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Research Article

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Posted Date: November 25th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-11375285/v1

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Additional Declarations: No competing interests reported.

Women's Empowerment and Maternal Healthcare Utilization in Cameroon

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Abstract:

Previous studies in low- and middle-income countries have demonstrated that women's status significantly enhances mothers' mental and physical well-being, and that of their children. However, there is a scarcity of research on this topic in Cameroon. This study investigates the effects of women's empowerment on their utilization of antenatal and postnatal care in Cameroon, utilizing data from the Cameroon Demographic and Health Survey (CDHS). Using a logistic regression model, the study reveals that the use of antenatal healthcare services among empowered women is high in both rural and urban areas. Additionally, empowered rural women use postnatal services more than their urban counterparts do. The study results suggest that policy actions to increase women's empowerment should develop comprehensive programs that address the needs of both rural and urban women.

Keywords: women empowerment, antenatal care, postnatal care, healthcare utilisation, Cameroon

1. Introduction

Women's empowerment is an important determinant of antenatal and postnatal health services (Sipsma *et al.*, 2014). When women engage themselves in timely and periodic antenatal care, pregnancy related health risks that may endanger their health and that of their newborn children is easily identified and prevented. Equally, when these women engage in postnatal care, they benefit from the diagnose and treatment of postnatal complications, and also counselling with the aim of safeguarding the health status of the mother and child (Sado *et al.*, 2014). Therefore, women who engage themselves in reproductive care services undergo a low rate of both maternal and infant morbidity and mortality (Sipsma *et al.*, 2014).

Unfortunately, women in Africa face significant challenges in accessing these healthcare services due to financial constraints influenced by cultural and traditional factors. This limited access leads to health inequities and contributes to high maternal mortality rates (Buor, 2004). Statistics suggest that 37% to 90% of maternal deaths could be prevented with better access to reproductive healthcare, particularly antenatal care (Kilpatrick *et al.*, 2002). A multi-country analyses in Sub Saharan Africa was carried out by Dickson *et al.* (2021) to empirically test the association between women empowerment and skilled birth attendance and they found that, the overall prevalence of skilled birth attendance was 63.0% with the lowest prevalence in Tanzania being 13.8% and the highest in Rwanda given to be 91.2%.

In Cameroon, the fifth Demographic Health Survey (DHS 2018) reported maternal mortality levels at 467 deaths per 100,000 live births, which shows a change from the estimates in the DHS 2011 (INS and ICF 2020). However, these figures are still significantly higher than the global average of maternal deaths per 100,000 live births, as reported by the works of Kilpatrick *et al.* (2002), Yaya *et al.* (2021), Mokam and Zamo Akono (2022) and the WHO (2019). The infant mortality rate is approximately 51 deaths per 1000 live births (World Bank 2023).

In many developing countries, access to quality healthcare is limited because women often lack empowerment to participate in health-related decision-making (Sado *et al.*, 2014). Compared to men, women frequently face challenges in deciding how to allocate resources for healthcare, especially when men control when and how healthcare services are used. This issue is particularly pronounced in households where men do not prioritize the importance of antenatal and postnatal care (Jennings *et al.*, 2014). Whereas, the supremacy of men over women in decision-making as explained by Palencia et al. (2013), limits women's access to social and employment-related privileges as well as economic resources.

This restrains women to domestic responsibilities, which in turn has a negative effect on women's health status. Whereas, empowering women is necessary to remove the root cause of their unmet practical needs such as food, day care, and health (Moser, 1987) discloses. Studies in Cameroon such as that of Yaya *et al.* (2021) examined the predictors to skilled birth among married women in Cameroon and Mokam and Zamo Akono (2022) have looked at the association between women empowerment and reproductive healthcare. These studies are weakened in their empirical objectives and directions.

While Yaya *et al.* (2021) focuses in empirically testing skilled birth attendance predictors in Cameroon, Mokam and Zamo Akono (2022) analyses the effect of women's empowerment on antenatal reproductive healthcare services in Cameroon. Their focus was not to test the effect of women's empowerment on postnatal reproductive healthcare utilization. Thus, to the best of our knowledge, no study has examined women's empowerment in relation to antenatal and postnatal reproductive healthcare utilization in Cameroon, which are the bases of this study.

