as studies from Mozambique, Tanzania and Ghana have shown that women in their first trimester of pregnancy intentionally delay beginning ANC with the view that they are protecting their unborn baby from witchcraft attacks (Chapman, 2003; Gross et al., 2012; Konlan et al., 2020). There is also an association between Western medicine and Satanism and anecdotal fears about blood draw procedures and adverse events from vaccines have been found to contribute to vaccine hesitancy (Larson Williams et al., 2018). In summary, misconceptions on pregnancy and maternal vaccines continue to exist across sub-Saharan Africa and need to be understood and addressed at every instance via social and behavioural change communication.

Misinformation

Misinformation about diseases and vaccines are spread via rumours and can influence women's decision to attend ANC clinic (Larson Williams et al., 2018). The use of social media in recent years has facilitated the spread of false information about vaccines and rumours can undermine public and individual confidence in vaccination programmes and the health professionals who administer vaccines (Vandelaer et al., 2003; Chantler et al., 2019; Larson, 2020; Nalubega et al., 2021). Distrust combined with existing rumours and concerns can then compromise trusting relationships with providers and the health system (Ozawa and Stack, 2013; Kumar et al., 2016). Regarding rumours, some of the women in my study admitted to owning and using smartphones and consequently browsing on social media actively wherein they read rumours posted online. However, they said they did not believe rumours posted online or spread by word of mouth in the communities. They only chose to believe information that came from the Alkalo or other trusted person in the community such as the CHN. When looking for information about vaccines online, individuals run the danger of running into low-quality anti-

vaccination websites that could spread rumours and conspiracies (Sak et al., 2015; Finnegan et al., 2018). My findings in The Gambia are consistent with findings in Zambia which found that although negative community rumours can contribute to vaccine hesitancy, overall mothers were positive about receiving maternal vaccines (Larson Williams et al., 2018). Misinformation has been found in my study as well as in Zambia and Uganda, wherein pregnant women viewed maternal vaccines as preventive measures for diseases (Larson Williams et al., 2018; Kajungu et al., 2020). Mothers also reported commonly held beliefs about vaccines that conflict with conventional medicine, some of which may stand in the way of vaccine uptake. For example, believing that vaccines are curative rather than preventative may keep families from vaccinating their children, while assuming that vaccines act as general immunization boosters that cover all potential pathogens could either promote or discourage uptake (Larson Williams et al., 2018). Misinformation can also lead to vaccine hesitancy in instances where maternal expectations of vaccine efficacy are not met (Kajungu et al., 2020).

Activation

Immunisation schedule

It is recommended that a pregnant woman's antenatal care visits should take place once during the first trimester, twice during the second trimester and five times during the third trimester (WHO, 2018). This major public health strategy formulated by the WHO aims to achieve worldwide elimination of maternal and neonatal tetanus and has been adopted by many sub-Saharan African countries. In my study, all of the pregnant women claimed to have received at least one dose of TT during their most recent pregnancy, however, only a few had received more than two doses during their entire pregnancy. This is similar to findings in a study by Awosan and Hassan (2018), which assessed the perception and utilization of tetanus toxoid immunization among pregnant women in North-West Nigeria. They found that majority (68.1%) of the respondents had received at least one dose of TT during pregnancy, while about a third (34.3%) had received two or more doses. For those that had never received the vaccine, their reasons were lack of awareness of the vaccine (41.8%) and of its benefits (36.7%), and fear of harm to self and/or baby (21.5%) (Awosan and Hassan, 2018). In a study in Ethiopia, almost all (97.6%)

pregnant women had received two doses of tetanus toxoid vaccine (Tafere et al., 2018). Prevalence rates of >80% of pregnant women receiving adequate TT immunization has been found in Kenya, Zambia, Ivory Coast and Sierra Leone (Haile et al., 2013; Tikmani et al., 2019; Yaya et al., 2019; Yaya et al., 2020). There is also a direct correlation between the percentage of pregnant women who have four or more antenatal visits and the actual uptake of the tetanus toxoid vaccine. Pregnant women without ANC appointments had significantly higher likelihood of having poor TT vaccination than those who had at least four visits (Liyew and Ayalew, 2021). The odds of TT vaccine uptake was lower among women from rural communities (Gebremichael et al., 2018; Liyew and Ayalew, 2021) and in Ethiopia, TT immunization was almost always provided through outreach in the rural communities (Kidane et al., 2008). The main causes of incomplete TT immunization were the mother being unaware that she needed to get the next dose, her lack of desire to get it, the provider failing to inform her of her vaccination schedule, far distance of services, and fear of vaccine side effects (Haile et al., 2013; Mamoro and Hanfore, 2018). This suggests that a mother's understanding of the importance of TT vaccination is a prerequisite for her utilisation of the service.

Recommendations

Health care workers vaccine recommendations to pregnant women have been found to increase maternal vaccination uptake (Mak et al., 2015; Duque et al., 2017). A study in Kenya on the knowledge and attitudes towards influenza and influenza vaccination among pregnant women found that almost all of the women had received a recommendation for vaccination in their current pregnancy from a health-care provider (Otieno et al., 2020b). This is similar to findings in my study as nurses were found to host 'health talks' wherein they would advise pregnant women about the importance of ANC and benefits of the services offered therein. In another study, it was unclear whether pregnant women received information and recommendations on vaccines during antenatal classes or while being vaccinated (Godongwana et al., 2021). Yet still, regardless of where pregnant women received information, there were gaps in their sensitization about tetanus disease from health workers during antenatal clinic visits, with discrepancies on whether TT immunization protects both the mother and/or baby (Awosan and Hassan, 2018).

Willingness to receive new maternal vaccines

New maternal vaccines are under development against Group B Streptococcus and Respiratory Syncytial Virus (Madhi et al., 2013; Puopolo, 2014; Munoz, 2015; Madhi and Dangor, 2017) with efforts also underway to increase the use of currently available but underutilized vaccines, namely influenza and pertussis, for pregnant women in low-and middle-income settings (WHO, 2015; WHO, 2022). Women in my study were willing to receive new maternal vaccines if only they would be given proper sensitization prior to roll-out. Similar willingness was expressed by women in Uganda who were specifically interested in knowing the disease the new vaccine would prevent, how often and when they would need to receive it, and how safe it would be for themselves and their babies (Kajungu et al., 2020). In Kenya, the majority (83.7%) of women agreed that they would accept an influenza vaccine during pregnancy if offered (Otieno et al., 2020b). Contrarily, another study by the same authors in Kenya explored the drivers and barriers of vaccine acceptance among pregnant women and found that a little over half (50.8%) of women reported that trial vaccines should not be used on pregnant women and some (27%) felt that new vaccines are riskier than old vaccines vaccine (Otieno et al., 2020a). This discrepancy could be due to higher confidence in routine versus trial vaccines. Health workers in Malawi described programmatic factors that could support the delivery of new maternal vaccines. These included community efforts to increase coverage of antenatal care services, for example via mandating ANC attendance and tetanus vaccination and via financial fines for missing ANC. These health workers also described operational challenges to introducing new maternal vaccines in Malawi detailing inadequate information sharing between healthcare sites resulting in difficulty tracking vaccination status of pregnant women. Therefore, current health information systems must be expanded to capture coverage of new maternal vaccines, however this does result in additional work for health care workers who are already under pressure (Fleming et al., 2019). The majority of women in my study and in a study in South Africa expressed that direct costs would be a hindrance to their uptake of future maternal vaccines and future vaccines should be offered for free, just like other routine maternal vaccines (Johm et al., 2021; Godongwana et al., 2021). Different to findings in my study, religion has been found to either be a deterrent or enabler to the uptake of maternal vaccines. Two pastors of local Christian

churches in a study in South Africa expressed that they were in full support of maternal vaccines. However, pregnant woman noted their misconception and concern about alcohol being an ingredient in maternal vaccines, as it is strictly prohibited in Islam. However, their concern did not prevent them from being immunised as they believed the volume of alcohol included was limited (Godongwana et al., 2021). Similarly in Uganda, some Pentecostal Christians, Jehovah's witnesses, and Tabliqs Muslims believed that receiving certain medications would be disrespectful to their God because they are associated with satanic practices (Nalubega et al., 2021). Overall, the expressed willingness by pregnant women to receive new maternal vaccines suggests an adequate acceptability of their future implementation. However, to support the successful expansion of current and future maternal immunisation programs, there needs to be comprehensive introduction and explanation of maternal vaccination to pregnant women and communities and mitigation of direct and indirect costs to pregnant women.

Conceptual Framework

As seen in the findings of my two study objectives, there was an overlap in the factors influencing antenatal care service utilisation and maternal vaccination acceptance in The Gambia. In exploring the concept of access further, I reflect on the outputs and experiences of antenatal care service providers and service recipients. My conceptual framework is informed by pre-existing theories, a thorough literature review as well as findings from my in-depth PhD research. It contextualises factors which influence and have been influencing maternal vaccination acceptance in The Gambia. Similar factors have also previously been detailed further in a model by the Strategic Advisory Group of Experts (SAGE) on Immunization Working Group (Figure 6). The SAGE model focuses on the determinants of vaccine hesitancy and groups factors into three different influences: contextual, individual and group, and vaccine and vaccination specific. In this model, it has been postulated that vaccine hesitancy is complex and differs for various vaccines as well as through time and in different contexts. Key determinants of vaccine hesitancy include past experiences with health care services, trust in health care providers, disease risk perceptions, perceived need and usefulness of vaccines and concerns regarding

vaccine safety and efficacy. Contextual influences are described as influences that arise due to historic, sociocultural, institutional, economic, or political factors. Individual and group influences are influences that arise from personal perception or influences of the social environment. Vaccine and/or vaccination specific influences are described as influences directly related to the vaccine or vaccination. These influences effect five areas of access to care: accessibility, availability, affordability, acceptability, and accommodation as suggested by Penchansky and Thomas (1981). Hence, concepts I derived from my own research are not novel as they have been researched and detailed over the decades by scholars including but not limited to Aday and Anderson (1975), Penchansky and Thomas (1981) and Thomson et al. (2016). It is important to recognize that there is an interrelationship between the different dimensions and therefore these taxonomies should be seen as guidance rather than a rigid classification. I therefore proposed to extend these concepts in the framework of my PhD research and conceptualised them in a seven-dimension taxonomy with 7 As, namely accessibility, availability, affordability, acceptability, accommodation, awareness, and activation, to highlight the context-specific factors in The Gambia (Figure 7).

Fig. 1. The SAGE Working Group [WG] "Model of determinants of vaccine hesitancy"].

Figure 6. The SAGE Working Group Model of Determinants of Vaccine Hesitancy

Source: Larson et al., 2014.

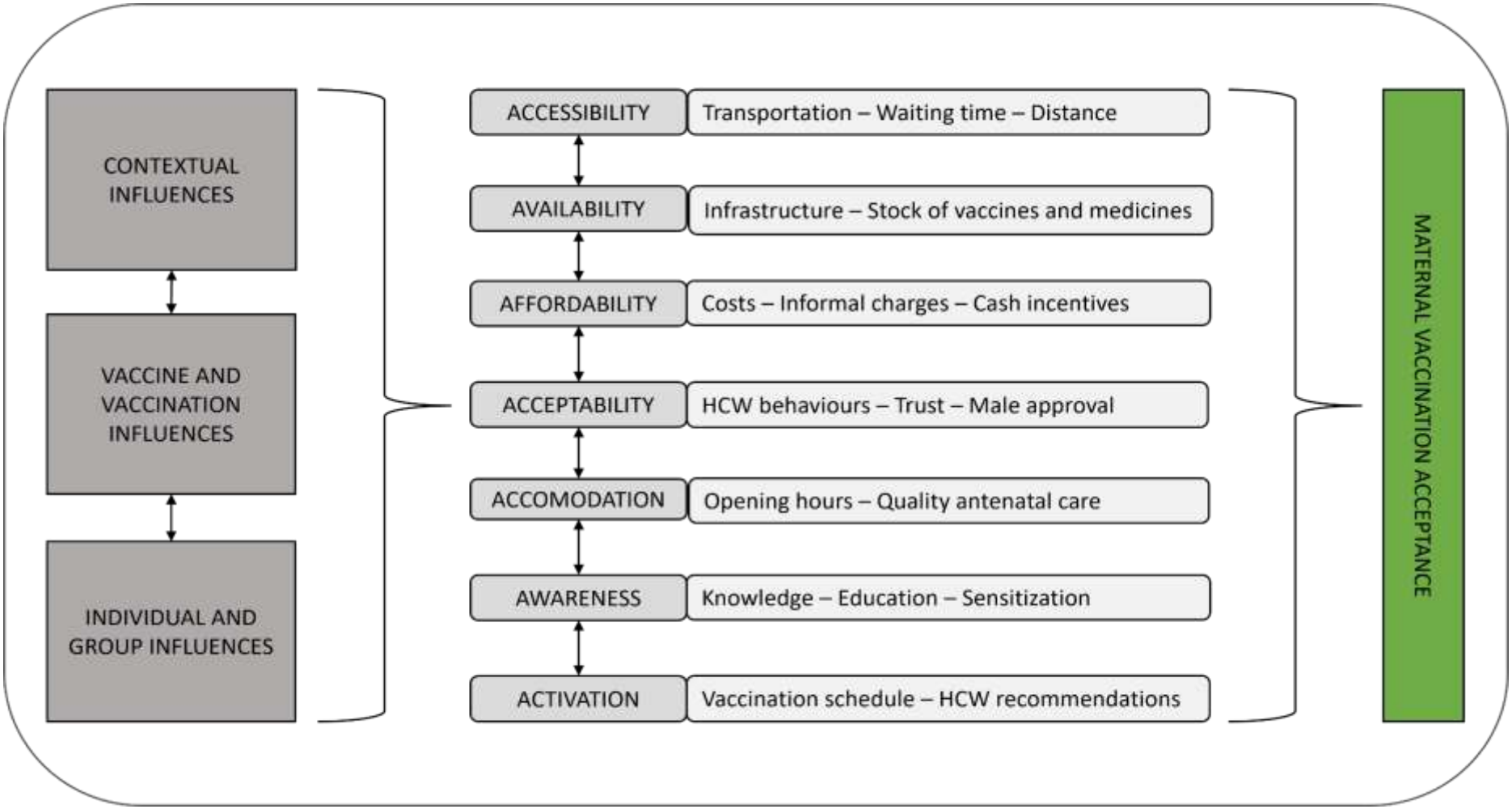

Figure 7. Conceptual model for factors influencing maternal vaccination acceptance in The Gambia based on my PhD research and taking into account the SAGE Working Group "Model of determinants of vaccine hesitancy" and Penchansky and Thomas (1981) "The Concept Of Access: Definition and Relationship to Consumer Satisfaction."

Theoretical Implications

Health behaviour

To better understand people's behaviour on their health and health care, a model was proposed by Anderson in 1995. This model was neither the first nor the only model at the time, but it did make an effort to combine a number of theories regarding the "hows" and "whys" of using health care, specifically to predict and explain use of health services. The original Anderson (1995) model proposes that the likelihood of a person using health services, as well as the conditions that make that usage possible or difficult, depend on their predisposing characteristics, their enabling resources and their need for treatment (Figure 8). Anderson (1995) also presented an emerging health services usage model, which illustrates the various factors that affect the usage of health services and, ultimately, health status. Additionally, it has feedback loops that demonstrate how outcomes influence following predisposing variables, perceived service needs, and health behaviour (Figure 9).

Figure 8. Health Behavioural Model (1960s)

Source: Anderson et al., 1995.

