Evolution and Determinants of Antenatal Care Services Utilization Among Women in Rwanda: a Rapid Review

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Systematic Review

Keywords: Evolution, Determinants, Utilizations, Antenatal Care, Women, Rwanda

Posted Date: September 16th, 2024

DOI: https://doi.org/10.21203/rs.3.rs-5077325/v1

Additional Declarations: The authors declare no competing interests.

Abstract

Background: Maternal and child health remains a global priority, with antenatal care (ANC) recognized as essential for ensuring positive pregnancy outcomes. Despite significant improvements, ANC utilization in low and middle-income countries, particularly in Sub-Saharan Africa, remains low, contributing to high maternal and neonatal mortality rates. This paper highlighted significant progress in Rwanda's maternal health services since 2000. It further explored the evolution of ANC utilization in Rwanda, identifying key determinants and trends over the past two decades.

Methods: Following a traditional maternal and child health services contextualization in Rwanda, a rapid review was conducted, searching databases such as PubMed, Google Scholar, and Scopus, alongside grey literature and reference lists. The review focused on studies published between 2010 and 2024, examining factors associated with ANC utilization in Rwanda. The screening was independently conducted by two reviewers with the assistance Rayyan application, followed by full-text screening and data synthesis. The results were presented using the forest plots to display the significant odd ratios of ANC services utilization across different predictor variables.

Results: The review included 11 studies and 1 report revealing a significant improvement in ANC utilization in Rwanda. By 2019-2020, 47% of women received ANC in the first trimester, and 59% had four or more visits, compared to 35% and 38%, respectively, in 2010.

Factors positively associated with adequate ANC included higher education levels, better wealth status, health insurance coverage, and small household size. Conversely, significant distance to health facilities and unwanted pregnancies were associated with lower odds of adequate ANC utilization. Delayed ANC was more likely among women with higher parity, those who lack social support, and those with no or only primary education.

Conclusion: The findings indicate that Rwanda has made considerable strides in improving ANC utilization. Addressing barriers such as distance to healthcare facilities, education, and economic disparities is crucial for further enhancing maternal and child health outcomes. The review underscores the need for targeted interventions to achieve WHO recommendations of 8 ANC visits and Sustainable Development Goals (SDGs) related to maternal and child health in Rwanda.

BACKGROUND

Maternal and child health: Global context

The World Health Organization (WHO) recommends that every pregnant woman and newborn receive quality healthcare throughout the pregnancy, childbirth, and postnatal period [1]. Antenatal care (ANC) is provided by skilled healthcare providers to pregnant women and adolescent girls to ensure the best health conditions for both the mother and her baby during pregnancy and improve positive pregnancy

outcomes. ANC comprises the aspect of risk identification; prevention and management of pregnancy-related or concurrent health conditions, health education, and health promotion [1].

Globally, about 90% of women worldwide utilize skilled ANC services at least once and only 57% of women utilize skilled ANC services at least four times, in Africa 53% and 49% receive at least four visits, respectively [2]. The recommended ANC visits must be at least eight, especially for women in developing countries [3]. Studies conducted in different countries showed that poor ANC attendance increases the risk of adverse pregnancy outcomes not limited to preterm labour, low birth weight, and stillbirth [4], [5], [6], [7].

Also as reported by WHO in 2022, approximately 800 women die every day from pregnancy and childbirth-related causes; which means that a woman dies around every two minutes [8]. The vast majority (95%) of these maternal deaths occurred in low and middle-income countries, of which 70% were in Sub-Saharan Africa alone [9]. The numbers alert that if no huge efforts are invested, the Sustainable Development Goal (SDG) target-3.1 of reducing maternal mortality to less than 70 maternal deaths per 100,000 live births by 2030 may not be achieved in some Sub-Saharan African countries [9].