Measuring women empowerment alters within individual studies and comparison between various studies remains problematic. Looking at women's empowerment and the use of antenatal care service, it is remark that antenatal care visits when numbered is positively related with labour force participation (Sebayang *et al.*, 2019). Similarly, to Pratley (2016) when women are empowered, there is an increase in maternal and child health outcomes such as antenatal care, skilled attendance at birth, contraceptive use, child mortality, full vaccination, nutritional status and less exposure to violence.

Satisfaction in health outcomes affiliates with the quality of services orchestrated. Emelumadu *et al.* (2014) reveal clearly that, antenatal attendees are highly satisfied when the maternal health services are of quality. The utilization of these maternal care services associates with positive perceptions in the supply of maternal services. This perception of preference relates to differences between racial, ethnic and language group which can be remedied by ameliorating client-clinician communication (Becker & Tsui, 2008).

Improving the use of reproductive healthcare services will demand a reduction in partner abuse and enhance empowerment among women in low-income countries, particularly among those with no formal education (Sipsma *et al.*, 2014). Women's decision-making power at home and attitude towards domestic violence are important determinants of antenatal and postnatal care (Sado *et al.*, 2014). Unfortunately, though women are major healthcare users, as well as providers, they are underground in decision making in healthcare (van Wijk *et al.*, 1996). Not being able to make decision on their health, make women to be at the mercy of domestic violence. To remedy domestic violence, powerless women should initiate and lead successful movements against their abusers. this should be done under the most adverse conditions (Kar *et al.*, 2001).

Jennings *et al.* (2014) found that women's empowerment, when associated with male antenatal accompaniment, can have both positive and negative effects. They suggest that

empowering women socially and economically can make efforts to involve men in pregnancy and childbirth more effective. However, it is crucial that men's involvement in antenatal care does not undermine women's autonomy in making their own healthcare decisions. Given the diverse and sometimes conflicting contributions of great thinkers in the literature, we can explore the following research question:

What are the effects of women's empowerment on their use of reproductive healthcare services in Cameroon? This will serve as a general question. In a specific manner, we aim to address the following questions:

- What are the effects of women's empowerment on their use of antenatal healthcare services in Cameroon?
- What are the effects of women's empowerment on their use of postnatal healthcare services in Cameroon?

The main objective of this study is to examine the effects of women's empowerment on their use of reproductive healthcare services in Cameroon. To this effect, we have the following specific objectives:

- To examine the effects of women's empowerment on their use of antenatal healthcare services in Cameroon.
- To analyse the effects of women's empowerment on their use of postnatal healthcare services in Cameroon.

2. Literature review on women's empowerment and reproductive healthcare utilization

The interconnection between women's empowerment and reproductive healthcare is an important domain of study as women's empowerment enhances their ability to make informed decisions about their reproductive health, thereby improving health outcomes for themselves and their families (van Wijk *et al.*, 1996). This literature review aims to explore this complex relationship through both theoretical frameworks and empirical evidence.

2.1. Theoretical literature review on women's empowerment and reproductive healthcare

Obtaining better health for women is easier when women are empowered. Empowering women serves as a means to increase women's decision-making power (Sado *et al.*, 2014), economic status (Mokam & Zamo Akono, 2022) and reduction in domestic violence (Ameyaw *et al.*, 2021). Empowering women therefore to make decisions about their health and well-being can lead to improved maternal health (Sado *et al.*, 2014). The following theoretical literature review aims to explore the link between women's empowerment and reproductive healthcare.

I.1.1. The motivation-facilitation theory

This theory of motivation-facilitation can be used to link the concepts of women's empowerment and reproductive healthcare in the sense that, it helps to show how women's empowerment influences their motivation to seek and utilize reproductive healthcare services, as well as the factors that facilitate or hinder the actual behaviour of attending both antenatal and postnatal healthcare appointments. Looking at the motivation phase, women's empowerment can be an important determinant in seeking reproductive healthcare services (Sado *et al.*, 2014). Therefore, women who are empowered both socially and economically are easily opportune to have the knowledge and confidence to prioritize their health.

