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Radio and Television Media and Health-Seeking Behavior Among Women in Rural Northern Nigeria

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

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Abstract

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MPH, University of Sheffield, United Kingdom, 2009

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Doctoral Study Submitted in Partial Fulfillment

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Doctor of Public Health

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Abstract

Poor maternal health-seeking behavior (MHSB) has contributed to persistently high maternal mortality in rural northern Nigeria. Despite increasing access to health information via media platforms, little is known about the association between media exposure and MHSB in this region. In this study, the association between mass media exposure (radio and television) and MHSB was investigated using institutional delivery as a proxy. The health belief model was applied as the theoretical framework for this study and sought to answer two key questions focused on whether there is an association between media exposure and MHSB in rural northern Nigeria and what the association is between media exposure and MHSB when moderated by the number of antenatal care (ANC) visits in rural northern Nigeria, controlling for education and wealth index. Secondary data from 11,048 women in the 2018 National Demographic Health Survey were analyzed using SPSS 29, employing descriptive statistics and complex samples logistic regression. Both radio and television exposure were significantly linked to increased use of health facilities for delivery, independent of education and wealth. Television exposure had a stronger protective effect, especially among women who attended four or more ANC visits, while the effect of radio was not moderated by ANC attendance. Radio and television, integrated with ANC and community engagement, can be leveraged to disseminate maternal health information. A concise policy brief, intervention plan, and educational material were developed that can have implications for positive social change, such as empowering women, reducing disparities, and supporting sustainable improvements in MHSB and outcomes in rural northern Nigeria.

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Dedication

This research work is dedicated to God for granting me the grace and resources to begin and successfully complete this milestone in my career journey. I also dedicate this work to my husband, Osieka Akeju, my daughter, Sophie Akeju, and my son, Rimade Akeju, for their constant support and encouragement throughout my doctoral journey.

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I acknowledge my Lord and Savior, Jesus Christ, for enabling me to start and complete this doctoral journey. I also acknowledge the unwavering support and encouragement of my husband and children throughout the five-plus years of this academic pursuit. I appreciate my committee chair, Dr. Jennifer Oliphant, for her constant guidance and support in completing this study. Additionally, I appreciate all the Walden University faculty and staff who have supported me in one way or another throughout this journey.

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Section 1: Foundation of the Study and Literature Review

Introduction

In this study, I explored the association between media and maternal health-seeking behavior (MHSB) in rural northern Nigeria. This research was critical due to the unique sociocultural dynamics and health challenges that women face in this region, where access to health care services is often limited (Sinai et al., 2024). By examining the association between media and MHSB in this region, I aimed to identify how media platforms might help to overcome some barriers to accessing health care, particularly cultural norms, because cultural beliefs and practices strongly influence health-seeking behavior (Badru & Adekola, 2023). The results of my study could also inform targeted health interventions and communication strategies that leverage media platforms to promote health awareness and encourage women to seek necessary medical care.

To the best of my knowledge, research exploring the connection between media and health-seeking behavior among women in this region was limited. However, the implications of my study extend beyond academic knowledge and hold the potential for positive social change. A positive and/or strong association between media and health-seeking behavior among women in rural northern Nigeria could imply that these women can be empowered with critical health information through media platforms, enabling informed decision making regarding their health and well-being. This empowerment could lead to improved health outcomes for these women and their families and communities, thereby promoting equity. As more women engage with health-related content through media, there may be a gradual transformation of social norms surrounding women's health, fostering a more supportive environment for women seeking medical assistance and discussing health issues openly. The findings from my study can be used to enhance health communication strategies, tailor public health interventions, and increase health literacy. My results could also inform policy development by emphasizing the importance of helping women effectively access and use health information from radio and television, ensuring they are informed participants in their health care decisions.

Background

The World Health Organization (WHO, 2023) reported that Nigeria had a maternal mortality ratio (MMR) of 1,047 deaths per 100,000 live births, making it the third highest in Africa, following South Sudan and Chad. The MMR was particularly high in rural areas and northern states of Nigeria (Babajide et al., 2023). Researchers have indicated a strong association between good MHSB and better maternal health outcomes (Ahmad et al., 2019; Guo et al., 2021; Onchonga et al., 2021; Sabetghadam et al., 2022; Toe et al., 2021; Zhang et al., 2020). Additionally, studies have shown that access to health information through media was positively associated with improved MHSB (Guo et al., 2021; He et al., 2022; Jalu et al., 2019; Tawfiq et al., 2023). However, poor MHSB persists in rural Nigeria due to the region's sociodemographic factors (Okoli et al., 2020).

Research has shown that many residents in rural northern Nigeria have access to media platforms such as radio and television. Ozohu-Suleiman (2021) found that in 120 communities across rural northern Kaduna State in Nigeria, 65% of women had access to radios, while 75% had access to televisions. Aboagye et al. (2022) investigated the relationship between mass media exposure and the use of maternal health care services among women in 28 sub-Saharan African countries (including Nigeria), using data from Demographic and Health Surveys (DHS) conducted between 2010 and 2020. They found that women who listened to the radio or watched television at least once a week were more likely to attend antenatal care (ANC), use skilled birth attendants, and utilize postnatal care services compared to those who did not use these media at all. However, Aboagye et al. did not focus exclusively on the rural parts of northern Nigeria.

To bridge the digital divide between urban and rural populations, Nigeria implemented initiatives such as the National Digital Economy Policy and Strategy for 2020−2030 and the National Broadband Plan for 2020−2025. These efforts contributed to a reduction in the media usage gap (mobile internet), which decreased from 53% in 2018 to 39% in 2020 (Mba, 2022). Leveraging the existing access to media platforms among women in rural northern Nigeria, in addition to Nigeria's initiatives to reduce the digital divide, is critical for enhancing good MHSB and reducing MMR. Further research and targeted interventions are necessary to ensure that all women, especially those in rural regions, have access to vital resources and support for safe motherhood. Although previous researchers had investigated this issue, I found no literature on the association between media and MHSB in rural northern Nigeria. My study was needed because its findings could improve MHSB in rural northern Nigeria by providing evidence for the use of media platforms to deliver effective health communication interventions in this region.

Problem Statement

The research problem was the lack of knowledge about the possible association between media and MHSB in rural northern Nigeria. In Nigeria, I observed an increasing trend in seeking health information from media sources. According to Abaya et al. (2023), 81.4% of adults in Abuja, northcentral Nigeria, sought health information on the internet, with more than half accessing the internet daily. Adeosun and Folayan (2019) reported that 94% of youths in Ekiti State, southwestern Nigeria, had their health-seeking behavior influenced by the internet. Furthermore, Jamiu et al. (2023) found that the percentage of Nigerians seeking health information online increased from 87.4% to 96.6% during the COVID-19 pandemic. However, I did not explore the association between internet use, as a component of media, with MHSB in this study because 99% of my target population who participated in the 2018 Nigeria Demographic Health Survey (NDHS) did not use the internet frequently.

A study conducted in Ghana showed that mass media, particularly radio, was one of the preferred sources for seeking health information among rural women (Kankam et al., 2024). Studies in rural northern Nigeria also indicated that women had access to and were exposed to health messages from mass media sources, mostly radio and television, with radio being the more popular source of information (Adamu, 2020; Ozohu-Suleiman, 2021). Similarly, Anyanwu et al. (2020) explored how the Radio Nigeria "Health Watch" program affects young mothers' care for themselves and their children in a rural community in southeast Nigeria. The study aimed to determine how much young mothers know about these care practices from the radio program and whether the program influenced their behavior. The survey revealed that 51% of the mothers were aware of the care practices promoted by the radio program, while 45% reported that the radio program messages influenced their maternal and child care behaviors. Onwe et al. (2020) also conducted a study in an urban community in southeast Nigeria to examine how a radio campaign helped promote exclusive breastfeeding among women. The results showed that the radio campaign had a strong impact, with most women starting to practice exclusive breastfeeding after hearing the messages. Another study in urban southwest Nigeria found that exposure to mass media greatly increased women's awareness of maternal health (Igbinoba et al., 2020).

Given these findings, I recognized the need to understand the association between media and MHSB in rural northern Nigeria so that health information delivered through these platforms could be tailored to the sociocultural context of this region and regulated to improve maternal health outcomes. In conducting this study, I highlighted the significance of mass media tools for disseminating health information, which has the potential to significantly influence health-seeking behaviors (Adamu, 2020; Ozohu-Suleiman, 2021). My research addressed a significant gap in understanding the association between media exposure and health-seeking behavior and emphasized the need for targeted interventions that consider the unique sociocultural challenges faced by women in rural northern Nigeria.

Purpose of the Study

In this quantitative study, I used statistical techniques on secondary data to explore whether there was an association between media and MHSB in rural northern

Nigeria. The study population included women within the reproductive ages of 15 to 49 years who participated in the 2018 NDHS and responded to questions about the place where they received care during the delivery of their babies, recalling the last 5 years preceding the survey. The dependent variable was MHSB. The continuum of care for reproductive, maternal, newborn, and child health (RMNCH) includes integrated service delivery for mothers and children from prepregnancy to delivery, the immediate postnatal period, and childhood (Ayehubizu et al., 2024). I initially set out to use certain elements of the RMNCH continuum of care as proxies for measuring MHSB, including seeking ANC within a health facility, child delivery within a health facility, and postnatal care within a health facility (Habte et al., 2024). However, only 63.4% and 12.2% of the target population responded to questions relating to institutional ANC and postnatal care, respectively. Therefore, I used only institutional delivery as the proxy for MHSB because 100% of the target population responded to questions about the place of delivery of their babies in the 5 years preceding the survey. The independent variable was media exposure. I used the frequency of watching television and listening to the radio as proxies for media exposure. The control variables were education (educational level) and wealth index, while the moderator was the number of ANC visits during pregnancy by women in the study population.

The field-based products resulting from this study may be important for women and their families living in rural northern Nigeria, as they offer culturally acceptable information that can help promote positive changes in maternal health. The products may hold significance for policymakers and public health practitioners by providing valuable evidence to inform maternal health communication strategies in northern Nigeria. The products could shape policy development by highlighting the need to teach women to use traditional media tools such as radio and television to access health information. This may empower women to become informed consumers of health information and active participants in decisions about their health care.

Research Questions and Hypotheses

In this study, I explored the following research questions (RQs) and formulated their corresponding null (H_0) and alternative (H_a) hypotheses:

RQ1: Is there an association between media exposure and MHSB in rural northern Nigeria when controlling for education and wealth index?

$H_0$1: There is no significant association between media exposure and MHSB in rural northern Nigeria when controlling for education and wealth index.

H_a1: There is a significant association between media exposure and MHSB in rural northern Nigeria when controlling for education and wealth index.