In 2022 it was reported that a woman dies around every two minutes and a child born in Sub-Saharan Africa is 10 times more likely to die than a child born in a high-income country [10]. Despite global improvement in maternal and child health services and the recognizable importance of antenatal care services, ANC utilization is still low in low and middle-income countries and generally; low wealth, a long distance from the health facility, low education, and other socio-cultural factors as the reasons for no or delayed ANC initiation as well [11].

Key components of ANC

Antenatal care (ANC) is a critical aspect of maternal and neonatal health, involving a comprehensive package of services aimed at ensuring the well-being of both mother and child [12]. The section below discussed the essential components of ANC, synthesizing findings from multiple literature to provide a detailed understanding of effective interventions and practices.

Health Education and Counseling

Health education and counselling are fundamental components of ANC, providing pregnant women with vital information on nutrition, childbirth preparation, breastfeeding, family planning, and newborn care [13]. A review of McCauley et al. involving 221 papers emphasized that effective health education can significantly improve maternal and neonatal outcomes by empowering women with knowledge and promoting healthy behaviours [14].

Routine Check-Ups and Screenings

Routine check-ups and screenings are vital for monitoring the health status of the mother and fetus [15]. The ANC visits typically include measuring blood pressure, assessing fetal growth, and conducting tests for conditions such as anaemia, gestational diabetes, and pre-eclampsia among others. Toolan et al.

found that regular monitoring and early detection of complications are crucial for timely interventions, thereby reducing unanticipated maternal and neonatal morbidity and mortality [16]. Lateef et al. also highlighted the importance of consistent and thorough screenings to ensure early identification and management of potential health issues [17].

Nutritional Support

Addressing the dietary needs of pregnant women to promote optimal fetal development and maternal health. Studies have shown that appropriate nutritional counselling and supplementation can prevent deficiencies and related complications. Nutritional interventions, including iron and folic acid supplementation, significantly reduce the risk of anaemia, preterm delivery, infections, and neural tube defects in newborns [18], [19], [20].

Mental Health Support

Pregnancy can be a period of significant emotional stress, and addressing mental health concerns is essential for the well-being of both mother and child. A study by Biaggi et al. highlighted the prevalence of antenatal depression and anxiety, suggesting that integrated mental health services within ANC can improve overall maternal health outcomes [21]. Symon et al. also found that mental health interventions for both mothers and their partners, including counselling and support groups, can significantly reduce stress and anxiety levels among pregnant women [14], [22].

Birth Preparedness and Complication Readiness

In addition to regular ANC visits, birth preparedness, danger sign recognition, and complication readiness are essential components of maternal health care. A study on birth preparedness in Rwanda highlighted the need for increased access to skilled care at birth and emergency obstetric care for complications [23]. The study pointed out that while several initiatives have been undertaken to improve these aspects, challenges remain in ensuring that all women are adequately prepared for childbirth [23].

10 Years Evolution of ANC women in Rwanda

2000–2010: Foundations of maternal and child health Improvement

In the early 2000s, Rwanda's healthcare system faced significant challenges, including limited access to quality antenatal care (ANC) services and high maternal (1,007 in 100,000 live births) and neonatal (44 in 1,000 live births) mortality rates [24]. The government responded by implementing a series of Health Sector Strategic Plans (HSSP), which prioritized maternal and child health. The successful execution of HSSP I (2005–2009) which aimed to rebuild the healthcare system by increasing funding level, improving infrastructure, and boosting training healthcare providers [24].

A key aspect was the deployment of community health workers (CHWs) to expand coverage and accessibility, particularly in rural areas [25]. CHWs played a crucial role in bridging the gap between

health facilities and the community by providing basic ANC services, health education, and referrals [26]. Later HSSP II (2009–2013) laid the foundation for improved ANC services through increased healthcare funding, capacity-building programs [27].