Due to their enhanced sense of autonomy and control over their own lives, empowered women will be motivated to engage in preventive health behaviours. The facilitation phase, which involves the conversion of motivation in to action shows that, even if women have that zeal to access and utilize RHC services, barriers will still hinder them in one way or the other, to follow through with their intensions (Ahinkorah *et al.*, 2022).

Empowered women will be equipped to overcome barriers and social norms that may hinder their ability to utilize healthcare services and will increase their likelihood of regular check-ups and early intervention when there is a complication, thereby contributing to the well-being of women and their children (Buor, 2004).

I.1.2. the health belief model

Examining the relationship between women's empowerment and maternal healthcare (MHC) through the lens of the health belief model (HBM), the following components are taken in to consideration. Focusing most specifically on the role of cues to action, cues to action shows how empowering women through education, community outreach, and social support can be

important to push women to take informed decisions concerning their health and as such engage in reproductive care (Nieuwenhuijze & Leahy-Warren, 2019).

The concept of perceived sustainability shows how, empowered women can have an advanced awareness of the risks associated with pregnancy complications and the importance of attaining a regular maternal care. Empowered women who are inform about the risks and benefits of reproductive care can influence their perceptions of susceptibility and severity, motivating them to seek necessary health services (Rosenstock, 1974).

Perceived severity shows how empowered women may recognize the severe implications of untreated or poorly managed pregnancy-related issues on their own health as well as the well-being of their child. This awareness encourages empowered women to take maternal care seriously (Buor, 2004). considering perceived benefits, women who are empowered are likely to understand the numerous benefits of utilizing pregnancy healthcare services (Yeo *et al.*, 2022).

Perceived barriers show the various barriers faced by empowered women when trying to access maternal healthcare (Ahinkorah *et al.*, 2022). These barriers include lack of transport, limited healthcare services available, cultural or social norms that discourages seeking medical help, and time constraint due to work or family responsibilities.

2.2. Women's empowerment and reproductive healthcare utilization

Women's empowerment and reproductive healthcare use are important factors that affect maternal and child health outcomes. Women's health is an important non-income indicator of poverty and so, a means to reduce poverty in developing countries is by improving the health of women (Arthur, 2012). This empirical literature review aims to analyse the different findings from existing works in this area of women empowerment and overall maternal healthcare use.

The works of Sado *et al.* (2014) emphasis on the positive association between women's empowerment and reproductive healthcare. Sado *et al.* (2014) carried out a study in Albania which aimed at investigating the influence of women's empowerment within the household on antenatal and postnatal care utilization. In their study, they used the bivariate and multivariate analyses based on nationally representative data from the 2008-09 Albania Demographic and Health Survey and analysed the linkages between women empowerment and maternal healthcare utilization using two types of indicators of women's empowerment: decision making power and attitudes towards

domestic voilence. They equally found out that, the use of maternal health care services is influenced by women's role in decision-making and the attitudes of women towards domestic violence.

Annan *et al.* (2021) carried out a study in Sub-Saharan Africa which aimed at examining women's empowerment and household wellbeing. In their study, a cross reporting by wives and husbands on women's decision-making ability over large purchases in 23 nationally representative surveys in Sub-Saharan Africa was use to present a novel measure of women's intra-household power. Annan *et al.* (2021) found out in their study that, the well-being of both the mother and children is best in situations where the woman's power is recognize by the husband. They equally found out that women taking power by assigning themselves more decision-making power than their husbands do to them, is better for their reproductive health and children's health but is worse for emotional violence, compared to being given power by their husbands.

Mokam and Zamo Akono (2022) analysed the association between the dimensions of women's empowerment and the utilization of adequate reproductive healthcare in cameroon. They used data from the fifth demographic and health survey of Cameroon carried out in 2018. Women's empowerment in this study is measured using the economic status index and the decision-making index. A logistic regrssion model is use in this study. They found out that, an increase in the decision-making index is significantly associated with higher chances of having at least four antenatal visits during pregnancy, of making the first prenatal visit during the first 3 months of pregnancy and delivery in a hospital.

While previous studies such as the works of (Annan *et al.*, 2021) and (Sado *et al.*, 2014) have explored the relationship between women's empowerment and reproductive healthcare within different regions, our work offers an understanding on how women's empowerment influences both antenatal and postnatal care within the Cameroonian context. Providing therefore a better understanding of how empowerment affects women's decisions related to healthcare and thus the continuum of maternal care services (that is before and after birth care services). Studies on women's empowerment and use of reproductive healthcare services in Cameroon focused on antenatal care services, neglecting the postnatal phase of the healthcare.