RQ2: What is the association between media exposure and MHSB when moderated by the number of ANC visits in rural northern Nigeria, when controlling for education and wealth index?

$H_0$2: There is no significant association between media exposure and MHSB when moderated by the number of ANC visits in rural northern Nigeria, when controlling for education and wealth index.

*H*a2: There is a significant association between media exposure and MHSB when moderated by the number of ANC visits in rural northern Nigeria, when controlling for education and wealth index.

Theoretical Framework

The framework that grounded this study was the health belief model (HBM). Behavioral scientists working in the United States Public Health Service developed HBM in the 1950s after they observed that people with symptoms of tuberculosis were not utilizing the available medical diagnostic tools as expected. Many individuals with symptoms did not recognize them as signs of tuberculosis and did not understand the severity of the disease (Green et al., 2020).

When assessing health behaviors, the following HBM propositions influence whether someone is ready to take action on health behavior:

- perceived susceptibility: how much people think they are at risk of getting sick.
- perceived severity: how serious they believe the illness is.
- perceived benefits: the good things they expect from changing their behavior.
- perceived barriers: the problems that might stop them from taking action.
- self-efficacy: how confident people feel in their ability to make changes.
- cues to action: when a person is ready to change their behavior to gain benefits, health messages from mass media, friends, and other sources can encourage them to act (Green et al., 2020).

I noted that HBM had been used in similar studies. For example, Zhao et al. (2022) combined HBM with social support theory to look at how patients with chronic conditions sought health information online. Zhao et al. found that beliefs about risk and benefits were important factors in whether people looked for health information, suggesting that these beliefs could also affect how women find health information on media platforms. Another study focused on how young adults sought and shared health information on social media, showing that HBM-related factors such as perceived risk, severity, and benefits positively influenced their intentions to seek and share health information, while perceived barriers had a negative impact (Malik et al., 2022).

I selected HBM as the theoretical framework for my study because its constructs were crucial for understanding how women perceive and respond to health information accessed through media platforms. In addition, HBM had been successfully adapted across diverse cultural contexts, making it suitable for examining health behaviors in rural northern Nigeria (Zhao et al., 2022). In the context of my study, I considered that women may become more aware of their health risks through mass media, prompting preventive actions (perceived susceptibility). I recognized that media could provide detailed information on the seriousness of health conditions, emphasizing the importance of timely medical help (perceived severity). Access to success stories and educational content via mass media could highlight the benefits of seeking health care (perceived benefits). I also considered that media could offer solutions to common health care barriers, such as cost and distance (perceived barriers), and serve as reminders for health actions such as seeking health care services (cues to action). In this way, I examined how exposure to health-related content through media affected maternal health-seeking decisions. I acknowledged that mass media can provide information and support, which can boost women's confidence in managing their health and seeking care (self-efficacy; see Nkwo et al., 2021).

By applying this model to this public health issue, I provided a structured approach to understanding complex health behaviors and identified important factors influencing how people make decisions about their health. The insights gained from applying this model could guide the design of effective public health interventions tailored to the target population, thereby improving health outcomes. However, I recognize that HBM assumes individuals make rational decisions based on available information, which may not account for emotional or psychological factors influencing behavior. HBM also focuses on individual beliefs, often overlooking the broader social and cultural factors. By utilizing the HBM framework, I would be able to target specific beliefs and attitudes in public health interventions, tailoring media campaigns to address susceptibilities, severities, benefits, and barriers, while providing cues to action and enhancing self-efficacy. The HBM aligns directly with the public health intervention plan developed from this study's findings by guiding both messaging and activities. Health information communicated through media platforms can highlight maternal risks (susceptibility and severity), emphasize the benefits of skilled care, and address common barriers. Routine reminders and supportive group discussions can serve as cues to action and help build women's confidence (self-efficacy) to seek skilled maternal health services.

Nature of the Study

In this quantitative study, I utilized data from the 2018 NDHS. The NDHS was a national survey that provided up-to-date estimates of key demographic and health indicators, focusing on areas such as maternal and child health, family planning, nutrition, and disease prevalence. The 2018 NDHS data were collected from a nationally representative sample of 41,821 women ages 15-49 across 1,400 household clusters throughout Nigeria using computer-assisted personal interviewing (National Population Commission, 2019). For my research design, I conducted both descriptive and inferential analyses to answer the research questions. In the descriptive analysis, I computed frequencies and percentages for the categorical variables to gain insights into the frequency of occurrence and distribution of the various data categories. For the inferential analysis, I applied a complex samples logistic regression model to account for the complex design of the 2018 NDHS and to predict the probabilities of the two possible outcomes of MHSB (dependent variable), given the different elements of media exposure (independent variable), while controlling for education and wealth index and moderating by the number of ANC visits of the women during pregnancy. By using this comprehensive research design, I aimed to provide a detailed and robust analysis of the relationships between media exposure and MHSB, offering valuable insights for public health interventions and policy development.

Literature Search Strategy

I used libraries, databases, and search engines to access existing literature, including the Walden University library databases, Google Scholar, ChatGPT and

Perplexity. The key search terms and combinations used included “media and MHSB,” “health information and health-seeking behavior in women,” and “source of health information and women in rural Africa.” Additional terms incorporated “MHSB and rural northern Nigeria,” as well as “health communication strategies in rural northern Nigeria.” For the literature review, I focused on peer-reviewed journal articles published between 2019 and 2025, as well as dissertations and theses that contributed to the understanding of MHSB among rural populations. My search produced a variety of relevant studies that laid the groundwork for understanding the key concepts related to my study topic and reflected the latest findings in this area. In cases where I found limited recent research, particularly regarding health communication strategies for women in rural northern Nigeria, I employed a broader search. This included examining grey literature, such as government reports and nongovernmental organization publications, which provided valuable insights into community health communication interventions in northern Nigeria.

Literature Review Related to Key Variables and/or Concepts

MHSB is crucial for ensuring maternal health and reducing MMR (He et al., 2022). My review of the literature indicated that MHSB is linked to health information that women obtain from media sources (Ajayi et al., 2023; Hayes et al., 2021; He et al., 2022; Nguyen et al., 2023). Between 2012 and 2019, I observed an increase in the use of media platforms for seeking health information in the United States, alongside a decline in the use of other information sources, such as healthcare providers, family, friends, and traditional channels (Ajayi et al., 2023). In a study examining the relationship between various factors and MHSB across 10 African countries (excluding Nigeria), He et al. (2022) found that mass media served as the second strongest determinant for utilizing ANC, next to high household wealth. Studies conducted in southeast and southwest Nigeria showed a positive association between exposure to health information through mass media platforms such as radio and television and improved maternal health awareness, MHSB, and maternal health practices (Anyanwu et al., 2020; Igbinoba et al., 2020; Onwe et al., 2020). In another study where the 2018 NDHS data were examined to explore the prevalence of high-risk fertility behavior among Nigerian women and its associated factors, the results indicated that women exposed to health messages through the media (e.g., radio and television) were less likely to engage in high-risk fertility behavior compared to those who were not exposed to media (Ekholuenetale et al., 2025).

Nigeria's most recent DHS (2023–2024) reported that approximately 15,000 women, representing 38% of women of childbearing age among the survey respondents, were exposed to health messaging through the media in the 6 months preceding the survey. Among them, 53% heard the messages on the radio, 28% encountered them on television, and around 4,750 women (12% of female survey respondents) reported exposure to malaria-related messaging on social media (NDHS, 2024). Based on my review, I concluded that exposure to health messages via these mass media channels has the potential to improve the use of maternal and child health services, which could result in better maternal and child health outcomes (see Ohaja et al., 2022).

Conversely, I noted an urban-rural imbalance in access to health information. For example, a study in Vietnam highlighted that women living in rural areas had more inpatient treatments, indicating a lack of awareness about opportunities for regular health checkups and the need for improved access to health information (Nguyen et al., 2023). Furthermore, He et al. (2022) found that maternal residence in rural areas correlated with lower utilization of intrapartum and postnatal care. Despite challenges prevalent in rural communities, such as poor access to electrical power supply and network signals, I found that women in rural northern Nigeria have access to mass media tools such as radio and television, which are used to obtain information on maternal and child health (Adamu, 2020; Ozohu-Suleiman, 2021). In a study conducted in Ghana, women living in rural communities indicated mass media as one of their preferred sources for seeking health information, particularly favoring radio due to its reach within their settings (Kankam et al., 2024).

I also recognized that the influence of mass media on MHSB was associated with maternal education level and income (see Adamu & Ango, 2024). An analysis of national survey data from 10 African countries revealed that higher household wealth and education levels were strong determinants for accessing antenatal, intrapartum, and postnatal care (He et al., 2022). I understood that utilization of ANC services, a key component of good MHSB, was important in the continuum of care for pregnant women and, therefore, critical in preventing problems during pregnancy and maternal death (see He et al., 2022). These findings led me to introduce education and wealth index as controls in my study, as well as the number of ANC visits as a moderating factor. Despite the existing evidence on the influence of media exposure on MHSB in many parts of the world, I found that this association in rural northern Nigeria had been understudied.

Definitions

Dependent Variable (MHSB)

I operationally defined MHSB as women who reportedly sought health care services within a government-accredited health facility or institution when giving birth to their babies within 5 years preceding the 2018 NDHS.

Independent Variable (Media)

For this study, I defined media as tools used to reach large groups of people with information, ideas, and concepts. I measured media exposure by the frequency with which women in the target population watched television and listened to the radio (see Mutumba, 2022). I excluded internet use as a component of media exposure because the 2018 NDHS reported that 99% of my target population did not use the internet frequently. Including this element as a proxy for media exposure could have biased the analysis and undermined the validity of my results.

Control Variables (Education and Wealth Index)

I defined education by the level of educational attainment of the target population and categorized it into two groups: no education and educated. I used the combined wealth index computed by the NDHS team to ascertain the wealth status of the target population. The combined wealth index was a composite measure of a household's cumulative living standard, using household assets and characteristics to create a single indicator of overall wealth or standard of living. The NDHS team represented the wealth index for each household on a 5-point nominal scale: Poorest, Poorer, Middle, Richer, and Richest. To simplify my regression model and improve its statistical power, I recoded the data into three categories: Poorest and Poor (1), Middle (2) and Richer and Richest (3).

Moderator Variable (Number of ANC Visits)

I defined the number of ANC visits as the number of times a pregnant woman received ANC during her pregnancy. The WHO recommends that pregnant women have at least four ANC visits (UNICEF, 2024). Therefore, I categorized this variable into two groups: no ANC visits, don't know, and less than four ANC visits (0); and four or more ANC visits (1).