2010–2020: Scaling Up and Enhancing Quality

The second and third Health Sector Strategic Plans (HSSP II and III) continued to emphasize maternal and child health. One notable initiative was the Preterm Birth Initiative-Rwanda, which introduced group antenatal care (G-ANC) to improve care quality and maternal satisfaction. G-ANC involved organizing pregnant women into groups for shared ANC visits, fostering peer support, and improving health literacy [18]. The G-ANC was found not to affect the gestational age lengths but generally increase the quality of care, freedom of expression, and relationships [28], [29]. The initiative demonstrated positive outcomes, including improved maternal satisfaction, better adherence to ANC schedules, and enhanced health literacy among pregnant women [30].

Rwanda also focused on addressing the social determinants of health that impact ANC utilization and outcomes. The government implemented programs to improve women's education, economic empowerment, and access to health insurance. These measures contributed to increased ANC attendance and better maternal health outcomes [27]. The maternal mortality rate dropped from 476 per 100,000 live births in 2010 to 210 per 100,000 live births in 2015. while neonatal mortality has decreased from 50 per 1,000 live births to 32 per 1,000 live births in the same period. Additionally, in 2016–2017, 98% of Rwandan women delivered at the health facilities [27].

Post-2020: Continuing Challenges and Innovations

Recent research has highlighted ongoing issues such as the prevalence of antenatal depressive symptoms and the need for mental health support within ANC programs. Mulungi et al. reported that the prevalence of delayed ANC in Rwanda was 41% [31]. Despite these alarming proportions, Rwanda has relatively made significant progress in improving ANC quality and coverage compared to previous years. Rwanda continues to employ evidence-based, Innovative and employment of advanced technologies to quickly deliver services to needy populations across all regions.

Antenatal care (ANC) utilization in Rwanda is influenced by various determinants, including socio-demographics, health systems, and individual factors. These determinants are critical for understanding the barriers to adequate ANC and for developing strategies to improve maternal health outcomes. To better understand these determinants factors from the recent publication, we conducted a rapid review.

REVIEW OF THE DETERMINANTS OF ANC UTILIZATION IN RWANDA

Information search

Information related to the ANC utilization in Rwanda was searched on Pubmed, Google Scholar, Scopus, grey literature, and reference lists. The study used MeSH terms and Boolean operators as necessary. The MeSH terms employed based on the PICO framework were:

"Women"[MeSH Terms] OR "Pregnant Women"[tw] OR "Maternal Health"[tw] OR "Women's Health"[tw] AND "Rwanda"[MeSH Terms] OR "Africa"[tw] OR "Rural Population"[tw] OR "Urban Population"[tw] AND "Prenatal Care"[MeSH Terms] OR "Antenal Care"[tw] OR "Maternal Health Service*"[tw] OR "Patient Acceptance of Health Care"[tw] OR "Health Services Accessibility"[tw] AND "Health Knowledge, Attitudes, Practice"[tw] OR "Maternal Mortality"[tw] "Neonatal Mortality"[tw]OR "Pregnancy Outcome"[tw].

Study selection and inclusion

Studies focusing on antenatal care utilization in Rwanda or similar contexts, that have reported the prevalence or factors related to ANC were selected. English studies involving human subjects (Women), published since 2010 were selected. Exclusion criteria were non-human participants, male-only, clinical trial reports, and being out of Rwanda context or lacking ANC focus.

Screening process

The screening process was independently conducted by two reviewers using Rayyan (www.rayyan.ai). The process involved title and abstract screening, followed by full-text screening and generating the PRISMA chart.

Data abstraction and synthesis

Data from different studies were discussed in the subheadings. The results from each study were extracted and entered into an Excel database. GraphPad Prism version 10 was utilized to synthesize results and present odd ratios of concluded factors to forest plots.

RESULTS

Characteristics of the study included

A total of 11 studies have been found to address factors associated with antenatal care visits among women in Rwanda (Fig. 1). These articles were published between after January 2010 and July 2024. 4 studies assessed the factors associated with adequate utilization of ANC [25], [32], [33], [34], 7 assessed the factors associated with poor, delayed, or inadequate ANC [31], [35], [36], [37], [38], [39], [40], and 1 report of Rwanda Demographic and Health Survey 2019/2020.