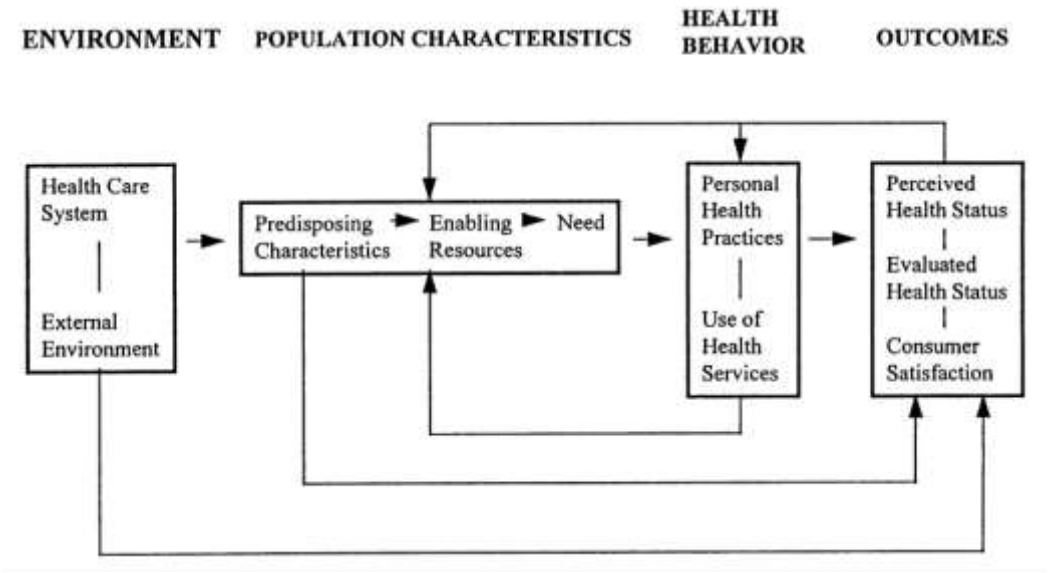

Figure 9. Emerging Behavioural Model (1990s)

Source: Anderson et al., 1995.

Predisposing Characteristics

In my study, different demographic characteristics were mentioned as having an impact on the use of ANC, including education level, geographic location, marital status, age, religion, and ethnicity. Women with little or no education were typically less aware of and less likely to use ANC during the first trimester, and they were also less likely to get the necessary number of ANC visits. Women with higher education levels, on the other hand, were considerably more likely to schedule ANC early in pregnancy and to attend the advised number of ANC appointments. Region of residence and rurality were found to impact women's utilization of ANC with women living in urban areas being more likely to obtain the recommended number of ANC visits and to have increased ANC uptake overall as compared to women living in rural regions. Maternal age affected the time and frequency of ANC use as younger women were less likely to attend the four recommended ANC visits. Gender dynamics such as autonomy and decision-making had an effect on the use of ANC. Women who had greater autonomy, particularly financial autonomy, and superior decision-making skills were more likely to use ANC. Receiving the husband's consent was mentioned as an enabler to ANC utilisation. A woman's attitudes about ANC and pregnancy, as well as her independence in making healthcare decisions, were found to be influenced by her culture. For instance, some women delayed the start of ANC because they thought

that if the pregnancy was revealed too soon, their baby would be in danger or that their adversaries would curse them and make them miscarry. However, women who believed in the benefits of ANC, in particular, had a higher likelihood of using maternal health services. The effect marital status, marriage type, religion and employment was varied in my study, however, have been found in the literature as variables influencing the use of ANC.

Enabling Resources

The most often mentioned barrier to women utilising ANC early and receiving the required number of visits was socioeconomic status or financial problems. Women with greater socioeconomic level or wealth were more likely to use ANC generally, start ANC early in pregnancy, and have all four recommended visits. One of the most often stated factors for delayed or insufficient ANC uptake was the distance to the closest ANC centre. Higher levels of ANC usage were reported by women who either resided closer to healthcare services or thought the facility was nearby. It should come as no surprise that individuals who resided further from the nearest medical institution were less likely to obtain four ANC visits, start ANC early in their pregnancy, and utilise ANC generally. Transportation was also identified as a barrier to ANC uptake with one of the biggest obstacles limiting women from obtaining ANC being a lack of transportation. Pregnant women also noted having to walk to the ANC facility and those in rural areas mentioned using insufficient forms of transportation such as horse and donkey carts. Poor ANC quality was identified as a deterrent to ANC uptake and women were less likely to follow WHO ANC recommendations if they felt the care received was of low quality. Women noted a lack of resources, lengthy wait times and unfriendly health care workers as causes for the poor quality of care. Infrastructure or a lack of resources such as a lack of electricity, flowing water, or damaged building infrastructure were not mentioned as a factor affecting access to ANC.

Need

Parity, which is the number of births a woman has had, is a factor that affects the use of ANC. Women who have never given birth before or who have low parity are more likely to start ANC early in pregnancy and to go to more ANC appointments. Women with higher parity, on the other hand, are less

likely to acquire ANC early, attend the recommended number of visits, or adhere to the WHO's ANC recommendations. Need factors, specifically the parity effect on antenatal care service utilisation as defined in the Anderson (1995) models were not explored in my PhD research.

Vaccine hesitancy

"Vaccine hesitancy refers to delay in acceptance or refusal of vaccination despite availability of vaccination services. Vaccine hesitancy is complex and context specific, varying across time, place and vaccines. It is influenced by factors such as complacency, convenience and confidence" (Figure 10; Figure 11) (MacDonald, 2015). Confident individuals accept and trust in the effectiveness and safety of vaccines and in the health system that delivers them. On the other hand, vaccine hesitant individuals fall within a range of total acceptance to complete refusal. People who are vaccine-hesitant may be uncertain, have second thoughts, or worry about getting vaccines. Some might accept all vaccines while still having reservations about them. Others may even delay or refuse receipt of vaccines. Based on this definition and my findings, one of the main arguments presented through this thesis is that most pregnant women in The Gambia are vaccine confident rather than vaccine hesitant. Any noted indecision, doubts, or concerns about maternal vaccines were mostly related to previously experienced side-effects and/or insufficient sensitization but did not deter the majority from vaccine uptake. Several women interviewed admitted to a delay in attending ANC clinic in the first trimester due to witchcraft-related myths. However, none of the women admitted to refusing maternal vaccines outright but this could be due to social desirability bias. Regarding confidence, women in The Gambia trusted in the safety and efficacy of maternal vaccines, the health system that delivers them and the motivations of policymakers who make decisions about maternal vaccines. This relationship of trust positively influenced women's perceptions of the care and services offered by the health system. Additionally, from the perspective of health care workers across several sub-Saharan African countries, patients accept whatever they recommend because of 'blind' trust (Pugliese-Garcia et al., 2018; Nganga et al., 2019; Johm et al., 2021). This 'blind' trust would then either manifest as HCWs administering vaccines without thorough sensitization or those who do the contrary. Although pregnant women perceived maternal vaccines as effective and health care workers as authoritative, capable, knowledgeable,

educated and trustworthy, the foundation of their confidence was rooted in misinterpretations of the meaning, purpose and mode of action of maternal vaccines. It was also rooted in the social position and perceived integrity of the HCW as an educated professional who adheres to a stricter moral compass and holds a greater deal of knowledge about health, vaccines and the like. There were misconceptions on vaccine information and vaccination schedule as well as myths and superstitions.

Success in immunisation programmes may paradoxically lead to complacency and hesitancy as people assess the risks of receiving a certain vaccine against the chances of contracting the disease it protects, even though that disease is no longer widespread. The extent to which complacency dictates hesitancy is also influenced by self-efficacy, that is the self-perceived or actual ability of an individual to take action to be immunised. Complacency is also fostered in the belief that traditional and religious practices are protective agents and the inability to prioritize seeking vaccines (MacDonald, 2015; Pugliese-Garcia et al., 2018). Complacency was difficult to determine in my study as women' perceived risk of vaccine-preventable diseases depended on their knowledge and understanding which was found to be limited due to sociodemographic and educational factors. However, women believed vaccines are needed and supplementary to herbal and traditional medicines. Similar to the results in my study, there was normative use of traditional remedies in Ethiopia, and it coexisted with the use of modern medicine. However, the use of traditional remedies was hypothesized to be driven by the perception that modern health care is ‘‘white" or ‘‘western" rooted in a colonial history of appropriation and exploitation. This perception leads to distrust of modern medicine, regardless of current intentions and inventions (Dillon-Malone, 1988; Sugishita, 2009). In addition, misconceptions can act as a forerunner of vaccine hesitancy if individuals start becoming infected despite having received a vaccine. Distrust combined with existing rumours and concerns can then go beyond vaccination to compromise trust relationships with health care providers (Stekelenburg et al., 2005; Geissler and Pool, 2006). A study conducted in The Gambia, Guinea, Nigeria and Sierra Leone by the Institute of Development Studies explored local vaccination cultures and factors shaping vaccine delivery and acceptance. They found that "most mothers have active demand for vaccination based on non-biomedical concepts of the body and vaccine actions such as preventing and 'chasing out' disease, promoting strength and weight, and

complementing Islamic and herbal protection" (Leach, 2018). The degree to which vaccination services are provided at a convenient time, place, and cultural environment affects vaccination decision making and may also cause vaccine hesitancy. Convenience factors found in the Gambia were availability, accessibility, affordability and accommodation of antenatal care services and the maternal vaccines offered therein. Individual influences such as low perceived self-efficacy and low literacy were also identified as convenience issues in Zambia (Pugliese-Garcia et al., 2018).

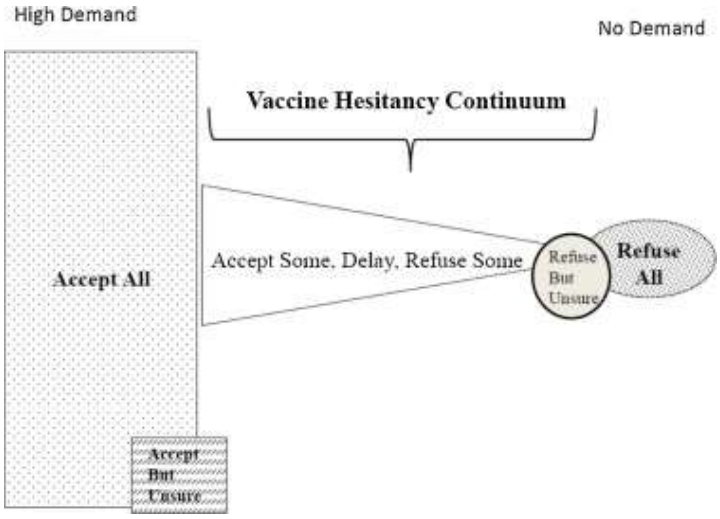

Figure 10. The continuum of vaccine hesitancy

Source: MacDonald, 2015.

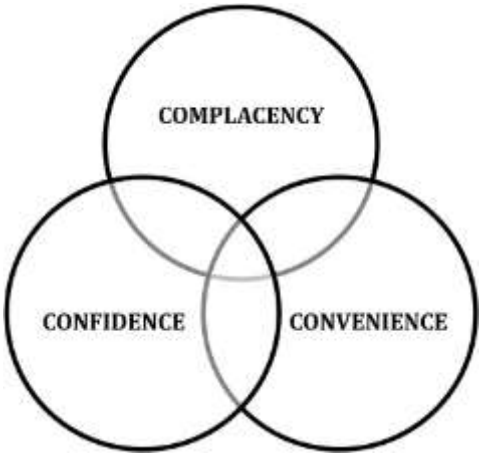

Figure 11. 3Cs model of vaccine hesitancy

Source: MacDonald, 2015.

Strengths And Limitations

Strengths

My PhD has a number of strengths. My conduct of a literature review was a robust methodology for assessing the current landscape in the field of maternal vaccination acceptance. The literature review emphasised the role of patient-provider interactions in improving maternal vaccination acceptance and uptake and highlighted the structural and sociocultural norms influencing women's decisions to receive vaccines during pregnancy. These findings provided important understanding and aided the interpretation of the importance of my PhD research. My research is an important and valuable addition to the body of knowledge on the barriers and enablers to maternal vaccination acceptance in sub-Saharan Africa. There was a breadth of information collected regarding pregnant women and women with infants' knowledge and perceptions of maternal vaccines, including their willingness to receive future maternal vaccines. Rich data was generated and resulted in the development of a conceptual framework, which can be used as a guide for other researchers aiming to develop a theory from data collected in similar contexts. My findings also enabled me to make detailed recommendations for policy, programmes and research.

I made every effort to ensure that my study was carried out with sufficient rigour and explained in detail what steps to take to answer my research question via a clear and transparent methodology chapter. All study participants were given the freedom to freely express their opinions to the researcher and among themselves thanks to my mostly qualitative methodology. In-depth interviews provided rich insight into people's personal values, perceptions and feelings. They allowed the researcher to build rapport with participants and therefore elicit a depth of information. Focus group discussions helped the researcher to understand social norms, attitudes and beliefs. The validity and reliability of my study was further strengthened by the triangulation of data collection methods, theories and data sources. I also concentrated on upholding all of the criteria for qualitative research, as defined by Lincoln and Guba (1985) which are credibility, transferability, dependability, and confirmability. Transferability is the

degree to which the results can be used in other contexts, dependability is the degree to which the study's results can be repeated, confirmability is the degree to which the study's findings can be independently verified by others, and credibility is the degree to which the findings are believable and true (Lincoln and Guba, 1985; Mays and Pope, 1995; Clarke and Braun, 2013). My qualitative data collection also adhered to the SRQR guidelines (O'Brien et al., 2014). Purposeful sampling is a commonly used method in qualitative research to identify and select individuals or groups of individuals who have experience with and knowledge of a phenomenon of interest, especially when resources are limited (Patton, 2002; Creswell & Plano Clark, 2011). They must also be able to voice their thoughts and opinions in a thoughtful and expressive manner and be ready and willing to take part (Spradley, 1979; Bernard, 2002; Tongco, 2007). The advantages of using purposive sampling in my study was its cost and time-effectiveness and only a few primary data sources could contribute to the study.

Limitations

Given that my PhD mainly employed qualitative methods, study participants were limited to those who voluntarily gave their consent. As a result, we missed out on the experiences of those who refused to participate. It is possible that these same individuals are those who also refuse maternal vaccines. It should also be highlighted that my PhD represents a small sample of pregnant women, women with infants and health care workers. My research was carried out in only four regions and nine communities across the country due to time and budget restrictions. The findings of this study should therefore not be generalised to the greater Gambian populace due to the limited sample size. Drawbacks of purposive sampling were the failure to generalise research results, susceptibility of researcher mistakes in judgement and a lack of dependability and extreme partiality. Also, it did not negate any errors in judgment by myself and my field assistant. This method also has a low level of reliability and high level of bias. It is important to note, however, that biases are a fact of life and an inherent aspect of being human. However, biases have a big impact on how each of us interprets, communicates, and analyses data. When a researcher's viewpoint affects the findings of a study that claims to have an objective point of view, researcher bias may occur. It can occur at stage of the research process, including the preliminary planning phase, data collection and analysis or theory development. When researcher bias

exists, a study's findings may reflect a subjective viewpoint, which may influence how other researchers use the data. Although efforts were made, a type of response bias called social-desirability bias (Fisher, 1993) was experienced during my data collection. Social desirability bias is a predisposition to act in ways that we believe are more proper or socially acceptable to others even if it is not true. Participants in my studies (Chapters 5, 6 and 7) at times responded to interview questions in a way that they thought would seem favourable, although they had informed prior to interviews that there were no right or wrong answers and any opinion they provided would be valuable. Some techniques used to reduce social-desirability bias were establishing confidentially and using specialized questioning. As the study setting were non-anonymous, confidentiality was established by ensuring that only study staff were present during interviews and had access to study data. Nominative questioning was used to ask participants about the behaviour of their close friends, rather than their own behaviour to the same sensitive issue (Miller, 1985).

The influence of male partners, specifically husbands, on pregnant women's access to antenatal care services and their acceptance of maternal vaccination were not thoroughly examined by the researcher. Men's perspectives on maternal health could have added to our knowledge of the demand side factors and helped us better comprehend the health behaviours of pregnant women and women with infants. This study was also unable to obtain the viewpoints of friends and co-wives who affected pregnant women's vaccination decisions due to time restrictions. It would be advantageous for future studies on maternal vaccine acceptance to speak with these influencers as social contacts have a significant impact on vaccination decisions. The context-specific nature of qualitative research also means that my results cannot be generalised to other contexts. However, the topic of maternal vaccination acceptance can be investigated in other contexts using my study methodology as a guide. My generated themes are hypothesis-generating and can guide the creation of survey instruments that can be used in future quantitative studies across a wider range of populations and health care delivery settings for data that can be more broadly generalised.