3. Methodological approach

When women have that ability to express their preferences and make strategic life choices for themselves, they take this as a means to use reproductive healthcare services both for themselves and their babies (Sado *et al.*, 2014). This study examines the effects of women's empowerment on their reproductive healthcare in Cameroon using the Demographic and Health Survey (DHS) dataset for 2018.

3.1. Data source and description

The data used in this study is secondary in nature and comes from the fifth Cameroon Demographic and Health Survey carried out from June 2018 to January 2019 by the National Institute of Statistics of Cameroon (CDHS 2018). The CDHS is a national representative survey that aims to collect comprehensive data on various health and demographic indicators in Cameroon. The Cameroon Demographic and Health Survey was design to provide data for monitoring the population and health situation in Cameroon.

The main objective of the survey was to assess demographic indicators such as population size, structure and distribution. The survey equally examines trends in fertility, marriage, sexual activity, fertility preferences, family planning methods, breastfeeding practices, nutrition, childhood and maternal mortality, maternal and child health, domestic violence, malaria, and HIV/AIDS.

3.2. Measurement of variables

In the context of studying the effects of women's empowerment on their utilization of reproductive healthcare services in Cameroon, the following variables can be identified:

3.2.1. Dependent variable

The dependent variable in our work is reproductive healthcare utilization. This variable is captured in several ways such as antenatal healthcare utilization (Sebayang *et al.*, 2019), postnatal healthcare utilization (Sado *et al.*, 2014), utilization of family planning services (Becker & Tsui, 2008), preference in the utilization of delivery services (Becker & Tsui, 2008), obstetric care (Pratley, 2016), and barriers to healthcare access and utilization (DiBari *et al.*, 2014). The present work will focus on two variables that capture reproductive healthcare utilization precisely antenatal and postnatal healthcare utilization.

Both antenatal and postnatal healthcare utilisation are essential components of reproductive healthcare services for women as they serve as a means to promote maternal health reducing maternal mortality, neonatal mortality, and complications during pregnancy and childbirth (Htun *et al.*, 2021). These reproductive healthcare services are interconnected components of the continuum of maternal healthcare and as such, women who are the main users of such healthcare services should not minimize the use of these services.

Considering antenatal care use, we used binary variables to show whether a woman received four or more antenatal care services from a healthcare provider, which corresponds to the WHO's definition for adequate antenatal care. These indicators for antenatal care are *antenatal visits during pregnancy, the timing of the first antenatal visit, and delivery in a health facility*. These indicators are binary and typically denote whether a woman utilized these services or not. Zero is attributed to women who receive less than four antenatal visits during pregnancy and those who said they did not deliver in a health facility. Otherwise, the value one is attributed. Similarly, for women who went for antenatal visits within the first three months, the value one is attributed to them and the value zero for those who did not attend this visit within this period. Antenatal healthcare utilisation is measured by:

Considering postnatal care use, our work will focus on three indicators that measure this variable. They include *baby postnatal check within two months*. The variable takes the value 1 if a postnatal check for the baby was conducted within two months and it takes the value zero for those who did not conduct the check and equally those who said they do not know. Another variable use to measure postnatal care use is *time after delivery postnatal check took place).* The variable takes the value one for women who did their time after delivery in hours, days or weeks and zero is attributed to those who said they do not know.

The last indicator is *person who performed postnatal check-up*. Here, the indicator takes the value one if the person who performed the postnatal check-up is a traditionalist, a doctor or a nurse, and takes the value zero if they do not fall within these categories. It should be noted that, nurses in the context of this study are midwife, auxiliary midwife and village care workers. Equally, traditional birth attendants and others are considered as traditional doctors.