Figure 1: PRISMA diagram for studies selection and inclusion

Prevalence of ANC utilization in Rwanda

The national trend of ANC continued to improve significantly by 2010, with 35% of women receiving first-trimester ANC and 38% having four or more visits. The upward trend persisted, as by 2014-15, 44% of

women received ANC in the first trimester, and 56% had four or more visits. Finally, in the 2019-20 period, 47% of women received first-trimester ANC, while the percentage of those with four or more visits reached 59% (Fig. 2).

Figure 2: ANC trends in Rwanda. Source: Rwanda Demographic and Health Survey 2019/20 (Maternal Health Care, Page 132)

Factors associated with the utilization of ANC in Rwanda

The timing and frequency of ANC visits are critical for early detection and management of potential health issues. The review classified into the studies that assessed the determinants of adequate (ANC of 4+) and delayed or inadequate (ANC visits less than 4, or did not attend the 1st visit in the 1st trimester) ANC utilization in Rwanda considering the standards set by the World Health Organization (WHO) and the Rwanda Ministry of Health.

Determinants of Adequate ANC

In Rwanda, several factors are associated with the likelihood of receiving adequate (ANC). Women who attended a referral hospital had a higher odds ratio (OR = 2.07) of receiving adequate ANC, while those with exposure to newspapers or magazines at least once a week (OR = 1.48) and those with secondary or higher education (OR = 1.19 to 1.9) also demonstrated increased odds. Similarly, Conversely, having health insurance (OR = 1.33). Controversy, facing significant distance to the facility (OR = 0.82), and experiencing unwanted pregnancies (OR = 0.78) were associated with lower odds of receiving adequate ANC.

Socioeconomic status also plays a crucial role, with rich women (OR = 1.2) and those of slightly better socioeconomic status (OR = 2.13) more likely to receive adequate ANC. Urban residents decreased the odds (OR = 0.71) of inadequate ANC compared to rural areas. Additionally, parity less than 2 (OR = 6.04) was associated with higher odds, while higher parity and larger household sizes were linked to lower odds (Fig. 3).

Figure 3: Forest plot showing selected factors associated with adequate ANC utilization in Rwanda

Determinants of delayed and inadequate ANC

Women with a higher number of children are more likely to delay ANC. Those with 4–6 children have an OR of 1.4, indicating they are 40% more likely to delay ANC compared to women with fewer children. This likelihood increases for women with 7 or more children, with an OR of 1.5. Women who did not attend ANC in previous pregnancies have an OR of 2.0, making them twice as likely to delay ANC in subsequent pregnancies. Marital status also plays a significant role; unmarried women are nearly three times more likely to delay ANC, with an OR of 2.99. Unwanted pregnancies contribute to delays as well, with an OR of 1.41. The absence of family support and older maternal age further contribute to delays, with ORs of 1.71 and 1.78, respectively.

Education and socioeconomic status are critical in determining ANC timing. Women with no education have an OR of 2.6, meaning they are more than twice as likely to delay ANC compared to their educated counterparts. Even women with only primary education show a high OR of 2.8. Financial barriers also play a role, as the lack of health insurance and employment status exacerbate delays, with ORs of 1.4 and 2.3, respectively (Fig. 4).

Figure 4: Forest plot showing selected factors associated with delayed and inadequate ANC utilization in Rwanda

DISCUSSION

The review described trends and assessed the factors associated with the level of utilization of ANC services among women in Rwanda. Firstly, it revealed a prevalence of 47% which is a quite big improvement compared to 44% found during the analysis of determinants for utilization of 4 + ANC using DHS (2005–2015). When compared to other SSA countries, the highest prevalence of ANC utilization among women in Rwanda is associated with strengthened and reformed health systems, public-private sector partnerships, strong political commitment, and community health worker (CHWs) programs specifically in Rwanda [31], [41] [42]. Contrary to Burundi low utilization is owed to inequality in the use of health services and a large gap between contact and contents of ANC [43].