CHAPTER 8 – RESEARCH DISSEMINATION

Chapter Overview

My PhD study data was cleaned and analysed in the latter half of 2019 with the intention of disseminating the study results in early 2020. However, due to the unforeseen COVID-19 pandemic and its resulting negative consequences, my team and I were unable to travel for dissemination. Thankfully, we survived the global pandemic and were able to travel to the field in February 2021 to disseminate the study results to all our study regions, hospitals/health centres and communities to disseminate our study results. I prepared an A3 size infographic which was printed and laminated in several copies for distribution to the Regional Health Directorates (RHD), hospitals/health centres, Alkalos, health care workers, facilitators, Expanded Programme on Immunization (EPI) and National Nutrition Agency (NaNa). The purpose of our dissemination activities was to raise awareness by letting our study communities, study participants, facilitators and study regional health directorates know what we did and found. We also aimed to inform and educate our study communities on the factors influencing antenatal care service utilisation and maternal vaccination acceptance. We were also able engage with the above-mentioned different groups and individuals to get their valuable feedback. Finally, we were able to promote and 'sell' our study outputs and results for the benefit of future research on maternal vaccination acceptance in The Gambia.

Dissemination Of Findings To Study Participants And Regional Health Directorates

West Coast Region (WCR)

We began our dissemination of study results in Brikama, West Coast Region on Wednesday, 17th February 2021. PJ visited the RHD and was received by the team excluding the director. She disseminated the study results, distributed food packs and left several copies of the printed A3 size infographics with them. They said our project was the first research study to disseminate its findings at regional level. While PJ was at the Brikama RHD, AC headed over to the health centre at Darsilameh to disseminate our results with the OIC there, leaving behind a copy of our printed A3 size infographic. From there we travelled to Brikama Kassa Kunda to disseminate our results with the women at the facilitator's compound. We disseminated in Fula, distributed the bucket gifts and left one printed A3 size infographic behind with the facilitator. We also presented the Alkalo with one bucket gift. We returned to WCR to complete our dissemination on Saturday, 27th February 2021. We met with the women at the nursery school in Marakissa, disseminated the results, distributed bucket gifts and left one A3 size infographic behind with the facilitator. From there, we departed and each of us were dropped off at our respective homes.

Upper River Region (URR)

We departed for Basse on Sunday, 21st February 2021. The journey was smooth, however, we had to endure five hours of heat and dust without air conditioning in the vehicle. We arrived at the Basse Field Station and were hosted in their new accommodation block. The following morning, Monday, 22nd February 2021, we departed for our study communities. Yero Bawol was the first village we visited. Upon arrival, we were welcomed by the Alkalo and family at his compound. We greeted and informed them about the research study and the purpose of our visit. The dissemination was carried out in the Fula language by Amie, and we left one A3 size infographic with the Alkalo. The Alkalo said he was very happy that his village had taken part in our study. Everyone who had been interviewed was given one 'bucket gift' consisting of one bucket, two bars of donkey soap and one packet of powder detergent.

They were very happy and appreciative. Sadly, we were informed that two of the women who participated in the study had died last year. We then proceeded to Yero Bawol health centre to meet with the OIC and CHN midwife that we interviewed during our first visit, however, we were informed they have been transferred. We were also informed that the current OIC had travelled to Basse RHD but would return in an hour. From there we proceeded to Chamoi Bunda, and were welcomed by the Alkalo and family. Dissemination of results was done in Mandinka. Bucket gifts were left for each participant, and we also left one A3 size infographic with the Alkalo. He was thankful and promised to distribute the gifts accordingly. Barrow kunda was the next village visited and we arrived at the former Alkalo's home but were informed he passed away last year and his brother who lives nearby is the new Alaklo. We were also informed that the community health nurse who served as our facilitator for the region had been transferred to Gambissarra, and the CHN who replaced him was not around. We headed to the new Alkalo's home, greeted him about the research study along with the VHW who we met during our last visit. Dissemination of results was done in Mandinka by Amie, bucket gifts were given, and we left one A3 size infographic with the Alkalo. In both Barrow kunda and Chamoi bunda, the women and Alkalo were happy with our visit and thankful for the gifts. We proceeded to Baja kunda major health centre, met with the OIC, disseminated our results, and left one A3 size infographic with him. We then headed back to Yero Bawol health centre to meet with the current OIC. We luckily found the CHN midwife who participated in the study when we visited Baja kunda was now working at Yero Bawol health centre. We disseminated our results and gave him one bucket gift. From there, we ended our field activities and headed back to Basse field station. Due to delays with the Gambia Ports Authority (GPA), we spent almost an hour at the ferry crossing point. The following day, Tuesday, 23rd February 2021, we visited the Basse RHD where the director and team received us. We disseminated our results, presented them with our hospital/health centre statistics form, distributed food packs and left one A3 size infographic with them. They said our project was the first research study that they could think of to disseminate its findings at the regional level. From there, we returned to the Basse field station, rested until evening, and then travelled to the MRCG at LSHTM Walikunda field station.

Figure 12. AC giving infographics and bucket gifts to Alkalo

Source: P. Johm with consent

Central River Region (CRR)

We left Basse on Tuesday, 23rd February 2021, for Walikunda in CRR. We were supposed to spent two nights at the field station, however, due to the subpar state of the camp and facilities, we decided to revise our itinerary to a one day and one night stay in CRR. The next morning, Wednesday, 24th February 2021, we departed the Walikunda field station for Brikama-Ba, where we met with the Alkalo. We proceeded with dissemination in Mandinka. We left bucket gifts as well as a list of participants who should receive them with the Alkalo. He was thankful and promised to distribute accordingly. We then proceeded to Jahaly where we also met with the Alkalo. Dissemination was done in Mandinka. We left bucket gifts as well as a list of participants who should receive them with the Alkalo. He was thankful and promised to distribute accordingly. We also stopped by the health centre and were told that the OIC had travelled to Kombo. We therefore travelled back to Brikama-Ba health centre where we disseminated our results with the OIC and CHN midwife who participated in the study. They were each presented with a bucket gift and we left one A3 size infographic with the OIC. We then travelled to RHD in Bansang to make our meeting appointment at midday. We were received by the director and

team. We disseminated our results, presented them with our hospital/health centre statistics form and left one A3 size infographic behind. We concluded, distributed food packs, took a group photo, thanked the RHD team and left Bansang for Farafenni, North Bank Region that afternoon.

Figure 13. Group photo with team at a Regional Health Directorate

Source: P. Johm with consent

North Bank Region (NBR)

We arrived at Farafenni, NBR, on Wednesday, 24th February 2021. The next morning on Thursday, 25th February 2021, we headed for the RHD. We were welcome by the director and his team in his office. We disseminated our results and a lengthy discussion followed wherein they provided insightful feedback into our findings as well as recommendations. We concluded the discussion, distributed food packs, presented them with our hospital/health centre statistics form and left one A3 size infographic behind. They were very grateful and said this was one of its kind, and they disclosed that other studies giving feedback such as we did will be helpful to the MoH for future planning. We concluded, thanked the RHD team and proceeded to Yallaba, where we met with the Alkalo. Dissemination was done in

Fula. We left him a bucket gift and one A3 size infographic. He was grateful and prayed for us and our endeavours. We then walked over to the community bantaba which is located under a mango tree, where the women who participated in the study were waiting. Dissemination was done in Fula by Amie. We distributed one bucket gift to each of them and left one A3 size infographic with the facilitator. They were thankful and bid us farewell. We then headed over to the neighbouring village of Numu kunda, where we first visited the Alkalo to disseminate our results. This was conducted in Wolof and he was thankful for the feedback and our visit. It was a very dusty and windy day. We left him one bucket gift and headed over to the women who were waiting for us at the facilitators house. We found some of the women making pottery as is their custom. We disseminated in Wolof, distributed the bucket gifts and left one A3 size infographic behind with the facilitator. They were happy to see us and happy with the gifts we presented. They prayed for us and our success in work and life and said they hope to see us again soon. From there, we headed back to our accommodation and rested. On Saturday, 27th February 2021, we departed Farafenni early in the morning and headed to Brikama, West Coast Region.

Figure 14. PJ and AC giving infographics and bucket gifts to Village Health Workers

Source: P. Johm with consent

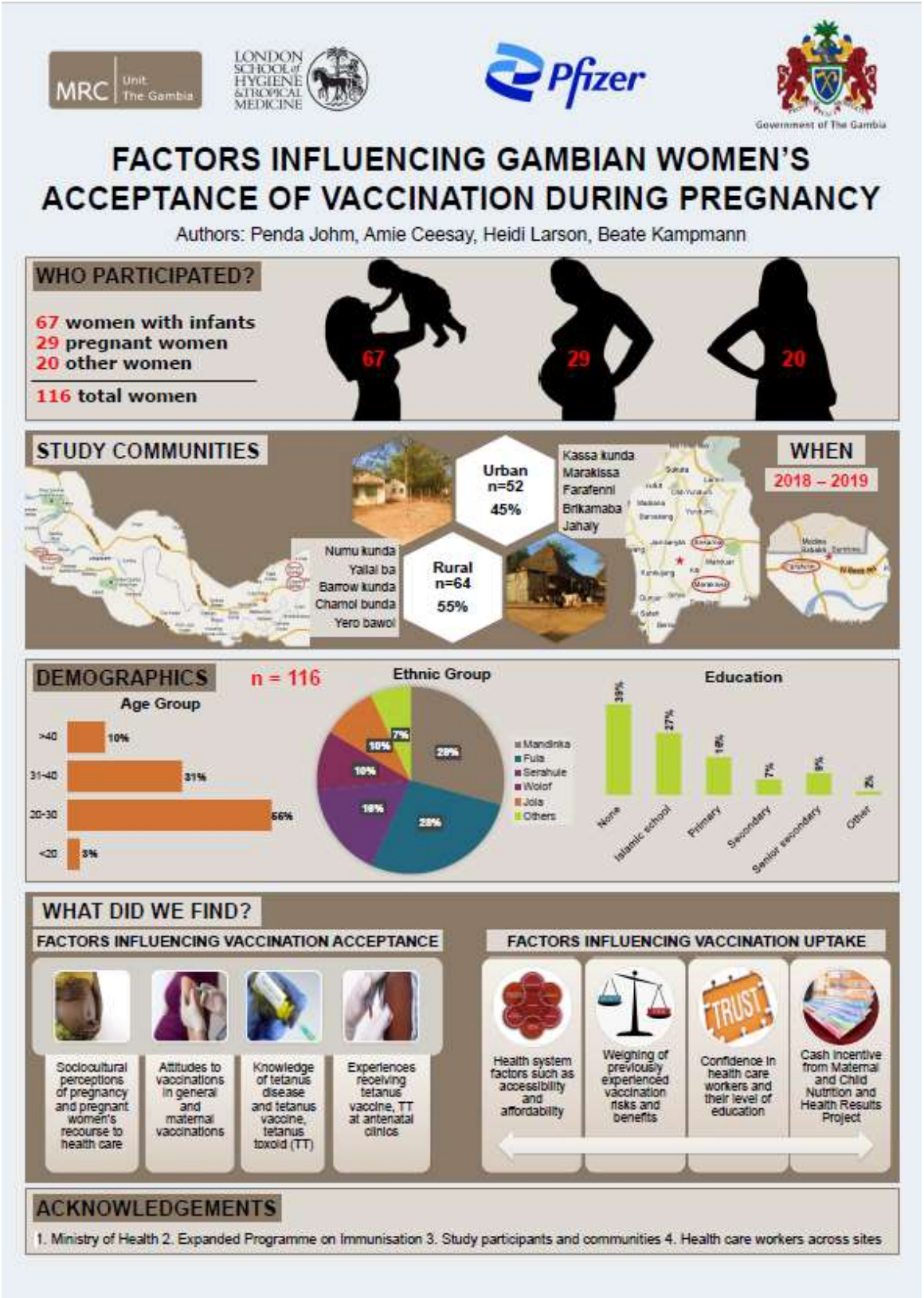

Figure 15. Research dissemination infographic of study results distributed to study communities, participants, facilitators and regional health directorates.

CHAPTER 9 – CONCLUSION

Conclusion

This PhD investigated the supply- and demand-side factors influencing maternal vaccination acceptance in The Gambia. I considered the perceptions and experiences of pregnant women and women with infants in relation to maternal vaccination in the context of the health system in which they are provided. I specifically looked at access factors influencing women's utilisation of vaccines given during pregnancy as well as the individual and group influences on their vaccination decision-making and acceptance. In-depth interviews, focus group discussions and surveys were used to primarily assess the perceptions of pregnant women and women with infants on maternal vaccination acceptance in selected locations, representative of the geography and population mix across The Gambia. The different data collection methods increased the validity and reliability of the study and were effective to elicit individual and group perceptions as participants were encouraged to openly detail their experiences and express any concerns about antenatal care provision in The Gambia. For maximum variation of results and stakeholder representation, different groups of individuals were also recruited, namely, family members, health care workers, community leaders and institutional actors. Their perceptions of maternal health and maternal health services were found to influence pregnant women's utilisation of antenatal care services and acceptance of vaccines offered during pregnancy. Qualitative data was collected until thematic/data saturation was reached and quantitative data was collected from the health facilities providing antenatal care services to women in the study. In total, 96 pregnant women and women with infants, 20 health care workers, nine health facility managers, eight community leaders, five family members and five institutional actors were interviewed. Convenience sampling was used to recruit health facility managers, community leaders, family members and institutional actors. Purposive sampling was used to ensure that only health care workers were contacted and interviewed who provided care to women attending antenatal clinic. Purposive and snowball sampling were used to recruited pregnant women and women with infants as only they could speak to their lived experiences concerning maternal health care and maternal immunisation service in The Gambia.

In an effort to determine the health system factors that influence antenatal care service utilization, the results of the second study objective (Chapter 4) support published evidence that the utilisation of ANC by expectant mothers across urban and rural locations in The Gambia is influenced by access to care factors such as accessibility, availability and affordability of human resources, physical infrastructure and essential vaccines and medicines. Most health facilities were major or minor health centres (55.6), located in rural Gambia (55.6%) and public sponsored (77.8%). Availability of services was measured by the infrastructure, stock of vaccines and medicine and number of health care workers. All the facilities had suitable physical infrastructure and provided essential vaccines (tetanus toxoid) and drugs (folate/iron supplementation). At times, medicines were out of stock and therefore had to be procured by pregnant women at a cost. HCWs faced challenges at their respective health facilities including infrequent water and electricity supply and insufficient beds and health care workers. Regarding affordability, free antenatal care was said to be provided at all the facilities, however, other costs were incurred to cover lab fees and medicines. Based on qualitative interviews with health care workers, facilitators and barriers to utilization of antenatal care services were HCWs perceptions of maternal vaccines, health talks from HCWs and challenges faced by HCWs at health facilities.

My results imply that in order to improve antenatal care service delivery and accessibility, there is a need for more healthcare workers, fully stocked health facilities with better infrastructures and schemes to organise transport or manage associated costs to mitigate problems with distance to health facilities for antenatal care services. Maintaining the provision of free or subsidized ANC services will continue to encourage their uptake. Also, to increase levels of utilization of antenatal care services, healthcare providers should focus on increasing provision of maternal health information to pregnant women at health facilities and direct them to additional sources of reliable information. This in turn encourages women to become aware and knowledgeable to make well-informed decisions regarding their health. Responsibilities can also be shared more equitably, and more time and attention given to pregnant women during their antenatal clinic visits with more healthcare workers. With fully stocked health facilities, indirect costs will decrease resulting in overall positive attitudes towards maternal health care

services. With improved infrastructure, pregnant women's experience at health facilities will be improved and their satisfaction will increase.