3.2.2. Independent variable

Women's empowerment is the variable of interest in our study. It is a multidimensional concept and difficult to measure (Kabeer, 1999). Following Kabeer (1999)'s definition of women empowerment, we measured women's empowerment through two aspects that is; *women's economic status and women's decision-making*. The economic status of women is captured by:

Women worked in the last twelve months; the value zero is attributed to women who reported not working in the last twelve months. The value one is attributed to those who reported working in the past year, those currently working and those who have a job but are on leave for seven days. *If women own a piece of land*; this indicator takes the value zero for women who reported not having a land and the value one is attributed to those who reported owning a land alone only, jointly only, and both alone and jointly. This variable indicates whether a woman owns any land which is different from the control variable women own land by status of ownership that categorizes the type of land a woman owns. *If women own a house*; this indicator is measured by attributing the value zero to women who reported not owning a house and the value one to those who reported owning a house alone only, jointly only, and both alone and jointly.

It should be noted that, the aggregation of these three variables forms an indicator of women empowerment called women's economic status. The following indicators with their respective measures capture women's decision-making, which is another proxy for women's empowerment:

Person who usually decides on respondent's health care; here, the value zero is assign if the person who decides on woman's healthcare is the husband alone, someone else or others. The value 1 is ascribed if it is the woman alone or the woman with her partner who decide on her healthcare. *Person who usually decides on large household purchases*; the value zero is attributed if the person who usually decides on these purchases is the respondent husband alone, someone else or others. The value one is assigned if the person who usually decides on these purchases is the respondent alone or the respondent alongside her husband. *Person who usually decides on visits to family*; the value zero is ascribe if the person who decides on these visits is the woman's husband alone, someone else or others. The value one is use if the woman takes this decision alone or if she takes it with her husband. *Person who usually decides what to do with money husband earns*; here we ascribe the value 1 if respondent alone, or respondent with her husband and zero if husband alone, others or if the husband has no earning.

3.2.3. Control variables

It is essential to consider control variables that account for socio-economic, demographic and cultural factors that could affect reproductive healthcare utilization apart from women's empowerment. These variables are.

Household wealth: In our study, household wealth is measured in quantile. *Women education:* The value zero is assign to those who had no education and one when the woman has a primary, secondary or higher education level. *Media exposure:* The present study measures media exposure through the frequency of reading newspaper or magazine, frequency of listening to radio, frequency of watching television and, frequency of using internet last month (these variables are all binary and take the value 0 for no and 1 for yes). *Size of the household:* A study by Johnson et al. (2019) emphasizes that, larger household sizes are associated with a low utilization of reproductive healthcare services. *Age of the mother:* Adolescent mothers are considered lower in societal position, and this may impair their decision-making power, related to healthcare service utilization (Sebayang *et al.*, 2019). *Place of residence:* In the context of this study, household place of residence can either be urban or rural (this variable is equally binary and takes the value 0 for rural and 1 for urban).

Women own land by status of ownership: based on this variable, the value zero is considered when a woman does not own a land and one when she owns it alone, or both alone and jointly with her husband. Land ownership by status of ownership as a control variable in the analysis provide a robust framework for investigating the complex relationship between economic empowerment, land ownership dynamics and healthcare utilisation outcome among women in Cameroon. The control variable shed light on how different ownership statuses may influence decision-making and overall healthcare utilisation.

3.3. Econometric strategy

The methodology to be use in our work is the logistic regression. A logistic regression and the logit model are part of the same overall modelling process, with logistic regression often referring to the practical application and interpretation of the model, while the logit model refers to the mathematical transformation used within that process. Another important difference is that, the

logistic regression model uses the logistic function to map the predicted values to probabilities. The probability of the outcome is express as:

$$P = \frac{1}{1+ e^{-\beta 0+\beta 1X1+\beta 2X2+\cdots+\beta kXk)}} \quad (1)$$

Where $\beta_0$is the intercept, β_i are the coefficients and X_i are the predictor variables.

The logit model on its part uses the logit (log-odds) function to transform the probability into a continuous variable that can range from negative to positive infinity. The log-odds of the outcome is express as:

$$\text{Logit (p)} = log\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots\cdots\cdots + \beta_k X_k \quad (2)$$

Here, the same symbols (β_0, β_i, X_i) are used, but the focus is on the log-odds instead of the probability. P is the probability of the outcome occurring.