In this review, women were more likely to have adequate ANC when they attended referral hospital [25] and lower odds when the provider is a nurse [34]. In another study, Rurangirwa et al. reported that more than half of the nurses (55.5%) with over six years of experience exhibited inadequate practices in ANC services [44]. This finding indicates a critical need for ongoing training and capacity building among healthcare providers to ensure consistent and high-quality ANC services through mentorship and quality improvement programs across the country.

Health insurance coverage was positively associated with the utilization of ANC services. Wang et al. demonstrated that health insurance can greatly enhance access to maternal health services, including ANC [45]. Broadening health insurance coverage to include income-sensitive premiums or exemptions for the poor, along with low or no copayments, can improve maternal health outcomes.

In general, the utilization of ANC services by women residing in urban areas is linked with the presence of skilled healthcare providers in rural areas rather than urban and this follows their socio-economic instinct [46]. However, these findings vary with countries and are opposed to the observation of Andegiorgish et al. where in Zambia uptake was higher among rural residents [47].

Our study also indicates that women in the wealth index of the richest utilize ANC most likely compared to those in the poorest wealth index. Unsurprisingly, family wealth or employment enables women to get transportation fees, health insurance, and other financial requirements needed for adequate ANC visits [48], [49].

The women who considered the distance to a health facility a problem or lacking transport had high odds of delaying and not completing recommended ANC visits [34]. The distance towards the health facilities and treatment payment scheme are potential ANC services accessibility barriers evident in SSA compared to America and Asia and thus can be reversed by safe motherhood initiatives aimed at reducing poverty and empowering women [50].

Among other factors, women with higher self and partners' levels of education, and listening more frequently to Radio or watching television had utilized ANC services more than those without formal education. The same findings were observed in other studies [51], [52], [53]. And probably it is because education increases awareness and knowledge about the importance of ANC and the consequences of missing it thus promoting their health-seeking behaviours.

Women aged above 30 years old had a higher level of inadequate or delayed utilization of ANC services than other age groups. These findings do not support other studies done in different countries [54] that showed a positive association between the increase in maternal age and the level of ANC utilization. It is possible because the older a woman gets, the more she believes she has an experience about what can go wrong from previous births.

CONCLUSIONS

Despite the benefits of the recommended ANC services to maternal and childbirth and even the long-term health impact on the population, the findings in this review revealed overall significant improvement over the past 2 decades and substantial differences in utilization levels across demographics in Rwanda. The majority of the women received adequate antenatal care because of factors like rural residency, higher wealth index, higher educational attainment, and exposure to media. Advanced maternal age, far distance to the health facilities, intimate partner violence, and unwanted pregnancy were among the factors predicting low levels of ANC utilization.

The government and health policymakers must address the factors identified in this review to improve maternal and child health and implement WHO recommendations on optimal ANC visits. This will be achieved through decentralized health facilities in rural areas training more healthcare providers and motivating them so that they can attend ANC services in rural regions, raising community awareness about the benefits of ANC using radio, television, and other affordable and accessible means, investing in education for all as an integral components of attaining SDGs, improving infrastructures such as roads and lastly but not the least empowering women in terms of rights to health decision and financial stability.

Abbreviations

ANC
Antenatal Care
CHWs

Community Health Workers
DHS
Demographic and Health Survey
HSSP
Health Sector Strategic Plan
OD
Odd Ratio
SDGs
Sustainable Development Goals
WHO
World Health Organization

Declarations

Ethics approval and consent to participate: Not applicable.

Consent for publication: Not applicable.

Availability of data and materials: Obtained from the corresponding author upon a reasonable request.

Competing interests: The authors declare that they have no conflict of interests.

Funding: This review received no funding.

Authors' contribution: E.T and R.G conducted studies search and selection. V.B and E.S participated in data synthesis. All authors contributed to the manuscript writing and final review.

Acknowledgements: The language model assisted in a small part of the review findings synthesis.