Upon exploring factors that influence women's acceptance of vaccines given during pregnancy, it was demonstrated in the third study objective (Chapter 5) that vaccine acceptance is influenced by contextual, individual or group, and vaccine- or vaccination-specific factors. Women in The Gambia were found to be vaccine acceptors and be fully immunised with few concerns about vaccines and generally high confidence in health care providers. Accessibility was mainly an issue for women in rural Gambia with insufficient commercial vehicles frequenting their communities resulting in walking to health facilities or taking a horse/donkey cart. It was interesting to note that a barrier to women uptake of maternal vaccines in their first trimester was the superstitious belief of witchcraft attacks on the fetus, which in turn caused them to delay attending ANC for maternal vaccine uptake. Availability factors were suitable infrastructure and stock of vaccines and medicines. Affordability factors were cash incentives and direct and indirect costs. Pregnant women in some regions in The Gambia received a cash incentive when they booked in for ANC during their first trimester via an ongoing project at the time. This cash payment encouraged their uptake of ANC within the first 12 weeks of pregnancy. Acceptance factors were sociodemographic characteristics, decision-making, routine vs. new maternal vaccines, trust, safety and efficacy concerns, male involvement and vaccine hesitancy. The husband was listed as the predominant head of household (36.5%) followed by father-in-law (22.9%) and brother-in-law (17.7%). Males, specifically the husband of a woman influences her decision to attend ANC clinic during pregnancy as he is the head of household, and she is also mandated by religion to submit to him. Some husbands were however said to be actively involved in the health care of their pregnant wives. Healthcare providers were one of the most trusted sources of vaccine information and one of the biggest influences on maternal vaccine decision-making. Injection site reactions such as pain, swelling, itching and redness were most frequently reported, however, women were overall confident about maternal vaccines and no instances of vaccine refusal were noted. Quality antenatal care and opening hours were accommodation factors. Most facilities opened at 08:00 (66.7%), closed at 16:00

(44.4%) and had 11 to 50 health care workers (55.6%). However, the poor behaviours of health care workers were found to affect the quality of antenatal care services. The harsh, rude and abusive attitudes of some health care workers towards pregnant women attending ANC affected women's acceptance of maternal health services. Awareness factors were knowledge, information channels, education, misconceptions and misinformation. Pregnant women demonstrated an understanding of maternal vaccines' role in disease prevention for themselves and their unborn babies and were found to have adequate knowledge on the benefits of using ANC services as well as how many visits they should make during the course of their pregnancy. Women normally heard information about vaccines given during pregnancy from healthcare workers at the antenatal clinics and also on radio and television. Women highly trusted healthcare workers as a reliable source of vaccine information. Most women had either no formal education (35.4%), Islamic school education (29.2%) or Primary School level education (19.8%). Women's low levels of education is only one explanation as to why their knowledge of maternal vaccines, including how they work to prevent disease and where they come from was adequate. Another explanation is the insufficient or incomprehensible health information provided to pregnant women at health facilities by health care workers. Health care workers did however note that most women who attended antenatal clinic were reserved in asking questions during health talks due to feelings of shame or fear of asking questions in a group setting. Regarding misinformation, women chose to believe information that comes from a trusted person in the community rather than rumours being circulated in the communities and online. Activation factors were maternal immunisation schedule, recommendations from health care workers and willingness to receive new maternal vaccines. Nurses hosted health talks and would advise pregnant women about the importance of ANC and benefits of its uptake. Pregnant women did receive at least one dose of TT during their most recent pregnancy thanks to reminders from health care workers. Women were also willing to receive new maternal vaccines if only they would be given proper sensitization prior to roll-out on the associated risks and benefits.

My results imply that maternal vaccination acceptance is a complex issue affected by a variety of factors. To increase the acceptance of antenatal care services, women must feel respected, encouraged, and well cared for, if not they will have a negative perception of the healthcare system which in turn will affect their uptake of the services offered therein such as maternal vaccination. To improve maternal vaccine acceptance and prevent women from becoming vaccine-hesitant, efforts should focus on addressing any past negative experiences with vaccines, trust and/or distrust of western medicine, safety and efficacy concerns and any restricting traditional and religious beliefs and practices. There is also the need to further engage and educate household and community leaders for transparency on vaccines for improved access to maternal vaccines. When accurate and sufficient information regarding maternal immunization is shared from trusted sources, most fears and misconceptions are allayed and the utilisation of maternal vaccination increases.

In conclusion, my thesis was concerned with documenting and publishing the different factors that influence women's utilization and acceptance of antenatal care services, specifically maternal vaccines offered therein, as the literature from sub-Saharan Africa on this specific topic was limited. The second study objective determined the health system factors that influence antenatal care service utilization and the third study objective determined the individual and group factors that influence women's acceptance of vaccines given during pregnancy. The study findings therefore successfully contribute to the growing information, especially from the Gambian context. Policy makers can use the findings to enhance maternal vaccine acceptance programmes not only in The Gambia but in other sub-Saharan African countries by developing socially acceptable strategies which respect the different actors involved in decisions related to maternal health. Health researchers and development experts can also use the findings to develop novel interventions that can for example improve women's knowledge, acceptance and/or uptake of maternal vaccines.

Recommendations For Policy, Programmes And Research

Since the onset of my PhD there has been a shift in global maternal vaccination policy towards greater recognition and promotion of higher quality antenatal care, especially in light of the COVID-19 pandemic. The direct findings of my PhD along with indirect findings in the literature have led me to make several suggestions for public health practice, local governments, policymakers and maternal vaccination programs throughout the thesis. Below, however, I suggest one practical recommendation each for policy, programmes and research which I believe can increase antenatal care service utilization and maternal vaccination acceptance and engender a more accessible maternal health care system.

Policy

In 2016, the World Health Organization published a new set of recommendations for a Positive Pregnancy Experience (PPE). Pregnant women are expected to make eight contacts in each pregnancy beginning with the first contact up to 12 weeks, second at 20 weeks, third at 26 weeks, fourth at 30 weeks, fifth at 34 weeks and every two weeks after that up to 40 weeks (WHO 2016). The WHO 2016 PPE model has been taken up in The Gambia and women are expected to follow this schedule. However, according to the Gambia Demographic and Health Survey (2019-20), more than half (57%) of the pregnant women attended ANC after their first trimester. Some (21%) of the pregnant women attended ANC less than four times. Alarmingly, only 4% of pregnant women attended ANC eight or more times. These findings show that ANC service uptake in The Gambia remains a number that is not absolute and compliance to the WHO recommendation is low. This could be due to both supply and demand issues regarding antenatal care service utilisation such as the quality of care being offered. Healthcare providers are one of the most trusted sources and one of the biggest influences on maternal health care decision making. Recommendations from trusted health-care providers can promote antenatal care utilization and maternal vaccine acceptance and uptake. In addition, more respectful and sympathetic treatment by health care workers can encourage women to seek and accept the eight recommended contacts in each pregnancy.

Programmes

The Ministry of Health (MoH) in The Gambia entered into agreements with local health facilities under a results-based financing (RBF) mechanism under the Maternal and Child Nutrition and Health Results Project (MCNHRP). The National Nutrition Agency (NaNA) reimbursed medical facilities for results that had been attained and confirmed. The VDC and Village Support Group (VSG) were also contracted by the MoH to offer health information and education services as part of the RBF programme (The Gambia National Health Financing Strategic Plan 2019- 2024). Cash incentives have been found to significantly increase ANC visits in the first trimester and subsequently tetanus vaccine uptake as well as to compensate for direct and indirect costs. A recommendation is for cash payments to continue to be facilitated via RBF such as the one under the MCNHRP being managed by NaNA and the MoH. The supply side intervention of the RBF mechanism can pay out conditional cash transfers (CCT) to pregnant women for their mandatory uptake of ANC within their first trimester.

Research

Male engagement in programmes promoting maternal health remains necessary as men are important as leaders, partners, fathers, and financial providers. Studies on determinants of male involvement in maternal health care in sub-Saharan Africa found that most husbands do not take an active role in reproductive health activities. When weighed against other competing social responsibilities, many men do not think that pregnancy chores are worth their efforts. This is more problematic in polygamous marriages where there is co-wife rivalry and in communities where males who assist with household duties might face ridicule. Nevertheless, it is important for male partners to be involved in antenatal care for moral support as well as to increase the uptake of maternal health services. Examining the relationship between male partners and maternal health and health seeking behaviour is important because it shows how gender inequality is practised in families and communities. Therefore, a recommendation is for both qualitative and quantitative research to be conducted on the barriers and enablers to male involvement in maternal health care for contextualized understandings.

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APPENDICES

Appendix 1. Health Facilities Survey

HOSPITAL/HEALTH CENTER DATA - MATIMMS AFRICA STUDY	
Hospital/health center name	
Location	
Public or private sponsored	
Officer in charge	
Midwife in charge	
Opening days and hours	
How many staff	
Departments present	
Antenatal clinic	
Antenatal clinic days	
Antenatal clinic times	
How many women access antenatal clinic per month?	
Average number of attendance to ANC services by pregnant women throughout the pregnancy	
Vaccines offered to pregnant women	
Medicines offered to pregnant	
Other treatments offered to pregnant women	
# of deliveries past 2 yrs	
# of maternal deaths past 2 yrs	
# of neonatal deaths past 2 yrs	
# of miscarriages past 2 yrs	
# of stillbirths past 2 yrs	
Premature babies kept or referred out?	
Any new anc initiatives	
Any outreach clinic services	
Any community health workers	
Type of community health workers	
# of each type of community health workers	
Any home deliveries	
# of home deliveries	
How many health centers in area	
Distance to your hospital/health center	
Any transport services available to women	
What kind of transport services	
How long women wait to be seen	
Costs for ANC services	
Other costs for delivery	
Costs for newborn care	
Costs for vaccination	
Costs for any drugs	

Appendix 2. Thematic Guide Health Care Workers

Sociodemographic

- Occupation (job title, duties, training received)

Vaccinations

- Vaccination campaigns (necessity, target groups, safety, efficacy, involvement)
- Maternal vaccines (knowledge, acceptance, dosage, safety, efficacy, women's uptake)
- Vaccination hesitancy
    - Trust in those who provide vaccines
    - Vaccination delay or refusal

Antenatal care

Availability

- Opening hours, staff, vaccines, medicines, beds, electricity, water, etc.
- Health talks (assessment, routine ANC, vaccine awareness, recommended schedule)

Accessibility

- Geographic, distance, time spent at facility
- Working conditions

Affordability

- Do pregnant women pay for antenatal care
- Do pregnant women pay for vaccines or medicines

Acceptability

- Quality of care they offer
- Introduction of new vaccines
- Vaccine acceptance, refusal and hesitancy

Appendix 3. Thematic Guide Women

Perceptions of pregnancy, labour, delivery and postnatal care

- Local beliefs on pregnancy, maternity as a necessity, pregnant woman's recourse to care, pregnancy outside marriage, abortions, family planning, importance of a child
- Husband's involvement in care of pregnant wife? child rearing?
- Where should pregnant women deliver? Who should care for the mother?

Beliefs surrounding immunization in general and vaccination campaigns

- Perceptions on vaccination campaigns (necessity, target groups, safety, efficacy)
- Vaccination hesitancy
    - Do you trust vaccines in general? Those who provide them?
    - Have you ever decided against receiving a vaccination?
    - Are vaccinations needed? Even when a disease is no longer widespread?
- Who should be vaccinated: a sick or healthy person?
- Do you believe vaccinations can truly prevent disease? What kind of disease? How?
- What other ways are there to prevent diseases apart from taking vaccinations?

Knowledge and perceptions on existing and potential immunizations during pregnancy

- Perceptions on maternal vaccines (acceptance, safety, efficacy, side effects, necessity)
- Do you know: (1) what vaccine you received (name)? (2) why you received them? (3) how many? (4) who makes it? (5) what is in it?
- Would be interested to get additional vaccines in pregnancy if they prevented the disease in a) yourself or b) in your baby (or c) in both of you
- Childhood immunizations (acceptance, uptake for each child, safety, efficacy, side effects)

Potential barriers and enablers to introduction of new maternal vaccines (i.e. GBS and RSV)

Decision making process

- Women's agency: Who is involved in your decision to receive antenatal care? Vaccines?

The role of information channels (e.g. rumours, traditional, media, internet).

- How do you come to know about maternal vaccines? vaccination campaigns?

Sensitization messages and those involved in their dissemination

- What do you think about the information they give you on maternal vaccines?

Factors related to health system around antenatal care

Availability

- Where do you go for antenatal care during each pregnancy?
- Do they always have vaccines readily available? medicines? supplies? beds?
- Are they always open? staff available each time you visit?

Accessibility and affordability

- How do you access the facility? (mode of transportation, time spent)
- Do you pay for antenatal care? Vaccines? (If no, would you pay if you had to?)

Trust or distrust in the health care system and vaccine providers

- What do you think about antenatal care in The Gambia?
    - Do you trust that the government makes decisions in your best interest?
    - Has any pregnant woman you know ever been treated poorly at the antenatal clinic? (neglect, rude staff, humiliation)

Appendix 4. Ethics approvals

The Gambia Government/MRC Joint
ETHICS COMMITTEE

C/o MRC Unit: The Gambia, Fajara
P.O. Box 273, Banjul
The Gambia, West Africa
Fax: +220 – 4495919 or 4496513
Tel: +220 – 4495442-6 Ext. 2308
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20 September 2017

Professor Beate Kampmann
Theme Leader, Vaccines and Immunity
MRC Unit The Gambia
Fajara

Dear Professor Kampmann

SCC 1568v1.1, Assessing preparedness for maternal immunization in West Africa – matImms AFRICA

Thank you for submitting your response letter dated 9 September 2017 addressing the issues raised by The Gambia Government/MRC Joint Ethics Committee at its meeting held on 25 August 2017.

Your responses are quite satisfactory – your proposal has now received full ethical approval.

With best wishes

Yours sincerely

Mr Malamin Sonko
Chairman, Gambia Government/MRC Joint Ethics Committee

Documents submitted for review:

- Response letter 9 September 2017
- SCC approval letter – 18 August
- SCC application form, version 1.1 – 16 August 2017
- Informed Consent Document, version 1.0 – 24 July 2017
- American Anthropological Association Statement on Ethnography and Institutional Review Boards, 4 June 2004
- Questionnaire, version 1.1 – 15 September 2017
- Thematic guide, version 1.0 – 24 July 2017
- CVs: Beate Kampmann; Penda Tutan Johm; Elhadji Mamadou Mbaye; Marie Nicole Taha Nkoum

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Observational / Interventions Research Ethics Committee

Miss Penda John
LSHTM

23 August 2018

Dear Penda,

Study Title: Assessing preparedness for maternal immunization in The Gambia

LSHTM Ethics Ref: 15808

Thank you for responding to the Observational Committee's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

Conditions of the favourable opinion

Approval is dependent on local ethical approval having been received, where relevant.

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document Type	File Name	Date	Version
Local Approval	SCC 1568v1.1_Kampmann_Approved_18Aug17	18/08/2017	1.0
Local Approval	ETHICS Approval Letter_20Sep17	20/09/2017	1.0
Local Approval	MoHSW Approval Letter	24/11/2017	1.0
Investigator CV	Professor Beate Kampmann CV	20/01/2018	1.0
Investigator CV	Ms Penda John CV	12/02/2018	1.1
Investigator CV	Professor Heidi Larson CV	24/03/2018	1.0
Protocol / Proposal	Matlinuns Thematic Guide	18/07/2018	1.1
Protocol / Proposal	Matlinuns Questionnaire	18/07/2018	1.1
Information Sheet	Matlinuns Information Sheet	18/07/2018	1.1
Information Sheet	Matlinuns Informed Consent	18/07/2018	1.1
Covering Letter	Matlinuns Cover letter	19/07/2018	1.0
Protocol / Proposal	Matlinuns Literature review protocol	31/07/2018	1.0
Protocol / Proposal	Matlinuns Study Protocol	15/08/2018	1.0
Covering Letter	Matlinuns Cover letter 2	22/08/2018	1.0

After ethical review

The Chief Investigator (CI) or delegate is responsible for informing the ethics committee of any subsequent changes to the application. These must be submitted to the Committee for review using an Amendment form. Amendments must not be initiated before receipt of written favourable opinion from the committee.