Assumptions

For this study, I assumed that each data point from participants in the 2018 NDHS was independent and not influenced by other data points. This assumption was crucial because the complex samples logistic regression analysis I used to address my research questions relied on the independence of observations. If this assumption was not met, my results could have been biased, potentially leading to inaccurate conclusions. I also relied on the assumption that the 2018 NDHS data were of high quality, accurate, and representative of the target population. Additionally, I assumed that, despite its age and any contextual changes since collection, the 2018 NDHS data remained relevant for the current analysis.

Scope and Delimitations

I included only female respondents from the 2018 NDHS who were within the reproductive age bracket of 15 to 49 years and who responded to questions about the place where they received care during the delivery of their babies, recalling the last 5 years preceding the survey. I excluded all other participants. Additionally, I focused on NDHS respondents residing in rural geographical locations in northern Nigeria. To ensure internal validity, I used education and wealth index as control variables and the number of ANC visits as a moderator because these factors could influence MHSB. To address potential generalizability concerns, I compared my findings and conclusions with those from newer research studies that are similar in scope.

Limitations

This study had several limitations. One key limitation was recall bias, as I relied on the target population's self-reported responses about accessing maternal care at health facilities based on pregnancies or births that occurred up to 5 years prior to the survey. With regard to this potential bias, I noted that the average MMR in Nigeria's northern states was relatively stable during the 5-year recall period, with 694 in 2013 and 755 in 2018 (Babajide et al., 2023). This consistency indicated minimal changes in maternal health conditions over the 5-year period, which could have reduced the likelihood of significant recall-related inaccuracies.

Additionally, the cross-sectional design of the 2018 NDHS limits my ability to establish cause-and-effect relationships; therefore, I sought only to establish associations between the variables of interest. At the time I conducted this study, the full data set for the 2023-2024 NDHS had not yet been released for public use (see The DHS Program, 2021). Because I used data from 2018, my findings may not accurately reflect current conditions in northern Nigeria. To address this, I compared my findings and conclusions with those from newer research studies that had similar objectives. I also recognized that

MHSB may be influenced by other societal and cultural factors. While I used regression analysis to control for confounding variables such as education level and wealth index, I did not account for other factors associated with a woman's decision to seek health care.

Significance

I believe my study can significantly contribute to understanding the relationship between media exposure and MHSB and provide valuable insights for designing effective maternal health behavior change interventions in rural northern Nigeria. Through my findings, I aim to inform public health policy, by guiding resource allocation and the strategic use of media platforms to enhance maternal health outcomes in this region. Furthermore, by demonstrating a strong association between media exposure and MHSB, I show that media platforms can be used to empower women with critical information, which may lead to improved outcomes and help shift social norms around women's health. Ultimately, my research can inform the development of tailored public health strategies, increase health literacy, and influence policy by supporting initiatives that help women use information from radio and television to actively participate in health care decisions.

Summary and Conclusions

In summary, I recognize mass media exposure as a significant factor influencing MHSB by enhancing awareness and utilization of health care services (Fatema & Lariscy, 2020; Igbinoba et al., 2020; Y. Wang et al., 2021). I also acknowledge that factors such as education level, wealth, and the number of ANC visits play crucial roles in shaping MHSB (Adamu & Ango, 2024; Fatema & Lariscy, 2020; He et al., 2022).

Notably, I observed disparities in access to health information between urban and rural areas, with rural residents often facing limited access to maternal health services (Nguyen et al., 2023). Since rural northern Nigeria accounts for a substantial portion of maternal mortality in the country, I believe that understanding the relationship between mass media exposure and MHSB in this region is essential for improving health outcomes. Despite existing evidence from other regions, I found that the association between MHSB and mass media exposure among women in rural northern Nigeria remains understudied. To address this knowledge gap, I analyzed secondary data from the 2018 NDHS. In the next Section, I described my study's research design, methodology, and threats to validity.

Section 2: Research Design and Data Collection

Introduction

In this quantitative study, I used statistical techniques on secondary data from the 2018 NDHS to investigate the relationship between media exposure and MHSB among women aged 15-49 in rural northern Nigeria. My intention is that policymakers and public health practitioners will utilize my findings to inform their decisions and strategies, with the goal of empowering women by teaching them how to effectively use radio and television to access health information and enhance their role in health care decision making.

Research Design and Rationale

I measured the dependent variable, MHSB, using institutional delivery as a proxy. I assessed the independent variable, media exposure, by examining the frequency with which women in the target population watched television and listened to the radio. I included educational level and wealth index as control variables and treated the number of ANC visits as a moderator. I used a quantitative, correlational design involving descriptive statistics and a complex samples logistic regression model to address the research questions. By leveraging existing large-scale secondary data sets like the 2018 NDHS, I efficiently identified associations between variables that are crucial for understanding how different factors influence health outcomes in public health contexts. This approach enabled me to develop practical insights into real-world scenarios in rural northern Nigeria without requiring expensive primary data collection. My findings aligned with public health research needs and can inform evidence-based practices and policies.

Methodology

Population

The target population for this study consisted of 11,048 women aged 15 to 49 who resided in the rural areas of the northcentral, northeast, and northwest regions of Nigeria and participated in the 2018 NDHS.

The 2018 NDHS employed a two-stage stratified cluster sampling method. First, the country was divided into 74 strata by separating each of the 36 states and the Federal Capital Territory into rural and urban areas. In the first stage, the original researchers selected 1,400 enumeration areas or clusters using probability proportional to size sampling. Due to logistical challenges, data collection was completed in 1,389 clusters. In the second stage, the original researchers randomly selected 30 households from each cluster using equal probability systematic sampling without replacement, resulting in a total sample size of approximately 42,000 households. The original researchers calculated sampling weights to adjust for nonresponse rates at various levels and to ensure that the results were nationally and regionally representative (The World Bank, 2019).

For this study, I analyzed only data from rural locations in northern Nigeria collected from women aged 15-49 who responded to questions regarding the place of delivery of their babies within the 5 years preceding the 2018 NDHS. I excluded data from outside of this category from the analysis. I obtained written approval from the data archivist of the DHS program to access and use the 2018 NDHS data sets for this study.

The 2018 NDHS is a highly reputable data set due to its rigorous methodology, extensive coverage, and adherence to international standards. The methodology employed by the original researchers minimized bias and enhanced the reliability and generalizability of the findings. The survey included computer-assisted personal interviewing (CAPI) to facilitate efficient data collection and reduce errors that could have occurred with traditional paper-based methods (National Population Commission, 2019; The World Bank, 2019). I selected this data set as the best source for my study because it contains data elements for key maternal health indicators, providing insights into regional variations in Nigeria, such as rural versus urban areas and northern versus southern regions. Additionally, the data set was easily accessible and included a representative sample size that offered sufficient statistical power to analyze associations like those between media exposure and MHSB (National Population Commission, 2019; The World Bank, 2019). A power analysis was not required for this secondary data analysis using the 2018 NDHS. The original NDHS study design – a stratified, multistage cluster approach - achieved a 99% response rate, providing a robust, predetermined sample size suitable for my analysis.

Operationalization

Dependent Variable (MHSB)

In this study, I operationally defined MHSB as women who reportedly sought health care services within a government-accredited health facility or institution when giving birth to their babies within 5 years preceding the 2018 NDHS. To measure reported institutional child delivery, I used the NDHS variable that captured every possible location of child delivery, with responses coded as scale data ranging from home delivery to delivery in public health institutions, private health institutions, and others. These responses were derived from Question 430 in the 2018 NDHS Women's Questionnaire: "Where did you give birth to NAME?" For my analysis, I used SPSS to recode the scale data into two categories for institutional delivery: yes (1) and no (0). The *yes* (1) category included women who reported delivering in public sector institutions (government hospitals, health centers, health posts, and other public facilities) and private sector institutions (private hospitals, clinics, and other private medical facilities). All other possible delivery locations were coded as *no* (0).

Independent Variable (Media)

I defined media as tools used to reach large groups of people with information, ideas, and concepts. I measured media exposure by the frequency with which women in the target population watched television and listened to the radio. For the frequency of watching television, I used the NDHS variable with three categories: Not at all (0), Less than once a week (1), and At least once a week (2). These responses were derived from Question 115 in the 2018 NDHS Women's Questionnaire: "Do you watch television at least once a week, less than once a week, or not at all?" I calculated the frequency of watching television component of media exposure using this variable from the coded 2018 NDHS data. For the frequency of listening to the radio, I used the NDHS variable with three categories: Not at all (0), Less than once a week (1), and At least once a week (2). These responses were derived from Question 114 in the 2018 NDHS Women's Questionnaire: "Do you listen to the radio at least once a week, less than once a week, or not at all?" I calculated the frequency of listening to the radio component of media exposure using this variable from the coded 2018 NDHS data.

Control Variable (Education)

I defined education as the highest level of education attained by the target population. The NDHS data included a variable with four categories for educational level: no education (0), primary (1), secondary (2), and higher (3). These responses were based on Question 108 in the 2018 NDHS Women's Questionnaire: "What is the highest level of school you attended: primary, secondary, or higher?" For my analysis, I used SPSS to recode the data into two categories—no education (0) and educated (1)—with the educated (1) category combining primary (1), secondary (2), and higher (3).

Control Variable (Wealth Index)

I determined the wealth index using the composite measure of a household's cumulative living standard, as computed by the NDHS team. The NDHS team represented the wealth index for each woman on a 5-point nominal scale: poorest (1), poorer (2), middle (3), richer (4), and richest (5). To simplify the regression model and improve its statistical power, I used SPSS to recode the data into three categories: poorest and poorer (1), middle (2), richer and richest (3).

Moderator Variable (Number of ANC Visits)

I defined the number of ANC visits as the number of times a pregnant woman received ANC during her pregnancy. For measurement, I used the NDHS variable for the number of ANC visits during pregnancy, with responses coded as nominal data: 0 for women who had no ANC during pregnancy, 98 for those who did not know their ANC visit count, and 1 to 20 for women who recalled their ANC visits based on pregnancies or deliveries within the 5 years before the survey. These responses were derived from Question 412 in the 2018 NDHS Women's Questionnaire: "How many times did you receive ANC during this pregnancy?" For my analysis, I used SPSS to recode the number of ANC visits into two categories: no ANC visits, don't know, or less than four ANC visits (coded as 0), and four or more ANC visits (coded as 1).

Data Analysis Plan

I used IBM SPSS Statistics Version 29 for data analysis in this study. I employed a rigorous data cleaning procedure in SPSS to ensure that my analysis was conducted on high-quality data from the 2018 NDHS data set. Before proceeding, I created a backup of the original data set. I flagged relevant variables with significant amounts of missing data, such as responses to questions about the place where women sought ANC and postnatal care and excluded these data from my analysis.