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Figures

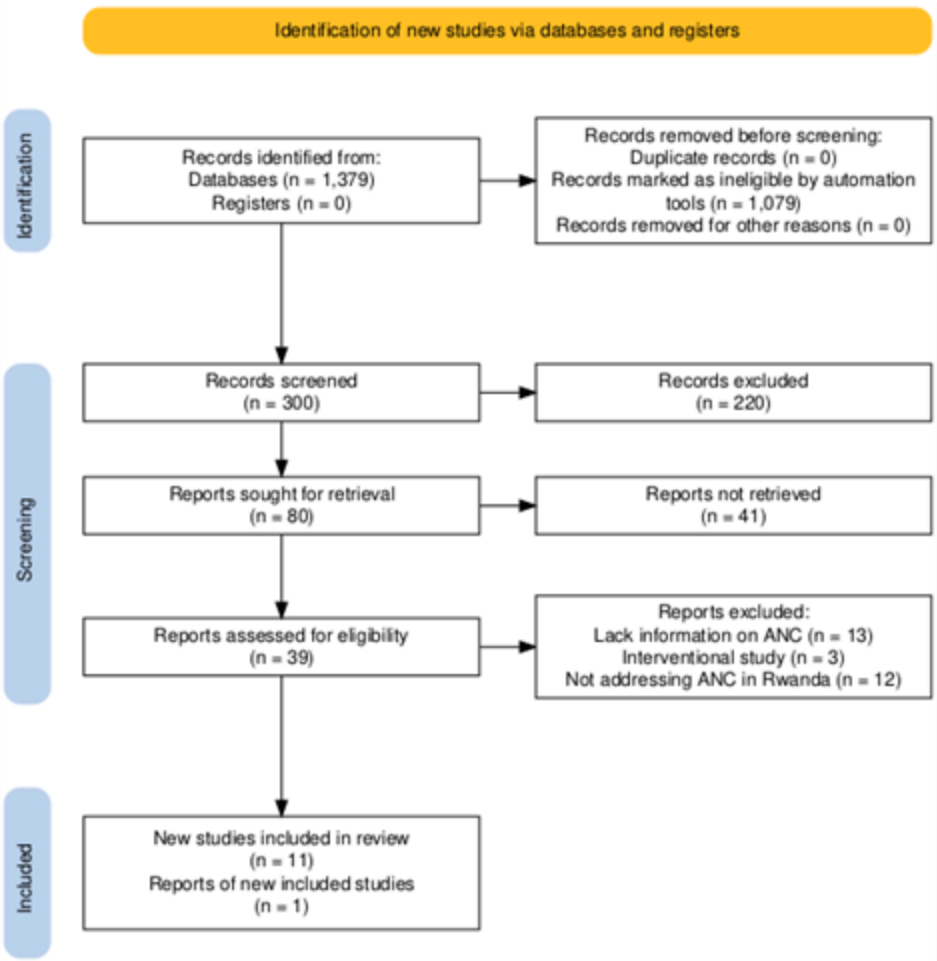

Figure 1

PRISMA diagram for studies selection and inclusion

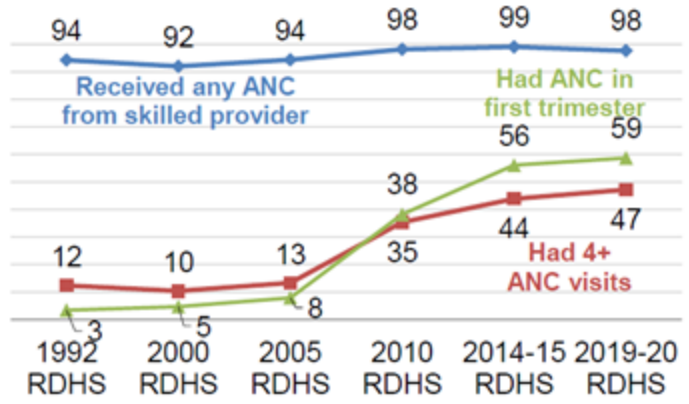

Figure 2

ANC trends in Rwanda. Source: Rwanda Demographic and Health Survey 2019/20 (Maternal Health Care, Page 132)