The CI or delegate is also required to notify the ethics committee of any protocol violations and/or Suspected Unexpected Serious Adverse Reactions (SUSARs) which occur during the project by submitting a Serious Adverse Event form.

An annual report should be submitted to the committee using an Annual Report form on the anniversary of the approval of the study during the lifetime of the study.

At the end of the study, the CI or delegate must notify the committee using an End of Study form.

All aforementioned forms are available on the ethics online applications website and can only be submitted to the committee via the website at: http://leo.lshtm.ac.uk

Additional information is available at: www.lshtm.ac.uk/ethics

Yours sincerely,

Professor John DH Porter
Chair

ethics@lshtm.ac.uk
http://www.lshtm.ac.uk/ethics/

Appendix 5. Code of ethics of the American Anthropological Association

Code of Ethics
of the American Anthropological Association

Approved June 1998

I. Preamble

Anthropological researchers, teachers and practitioners are members of many different communities, each with its own moral rules or codes of ethics. Anthropologists have moral obligations as members of other groups, such as the family, religion, and community, as well as the profession. They also have obligations to the scholarly discipline, to the wider society and culture, and to the human species, other species, and the environment. Furthermore, fieldworkers may develop close relationships with persons or animals with whom they work, generating an additional level of ethical considerations

In a field of such complex involvements and obligations, it is inevitable that misunderstandings, conflicts, and the need to make choices among apparently incompatible values will arise. Anthropologists are responsible for grappling with such difficulties and struggling to resolve them in ways compatible with the principles stated here. The purpose of this Code is to foster discussion and education. The American Anthropological Association (AAA) does not adjudicate claims for unethical behavior.

The principles and guidelines in this Code provide the anthropologist with tools to engage in developing and maintaining an ethical framework for all anthropological work.

II. Introduction

Anthropology is a multidisciplinary field of science and scholarship, which includes the study of all aspects of humankind--archaeological, biological, linguistic and sociocultural. Anthropology has roots in the natural and social sciences and in the humanities, ranging in approach from basic to applied research and to scholarly interpretation.

As the principal organization representing the breadth of anthropology, the American Anthropological Association (AAA) starts from the position that generating and appropriately utilizing knowledge (i.e., publishing, teaching, developing programs, and informing policy) of the peoples of the world, past and present, is a worthy goal; that the generation of anthropological knowledge is a dynamic process using many different and ever-evolving approaches; and that for moral and practical reasons, the generation and utilization of knowledge should be achieved in an ethical manner.

The mission of American Anthropological Association is to advance all aspects of anthropological research and to foster dissemination of anthropological knowledge through publications, teaching, public education, and application. An important part of that mission is to help educate AAA members about ethical obligations and challenges involved in the generation, dissemination, and utilization of anthropological knowledge.

The purpose of this Code is to provide AAA members and other interested persons with guidelines for making ethical choices in the conduct of their anthropological work. Because anthropologists can find themselves in complex situations and subject to more than one code of ethics, the AAA Code of Ethics provides a framework, not an ironclad formula, for making decisions.

Persons using the Code as a guideline for making ethical choices or for teaching are encouraged to seek out illustrative examples and appropriate case studies to enrich their knowledge base.

Anthropologists have a duty to be informed about ethical codes relating to their work, and ought periodically to receive training on current research activities and ethical issues. In addition, departments offering anthropology degrees should include and require ethical training in their curriculums.

No code or set of guidelines can anticipate unique circumstances or direct actions in specific situations. The individual anthropologist must be willing to make carefully considered ethical choices and be prepared to make clear the assumptions, facts and issues on which those choices are based. These guidelines therefore address *general* contexts, priorities and relationships which should be considered in ethical decision making in anthropological work.

III. Research

In both proposing and carrying out research, anthropological researchers must be open about the purpose(s), potential impacts, and source(s) of support for research projects with funders, colleagues, persons studied or providing information, and with relevant parties affected by the research. Researchers must expect to utilize the results of their work in an appropriate fashion and disseminate the results through appropriate and timely activities. Research fulfilling these expectations is ethical, regardless of the source of funding (public or private) or purpose (i.e., "applied," "basic," "pure," or "proprietary").

Anthropological researchers should be alert to the danger of compromising anthropological ethics as a condition to engage in research, yet also be alert to proper demands of good citizenship or host-guest relations. Active contribution and leadership in seeking to shape public or private sector actions and policies may be as ethically justifiable as inaction, detachment, or noncooperation, depending on circumstances. Similar principles hold for anthropological researchers employed or otherwise affiliated with nonanthropological institutions, public institutions, or private enterprises.

A. Responsibility to people and animals with whom anthropological researchers work and whose lives and cultures they study.

1. Anthropological researchers have primary ethical obligations to the people, species, and materials they study and to the people with whom they work. These obligations can supersede the goal of seeking new knowledge, and can lead to decisions not to undertake or to discontinue a research project when the primary obligation conflicts with other responsibilities, such as those owed to sponsors or clients. These ethical obligations include:

- To avoid harm or wrong, understanding that the development of knowledge can lead to change which may be positive or negative for the people or animals worked with or studied
- To respect the well-being of humans and nonhuman primates
- To work for the long-term conservation of the archaeological, fossil, and historical records
- To consult actively with the affected individuals or group(s), with the goal of establishing a working relationship that can be beneficial to all parties involved
-

2. Anthropological researchers must do everything in their power to ensure that their research does not harm the safety, dignity, or privacy of the people with whom they work, conduct research, or perform other professional activities. Anthropological researchers working with animals must do everything in their power to ensure that the research does not harm the safety, psychological well-being or survival of the animals or species with which they work.

3. Anthropological researchers must determine in advance whether their hosts/providers of information wish to remain anonymous or receive recognition, and make every effort to comply with those wishes. Researchers must present to their research participants the possible impacts of the choices, and make clear that despite their best efforts, anonymity may be compromised or recognition fail to materialize.

4. Anthropological researchers should obtain in advance the informed consent of persons being studied, providing information, owning or controlling access to material being studied, or otherwise identified as having interests which might be impacted by the research. It is understood that the degree and breadth of informed consent required will depend on the nature of the project and may be affected by requirements of other codes, laws, and ethics of the country or community in which the research is pursued. Further, it is understood that the informed consent process is dynamic and continuous; the process should be initiated in the project design and continue through implementation by way of dialogue and negotiation with those studied. Researchers are responsible for identifying and complying with the various informed consent codes, laws and regulations affecting their projects. Informed consent, for the purposes of this code, does not necessarily imply or require a particular written or signed form. It is the quality of the consent, not the format, that is relevant.

5. Anthropological researchers who have developed close and enduring relationships (i.e., covenantal relationships) with either individual persons providing information or with hosts must adhere to the obligations of openness and informed consent, while carefully and respectfully negotiating the limits of the relationship.

6. While anthropologists may gain personally from their work, they must not exploit individuals, groups, animals, or cultural or biological materials. They should recognize their debt to the societies in which they work and their obligation to reciprocate with people studied in appropriate ways.

B. Responsibility to scholarship and science

1. Anthropological researchers must expect to encounter ethical dilemmas at every stage of their work, and must make good-faith efforts to identify potential ethical claims and conflicts in advance when preparing proposals and as projects proceed. A section raising and responding to potential ethical issues should be part of every research proposal.

2. Anthropological researchers bear responsibility for the integrity and reputation of their discipline, of scholarship, and of science. Thus, anthropological researchers are subject to the general moral rules of scientific and scholarly conduct: they should not deceive or knowingly misrepresent (i.e., fabricate evidence, falsify, plagiarize), or attempt to prevent reporting of misconduct, or obstruct the scientific/scholarly research of others.

3. Anthropological researchers should do all they can to preserve opportunities for future fieldworkers to follow them to the field.

4. Anthropological researchers should utilize the results of their work in an appropriate fashion, and whenever possible disseminate their findings to the scientific and scholarly community.

5. Anthropological researchers should seriously consider all reasonable requests for access to their data and other research materials for purposes of research. They should also make every effort to insure preservation of their fieldwork data for use by posterity.

C. Responsibility to the public

1. Anthropological researchers should make the results of their research appropriately available to sponsors, students, decision makers, and other nonanthropologists. In so doing, they must be truthful; they are not only responsible for the factual content of their statements but also must consider carefully the social and political implications of the information they disseminate. They must do everything in their power to insure that such information is well understood, properly contextualized, and responsibly utilized. They should make clear the empirical bases upon which their reports stand, be candid about their qualifications and philosophical or political biases, and recognize and make clear the limits of anthropological expertise. At the same time, they must be alert to possible harm their information may cause people with whom they work or colleagues.

2. Anthropologists may choose to move beyond disseminating research results to a position of advocacy. This is an individual decision, but not an ethical responsibility.

IV. Teaching

Responsibility to students and trainees

While adhering to ethical and legal codes governing relations between teachers/mentors and students/trainees at their educational institutions or as members of wider organizations, anthropological teachers should be particularly sensitive to the ways such codes apply in their discipline (for example, when teaching involves close contact with students/trainees in field situations). Among the widely recognized precepts which anthropological teachers, like other teachers/mentors, should follow are:

1. Teachers/mentors should conduct their programs in ways that preclude discrimination on the basis of sex, marital status, "race," social class, political convictions, disability, religion, ethnic background, national origin, sexual orientation, age, or other criteria irrelevant to academic performance.

2. Teachers'/mentors' duties include continually striving to improve their teaching/training techniques; being available and responsive to student/trainee interests; counseling students/ trainees realistically regarding career opportunities; conscientiously supervising, encouraging, and supporting students'/trainees' studies; being fair, prompt, and reliable in communicating evaluations; assisting students/trainees in securing research support; and helping students/trainees when they seek professional placement.

3. Teachers/mentors should impress upon students/trainees the ethical challenges involved in every phase of anthropological work; encourage them to reflect upon this and other codes; encourage dialogue with colleagues on ethical issues; and discourage participation in ethically questionable projects.

4. Teachers/mentors should publicly acknowledge student/trainee assistance in research and preparation of their work; give appropriate credit for coauthorship to students/trainees; encourage publication of worthy student/trainee papers; and compensate students/trainees justly for their participation in all professional activities.

5. Teachers/mentors should beware of the exploitation and serious conflicts of interest which may result if they engage in sexual relations with students/trainees. They must avoid sexual liaisons with students/trainees for whose education and professional training they are in any way responsible.

V. Application

1. The same ethical guidelines apply to all anthropological work. That is, in both proposing and carrying out research, anthropologists must be open with funders, colleagues, persons studied or providing information, and relevant parties affected by the work about the purpose(s), potential impacts, and source(s) of support for the work. Applied anthropologists must intend and expect to utilize the results of their work appropriately (i.e., publication, teaching, program and policy development) within a reasonable time. In situations in which anthropological knowledge is applied, anthropologists bear the same responsibility to be open and candid about their skills and intentions, and monitor the effects of their work on all persons affected. Anthropologists may be involved in many types of work, frequently affecting individuals and groups with diverse and sometimes conflicting interests. The individual anthropologist must make carefully considered ethical choices and be prepared to make clear the assumptions, facts and issues on which those choices are based.

2. In all dealings with employers, persons hired to pursue anthropological research or apply anthropological knowledge should be honest about their qualifications, capabilities, and aims. Prior to making any professional commitments, they must review the purposes of prospective employers, taking into consideration the employer's past activities and future goals. In working for governmental agencies or private businesses, they should be especially careful not to promise or imply acceptance of conditions contrary to professional ethics or competing commitments.

3. Applied anthropologists, as any anthropologist, should be alert to the danger of compromising anthropological ethics as a condition for engaging in research or practice. They should also be alert to proper demands of hospitality, good citizenship and guest status. Proactive contribution and leadership in shaping public or private sector actions and policies may be as ethically justifiable as inaction, detachment, or noncooperation, depending on circumstances.

VI. Epilogue

Anthropological research, teaching, and application, like any human actions, pose choices for which anthropologists individually and collectively bear ethical responsibility. Since anthropologists are members of a variety of groups and subject to a variety of ethical codes, choices must sometimes be made not only between the varied obligations presented in this code but also between those of this code and those incurred in other statuses or roles. This statement does not dictate choice or propose sanctions. Rather, it is designed to promote discussion and provide general guidelines for ethically responsible decisions.

VII. Acknowledgments

This Code was drafted by the Commission to Review the AAA Statements on Ethics during the period January 1995-March 1997. The Commission members were James Peacock (Chair), Carolyn Fluehr-Lobban, Barbara Frankel, Kathleen Gibson, Janet Levy, and Murray Wax. In addition, the following individuals participated in the Commission meetings: philosopher Bernard Gert, anthropologists Cathleen Crain, Shirley Fiske, David Freyer, Felix Moos, Yolanda Moses, and Niel Tashima; and members of the American Sociological Association Committee on Ethics. Open hearings on the Code were held at the 1995 and 1996 annual meetings of the American Anthropological Association. The Commission solicited comments from all AAA Sections. The first draft of the AAA Code of Ethics was discussed at the May 1995 AAA Section Assembly meeting; the second draft was briefly discussed at the November 1996 meeting of the AAA Section Assembly.

The Final Report of the Commission was published in the September 1995 edition of the *Anthropology Newsletter* and on the AAA web site (http://www.aaanet.org). Drafts of the Code were published in the April 1996 and 1996 annual meeting edition of the *Anthropology Newsletter* and the AAA web site, and comments were solicited from the membership. The Commission considered all comments from the membership in formulating the final draft in February 1997. The Commission gratefully acknowledge the use of some language from the codes of ethics of the National Association for the Practice of Anthropology and the Society for American Archaeology.

VIII. Other Relevant Codes of Ethics

The following list of other Codes of Ethics may be useful to anthropological researchers, teachers and practitioners:

Animal Behavior Society
1991 Guidelines for the Use of Animals in Research. *Animal Behavior* 41:183-186.

American Board of Forensic Examiners
n.d. *Code of Ethical Conduct.* (American Board of Forensic Examiners, 300 South Jefferson Avenue, Suite 411, Springfield, MO 65806).

American Folklore Society
1988 Statement on Ethics: Principles of Professional Responsibility. *AFSNews* 17(1).

Archaeological Institute of America
1991 Code of Ethics. *American Journal of Archaeology* 95:285.
1994 *Code of Professional Standards.* (Archaeological Institute of America, 675 Commonwealth Ave, Boston, MA 02215-1401. Supplements and expands but does not replace the earlier Code of Ethics).

National Academy of Sciences
1995 *On Being a Scientist: Responsible Conduct in Research.* 2nd edition. Washington, D.C.: National Academy Press (2121 Constitution Avenue, NW, Washington, D.C. 20418).

National Association for the Practice of Anthropology
1988 *Ethical Guidelines for Practitioners.*

Sigma Xi
1992 Sigma Xi Statement on the Use of Animals in Research. *American Scientist* 80:73-76.

Society for American Archaeology
1996 *Principles of Archaeological Ethics.* (Society for American Archaeology, 900 Second Street, NE, Suite 12, Washington, D.C. 20002-3557).

Society for Applied Anthropology
1983 *Professional and Ethical Responsibilities.* (Revised 1983).

Society of Professional Archaeologists
1976 *Code of Ethics, Standards of Research Performance and Institutional Standards.* (Society of Professional Archaeologists, PO Box 60911, Oklahoma City, OK 73146-0911).

United Nations
1948 Universal Declaration of Human Rights.

Appendix 6. Participant Information Sheet

PARTICIPANT INFORMATION SHEET

Version 1.1 Date 18 July 2018

Study Title: Assessing preparedness for maternal immunization in The Gambia

Sponsor & Funder: MRCG at LSHTM & Pfizer

What is this study about and why is it being done?
Vaccination of women during pregnancy might help to protect new-born babies from a number of specific infections. This has already been used for the prevention of tetanus in low-income countries such as The Gambia, and in the prevention of whooping cough and flu in several resource-rich countries. We are doing this study to find out how women who are pregnant or had babies recently feel about pregnancy, vaccines and about vaccines given during pregnancy. We also want to check what their families, the health care workers and other people in the community think about this, who might be giving the women advice. We are also interested in women's previous experiences with vaccination programs and their relationship with those providing the vaccination services. Any information you can give us is important.