Research Questions and Hypothesis

RQ1: Is there an association between media exposure and MHSB in rural northern Nigeria when controlling for education and wealth index?

$H_0$1: There is no significant association between media exposure and MHSB in rural northern Nigeria when controlling for education and wealth index.

H_a1: There is a significant association between media exposure and MHSB in rural northern Nigeria when controlling for education and wealth index.

RQ2: What is the association between media exposure and MHSB when moderated by the number of ANC visits in rural northern Nigeria, when controlling for education and wealth index?

$H_0 2$: There is no significant association between media exposure and MHSB when moderated by the number of ANC visits in rural northern Nigeria, when controlling for education and wealth index.

$H_a 2$: There is a significant association between media exposure and MHSB when moderated by the number of ANC visits in rural northern Nigeria, when controlling for education and wealth index.

To test these hypotheses, I employed the complex samples logistic regression model. The assumptions of this analysis, and how I addressed them, are as follows:

- Appropriate sampling design: I ensured adherence to this assumption by using data from the 2018 NDHS, which employed a two-stage stratified cluster sampling design. I incorporated the sampling design specifications (weights, strata, and clusters) to produce valid estimates and standard errors.
- Categorical dependent variable: I met this assumption by recoding institutional child delivery (a proxy for MHSB) into two groups, “yes” and “no.”
- Independent variables: I included one independent variable with two elements, both measured on a nominal scale, meeting this assumption.
- Independence of observations: I assumed that the 2018 NDHS data met this assumption.

- Linearity: This assumption was not applicable because my independent variables were measured on a nominal scale.
- No multicollinearity: I ensured this by calculating the Variance Inflation Factor (VIF) and Tolerance for each component of the independent variable (frequency of watching television and frequency of listening to the radio).
- Sufficient sample size: I met this assumption, as my sample size was 11,048, which was adequate to ensure reliable and stable estimates.

While I did not include a potential covariate influencing MHSB beyond its primary focus or explicitly address a confounding variable distorting the media-MHSB relationship, I incorporated two key control variables: education and wealth index. I held these variables constant to isolate the impact of media exposure on MHSB. Education is a known determinant of MHSB, with more educated women demonstrating higher awareness and utilization of health services (James et al., 2023; H. Wang et al., 2021). Wealth is also strongly associated with positive maternal health outcomes (Chen & Sun, 2023; Weeks et al., 2024).

Additionally, I included the number of ANC visits during pregnancy as a moderator, hypothesizing that it could influence the strength or direction of the association between media exposure and MHSB. Evidence suggests that women exposed to health messages through media are more likely to attend ANC visits, and those visits, in turn, encourage better use of skilled birth services and postnatal care (Emmanuel et al., 2025; Oweibia et al., 2025). In challenging settings like conflict-affected rural northern Nigeria, ANC visits help women overcome cultural and access barriers, making them more responsive to media messages about maternal health (Adeyanju et al., 2025; Opara et al., 2024). Therefore, I considered that ANC visits could enhance the impact of media by reinforcing health messages and building trust in health care, ultimately improving MHSB (see Oweibia et al., 2025). I used the complex samples logistic regression model to interpret my findings by examining the odds ratios/coefficients for each predictor variable (frequency of watching television and frequency of listening to the radio) relative to the proxy for MHSB (institutional child delivery) and evaluating their statistical significance (p-values) to understand their impact on the likelihood of belonging to each outcome category. I also reported standard errors (SE) and confidence intervals (CI) for the estimated coefficients.

Threats to Validity

In this study, I examined women of reproductive age in rural Northern Nigeria. This geographic focus posed a threat to external validity; therefore, I compared my findings with research from similar regions within Nigeria and internationally to identify similarities, differences, and potential causes for variation. I used 2018 NDHS data, which predates the COVID-19 pandemic. Recognizing potential temporal limitations due to subsequent disruptions to the health system and MHSB, I compared my results with more recent data where available. Given the cross-sectional design of the 2018 NDHS, establishing causality was challenging; MHSB may influence media exposure, rather than vice versa. To mitigate this, I focused on identifying associations rather than asserting causation, and I selected variables based on established literature and theoretical frameworks. I addressed potential selection bias, an internal validity threat, by applying the NDHS sampling weights in my analysis to correct for any over- or under-representation of specific population groups.

Ethical Procedures

The 2018 NDHS data set was made available for public use by the survey team upon request. The IRB-approved procedures for DHS public-use data sets ensure that respondents, households, or sample communities cannot be identified. There were no names of individuals or household addresses in the data files. Geographic identifiers only extended to the regional level, where regions are typically large geographical areas encompassing several states or provinces. Each enumeration area (Primary Sampling Unit/PSU) has a PSU number in the data file, but these numbers did not include labels indicating their names or locations. When analyzing ethical issues for this study, I considered several key ethical principles, including informed consent, privacy, equity and resource allocation. Since participants in the original survey had already provided their consent, this did not pose an issue for my study. Privacy was assured because the data set was anonymized; nonetheless, I adhered to data confidentiality standards. I focused on disadvantaged women residing in rural northern Nigeria locations; therefore, I intend for my findings to inform policies that promote equity in health care access and equitable resource allocation.

Summary

In this study, I employed a quantitative approach to explore the association between MHSB and media among women within the reproductive age group in rural northern Nigeria, analyzing the 2018 NDHS data. I assessed the dependent variable, MHSB, using institutional child delivery as a proxy, while I measured media exposure as the independent variable by the frequency of watching television and listening to the radio. I included educational level and wealth index as control variables, and I used the number of ANC visits as a moderator. I applied descriptive statistics and complex samples logistic regression to examine associations between variables, providing insights into public health dynamics without the need for costly primary data collection.

Unlike standard logistic regression, complex samples logistic regression accounts for the complex sampling methods used in the 2018 NDHS. I incorporated sampling weights to ensure each observation accurately represented the population, and I adjusted for clustering (such as households and regions) and stratification (such as socioeconomic groups) to prevent biased standard errors. This approach allowed me to provide valid hypothesis tests and confidence intervals by properly considering the survey design. My methodology not only minimized bias but also aligned with public health research needs by offering practical insights that can inform evidence-based practices and policies. In the next section, I presented the results and findings from my secondary data analysis.

Section 3: Presentation of the Results and Findings Section

Introduction

I used quantitative methods to explore the association between media exposure and MHSB in rural northern Nigeria to answer the following research questions and testing the following hypotheses:

RQ1: Is there an association between media exposure and MHSB in rural northern Nigeria when controlling for education and wealth index?

$H_0$1: There is no significant association between media exposure and MHSB in rural northern Nigeria when controlling for education and wealth index.

H_a1: There is a significant association between media exposure and MHSB in rural northern Nigeria when controlling for education and wealth index.

RQ2: What is the association between media exposure and MHSB when moderated by the number of ANC visits in rural northern Nigeria, when controlling for education and wealth index?

$H_0$2: There is no significant association between media exposure and MHSB when moderated by the number of ANC visits in rural northern Nigeria, when controlling for education and wealth index.

H_a2: There is a significant association between media exposure and MHSB when moderated by the number of ANC visits in rural northern Nigeria, when controlling for education and wealth index.

Accessing the Data Set for Secondary Analysis

I used data from the 2018 NDHS to address the research questions and test the corresponding hypotheses. I obtained written approval from the data archivist of the DHS program to access and use the 2018 NDHS data sets for this study. The 2018 NDHS data collection took place between August 2018 and December 2018. The survey utilized probability sampling to obtain a nationally representative sample of 41,821 women aged 15-49 and 13,311 men aged 15-59 from various households across Nigeria. The survey achieved a high response rate of 99% for both women and men and collected data related to demographic and health indicators, including maternal and child health data (National Population Commission, 2019).

I analyzed data from the 11,048 women who participated in the survey, resided in the rural part of the northern region of Nigeria and responded to questions relating to the location of delivery of their babies in the 5 years before the survey. I initially set out to use three proxies to measure MHSB, considering certain elements of the RMNCH continuum of care, including ANC within a health facility, child delivery within a health facility, and postnatal care within a health facility (Habte et al., 2024). However, only 63.4% and 12.2% of the target population responded to institutional antenatal and postnatal care questions, respectively. Therefore, I excluded data for women who responded to institutional ANC and postnatal care questions due to the missing data. I used only data from women who responded to questions relating to institutional delivery as the proxy for measuring MHSB because 100% of the target population responded to questions relating to the place of delivery of their babies in the 5 years preceding the survey.

Because I focused on women in rural northern Nigeria, I applied sampling weights during the analysis to strengthen the external validity of the results and ensure the subsample was representative of the rural northern Nigerian women population. The estimated target population size used in this survey was 10,747.478, which was less than the unweighted sample size of 11,048. The 2018 NDHS employed a stratified, clustered sampling design, where each respondent was assigned a weight to adjust for unequal selection probabilities, nonresponse, and to align the sample with national population totals. The unweighted sample size (11,048) reflected the raw number of survey respondents, while the population size (10,747.478) was the sum of all sampling weights for valid cases, representing the estimated target population after these adjustments. The average weight was less than 1.0, often the case when certain groups were oversampled, so the weighted population total (10,747.478) was smaller than the unweighted count (11,048), with an average weight of approximately 0.97. This difference indicated that I properly incorporated the NDHS sampling weights in my analysis to ensure that the regression results were generalizable to Nigeria's actual population rather than just the survey sample (National Population Commission, 2019).

Results

Descriptive Statistics of the Target Population

The target population for this study included 11,048 women within the reproductive ages of 15 to 49 years. About half of these women (48.5%) were between 20 and 29 years old. Approximately one-third (32.6%) resided in the northeast region of Nigeria, 24.2% in the northcentral region, and 43.2% in the northwest region. All the women reported childbirths within 5 years prior to the 2018 NDHS. About half (48.2%) had at least one baby within 5 years before the survey. Roughly two-thirds (68.9%) of the women were uneducated, while the remainder had received some form of formal education (13.9% primary, 15.3% secondary, and 1.9% higher than secondary). Approximately 73.6% of the women were in the poorest and poorer categories of the combined wealth index quintile computed by the NDHS team. Almost all the women (96.2%) were either married or living with a partner.

Only 27% of the households in this region had electricity, and about one-fifth (19.2%) had a television, while 45.2% had a radio. About a third (28.3%) of the women owned mobile phones. Additionally, 34.9% of the women frequently listened to the radio, 18.6% frequently watched television, and only 1% frequently used the internet in the month before the survey. In this study, I defined "frequently" as a minimum of less than once a week and a maximum of at least once a week. About one-fifth (22.1%) of the women had their babies in a public or private health institution (hospital, health center, health post, or clinic).