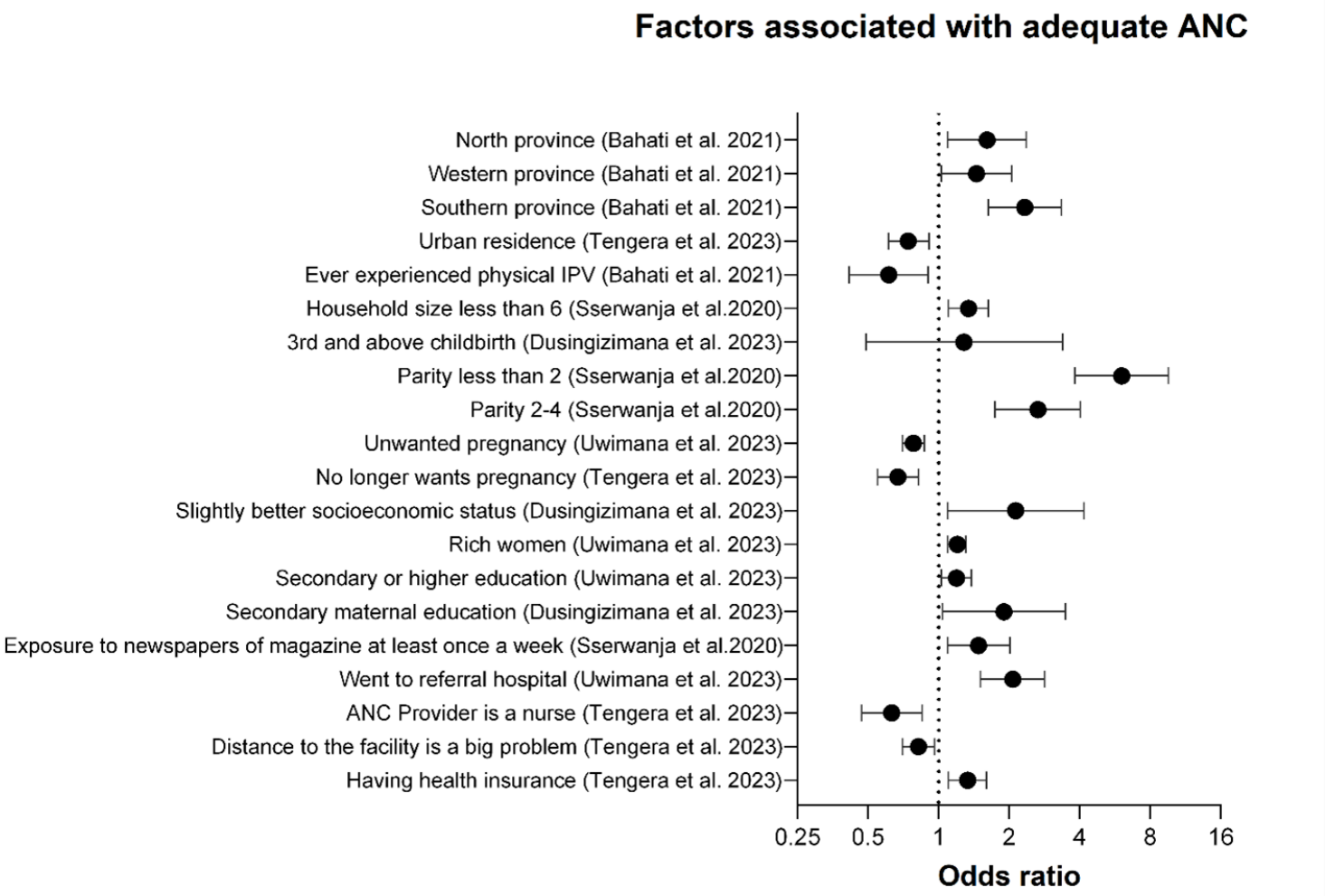

Figure 3

Forest plot showing selected factors associated with adequate ANC utilization in Rwanda