What does this study involve?
We will ask you some questions about what you know and what you think about pregnancy and vaccinations in general and specifically about vaccines given during pregnancy, and those who provide them. You are not required to do anything else. Questionnaires may take up to thirty minutes, interviews may last up to an hour and focus group discussions may last up to two hours. Interviews and focus group discussions will be audio recorded with your permission and a transcript of the interview will be analysed by the investigator. Access to the interview transcript will be limited to the study team and our research collaborators. For questionnaires and interviews we will meet with you at a time and location most convenient for you. For focus group discussions you will have to travel to meet with us in a room with five to nine other women. You will receive GMD150 to cover your transportation fees and refreshments will also be served.

What harm or discomfort can you expect in the study?
The research does not involve anything that should cause you harm. You may feel discomfort speaking about some of the issues and do not have to respond to questions you feel uncomfortable with. The information you will be providing us with will be kept strictly confidential and your name will not be known to people outside the study team.

What benefits can you expect in the study?
As this is an observational research study there will be no direct benefits to you. However, by you participating in this study you provide important information to help improve antenatal care and decisions taken regarding maternal vaccinations, and specifically for the introduction of new maternal vaccines. It will also make the antenatal care providers and vaccine providers in The Gambia more aware of what people think about their services.

Will you be compensated for participating in the study?
You will not be compensated for interviews and questionnaires. However, for focus group discussions as you will have to travel to meet with us in a room with five to nine other women, we will pay you the total sum of GMD150 to cover your travelling expenses and/or loss of earnings.

What happens if you refuse to participate in the study or change your mind later?
It is, of course, entirely up to you whether you would like to participate in this study and answer our questions. If you agree to participate you are free to stop the interview at any moment. You are also free to withdraw from the study within four weeks of participation and are free to withdraw any information provided prior to your withdrawal. After four weeks, we will conclude that you have given full consent for all the information you provided to be used in the study.

How will personal records remain confidential and who will have access to it?
Strict confidentiality and anonymity of your information will be maintained by providing you with an individual identification number. We will document your name on consent forms and in field notebooks, which will be safely stored at the Medical Research Council Unit The Gambia. Your full name will only be accessible to the study team. All other physical and computer files will be completely anonymous with your assigned identification number. The principal investigator will ensure that field assistants and the entire study team follow these procedures.

What will happen to the results of this study?
After the research is completed and the study results are available, the principal investigator along with some members of the study team will hold meetings in your or a nearby village to inform you, your family and the community about the findings of the research. The study results will also be shared with members of the scientific community through academic publications and in both national and international conferences. We will use quotations by you in academic publications and presentations at conferences, but they cannot be attributed to you as all is anonymised. At the end of the project, all physical and digital study data will initially be archived for a five-year period followed with an appraisal by the relevant committee.

Who should you contact if you have questions?
If you have any questions or concerns you can call the study investigator, Penda Johm on the number 7229242, or the field assistant, Amie Ceesay on the number 7120442. Please feel free to ask any question you might have about the study.

Who has reviewed this study?
All research involving human participants is looked at by an independent group of people, called a Research Ethics Committee, to protect your interests. This study has been reviewed and given favourable opinion by scientists and heads of research related departments at the Medical Research Council Unit The Gambia and by the Gambia Government/MRCG Joint Ethics Committee. As the study is also being carried out in fulfilment of a PhD, it has also been reviewed by the London School of Hygiene and Tropical Medicine (LSHTM) observational research ethics committee. These ethics committees protect your rights and wellbeing through the process of independent review and have given permission for the research to take place.

Thank you for taking the time to read this information sheet. If you want to take part in the study, please read and sign the consent form.

If you would like further information, please contact the study investigator, Penda Johm on the phone number 7229242.

Appendix 7. Participant Informed Consent Forms

WRITTEN CONSENT FORM

Version 1.1 Date 18 July 2018

Participant's Name: _____

Participant's Identification Number: |__|__|__|__|__|

☐ I have read the written information

and I confirm that

- my choice to participate is entirely voluntarily,
- I have had the opportunity to ask questions about this study and I am happy with the answers that have been provided,
- I understand that I allow access to the information about me by the persons described in the information sheet,
- I agree that my words may be quoted directly, and the study researchers may publish documents that contain anonymous quotations by me.
- I had enough time to think about whether I want to take part in this study,
- I agree to take part in this study.

Participant's signature _____ _____
Date (dd/mm/yyyy) Time (24hr)

Printed Name of Person obtaining consent _____

Signature of Person obtaining consent _____ _____
Date (dd/mm/yyyy) Time (24hr)

ORAL CONSENT FORM

Version 1.1 Date 18 July 2018

Participant's Name: _____

Participant's Identification Number: |__|__|__|__|__|

☐ I have read and explained the written information sheet to the participant in a language that they understand,

and I confirm that

- their choice to participate is entirely voluntarily,
- they have had the opportunity to ask questions about this study and were happy with the answers that have been provided,
- they understand that they allow access to the information about them by the persons described in the information sheet,
- they agree that their words may be quoted directly, and the study researchers may publish documents that contain anonymous quotations by them.
- they had enough time to think about whether they want to take part in this study,
- they agree to take part in this study.

Printed Name of Person obtaining consent _____

I confirm that I have explained the study information accurately in _____ (write name of local language), and it was understood to the best of my knowledge by the participant. He/she (circle one) has freely given consent to participate in the study.

Signature of Person obtaining consent _____ _____

Date (dd/mm/yyyy) Time (24hr)

Printed Name of Witness _____

Appendix 8. Standards for Reporting Qualitative Research (SRQR)

Standards for Reporting Qualitative Research (SRQR)*

http://www.equator-network.org/reporting-guidelines/srqr/

	Page/line no(s).
Title and abstract	
Title - Concise description of the nature and topic of the study Identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended	3926
Abstract - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions	3926
Introduction	
Problem formulation - Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	3927
Purpose or research question - Purpose of the study and specific objectives or questions	3927
Methods	
Qualitative approach and research paradigm - Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/ interpretivist) is also recommended; rationale**	3927
Researcher characteristics and reflexivity - Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability	None
Context - Setting/site and salient contextual factors; rationale**	3927
Sampling strategy - How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale**	3927
Ethical issues pertaining to human subjects - Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	3928
Data collection methods - Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale**	3927

Data collection instruments and technologies - Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	3927
Units of study - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	3928
Data processing - Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts	3927
Data analysis - Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale**	3928
Techniques to enhance trustworthiness - Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale**	3928

Results/findings

Synthesis and interpretation - Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	3930
Links to empirical data - Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	3929

Discussion

Integration with prior work, implications, transferability, and contribution(s) to the field - Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	3931
Limitations - Trustworthiness and limitations of findings	3932

Other

Conflicts of interest - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	3932
Funding - Sources of funding and other support; role of funders in data collection, interpretation, and reporting	3933

*The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.

**The rationale should briefly discuss the justification for choosing that theory, approach, method, or technique rather than other options available, the assumptions and limitations implicit in those choices, and how those choices influence study conclusions and transferability. As appropriate, the rationale for several items might be discussed together.

Reference:

O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. **Standards for reporting qualitative research: a synthesis of recommendations.** *Academic Medicine*, Vol. 89, No. 9 / Sept 2014
DOI: 10.1097/ACM.0000000000000388

Appendix 9. Main characteristics of articles included in the summary descriptive analyses

Author (Year)	Study title	Year(s) data collected	Country(ies)	Study aim(s)	Study design	Sample size	Key findings
Abame (2019)	Relationship Between Unintended Pregnancy and Antenatal Care Use During Pregnancy in Hadiya Zone, Southern Ethiopia	2017	Ethiopia	This study aimed to examine whether unintended pregnancy influences antenatal care utilization during pregnancy.	Cross sectional study (Quantitative)	748 Women	The study found significant association between unintended pregnancy and use of antenatal care among pregnant women in Hadiya zone, southern Ethiopia. The magnitude of unintended pregnancy in the study area was noticeably high in light of the goals of ensuring the women reproductive health and rights which was 36.2% among the study population, 30.7% for mistimed and 5.5% for unwanted pregnancy.
Ahmed and Husein (2020)	Utilization of primary health care and its associated factors among women of childbearing age living in mogadishu-Somalia	2013	Somalia	The broad aim of this study is to assess utilization of Primary Health Care (PHC) and its associated factors among women of childbearing age living in Mogadishu Somalia.	Cross sectional study (Quantitative)	395 Women	The utilization of primary health care documented in this study is 57% poor utilization while 31.1% is average and only 11.9% is good. ANC visits among the participants of this study demonstrated that only 14% of them had on their 1st trimester. This result is also higher compared to 2011 EDHS reported where only 11% of women in Ethiopia made their first antenatal care visit before the fourth month of pregnancy.
Anatea (2018)	Determinants and perceptions of the utilization of tetanus toxoid immunization among reproductive-age women in Dukem Town, Eastern Ethiopia: a community-based cross-sectional study	2016	Ethiopia	This study was intended to investigate the status and factors determining the utilization of TT immunization among reproductive age women in Dukem town, Eastern Ethiopia.	Cross sectional study (Quantitative)	422 Women	We found the prevalence of valid TT dose (≥TT2+) utilization was 39.12% [95% CI: (32.8, 41.0)]. The study also revealed that only 41.1% of the participants used TT vaccination by card. In this study, a notable proportion (33.9%) of the participants were never vaccinated any dose of TT.

Armitage (2018)	Acceptability of intranasal live attenuated influenza vaccine, influenza knowledge and vaccine intent in The Gambia	2012	Gambia	Aimed to quantify knowledge about influenza and to determine possible relationships between influenza knowledge, socio-demographic factors and willingness to accept influenza vaccination in pregnancy or for their children <5 (vaccine intent).	Cross sectional study (Quantitative)	454 Women	Our results show that in those with direct experience of LAIV, the preference for nasal spray was significantly higher, in keeping with studies in high income countries. Women in the exposure group stated, unprompted, that nasal sprays were easier to give than injections and that they were less painful, suggesting that the LAIV given in NASIMMUNE was viewed favourably.
Awosan and Hassan (2018)	Perception and utilization of tetanus toxoid immunization among pregnant women attending a tertiary centre in North-West Nigeria	2015	Nigeria	This study aimed to assess the perception and utilization of tetanus toxoid immunization among pregnant women attending a tertiary centre in North-West Nigeria.	Cross sectional study (Quantitative)	254 pregnant women	The finding of most of the respondents in this study believing that TT immunization is effective in protecting from tetanus (73.3%) and safe for both mother and baby (79.2%) is reassuring, and it has serious implications on the acceptance of the vaccine by them considering the fact that doubts about the vaccine efficacy and safety concerns have been identified as barriers to uptake of TT immunization in studies conducted in many sub-Saharan African and Asia countries, particularly those where MNT has not been eliminated.
Bamidele and Umoh (2004)	Awareness And Compliance Of Antitetanus Immunization Among Adult Females In A Tertiary Institution In Nigeria	2002	Nigeria	The purpose of this study was to investigate the awareness level and the compliance to anti-tetanus immunization among adult female in an urban community in south west of Nigeria.	Cross sectional study (Quantitative)	394 Women	This study has shown a high level of awareness of anti-tetanus immunization programme among the adult female surveyed but a relatively low level of compliance as only less than half of those surveyed ever took the immunization in adulthood.
Bishop (2021)	An evaluation of an influenza vaccination campaign targeting	2015-2018	South Africa	Aimed to describe maternal influenza vaccine coverage in 27 antenatal clinics	Cross sectional study (Quantitative)	62,979 pregnant women	Where additional resources such as free and increased vaccine supply, focused training

	pregnant women in 27 clinics in two provinces of South Africa, 2015 - 2018			(ANCs) in Gauteng and Western Cape (WC) Provinces, where in collaboration with the Department of Health (DoH), we augmented the annual influenza vaccination programme among pregnant women.			of healthcare workers and improved maternal vaccine education were supplied, a high vaccine coverage was achieved.
Bobo (2021)	COVID-19 vaccine acceptability among pregnant women at a primary health care facility in Durban, South Africa	2020	South Africa	The objective of this study was to determine the acceptance of a COVID-19 vaccine among pregnant women.	Cross sectional study (Quantitative)	346 pregnant women	Found that rural black pregnant women are less likely to accept a potential COVID-19 vaccine. In addition to this, racial disparities are reported on COVID-19 vaccine acceptance based on education and employment.
Bonfrer (2014)	The effects of performance incentives on the utilization and quality of maternal and child care in Burundi	2010-2011	Burundi	Aimed to estimate the effects of PBF on the utilization and quality of maternal and child care in Burundi.	Cross sectional study (Quantitative)	4916 women	Found a significant rise in the likelihood of BP measurement and anti-tetanus vaccination as part of the ANC.
Defar (2021)	Distance, difference in altitude and socioeconomic determinants of utilisation of maternal and child health services in Ethiopia: a geographic and multilevel modelling analysis.		Ethiopia	Aimed to analyse if the geographic distance from home to the nearest health facility, the difference in altitude between home and health facility and socioeconomic status were associated with the use of antenatal care, facility delivery, full child immunisation and utilisation of primary care services for sick children in rural Ethiopia.	Cross sectional study (Quantitative)	766 women	Showed that long distance to the health centre, a more significant difference in altitude between home and facility and a lower socioeconomic group were all associated with a smaller proportion of women delivering at a health facility. Similarly, those living with a considerable difference in altitude and belonging to a lower socioeconomic group were less likely to have attended antenatal care four times or more. However, distance, altitude or socioeconomic status were neither associated with coverage of child immunisation

							nor with care seeking for sick children.
Dimbuene (2018)	Women's education and utilization of maternal health services in Africa: a multi-country and socioeconomic status analysis.	Democratic Republic of the Congo (2013–14), Egypt (2014), Ghana (2014), Kenya (2014), Nigeria (2013) and Zimbabwe (2015)	Democratic Republic of the Congo, Egypt, Ghana, Kenya, Nigeria and Zimbabwe	This study examined the differential effects of women's education within different socioeconomic strata in Africa.	Cross sectional study (Quantitative)	The study used the most recent Demographic and Health Surveys (DHS) available from the Democratic Republic of the Congo (2013–14), Egypt (2014), Ghana (2014), Kenya (2014), Nigeria (2013) and Zimbabwe (2015). All women of reproductive age (15–49 years) in the sample households are interviewed.	The findings revealed country-specific variations in maternal health service utilization, and for most indicators there was a clear gradient among socioeconomic strata: women living in better-off households exhibited greater access to, and utilization of, maternal health services.
Ekholuenetale (2020)	Women's enlightenment and early antenatal care initiation are determining factors for the use of eight or more antenatal visits in Benin: further analysis of the Demographic and Health Survey	2017-2018	Benin	The present study aims to determine the frequency, determinants, and socioeconomic inequalities of ANC utilization based on the eight or more contacts in Benin.	Cross sectional study (Quantitative)	1094 women	The results of this study revealed that after about 3 years of the launch of WHO minimum of 8 ANC contacts model, less than one tenth (only 8.0%) of women in Benin had at least 8 ANC contacts with the health care providers throughout the period of their pregnancy.
Fleming (2019)	Maternal immunization in Malawi: a mixed methods study of community perceptions,	2015	Malawi	The objectives of this study were to determine community perceptions of disease transmission and prevention, vulnerability,	Cross sectional study (Quantitative)	274 pregnant women	Found limited awareness and low priority of its prevention by pregnant women and health workers, indicating a strong need to educate the community, including preferred health