Table 1

Descriptive Statistics of the Study's Target Population (N = 11,048)

Variable	Frequency	Percentage
Age group		
- 15-19	832	7.5
- 20-24	2,531	22.9
- 25-29	2,825	25.6
- 30-34	2,054	18.6
- 35-39	1,572	14.2
- 40-44	882	8.0
- 45-49	352	3.2
Region		
- Northcentral	2,675	24.2
- Northeast	3,597	32.6
- Northwest	4,776	43.2
Educational level		
- No education	7, 617	68.9
- Educated	3,431	31.1
Wealth index combined		
- Poorest and poorer	8,133	73.6
- Middle	1,994	18.0
- Richer and richest	921	8.3
Number of ANC visits during pregnancy		
- No ANC visits, don't know, and < four ANC visits		
- Four or more ANC visits	6,522	59.0
Households with electricity	4,526	41.0
- No		
- Yes	7,977	72.2
- Not a dejure resident	2,985	27.0
Households with radio	86	0.8
- No		
- Yes	5,966	54.0
- Not a dejure resident	4,996	45.2
Households with television	86	0.8
- No		
- Yes	8,839	80.0
- Not a dejure resident	2,123	19.2
Owns a mobile phone	86	0.8
- No		
- Yes	7,921	71.7
Frequency of listening to radio	3,127	28.3
- Not at all		
- Less than once a week	7,196	65.1
- At least once a week	2.050	18.6
Frequency of watching television	1,802	16.3
- Not at all		
- Less than once a week	8,993	81.4
- At least once a week	1,158	10.5
Child delivery in a health institution	897	8.1
- No		
- Yes	8,605	77.9
	2,443	22.1

Evaluation of the Statistical Assumptions

I conducted a VIF and Tolerance test to confirm my assumption that the components of the independent (predictor) variable were not highly correlated. The multicollinearity analysis for the two components of media exposure (frequency of listening to the radio and frequency of watching television) revealed minimal correlation among the components of media exposure. For the frequency of listening to the radio, the analysis yielded a VIF of 0.84 and a Tolerance value of 1.19. The frequency of watching television produced similar results, with a VIF of 0.82 and a Tolerance value of 1.22. The VIF values for the 2 components fell well below the critical threshold of 5, which indicated the absence of concerning multicollinearity. Similarly, all Tolerance values exceeded 0.1, further confirming that multicollinearity was not a concern in my analysis. These results suggested that each media exposure component contributed unique information to the model without substantial overlap with other components.

Table 2

Multicollinearity Analysis

Components of media exposure	VIF	Tolerance
Frequency of listening to the radio	0.84	1.19
Frequency of watching television	0.82	1.22

Statistical Analysis Findings for RQ1

Radio Component of Media Exposure

I used complex samples logistic regression analysis to examine the association between frequency of listening to radio (a proxy for media exposure) and MHSB, proxied by place of child delivery, in rural northern Nigeria, while controlling for education and wealth index. The model was statistically significant (Wald $F = 87.210$, $p < 0.001$), and my results showed that listening to the radio explained differences in child delivery location. After controlling for education and wealth, I found that the frequency of listening to the radio remained a significant predictor of child delivery location.

Women who listened to the radio less than once a week had 33% lower odds of delivering outside a health facility compared to those who did not listen at all (Odds Ratio [OR] = 0.669; 95% Confidence Interval [CI]: 0.571–0.785). Similarly, women who listened at least once a week had 30% lower odds of non-institutional delivery (OR = 0.705; 95% CI: 0.595–0.835). These results indicated that radio exposure is independently associated with improved MHSB, beyond the effects of education and wealth. Education and wealth also showed strong independent associations with place of delivery. I found that educated women were about 75% less likely to deliver outside a health facility compared to uneducated women (OR = 0.247; 95% CI: 0.207–0.293). Women in the middle and richer wealth categories also had significantly lower odds of non-institutional delivery compared to the poorest women.

Table 3

RQ1: Sample Design Information (Radio Component of Media Exposure)

		N
Unweighted cases	Valid	11048
	Invalid	0
	Total	11048
Population size		10747.478
Stage 1	Strata	20
	Units	523
Sampling design degrees of freedom		503

Note. This confirms that the analysis properly accounted for the complex sampling design of the 2018 NDHS, which improves the accuracy of standard errors and test statistics.

Table 4

RQ1: Categorical Variable Information (Radio Component of Media Exposure)

		Weighted count	Weighted percent
Place of delivery[a]	Non-institutional delivery	8,608.568	80.1%
	Institutional delivery[b]	2,138.910	19.9%
Frequency of listening to radio	Not at all	6,820.203	63.5%
	Less than once a week	2,041.020	19.0%
	At least once a week	1,886.255	17.6%
Wealth Index	Poorest and poor	7,914.328	73.6%
	Middle	2,009.562	18.7%
	Richer and richest	823.587	7.7%
Educational level	No education	7,700.749	71.7%
	Educated	3,046.728	28.3%
Population size		10,747.478	100.0%

Note. a = dependent variable, b = reference category

Table 5

RQ1: Pseudo R Squares (Radio Component of Media Exposure)

Statistic	Value
Cox and Snell	0.127
Nagelkerke	0.201
McFadden	0.136

Note. These values indicate the model explains about 12.7% to 20.1% of the variance in place of delivery. Nagelkerke's R^2 of 0.201 suggests a modest fit.

Table 6

RQ1: Test of Model Effects (Radio Component of Media Exposure)

Source	df1	df2	Wald F	Sig (p-value)
Corrected model	5.000	499.000	87.210	<.001
Intercept	1.000	503.000	159.672	<.001
Frequency of listening to radio	2.000	502.000	14.823	<.001
Wealth index	2.000	502.000	37.637	<.001
Education level	1.000	503.000	249.643	<.001

Table 7

RQ1: Odds Ratio (Radio Component of Media Exposure)

		Place of delivery	Odds ratio	95% Confidence interval	
				Lower	Upper
Frequency of listening to radio	Less than once a week vs. not at all	Non-institutional delivery	0.669	0.571	0.785
	At least once a week vs. not at all	Non-institutional delivery	0.705	0.595	0.835
Wealth index	Middle vs. poorest and poor	Non-institutional delivery	0.510	0.411	0.634
	Richer and richest vs. poorest and poor	Non-institutional delivery	0.331	0.256	0.428
Educational level	Educated vs. no education	Non-institutional delivery	0.247	0.207	0.293

Television Component of Media Exposure

I used complex samples logistic regression analysis to examine the association between the frequency of watching television (a proxy for media exposure) and MHSB, proxied by place of child delivery, in rural northern Nigeria, while controlling for education and wealth index. The model was statistically significant (Wald F = 91.903, p < .001), and my results showed that television exposure explained differences in child delivery location. After controlling for education and wealth, I found that the frequency of watching television remained a significant predictor of the place of child delivery.

Women who watched television less than once a week had 54% lower odds of delivering outside a health facility compared to those who did not watch at all (OR =

0.464; 95%, CI: 0.386–0.558). Similarly, women who watched television at least once a week had 48% lower odds of non-institutional delivery (OR = 0.525; 95%, CI: 0.408–0.674). These results indicated that television exposure is independently associated with the use of institutional delivery services, which underscored its value as a medium for health communication in rural northern Nigeria. Education and wealth also had strong independent effects. I found that educated women were approximately 73% less likely to deliver outside a health facility compared to women with no formal education (OR = 0.269; 95%, CI: 0.226–0.321). Women in the middle and richer wealth categories had significantly lower odds of non-institutional delivery compared to the poorest women.

Table 8

RQ1: Sample Design Information (Television Component of Media Exposure)

		N
Unweighted cases	Valid	1,1048
	Invalid	0
	Total	1,1048
Population size		10,747.478
Stage 1	Strata	20
	Units	523
Sampling design degrees of freedom		503

This confirms that the analysis properly accounted for the complex sampling design of the 2018 NDHS, which improves the accuracy of standard errors and test statistics.

Table 9

RQ1: Categorical Variable Information (Television Component of Media Exposure)

		Weighted count	Weighted percent
Place of delivery[a]	Non-institutional delivery	8,608.568	80.1%
	Institutional delivery[b]	2,138.910	19.9%
Frequency of watching television	Not at all	8,790.480	81.8%
	Less than once a week	1,097.655	10.2%
	At least once a week	859.342	8.0%
Wealth index	Poorest and poor	7,914.328	73.6%
	Middle	2,009.562	18.7%
	Richer and richest	823.587	7.7%
Educational level	No education	7,700.749	71.7%
	Educated	3,046.728	28.3%
Population size		10,747.478	100.0%

Note. a = dependent variable; b = reference category

Table 10

RQ1: Pseudo R Squares (Television Component of Media Exposure)

Statistic	Value
Cox and Snell	0.133
Nagelkerke	0.211
McFadden	0.143

Note. These values indicate the model explains about 13.3% to 21.1% of the variance in place of delivery. Nagelkerke's R^2 of 0.211 suggests a modest fit.

Table 11

RQ1: Test of Model Effects (Television Component of Media Exposure)

Source	df1	df2	Wald F	Sig (p-value)
Corrected model	5.000	499.000	91.903	<.001
Intercept	1.000	503.000	82.229	<.001
Frequency of watching television	2.000	502.000	35.186	<.001
Wealth index	2.000	502.000	25.677	<.001
Education level	1.000	503.000	218.692	<.001

Table 12

RQ1: Odds Ratio (Television Component of Media Exposure)

		Place of delivery	Odds ratio	95% Confidence interval	
				Lower	Upper
Frequency of watching television	Less than once a week vs. not at all	Non-institutional delivery	0.464	0.386	0.558
	At least once a week vs. not at all	Non-institutional delivery	0.525	0.408	0.674
Wealth index	Middle vs. poorest and poor	Non-institutional delivery	0.556	0.447	0.692
	Richer and richest vs. poorest and poor	Non-institutional delivery	0.401	0.310	0.520
Educational level	Educated vs. no education	Non-institutional delivery	0.269	0.226	0.321

Statistical Analysis Findings for RQ2

Radio Component of Media Exposure

I used complex samples logistic regression analysis to examine the association between media exposure, measured by the frequency of listening to radio (a proxy for media exposure) and MHSB, proxied by place of child delivery, in rural northern Nigeria. Additionally, I examined whether this association was moderated by the number of ANC visits during pregnancy, while controlling for key socioeconomic factors, including education and wealth index. I found that women who listened to the radio less than once a week had 36% lower odds of non-institutional delivery compared to those who did not listen to the radio (OR = 0.644; 95% CI: 0.506–0.819), and those who listened at least once a week had 30% lower odds (OR = 0.697; 95% CI: 0.533–0.910). These results indicated a strong positive association between radio exposure and institutional delivery. However, the interaction terms between radio exposure and ANC visits were not statistically significant ($p > 0.05$), which indicated that the positive influence of radio listening on place of delivery did not vary by the frequency of ANC attendance. This finding suggested that radio exposure independently supported improved MHSB regardless of ANC visit frequency. Education and wealth remained strong independent predictors of place of delivery, and I confirm that the association between radio exposure and MHSB persisted even after accounting for these socioeconomic factors.