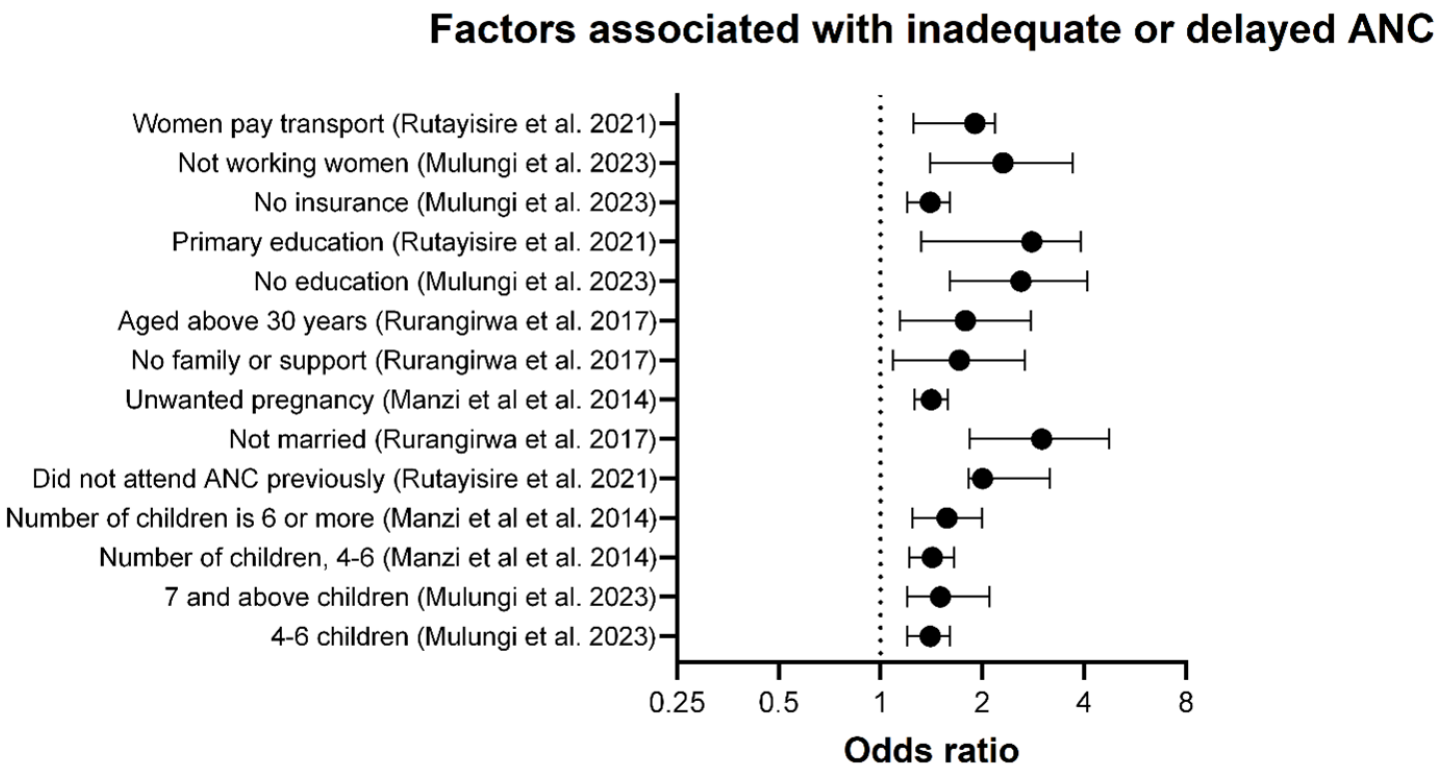

Figure 4

Forest plot showing selected factors associated with delayed and inadequate ANC utilization in Rwanda