	programmatic considerations, and recommendations for future planning			and health priorities of pregnant women in Malawi.			advisors, on the disease and to sensitize stakeholders to the importance of the vaccine and its reassuring safety profile.
Gebremedhin (2020)	Tetanus toxoid vaccination uptake and associated factors among mothers who gave birth in the last 12 months in Errer district, Somali regional state, eastern Ethiopia	2017	Ethiopia	To assess the uptake of tetanus toxoid vaccine and associated factors among mothers who gave birth in the last 12 months in Errer district, Somali Regional State, Eastern Ethiopia, 2017.	Cross sectional study (Quantitative)	440 mothers	Showed that urban residents were more likely to vaccinate for TT2 and the above doses as compared to rural residents.
Godongwana (2021)	Knowledge and attitudes towards maternal immunization: perspectives from pregnant and non-pregnant mothers, their partners, mothers, healthcare providers, community and leaders in a selected urban setting in South Africa	2018	South Africa	Aimed at understanding knowledge, attitudes and acceptability of maternal immunization amongst pregnant and nonpregnant women, mothers and partners of these women, healthcare providers, and community members in selected urban settlements in South Africa.	Semi-structured Interview (Qualitative)	45 women	In this study, while all healthcare providers were knowledgeable of maternal immunization, its importance and the need to provide it, the findings in this study of patients not knowing the types of immunizations that are available and some reporting not ever being immunized suggest existing gaps in the current immunization programme; from both the healthcare system (affecting supply/administering of maternal immunization) and the education given to women around maternal immunization; that if not addressed, may affect the acceptability of future immunization programmes
Haile (2013)	Determinants of utilization of sufficient tetanus toxoid immunization during pregnancy: evidence from the Kenya Demographic	2008–2009	Kenya	The objective of this study was to examine factors associated with sufficient TT immunization among postpartum women in Kenya.	Cross sectional study (Quantitative)	1370 postpartum women	The main factors contributing to having been sufficiently immunized against tetanus were lower birth order, higher household wealth index, women's employment, making

	and Health Survey, 2008-2009						joint health-related decisions with a partner, and higher number of antenatal care visits.
Hailemariam (2021)	Predictors of pregnant women's intention to vaccinate against coronavirus disease 2019: A facility-based cross-sectional study in southwest Ethiopia	2021	Ethiopia	The objective of this study was to investigate predicting factors of intention to be vaccinated against coronavirus disease 2019 among pregnant women in Bench-Sheko Zone, southwest Ethiopia.	Cross sectional study (Quantitative)	412 pregnant women	The study revealed that only 31.3% (95% confidence interval: 26.7–35.2) of the participants had an intention to be vaccinated against coronavirus disease 2019 when the vaccine will be made available in Ethiopia. Participants' intention to be vaccinated against coronavirus disease 2019 was significantly associated with attaining secondary school and above, residing in urban areas, being compliant with coronavirus disease 2019 guidelines and having good perception toward coronavirus disease 2019 vaccine.
Hoque (2020)	COVID-19 vaccine acceptability among pregnant women at a primary health care facility in Durban, South Africa	2020	South Africa	The objective of this study was to determine the acceptance of a COVID-19 vaccine among pregnant women.	Cross sectional study (Quantitative)	346 pregnant women	This study provides an insight into the demographic variables, level of knowledge, attitudes towards and preventive practices and acceptability of the COVID-19 vaccine among a recognized vulnerable group of pregnant women.
Huebl (2020)	Yellow Fever Vaccine Safety Perception of Pregnant Women in Emergency Response Mass Vaccination in Uganda	2017	Uganda	This study was part of a larger qualitative research on local perception and socio-environmental factors of YF in Uganda.	Semi-structured Interview (Qualitative)	20 pregnant women	The Ministry of Health informed affected districts on the YF epidemic and called for mass vaccination. The district health officers executed the campaign on the district level.
Johm (2021)	Factors influencing acceptance of vaccination during pregnancy in The Gambia and Senegal	2013 - 2015	The Gambia, Senegal	Explored the knowledge, attitudes, and perceptions of 152 women who were either pregnant or with an infant. NVivo 11 Qualitative Data Analysis Software was used	Focus group Discussion (Qualitative)	152 pregnant	Whilst most women agreed that it is helpful to receive vaccines at no cost, other opinions differed, saying it depends on the cultural norms and beliefs of the communities. One most

				for management and thematic analysis of the data.			noted deterrent to uptake of maternal vaccines was accessibility to ANC as women across both The Gambia and Senegal complained of insufficient public transportation as well as long waiting hours at their nearest health centres and hospitals.
Kajungu (2020)	Vaccines safety and maternal knowledge for enhanced maternal immunization acceptability in rural Uganda: A qualitative study approach	2019	Uganda	This study was aimed at exploring maternal knowledge, attitudes, willingness, and beliefs towards maternal immunization among pregnant women in rural Uganda.	Focus group Discussion (Qualitative)	90 pregnant women	Women were familiar with the importance of maternal vaccines, had positive attitudes, and expressed willingness to take them. Acceptance of a new vaccine could be affected by worries of pregnant women and that of their partners, who influence health seeking decisions in a home concerning adverse events, following the maternal immunization (AEFI). There were misconceptions about introduction of vaccines such as the belief that vaccines treat malaria and general body weakness, and being used as guinea pigs to test for the vaccine before its introduction to the larger population.
Konje (2018)	Missed opportunities in antenatal care for improving the health of pregnant women and newborns in Geita district, Northwest Tanzania	2015 - 2016	Tanzania	The primary objectives of this research study in rural communities of Geita district, Northwest Tanzania were: 1) to conduct a population-based study that examined the utilization and availability of ANC services; and 2) to explore the challenges faced by women who visited ANC clinics and barriers to utilization of ANC among pregnant women	Cohort Study (Quantitative)	1,719 pregnant women	Of the pregnant women who participated, 86.74% attended an ANC clinic at least once; 3.62% initiated ANC in the first trimester; 13.26% had not initiated ANC when they were interviewed in their 3rd trimester. In terms of other preventive measures, 91.01% received a tetanus toxoid vaccination. Significant challenges identified by women who visited ANC clinics included lack of male partner

							involvement, informal regulations imposed by health care providers, perceived poor quality of care, and health care system related factors. Socio-cultural beliefs, fear of HIV testing, poverty and distance from health clinics were reported as barriers to early ANC utilization.
Konlan (2020)	Factors influencing the utilization of Focused antenatal care services during pregnancy, a study among postnatal women in a tertiary healthcare facility, Ghana	2018	Ghana	This study assessed the factors that influence the use of focused antenatal care services during pregnancy among postnatal women in the Ho Teaching Hospital of the Volta region of Ghana.	Cross sectional study (Quantitative)	210 postnatal	The respondents indicated that FANC would enable them to receive comprehensive ANC (74.8%). Higher parity was significantly associated with low utilization of FANC (p = .028). Long distance to the health facility, seeking permission to use FANC was significantly associated with low utilization of FANC (p < .001). Fear associated with witchcraft was associated with low FANC utilization (p < .001).
Larson Williams (2018)	When you are injected, the baby is protected: Assessing the acceptability of a maternal Tdap vaccine based on mothers' knowledge, attitudes, and beliefs of pertussis and vaccinations in Lusaka, Zambia	2016	Zambia	Research aimed to assess the feasibility of implementing a maternal vaccination strategy against pertussis and potentially other pathogens in Zambia.	Focus group Discussion (Qualitative)	50 women	This research highlights Zambian mothers' knowledge of, experiences with, and attitudes toward pertussis and vaccines. Although mothers had a limited knowledge of the causes of pertussis and how vaccines work, many highly valued maternal and neonatal vaccines.
Lechthaler (2018)	Bottlenecks in the provision of antenatal care: rural settled and mobile pastoralist communities in Chad	2014 - 2018	Chad	To assess antenatal care (ANC) coverage and analyse constraining factors for service delivery to rural settled and mobile populations in two districts in Chad.	Cross sectional study (Quantitative)	1144 mothers	Study found that the coverage of ANC services in rural Chad is low. The rate of respondents who attended at least one ANC visit among settled populations was 79%, while that among mobile pastoralists was only

							46%. According to the national DHS survey conducted in 2014, 59% of rural mothers between 15 and 49 years in Chad attended at least one ANC during pregnancy, which lies between the utilisation rate estimated for rural settled and mobile populations in the present study.
Liyew and Ayalew (2021)	Individual and community-level determinants of poor tetanus toxoid immunization among pregnant women in Ethiopia using data from 2016 Ethiopian demographic and health survey; multilevel analysis	2016	Ethiopia	This study aimed to assess individual and community-level factors associated with poor TT immunization coverage in Ethiopia	Cross sectional study (Quantitative)	7043 pregnant women	In the multilevel logistic regression model adjustment, having no Antenatal care visit (AOR = 5.64; 95% CI: 2.48,7.30) and having one to three antenatal care visit (AOR = 1.50; 95% CI: 1.19–1.82); poor wealth index (AOR = 1.26; 95% CI: 1.03, 1.54); not being exposed to media (AOR = 1.29; 95% CI: 1.10, 1.51); maternal unemployment (AOR = 1.15; 95% CI: 1.10, 1.31); rural residence (AOR = 1.13; 95% CI: 1.08, 1.72); and high community illiteracy (AOR = 1.28; 95% CI: 1.03, 1.58) were associated with higher odds of poor tetanus toxoid immunization. Whereas, iron uptake during pregnancy (AOR = 0.59; 95% CI: 0.51, 0.68), was associated with lower odds of poor tetanus toxoid immunization.
Lori (2019)	Maternity waiting homes as part of a comprehensive approach to maternal and newborn care: a cross-sectional survey	2013–2014	Zambia	The objective of this study was to assess the associations among MWH use and ANC and PNC attendance, family planning, and immunization rates of newborns for mothers living	Cross sectional study (Quantitative)	2381 participants	Thirty-one percent of our sample reported using a MWH during their last pregnancy. Results indicate a positive association between MWH use and number of ANC visits (four or more visits), attending all PNC visits,

				in seven rural districts in Zambia.			and increased contraceptive use of any kind to avoid pregnancy.
Lund (2014)	Mobile phones improve antenatal care attendance in Zanzibar: a cluster randomized controlled trial	2009- 2010	Tanzania	Aimed to assess antenatal care in a comprehensive way taking into consideration utilisation of antenatal care as well as content and timing of interventions during pregnancy.	Cross sectional study (Quantitative)	2550 pregnant women	Findings showed that a simple mobile phone intervention improved antenatal care attendance.
Mamoro and Hanfore (2018)	Tetanus toxoid immunization status and associated factors among mothers in Damboya Woreda, Kembata Tembaro Zone, SNNP, Ethiopia	2017	Ethiopia	The aim of this study was to determine the status of TT immunization among mothers in Damboya Woreda, South Ethiopia.	Cross sectional study (Quantitative)	845 mothers	In this study, immunization status was assessed using the availability of vaccination card and maternal recall (oral history). Based on both immunization card and oral history, 607 (72.5%) mothers were protected against tetanus at their last birth.
Materia (1993)	A community survey on maternal and child health services utilization in rural Ethiopia	1990	Ethiopia	It was aimed at tackling the "silent emergency" concerning the health of women and children in Ethiopia, at increasing the low rate of health service utilization, and expanding Primary Health Care (PHC) programmes with less per capita resource	Cross sectional study (Quantitative)	111 mothers	Information on coverage of health programmes derive from reliable routine reporting from health facilities as well as from community surveys. Surveys are very useful for investigating factors, reasons and determinants of use and lack of use of health services and for suggesting recommendations for decision making.
Mihret (2018)	The role of timely initiation of antenatal care on protective dose tetanus toxoid immunization: the case of northern Ethiopia post natal mothers	2007	Ethiopia	The purpose of this study was to assess tetanus toxoid protective dose immunization at last birth and associated factors among mothers who gave birth within one year prior to the study in Debretabor town, Northwest Ethiopia, 2016.	Cross sectional study (Quantitative)	511 women	The odds of TT protective dose immunization was higher among mothers who have attended formal education, have initiated early ANC visit, with planned last pregnancy, achieving two or more ANC visit, and with perceived good quality of service.
Mohamed and Ahmed (2022)	Prevalence and determinants of antenatal tetanus vaccination in Sudan:	2014	Sudan	This study aimed to identify the extent of antenatal tetanus vaccination and their influencing factors in a	Cross sectional study (Quantitative)	5433 women	Most of the participants (28.6%) were 25–29 years old, and vast majority of them

	a cross-sectional analysis of the Multiple Indicator Cluster Survey			nationally representative population sample.			(73.7%) live in rural areas. The prevalence of mothers who had adequate tetanus vaccination was 60.0%. Antenatal tetanus vaccination was significantly associated with higher level of mothers' education (AOR = 1.70, 95% CI 1.25–2.32), higher household wealth index (AOR = 1.89, 95% CI 1.41–2.54), having four or more ANC visits (AOR = 1.49, 95% CI 1.30–1.71), and living in areas with low intensity of armed conflicts (AOR = 1.34, 95% CI 1.14–1.57).
Mose and Yeshaneh (2021)	COVID-19 Vaccine Acceptance and Its Associated Factors Among Pregnant Women Attending Antenatal Care Clinic in Southwest Ethiopia: Institutional-Based Cross-Sectional Study	2021	Ethiopia	The main objective of this study was to assess the prevalence of COVID-19 vaccine acceptance and its associated factors among pregnant women attending antenatal care clinic in Southwest Ethiopia	Cross sectional study (Quantitative)	396 pregnant mothers	The COVID-19 vaccine acceptance was found to be 70.7% (95% CI, 66.7%–74.7%). Maternal age (34–41) years [AOR=1.464, (95% CI; 1.218–5.129)], primary maternal educational status [AOR=3.476, (95% CI; 1.520–7.947), good knowledge [AOR=5.946, (95% CI; 3.147–7.065)], and good practice [AOR =9.15, (95% CI; 8.734–12.189)] of pregnant women towards COVID-19 and its preventive measures were factors associated with COVID-19 vaccine acceptance.
Nalubega (2021)	Maternal Vaccination in Uganda: Exploring Pregnant Women, Community Leaders and Healthcare Workers' Perceptions	2019 - 2020	Uganda	The objective of this study was to develop a better understanding of perceptions around maternal vaccination in Uganda, focusing on the factors that could influence pregnant women's decisions to accept or refuse vaccination during pregnancy.	Focus group Discussion (Qualitative)	135 pregnant women,	We have described pregnant women, community leaders, HCWs and programme managers' perceptions of the barriers to and enablers of maternal vaccination and the role of community and family in decision-making in an urban Ugandan setting.