Table 13

RQ2: Sample Design Information (Radio Component of Media Exposure)

		N
Unweighted cases	Valid	11,048
	Invalid	0
	Total	11,048
Population size		10,747.478
Stage 1	Strata	20
	Units	523
Sampling design degrees of freedom		503

Table 14

RQ2: Categorical Variable Information (Radio Component of Media Exposure)

		Weighted count	Weighted percent
Place of delivery[a]	Non-institutional delivery	8608.568	80.1%
	Institutional delivery[b]	2138.910	19.9%
Frequency of listening to RadioDummy1	Others	8706.458	81.0%
	Less than once a week	2041.020	19.0%
Frequency of listening to RadioDummy2	Others	8861.222	82.4%
	At least once a week	1886.255	17.6%
Wealth index	Poorest and poor	7914.328	73.6%
	middle	2009.562	18.7%
	Richer and richest	823.587	7.7%
Educational level	No education	7700.749	71.7%
	Educated	3046.728	28.3%
Number of ANC visits Dummy 1	No ANC visits, don't know, < four ANC visits	6502.870	60.5%
	Four or more ANC visits	4244.607	39.5%
Interaction variable for RadioDummy1 and ANCDummy1	No interaction	9786.144	91.1%
	Interaction present	961.334	8.9%
Interaction variable for RadioDummy2 and ANCDummy1	No interaction	9759.841	90.8%
	Interaction present	987.636	9.2%
Population size		10747.478	100.0%

Note. a = dependent variable; b = reference category

Table 15

RQ2: Pseudo R Squares (Radio Component of Media Exposure)

Statistic	Value
Cox and Snell	0.162
Nagelkerke	0.256
McFadden	0.177

Note. These values indicate the model explains a moderate amount of variation in place of delivery, indicating a good fit.

Table 16

RQ2: Test of Model Effects (Radio Component of Media Exposure)

Source	df1	df2	Wald F	Sig (p-value)
Corrected model	8.000	496.000	79.172	<.001
Intercept	1.000	503.000	86.458	<.001
RadioDummy1	1.000	503.000	12.898	<.001
RadioDummy2	1.000	503.000	7.044	.008
Wealth index	2.000	502.000	25.995	<.001
Education level	1.000	503.000	199.917	<.001
Number of ANC visits	1.000	503.000	191.281	<.001
RadioANCDummy1	1.000	503.000	1.517	.219
RadioANCDummy2	1.000	503.000	1.273	.260

Table 17

RQ2: Odds Ratio (Radio Component of Media Exposure)

		Place of delivery	Odds ratio	95% Confidence interval	
				Lower	Upper
Frequency of listening to RadioDummy1	Less than once a week vs. others	Non-institutional delivery	0.644	0.506	0.819
Frequency of listening to RadioDummy2	At least once a week vs. others	Non-institutional delivery	0.697	0.533	0.910
Wealth index	Middle vs. poorest and poor	Non-institutional delivery	0.568	0.457	0.706
	Richer and richest vs. poorest and poor	Non-institutional delivery	0.398	0.307	0.514
Educational level	Educated vs. no education	Non-institutional delivery	0.298	0.252	0.353
Number of ANC visits	Four or more ANC visits vs. No ANC visits, don't know, <four ANC visits	Non-institutional delivery	0.293	0.246	0.349
Interaction variable for RadioDummy1 and ANCDummy1	Interaction present vs. no interaction	Non-institutional delivery	1.212	0.892	1.646
Interaction variable for RadioDummy2 and ANCDummy1	Interaction Present vs. no interaction	Non-institutional delivery	1.211	0.867	1.692

Television Component of Media Exposure

I used complex samples logistic regression analysis to examine the association between media exposure, measured by the frequency of watching television (as a proxy for media exposure) and MHSB, proxied by place of child delivery, in rural northern Nigeria. Additionally, I examined whether this association was moderated by the number of ANC visits during pregnancy, while controlling for key socioeconomic factors, including education and wealth index. I found that women who watched television less than once a week had 55% lower odds of non-institutional delivery compared to those who did not watch television (OR = 0.453; 95% CI: 0.340–0.604), and those who watched television at least once a week had 60.5% lower odds (OR = 0.395; 95% CI: 0.278–0.561). These results indicated a strong positive association between television exposure and institutional delivery. Furthermore, the interaction between frequent television exposure (at least once a week) and ANC visits was statistically significant ($p = 0.010$), which indicated that the influence of television exposure on place of delivery varied by ANC attendance. This finding implied that the impact of television media on MHSB was enhanced or modified depending on whether women attended four or more ANC visits. Education and wealth remained strong independent predictors of place of delivery, and I confirmed that the association between television exposure and MHSB persisted even after accounting for these socioeconomic factors.

Table 18

RQ2: Sample Design Information (Television Component of Media Exposure)

		N
Unweighted cases	Valid	11,048
	Invalid	0
	Total	11,048
Population size		10,747.478
Stage 1	Strata	20
	Units	523
Sampling design degrees of freedom		503

Note. This confirms that the analysis properly accounted for the complex sampling design of the 2018 NDHS, which improves the accuracy of standard errors and test statistics.

Table 19

RQ2: Categorical Variable Information (Television Component of Media Exposure)

		Weighted count	Weighted percent
Place of delivery[a]	Non-institutional delivery	8,608.568	80.1%
	Institutional delivery[b]	2,138.910	19.9%
Frequency of watching	Others	9,649.822	89.8%
TVDummy1	Less than once a week	1,097.655	10.2%
Frequency of watching	Others	9,888.135	92.0%
TVDummy2	At least once a week	859.342	8.0%
Wealth index	Poorest and poor	7,914.328	73.6%
	middle	2,009.562	18.7%
	Richer and richest	823.587	7.7%
Educational level	No education	7,700.749	71.7%
	Educated	3,046.728	28.3%
Number of ANC visits Dummy 1	No ANC visits, don't know, < four ANC visits	6,502.870	60.5%
	Four or more ANC visits	4,244.607	39.5%
Interaction variable for	No interaction	10,128.392	94.2%
TVDummy1 and ANCDummy1	Interaction present	619.086	5.8%
Interaction variable for	No interaction	10,194.089	94.9%
TVDummy2 and ANCDummy1	Interaction present	553.389	5.1%
Population size		10,747.478	100.0%

Note. a = dependent variable; b = reference category

Table 20

RQ2: Pseudo R Squares (Television Component of Media Exposure)

Statistic	Value
Cox and Snell	0.167
Nagelkerke	0.265
McFadden	0.183

Note. These values indicate the model explains a moderate amount of variation in place of delivery, indicating a good fit.

Table 21

RQ2: Test of Model Effects (Television Component of Media Exposure)

Source	df1	df2	Wald F	Sig (p-value)
Corrected model	8.000	496.000	76.612	<.001
Intercept	1.000	503.000	36.248	<.001
TVDummy1	1.000	503.000	29.244	<.001
TVDummy2	1.000	503.000	27.030	<.001
Wealth index	2.000	502.000	17.646	<.001
Education level	1.000	503.000	169.594	<.001
Number of ANC visits	1.000	503.000	225.130	<.001
TVANCDummy1	1.000	503.000	1.032	0.310
TVANCDummy2	1.000	503.000	6.601	0.010

Table 22

RQ2: Odds Ratio (Television Component of Media Exposure)

		Place of delivery	Odds ratio	95% Confidence interval	
				Lower	Upper
Frequency of watching TVDummy1	Less than once a week vs. others	Non-institutional delivery	0.453	0.340	0.604
Frequency of watching TVDummy2	At least once a week vs. others	Non-institutional delivery	0.395	0.278	0.561
Wealth index	Middle vs. poorest and poor	Non-institutional delivery	0.621	0.500	0.771
	Richer and richest vs. poorest and poor	Non-institutional delivery	0.476	0.369	0.613
Educational level	Educated vs. no education	Non-institutional delivery	0.326	0.275	0.386
Number of ANC visits	Four or more ANC visits vs. no ANC visits, don't know, <four ANC visits	Non-institutional delivery	0.293	0.249	0.344
Interaction variable for RadioDummy1 and ANCDummy1	Interaction present vs. no interaction	Non-institutional delivery	1.195	0.847	1.687
Interaction variable for RadioDummy2 and ANCDummy1	Interaction present vs. no interaction	Non-institutional delivery	1.687	1.131	2.518

Summary

In summary, I used a complex samples logistic regression model to explore the association between media exposure and MHSB in rural northern Nigeria by answering the following research questions: RQ1: Is there an association between media exposure and MHSB in rural northern Nigeria when controlling for education and wealth index?

and RQ2: What is the association between media exposure and MHSB when moderated by the number of ANC visits in rural northern Nigeria, when controlling for education and wealth index? Concerning RQ1, after controlling for education and wealth, I found that both radio and television exposure had significant independent associations with improved MHSB, as measured by institutional delivery. Women who listened to the radio less than weekly had 33% lower odds, and those who listened at least weekly had 30% lower odds of non-facility delivery compared to non-listeners.

Similarly, women who watched television less than weekly had 54% lower odds, and those who watched at least weekly had 48% lower odds of non-institutional delivery compared to non-watchers. Notably, television exposure had a stronger protective effect than radio, indicating that watching television was more likely to help women reduce non-institutional delivery than listening to the radio. While education and wealth were strong independent predictors, I found that educated women were about 73–75% less likely to deliver outside health facilities, and women in higher wealth categories had significantly lower odds of non-institutional delivery than the poorest women. However, both media types contributed significantly to institutional delivery beyond socioeconomic factors.

Furthermore, in relation to RQ2, I found that radio exposure significantly reduced the odds of non-institutional delivery by 30–36%, but this effect was not influenced by ANC visit frequency. In contrast, television exposure had a stronger protective effect, reducing the odds of non-institutional delivery by 55–60.5%. Additionally, the impact of frequent television watching on delivery location was significantly moderated by ANC attendance, indicating that television's positive influence was stronger among women with four or more ANC visits. Education and wealth consistently remained important predictors of delivery location across analyses. In the next Section, I presented the application of these findings to professional practice and their implications for social change within the context of rural northern Nigeria.