Nass (2018)	A Pilot Study: Factors Influencing Compliance With Tetanus-Diphtheria Vaccine in Katsina State, Northwestern Nigeria	2006	Nigeria	The goal of the pilot study was to identify the Td+ vaccination coverage and identify any association between other factors.	Cross sectional study (Quantitative)	309 women	Findings from descriptive statistics indicated low (23%) Td2+ coverage in Charanchi district of Katsina State, which is even less than the annual administrative Td2+ coverage rates of the past 3 years in the district.
Natai (2020)	Association between male involvement during antenatal care and use of maternal health services in Mwanza City, Northwestern Tanzania: a cross-sectional study	2019	Tanzania	This study aimed to assess the association of male involvement during ANC on frequency of ANC visits (attend four or more visits), use of SBAs during childbirth and PNC utilisation within 48hours after delivery.	Cross sectional study (Quantitative)	430 women	The results of this study show that nearly half (45.6%) of the men do not participate in the antenatal care with their partners.
Ndimbii (2018)	Access and utilisation of reproductive, maternal, neonatal and child health services among women who inject drugs in coastal Kenya: findings from a qualitative study	2015	Kenya	The aim of this study was to document the RMNCH experiences and needs of women who inject drugs in coastal Kenya.	Focus group Discussion (Qualitative)	45 women	This study documents the experiences and needs of women who inject drugs in relation to their access to RMNCH services, and highlights that there are significant supply and demand side issues to be considered in program interventions.
Nebeb (2015)	Antenatal care utilization in Debre Tabor, North West Ethiopia	2013	Ethiopia	This study aimed to provide appropriate information for managerial decision-making.	Cross sectional study (Quantitative)	317 Women	In this study, the overall antenatal care utilization was 55.7%. The proportion is lower than previous study in Hadiya zone (86.3%) and Maichew town (80%) but higher than a study in Yem special woreda (28.6%). The difference may be due to difference in strength of data collection in the former two and due to time difference in the later case.
Nganga (2019)	Patient and provider perspectives on how trust influences maternal vaccine	2017	Kenya	This study aimed to find out how patient-provider relationships affect maternal vaccine uptake, particularly	Semi-structured Interview (Qualitative)	328 pregnant women	In this study, we assessed how pregnant women and antenatal care providers perceive patient trust in their relationship and

	acceptance among pregnant women in Kenya			in the context of a lower middle- income country where limited research in this area exists.			how, from their perspectives, it affects maternal vaccination in diverse areas from Kenya.
Nnebue (2014)	Constraints to utilization of maternal health services at the primary health care level in Nnewi, Nigeria	2007	Nigeria	To determine the constraints to utilization of maternal health services in the primary health centres in Nnewi, Nigeria.	Cross sectional study (Quantitative)	280 women	Eighty-four (30%) mothers were not vaccinated against tetanus for such reasons as non-availability of vaccines (28.6%), fear of side effects (25%), and lack of belief in vaccination efficacy (20.3%). Difficulties experienced before accessing the facilities were: bad state of roads (60.7%), lack of transportation (34.6%) and high transportation cost (25%).
Nsibande (2020)	Uptake of antenatal care in high HIV-prevalence settings: Results from three population-based surveys in South Africa	2010 - 2013	South Africa	The aim of this analysis was to determine the uptake of recommended routine basic ANC, i.e. ≥4 ANC visits, using secondary data from three national, population-based surveys (2010, 2011 - 2012 and 2012 - 2013) conducted in SA. Secondary objectives were to determine factors associated with adhering to ≥4 ANC visits and to assess whether better uptake of such visits increases coverage of selected key ANC services.	Cross sectional study (Quantitative)	9 ,470 women	We report our findings on the uptake of the recommended (pre-2016) ≥4 basic ANC visits and factors associated with ANC visit adherence, and describe the coverage and receipt of basic ANC service activities, from three national, population-based surveys (2010, 2011 - 2012 and 2012 - 2013) in SA. Overall, our findings show a relatively modest increase (9.2%) in the uptake of ≥4 ANC visits between 2010 and 2012 - 2013.
Ntambue (2012)	Determinants of maternal health services utilization in urban settings of the Democratic Republic of Congo - a case study of Lubumbashi City	2010	Democratic Republic of Congo	The present study was undertaken in order to determine the factors that influence the use of mother and child healthcare services in Lubumbashi, Democratic Republic of the Congo.	Cross sectional study (Quantitative)	1,762 women	This lack of knowledge among women with respect to the twofold advantages of this service (maternal, as well as foetal and neonatal), reflects a deficiency in information due to an absence of continuum in these services between healthcare facilities and the community.

Nyiro (2020)	Implications of gestational age at antenatal care attendance on the successful implementation of a maternal respiratory syncytial virus (RSV) vaccine program in coastal Kenya	2017 - 2018	Kenya	Aimed to describe the distribution of gestational age at each attendance for ANC care among pregnant women from the population of the Kilifi Health and Demographic Surveillance System (KHDSS) area, Coastal Kenya	Cross sectional study (Quantitative)	1000 women	Maternal immunisation to boost RSV specific antibodies, is a strategy proposed to protect infants against RSV associated disease within the first few months of life. Implementation of a maternal RSV vaccine program will be influenced by several factors, one of them being the appropriate timing of vaccination.
Olaitan (2017)	Ending preventable maternal and child deaths in western Nigeria: Do women utilize the life lines?	2015	Nigeria	The study objective was to determine utilization of maternal and child health care services among women of child bearing age in Western Nigeria	Cross sectional study (Quantitative)	382 women	This study found that the utilization of ANC was generally high. This proportion is higher than that reported in NDHS 2013(61%) but lower than the proportion reported in India (99%), Kenya (89%), South East Nigeria (97%). It is almost similar to figures reported in Ibadan, another city in southwest Nigeria where utilization was 78%.
Otieno (2020a)	Drivers and barriers of vaccine acceptance among pregnant women in Kenya	2017 - 2018	Kenya	The purpose of this study was to examine knowledge, drivers, and barriers of maternal vaccine acceptance in Kenya.	Cross sectional study (Quantitative)	604 pregnant	Found a high level of acceptance for maternal vaccines among pregnant women in Kenya. Most participants reported having received a vaccine during the current and/or prior pregnancy, and nearly all reported favorable views on the importance and effectiveness of vaccination during pregnancy.
Otieno (2020b)	Knowledge and attitudes towards influenza and influenza vaccination among pregnant women in Kenya	2017 - 2018	Kenya	Sought to understand knowledge and attitudes of Kenyan pregnant women on influenza vaccination and factors that would influence their willingness to receive influenza vaccines during pregnancy to	Cross sectional study (Quantitative)	507 pregnant women	Overall, 369 (72.8%) women had heard of influenza. Among those, 288 (78.1%) believed that a pregnant woman would be protected if vaccinated, 252 (68.3%) thought it was safe to receive a vaccine while pregnant, and 223 (60.4%) believed a baby would be

				inform decision making on future plans to expand the pregnancy vaccination platform in the country.			protected if mother was vaccinated. If given opportunity, 309 (83.7%) pregnant women were willing to receive the vaccine. Factors associated with willingness to receive influenza vaccine were mothers' belief in protective effect (OR 3.87; 95% CI 1.56, 9.59) and safety (OR 5.32; 95% CI 2.35, 12.01) of influenza vaccines during pregnancy.
Owolabi (2017)	Utilization and content of antenatal care comparing adolescent and older first time mothers in 13 countries of West Africa: a cross-sectional analysis from nationally representative surveys	2010	Benin, Burkina Faso, Ivory Coast, Gambia, Ghana, Guinea, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, Togo	Aims to ensure healthy lives and promote wellbeing at all ages. Other related health indicators include coverage of essential health services such as antenatal care.	Cross sectional study (Quantitative)	1,9211 women	Study utilized the most recent DHS data to describe ANC provision among adolescents and older women with first births in 13 countries of West Africa. To our knowledge, this is the first study to focus specifically on the West African sub-region and to compare the source of care and ANC components received by adolescents to that of older women.
Peneza and Maluka (2018)	Unless you come with your partner you will be sent back home': strategies used to promote male involvement in antenatal care in Southern Tanzania	2016	Tanzania	This study aimed at describing strategies that were used by health providers and the community to promote male participation in antenatal care services and challenges associated with the implementation of these interventions in Southern Tanzania.	Semi-structured Interview (Qualitative)	53 Women	The findings of this study revealed that different strategies were employed by health providers and the community in promoting participation of men in antenatal care services. These strategies included: health providers denying services to women attending antenatal care without their partners, fast-tracking service to men attending antenatal care with their partners, and providing education and community sensitisation. The implementation of these strategies was reported to have

							both positive and unintended consequences.
Pugliese-Garcia (2018)	Factors influencing vaccine acceptance and hesitancy in three informal settlements in Lusaka, Zambia	2018	Zambia	Sought to understand overarching perceptions on vaccines' hesitancy in three informal settlements in Lusaka.	Focus group Discussion (Qualitative)	281 laypersons	While respondents agreed that vaccines were perceived as acceptable, safe and effective, they also described how traditional and religious alternatives, past experiences with interventions, social norms and interactions, and incomplete understanding and access to vaccination interacted to foster hesitancy in their communities. Responses from health actors were acutely in tune with those in the community, likely because they are from the community and not professionalised.
Rai (2014)	Individual Characteristics and Use of Maternal and Child Health Services by Adolescent Mothers in Niger	2006	Niger	This paper attempts to explore factors associated with the utilization of MCH care services by adolescent mothers.	Cross sectional study (Quantitative)	934 women	This study identified a number of factors that were significantly associated with the utilization of selected MCH care services by adolescent women and their children in Niger.
Regassa (2011)	Antenatal and postnatal care service utilization in southern Ethiopia: a population-based study	2011	Ethiopia	Examining the prevalence and factors associated with antenatal Care (ANC) and Postnatal Care (PNC) service utilizations.	Cross sectional study (Quantitative)	1,094 women	The study has revealed that the level of ANC service utilization is relatively higher (about 77.4 percent) compared to other populations in southern Ethiopia.
Sabahelzain (2021)	Vaccine Information Seeking Behavior Among Pregnant Women in Khartoum State, Sudan: A Hospital-Based Cross-Sectional Study	2020	Sudan	This study aims to explore vaccine information-seeking behavior and its determinants among pregnant women in Khartoum state, Sudan.	Cross sectional study (Quantitative)	350 pregnant women	Findings showed that one-third of pregnant women (35.7%) searched for information about vaccines.
Sato and Fintan (2020)	Effect of cash incentives on tetanus toxoid vaccination	2013	Nigeria	Evaluated whether providing cash incentives increases the uptake of tetanus toxoid	Cross sectional study (Quantitative)	2,530 women	Found that cash incentives significantly increased onetime tetanus vaccine uptake among

	among rural Nigerian women: a randomized controlled trial			vaccination among women of childbearing age in rural northern Nigeria.			women of childbearing age. A two-dollar cash incentive (C300) increased the odds of vaccine uptake more than three times as compared to the control.
Scanlon (2021)	A retrospective study of the impact of health worker strikes on maternal and child health care utilization in western Kenya	2019	Kenya	Conducted a retrospective survey study to assess the impact of nationwide strikes by health workers in 2017 on utilization of maternal and child health services in western Kenya.	Focus group Discussion (Qualitative)	1341 women	Found that recent strikes by health workers were associated with lower maternal and health care utilization of ANC and delivery at a health facility among pregnant women in Trans Nzoia County in western Kenya.
Shikuku (2021)	Early indirect impact of COVID-19 pandemic on utilisation and outcomes of reproductive, maternal, newborn, child and adolescent health services in Kenya: A cross-sectional study	2020	Kenya	The objective of this study was to determine the initial impact of COVID-19 pandemic on RMNCAH services in Kenya in the first four months of the pandemic by comparing RMNCAH Kenya Health Information System (KHIS) utilisation data for 2019 and 2020.	Cross sectional study (Quantitative)	Over 1,500,000 women	This study has demonstrated the overall impact of COVID-19 pandemic on essential RMNCAH services utilisation and maternal and perinatal outcomes during the first four months, when strict measures were in place to limit community spread in a low – and middle-income setting.
Skjefte (2021)	COVID-19 vaccine acceptance among pregnant women and mothers of young children: results of a survey in 16 countries	2020	South Africa	Acceptance of COVID-19 vaccination among pregnant women and mothers of children younger than 18-years-old, as well as potential predictors.	Cross sectional study (Quantitative)	17,871 pregnant women	Found substantial geographic variation in the acceptance of COVID-19 vaccination among pregnant women and mothers of young. Acceptance in India, the Philippines, and Latin America was above 60% among pregnant women and above 78% among non-pregnant women for themselves; and above 75% among mothers for their children.
Sule (2014)	Awareness, perception and coverage of tetanus immunisation in women of child bearing age in an	2008	Nigeria	This study assessed the level of awareness and perception of women of child bearing age to tetanus immunisation and determines the coverage rate in Ojodu Local Council	Cross sectional study (Quantitative)	288 women	Two hundred and eighty-eight women of child bearing age (15-49years) in Ojodu Local Council Development Area of Lagos State participated in this study. The mean age of

	urban district of Lagos, Nigeria			Development Area (LCDA) of Lagos State, Nigeria.			respondents was 26.9 years. Slightly more than half of the respondents were single 52.4% and had no children 55.6%. About ninety per cent of respondents had at least secondary school level of education.
Tafere (2018)	Providers adherence to essential contents of antenatal care services increases birth weight in Bahir Dar City Administration, north West Ethiopia: a prospective follow up study	2015 - 2016	Ethiopia	The aim of this study was to investigate the association between adherences of providers to essential services of antenatal care and birth weight which might have an input for the design of guidelines and policies to improve child survival in low income countries like Ethiopia.	Cross sectional study (Quantitative)	718 women	This study revealed that the frequency of nutritional advice given to pregnant women during their ANC visits have statistically significant effect on increasing the birth weight of their babies. In contrary to this finding a meta-analysis done from thirty-three studies evidenced nutrition education and counselling significantly improved mean birth weight but was not significantly associated with the risk of low birth weight.
Tann (2007)	Use of antenatal services and delivery care in Entebbe, Uganda: a community survey	2004	Uganda	The aims of this study were to describe the changing use of antenatal services and delivery care amongst women living in a semi-urban community in and around Entebbe in central Uganda; to facilitate our understanding of women's access to antenatal and maternity services; to examine the range of services that they received, and to describe common perinatal care practices that occur both at home and in health care facilities.	Cross sectional study (Quantitative)	413 women	Found that antenatal services were well utilised, but that the availability of individual services varied with mothers able and willing to travel a moderate distance to a facility providing a good service.
van Eijk (2006)	Use of antenatal services and delivery care among women	2002	Kenya	Assessed provision and use of antenatal services and delivery care among women	Cross sectional study (Quantitative)	730 women	In this survey in a rural area in western Kenya, 9 out of 10 women reported at least one

	in rural western Kenya: a community based survey			in rural Kenya to determine whether women were receiving appropriate care.			ANC visit during their last pregnancy; however, two-thirds of these women began attending the ANC in the third trimester, and only half of these women made the recommended number of 4 visits. Services provided by the various ANCs were not optimal, with a low coverage of intermittent preventive treatment with sulfadoxine-pyrimethamine, and supplementation of iron and folic acid.
Wanyana (2021)	Rapid assessment on the utilization of maternal and child health services during COVID-19 in Rwanda	2019	Rwanda	To assess the change in the utilization of maternal and child health (MCH) services during the COVID-19 outbreak.	Cross sectional study (Quantitative)	50,000 women	The analyses showed that there was a decrease in utilization of 13 MCH services across Rwanda since the COVID-19 outbreak, particularly in utilizations related to health facility deliveries and child vaccinations services.
Worku and Woldesenbet (2016)	Factors that Influence Teenage Antenatal Care Utilization in John Taolo Gaetsewe (JTG) District of Northern Cape Province, South Africa: Underscoring the Need for Tackling Social Determinants of Health	2014	South Africa	This study aimed to assess whether teenage pregnancy was one of the risk factor for late attendance of ANC visit among other factors that influence teenage ANC utilization in JTG district, in Northern Cape Province, South Africa	Cross sectional study (Quantitative)	383 mothers	Findings from this study indicate that many of the opportunities for ANC benefits continue to be missed in the JTG district, particularly among teenagers.
Yaya (2019)	Antenatal visits are positively associated with uptake of tetanus toxoid and intermittent preventive treatment in pregnancy in Ivory Coast	2016	Ivory Coast	Aimed to examine the prevalence of women using these two services, and the association between women's uptake of IPTp-SP and tetanus toxoid (TT) with antenatal care use in Ivory Coast.	Cross sectional study (Quantitative)	9583 pregnant women	Despite numerous government interventions, tetanus and malaria related morbidity and mortalities remain a significant public health challenge across Africa.

Yaya (2020)	Prevalence and predictors of taking tetanus toxoid vaccine in pregnancy: a cross-sectional study of 8,722 women in Sierra Leone	2017	Sierra Leone	The aim of this study was to measure the prevalence and predictors of taking tetanus toxoid among pregnant women in Sierra Leone.	Cross sectional study (Quantitative)	8722 women	Literature reveals that immunization coverage among women of childbearing age is still a major public health problem especially developing countries. This study sought to assess the prevalence of both TT and adequate TT immunization, and their associated factors. Findings reveal that the proportion of pregnant women who received TT immunization was 97.8% and that of adequate doses was 82%.
Ymba and Perrey (2003)	Acceptability of tetanus toxoid vaccine by pregnant women in two health centres in Abidjan (Ivory Coast)	2003	Ivory Coast	A study was conducted in two health centres in Abidjan, Ivory Coast (Abobo and Port Bouet) to compare the knowledge of pregnant women regarding tetanus and hepatitis B and to evaluate the acceptability of tetanus immunisation.	Semi-structured Interview (Qualitative)	124 women	The acceptability of tetanus toxoid vaccine can be considered to be good if we refer to the interviews of women, as well as the midwives and the nurses involved in the tetanus immunisation programme.