Section 4: Application to Professional Practice and Implications for Social Change

Introduction

I used quantitative methods to explore the association between media (using radio and television exposure as proxies) and MHSB (using place of child delivery/institutional delivery as a proxy) among women aged 15-49 in rural northern Nigeria, while controlling for education and wealth. I conducted this study to generate valuable insights for policymakers and public health practitioners that could serve as evidence for maternal health communication strategies in northern Nigeria. I found that both radio and television exposure were significantly associated with increased use of health facilities for child delivery. Women who listened to the radio had 30–33% lower odds of delivering outside a health facility, while those who watched television had an even stronger protective effect, with 48–54% lower odds. Importantly, the positive influence of television was further enhanced among women who attended four or more ANC visits, which indicated a significant interaction between television exposure and ANC attendance. In contrast, the effect of radio exposure was not affected by ANC visits. Education and wealth consistently remained strong predictors of institutional delivery.

Interpretation of the Findings

In this study, I found that exposure to media tools such as radio and television was significantly associated with improved MHSB, specifically increased institutional delivery among women in rural northern Nigeria. My findings confirmed results from previous studies conducted in Nigeria and other African countries. For example, Anyanwu et al. (2020) and Igbinoba et al. (2020) reported that exposure to health information via radio and television in southern Nigeria led to improved maternal health awareness, practices and health-seeking behavior. Similarly, Ohaja et al. (2022) and Aboagye et al. (2022) found that radio and television played a crucial role in disseminating maternal health information across sub-Saharan Africa, and that exposure to maternal health messages through these platforms was strongly associated with increased use of ANC and skilled birth attendance. In addition, He et al. (2022) identified mass media as the second strongest determinant of ANC utilization across ten African countries, after household wealth.

The strong, independent effects of education and wealth on institutional delivery that I observed in this study were consistent with prior research highlighting these factors as critical determinants of maternal health service utilization. Studies have shown that higher educational attainment and household wealth increase the likelihood of seeking professional maternal care (Adamu & Ango, 2024; He et al., 2022). I also found that a substantial proportion of women in rural northern Nigeria accessed radio and television for health information. This finding aligns with recent studies from Ghana and northern Nigeria, which demonstrated the continued relevance and reach of radio and television in rural settings (Adamu, 2020; Kankam et al., 2024; Ozohu-Suleiman, 2021).

To address potential generalizability concerns and use of data from 2018, I compared my findings with those of newer research (between 2023 and 2025), similar in scope. Oweibia et al. (2025) assessed Nigeria's progress toward the Sustainable Development Goals by comparing data from the 2018 and 2023-2024 NDHS and found persistent barriers to MHSB in rural northern Nigeria across the periods, implying that my study findings remain relevant for informing current practice in rural northern Nigeria. Additionally, the findings of Ogwu et al. (2023) and Adewuyi et al. (2024) strongly validate my results by highlighting the positive association between mass media exposure and improved MHSB in Nigeria. Ogwu et al. (2023) demonstrated that ownership and use of mass media tools, specifically radio and television, were significantly associated with a higher number of ANC visits, and that mass media exposure increased the likelihood of adopting recommended maternal health care practices. Similarly, Adewuyi et al. (2024) found that, despite persistent rural–urban disparities, regular access to media (including radio and television) remained an important determinant of ANC utilization in rural Nigeria, particularly among socioeconomically disadvantaged women.

I addressed a gap in the literature by focusing on rural northern Nigeria, a region underrepresented in previous analyses. While the positive influence of media has been documented in other regions, evidence specific to rural northern Nigeria, particularly regarding both radio and television, had been sparse. My research extends the geographical and contextual scope of existing knowledge. Furthermore, I contributed to the literature by examining the moderating effect of ANC visits on the relationship between media exposure and MHSB. While prior studies established the importance of ANC attendance and media exposure independently, I found that the influence of television exposure on institutional delivery was enhanced by frequent ANC visits, as indicated by a significant interaction effect. This provides new insight into how media and direct health care engagement can synergistically improve maternal health outcomes.

I also found that the positive association between radio exposure and institutional delivery was not moderated by ANC attendance, indicating that different media channels might interact with health care behaviors in distinct ways, an area less explored in previous research. This finding challenges the notion that media effects are always amplified by direct health care engagement and suggests that radio can independently influence maternal health decisions, regardless of the frequency of ANC visits.

Interpreting my findings through the lens of the HBM, media platforms could increase women's awareness of their susceptibility to maternal health risks (perceived susceptibility) and the severity of complications associated with home deliveries (perceived severity). Media messages could also motivate women to seek skilled care (perceived benefits) and help address common barriers such as fear, misinformation, and logistical challenges (perceived barriers). Furthermore, television exposure, especially when combined with frequent ANC visits, could empower women by enhancing their confidence (self-efficacy) in making informed health decisions. Radio and television may also act as cues to action by providing timely reminders and prompts to seek facility-based care.

Limitations of the Study

There were several limitations affecting the generalizability, validity, and reliability of my secondary analysis of the 2018 NDHS data. First, because I used data from 2018, my findings may not fully reflect current conditions in rural northern Nigeria, especially given possible social and health system changes. However, Oweibia et al. (2025) found that barriers to MHSB in rural northern Nigeria persisted between 2018 and

2024, suggesting minimal social and health system changes since 2018. Second, I included only women aged 15–49 in rural northern Nigeria who answered specific questions about childbirth, so the results may not be generalizable to women outside this group or those living in urban areas. Additionally, since the full 2023–2024 NDHS data set was not publicly available at the time of my analysis, I could not account for more recent trends.

Trustworthiness and validity were also affected by reliance on self-reported data, which is subject to recall bias, as women who participated in the 2018 NDHS were asked to remember events from up to 5 years prior. While I controlled for confounders such as education and wealth index, other unmeasured factors, such as cultural beliefs or community influences, may have affected MHSB, limiting the internal validity of my findings. The use of proxy measures (institutional delivery for MHSB, and frequency of radio and television use for media exposure) may not have captured the full complexity of these constructs, potentially impacting construct validity. Reliability depended on the quality and consistency of the NDHS data, and any errors in data collection or interpretation could have introduced variability into the results.

Recommendations for Future Research

Based on the strengths and limitations identified in this study and the literature reviewed, I recommend that future research utilize more recent data sets, such as the 2023–2024 NDHS, to capture current trends in MHSB and media exposure in rural northern Nigeria. There is a need to look into other emerging types of media, including mobile phones and social media, which would shed more light on the impact on MHSB as communications access continues to grow in rural regions. Further studies should also examine the type and quality of health messages received, not just the frequency of exposure, to determine which aspects are most effective in promoting positive health behaviors. Additionally, future research should explore the influence of cultural, social, and community-level factors on MHSB, as these may interact with media exposure in complex ways. The use of longitudinal or mixed-methods designs could help clarify cause-and-effect relationships and provide deeper insight into barriers and facilitators affecting women's health decisions. Assessing the effect of specially designed media programs and digital literacy initiatives, particularly when integrated with ANC services, would also be valuable.

Public Health Practice and Field-Based Products

Recommendations for Public Health Practice

Based on my study findings and the broader literature, I recommend that public health practice in rural northern Nigeria prioritize the use of traditional media, specifically radio and television, to disseminate maternal health information. While digital media may play a future role, current efforts should focus on traditional media, given the limited internet use in rural areas. Public health programs should deliver culturally sensitive messages that address local beliefs and barriers, and these messages should be integrated with ANC services to reinforce their impact. These programs should also ensure women are empowered to make informed health care decisions, particularly by encouraging at least four ANC visits and addressing common obstacles such as cost and distance. Interventions should also consider the strong influence of education and wealth on MHSB by supporting women's education and economic empowerment, while improving physical access to health facilities.

To achieve maximum impact with these strategies, I recommend that policymakers and public health practitioners develop evidence-based communication programs, train health care providers to complement media messages, and engage community leaders to foster healthy social norms around maternal health. Collaboration between the government, nongovernmental organizations, and media outlets will ensure consistent and widespread dissemination of information. Programmatic adaptations should be flexible based on ongoing monitoring and evaluation feedback. Implementing these context-specific integrated approaches and public health initiatives can empower women, improve MHSB, and help reduce maternal mortality in rural northern Nigeria.

Field Product #1: Policy Brief Memo

This policy recommendation centers on leveraging traditional media, specifically radio and television, to improve MHSB among women in rural northern Nigeria. The policy aims to empower women with critical health information by strengthening maternal health messaging through accessible and culturally relevant media channels, integrating these efforts with ANC services, and addressing socioeconomic and infrastructural barriers. This approach focuses on encouraging the use of skilled maternal health services, reducing maternal mortality, and fostering positive social change within rural communities. I have included the policy brief memo in Appendix A.

Field Product #2: Community Health Intervention Plan

This community health intervention plan is designed to address the persistently high rates of maternal mortality and poor MHSB among women in rural northern Nigeria. Drawing on the HBM as a guiding framework, the plan leverages the power of traditional media, specifically radio and television, to deliver culturally relevant maternal health information and motivate positive health actions. The plan aims to empower women with the knowledge, confidence, and support needed to seek skilled care during pregnancy and childbirth by aligning intervention components with the beliefs, perceptions, and barriers identified in the local context. The intervention is tailored to the unique needs and challenges of rural communities, fostering collaboration among women, families, community leaders, and health professionals to create lasting improvements in maternal health outcomes. I have included the community health intervention plan in Appendix B. I have also included in Appendix C a visual representation of the community health intervention plan and in Appendix D an information sheet based on the plan.

Positive Social Change

At the individual level, the potential impact for positive social change is the empowerment of women in rural northern Nigeria through health messages delivered via radio and television, enabling them to become better informed about maternal health risks and the benefits of skilled care. This increased awareness can lead to improved decision making and more proactive health seeking behaviors. Another potential impact at this level is enhanced self-efficacy; exposure to culturally relevant media content and ANC services can boost women's confidence in navigating health care systems and advocating for their own health, and that of their children.

At the family level, the potential impact for positive social change could include improved support systems resulting from women sharing the health information gained from media with family members, particularly spouses and elders. Families may become more supportive of maternal health practices such as facility-based delivery and regular ANC visits. Additionally, positive health messaging can gradually influence family attitudes toward maternal health, reducing stigma and misconceptions that discourage women from seeking care, thereby contributing to a shift in social norms.

At the organizational level, the potential impact for positive social change could include improved engagement at the health facilities. Integrating media campaigns with ANC services can strengthen the role of health facilities as trusted sources of information and care, fostering a more welcoming environment for women. Furthermore, health workers and community health volunteers can be trained to complement media messages with interpersonal communication, thereby improving the overall quality and reach of maternal health interventions.

At the societal or policy level, the potential impact for positive social change could include evidence-informed policy development. Policymakers can use this study's findings to prioritize traditional media as a cost-effective platform for maternal health education in rural areas, thereby guiding resource allocation. This study can also potentially promote equity, as policies that support media-based health communication tailored to rural northern Nigeria can help address disparities in maternal health outcomes by reaching underserved populations. In addition, findings from this study can foster support for integrated interventions; encouraging collaboration between media outlets, health systems, and community organizations can create sustainable frameworks for maternal health promotion.

Conclusion

I designed a quantitative, correlational study using secondary data from the 2018 NDHS to investigate the association between media exposure and MHSB in rural northern Nigeria. The study incorporated descriptive and inferential analyses, including complex samples logistic regression, to address relevant research questions within a public health context. I applied HBM as the theoretical framework to interpret how media exposure influences MHSB. I critically analyzed the model's strengths, such as its emphasis on individual beliefs and motivation, and limitations, including its limited consideration of broader social and cultural factors, ensuring a balanced assessment of its applicability to the study context.

I addressed ethical considerations by using anonymized, publicly available secondary data collected under IRB-approved protocols, which ensured participant confidentiality and informed consent. Additionally, I considered equity implications by focusing on disadvantaged rural women and emphasizing responsible data use to inform policies that promote health equity. Following the data analysis, I found that exposure to traditional media platforms, radio and television, significantly enhances MHSB among women in rural northern Nigeria. This exposure increases awareness, reduces barriers, and empowers women to make informed decisions. Integrating culturally sensitive media campaigns with ANC services presents a practical, evidence-based strategy to improve maternal health outcomes and reduce maternal mortality in this underserved region.

To communicate the research findings in accessible language tailored to diverse stakeholders, including policymakers, public health practitioners, and community members, I developed a clear policy brief and intervention plan, as well as educational materials that translate scientific evidence into actionable strategies for improving maternal health. Based on empirical findings, I proposed policy recommendations emphasizing the strategic use of radio and television to disseminate maternal health information, integrated with ANC services and community engagement. These policies are designed to empower women, reduce health disparities, and foster sustainable improvements in maternal health behavior and outcomes in rural northern Nigeria.

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Appendix A: Policy Brief Memo

DrPH Field Product #1: Policy Brief Memo

Empowering Rural Northern Nigeria: Harnessing Radio and Television to Improve Maternal Health Outcomes

- **Introduction:** Maternal mortality remains critically high in rural northern Nigeria, largely because few women seek skilled care during pregnancy and childbirth. Despite prior efforts, progress has been limited (Adewuyi et al., 2024). Immediate action is vital. Culturally relevant health communication through radio and television offers a rapid, far-reaching approach to improve women's awareness and uptake of essential maternal health services (Aboagye et al., 2022; Ogwu et al., 2023).
- **Scope of the Problem:** Rural northern Nigeria faces the country's highest maternal mortality rates, putting thousands of women at risk each year (Oweibia et al., 2025). Main factors include poor health information, low facility births, insufficient antenatal care (ANC), entrenched cultural norms, poverty, and geographic barriers (Adewuyi et al., 2024). Women aged 15–49 are particularly vulnerable; lack of skilled care endangers mothers, newborns, and families, perpetuating cycles of poverty and poor health (Oweibia et al., 2025).
- **Current Approaches:** Facility strengthening, community outreach, and print campaigns often miss rural populations due to cultural, language, literacy, and infrastructure barriers (Oweibia et al., 2025). Most mass media efforts are not culturally tailored or well-integrated with health services (Ogwu et al., 2023), so radio and television remain underused and language barriers persist, yielding only modest gains in maternal health-seeking behavior (Aboagye et al., 2022).
- **Proposed Program or Policy:** A coordinated program is recommended that uses radio and television to deliver culturally relevant maternal health messages, integrating them with ANC services and health worker counseling. Community listening groups would foster support. Evidence shows this approach increases facility births and ANC attendance, even among disadvantaged women (Aboagye et al., 2022; Ogwu et al., 2023; Adewuyi et al., 2024). Outcomes include more facility deliveries, better knowledge, and reduced mortality. The strategy is cost-effective, with local adaptation and feedback mitigating risks.
- **Major Constituencies**: Key stakeholders, including rural women and families, providers, authorities, traditional/religious leaders, NGOs, and broadcasters, mostly support media-based strategies (Ogwu et al., 2023). Any concerns can be addressed through community partnerships, local languages, and alignment with development goals (Aboagye et al., 2022; Oweibia et al., 2025).
- **Conclusions:** Radio and television are underutilized but powerful for improving maternal health-seeking behavior. Integrating culturally tailored media with ANC services and community efforts is a cost-effective, evidence-based strategy to reduce mortality and promote positive change (Aboagye et al., 2022; Adewuyi et al., 2024).

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Appendix B: Community Health Intervention Plan

DrPH Field Product #2: Community Health Intervention Plan

Healthy Mothers, Stronger Communities: Leveraging Radio and Television for Improved Maternal Health in Rural Northern Nigeria

Problem Definition

Maternal mortality remains unacceptably high in rural northern Nigeria, with the region experiencing some of the country's highest maternal death rates (Oweibia et al., 2025). Thousands of women face life-threatening risks each year due to consistently low rates of skilled care-seeking during pregnancy and childbirth (Adewuyi et al., 2024). Factors such as limited access to timely health information, low facility-based delivery rates, poor antenatal care (ANC) attendance, entrenched cultural norms, poverty, and geographic barriers all contribute to the crisis (Aboagye et al., 2022; Adewuyi et al., 2024). Women aged 15–49 are particularly impacted, resulting in preventable deaths and perpetuating poor health and poverty within families (Oweibia et al., 2025).

Goals

- Increase the percentage of women in rural northern Nigeria delivering in health facilities by 30% within 3 years.
- Increase the percentage of women attending at least four ANC visits by 25% within 3 years.
- Improve knowledge among women and families regarding maternal health risks and the benefits of skilled care, as measured by pre- and post-intervention surveys.
- Reduce reported cultural and logistical barriers to accessing maternal care services, as measured by pre- and post-intervention surveys.

Target Population

Women of reproductive age (15–49 years) in rural communities across the northcentral, northeast, and northwest regions of Nigeria. Secondary beneficiaries include their families, newborns, and the wider community.

Intervention Strategies

- **Maternal health messaging via radio and television:** Culturally relevant maternal health programs will be developed and broadcast in local languages, using testimonials and interactive segments to address misconceptions and promote skilled care and ANC attendance (Aboagye et al., 2022; Ogwu et al., 2023). Broadcasts will be scheduled at convenient times for rural women (Ogwu et al., 2023).
- **Integration with ANC services:** Media messages will be reinforced during ANC visits, with health workers providing ongoing counseling on the importance of ANC and facility delivery (Aboagye et al., 2022; Adewuyi et al., 2024).
- **Community engagement:** Community leaders, respected women, and religious figures will be involved in message design and delivery. Regular listening groups and community discussions will foster dialogue and uptake (Oweibia et al., 2025).

- **Barrier reduction initiatives:** Support for women's education and economic empowerment will be provided alongside media campaigns, and advocacy efforts will work to improve transportation and facility resources (Aboagye et al., 2022; Adewuyi et al., 2024).

Implementation Plan

- **Timeline:** 3 years.
- **Months 1–3:** Formative research, community engagement, material development.
- **Months 4–6:** Media and health worker training, as well as pilot broadcasts and listening groups.
- **Months 7–36:** Full-scale broadcasts, integrated counseling with ANC, and ongoing community activities.
- **Resources:** Partnerships with local broadcasters, Ministry of Health, NGOs, health workers, community leaders, and women's groups.
- **Roles:** The media will be responsible for content production and broadcasting. Health workers will reinforce messaging and facilitate activities during ANC visits. Community leaders and groups will mobilize local participation, and a dedicated monitoring team will oversee evaluation and reporting activities.

Evaluation Plan

- **Process Evaluation:** This will include monitoring of broadcast times, participation in listening groups, and gathering ongoing feedback from women and community members.
- **Outcome Evaluation:** This will involve comparing rates of facility deliveries and ANC attendance before and after, as well as surveying changes in knowledge, attitudes, and barriers.
- **Impact Evaluation:** This will involve tracking of maternal mortality trends through health surveillance data.

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Appendix C: Visual Representation of the Intervention Plan

DrPH Field Product #3: Visual Representation of the Intervention Plan

Components and Alignment With HBM

Intervention Components	Specific Elements	Mode of Delivery	Alignment with HBM Constructs
Maternal Health Messaging	• Develop culturally relevant, local-language programs • Use testimonials and interactive segments to address misconceptions and promote skilled care/ANC attendance • Schedule broadcasts at convenient times for rural women	• Radio and television programs aired on local channels	• Perceived Susceptibility • Perceived Severity • Perceived Benefits • Cues to Action
Integration with ANC Services	• Reinforce media messages during ANC visits • Ongoing health worker counseling on ANC and facility delivery	• ANC facility-based counseling sessions, health worker reinforcement during visits	• Perceived Benefits • Cues to Action • Self-Efficacy
Community Engagement	• Involve community leaders, respected women, and religious figures in message design and delivery • Organize listening groups and community discussions	• Community meetings • Religious/social gatherings • Women's group forums	• Perceived Barriers • Self-Efficacy • Cues to Action
Addressing Socioeconomic & Structural Barriers	• Support women's education and economic empowerment • Advocate for improved transportation and facility resources	• Local development projects • NGO/government partnerships • Advocacy campaigns	• Perceived Barriers
Monitoring, Evaluation, and Adaptation	• Monitor broadcast times, listening group participation, and ongoing feedback • Pre/post surveys to assess knowledge, attitudes, barriers, and facility use • Track maternal mortality trends through health surveillance data	• Surveys • Focus groups • Stakeholder meetings • Health record reviews	• Cues to Action • Self-Efficacy

Appendix D: Information Sheet of the Intervention Plan

DrPH Field Product #4: Information Sheet of the Intervention Plan

SAFE MOTHERHOOD

Why is Maternal Health Important?

- Delivering in a health facility with skilled care can save your life and your baby's life.
- Complications during childbirth can happen to anyone—being prepared is key.

How Can Radio and TV Help You?

- Listen to the radio and watch TV programs that share important health messages and real-life stories from women like you.
- Learn about the benefits of antenatal care (ANC) and why at least four visits are recommended.

Overcoming Barriers

- If you face challenges getting to a health facility, ask about community support or transport options.
- Don't let myths or rumors stop you from seeking care—get information from trusted radio and TV programs.

What You Can Do

- Attend ANC visits at your nearest health clinic.
- Plan to deliver your baby in a hospital or clinic.
- Talk to your family about the importance of skilled care.
- Join community meetings and workshops to learn more and share your experiences.

Remember

- Your health matters. Look after yourself and support other women.
- Together, we can build a safer, healthier future
- For more information, visit your nearest health clinic.