The formalisation of a logit model for this study is as follows:

$$\log\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 EMP_i + \beta_2 X_{1i} + \beta_3 X_{2i} + \cdots\cdots\cdots + \beta_k X_{ki} + \in_i \quad (3)$$

Where $\log\left(\frac{p}{1-p}\right)$ represents the chances of using a particular reproductive healthcare EMP_i represents women's empowerment measures precisely women's economic status and women's decision-making. β is the parameter that measures the link between women's empowerment, and the use of reproductive healthcare X is the matrix for control variables, and $\in_i$ is the error term.

4. Results

4.1. Descriptive statistics of variables

The descriptive statistics of Table 1 portrays a summary statistic for reproductive healthcare utilization together with explanatory variables.

Table 1: Definition of variables and descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Antenatal healthcare					
antenatal visits	4968	0.63	0.483	<4[visit]	4+[visit
Timing	4289	0.86	0.347	0 [no]	1[yes]
Facility	4968	0.685	0.465	0[no]	1[yes]

Postnatal healthcare					
Baby postnatal check	4959	0.266	0.442	0[no]	1[yes]
Postnatal timing (hours)	1320	0.333	0.471	0[no]	1[yes]
Postnatal timing (days)	1320	0.394	0.489	0[no]	1[yes]
Postnatal timing (weeks)	1320	0.273	0.446	0[no]	1[yes]
Person performed(tradi)	1320	0.117	0.321	0[no]	1[yes]
Person performed(doctor	1320	0.18	0.385	0[no]	1[yes]
Person performed(nurse)	1320	0.703	0.457	0[no]	1[yes]
Empowerment					
Economic status					
Worked 12months	7963	0.73	0.444	0[no]	1[yes]
Land ownership	7963	0.183	0.387	0[no]	1[yes]
House ownership	7963	0.225	0.417	0[no]	1[yes]
Economic empowerment	7963	0.777	0.416	0[no]	1[yes]
Decision making					
Decision on health	7963	0.578	0.494	0[no]	1[yes]
household purchase	7963	0.613	0.487	0[no]	1[yes]
Visit to family	7963	0.664	0.472	0[no]	1[yes]
Husband money	7895	0.47	0.499	0[no]	1[yes]
Decision empower	7895	0.739	0.439	0[no]	1[yes]
Control variables					
Household size	7963	7.552	4.633	1	40
Exposure to Info	7963	0.586	0.493	0[no]	1[yes]
Residence place(Urban)	7963	0.466	0.499	0[no]	1[yes]
Residence place(Rural)	7963	0.534	0.499	0[no]	1[yes]
Household head	7963	0.141	0.348	0[no]	1[yes]
Wealth index(poor)	7963	0.25	0.433	0[no]	1[yes]
Wealth index(middle)	7963	0.25	0.433	0[no]	1[yes]
Wealth index(rich)	7963	0.25	0.433	0[no]	1[yes]
Wealth index(richer)	7963	0.25	0.433	0[no]	1[yes]
Education(uneducated)	7963	0.258	0.437	0[no]	1[yes]
Education(primary)	7963	0.338	0.473	0[no]	1[yes]
Education(secondary)	7963	0.355	0.478	0[no]	1[yes]
Education(higher)	7963	0.05	0.217	0[no]	1[yes]
Own lands(no)	7963	0.817	0.387	0[no]	1[yes]
Own lands(alone)	7963	0.06	0.238	0[no]	1[yes]
Own lands(jointly)	7963	0.123	0.328	0[no]	1[yes]
Own houses(no)	7963	0.775	0.417	0[no]	1[yes]
Own houses(alone)	7963	0.048	0.215	0[no]	1[yes]
Owns houses(jointly)	7963	0.176	0.381	0[no]	1[yes]

It can be observed from the table that 4968 women visited a hospital be it for antenatal healthcare or not. Out of this number, 3130 of these women reported undertaking antenatal healthcare with a 48% disparity between those who visited and those who did not. Over 4289 women who were interviewed concerning their first antenatal visit, on average, 86% (i.e., 3689) of them did their visits and a disparity of 34% was observed between those who went for their first visits and those who did not.

Considering women who registered for postnatal healthcare, among 4959 women who were interviewed, 26% (i.e., 1289) visited the hospital for baby's postnatal check-up, and a disparity of 44% was observe between women who did this check-up and those who did not. Still considering postnatal healthcare, among 1320 women who were interviewed, 33%, 39% and 27% women respectively reported to have undergone timing in postnatal care in hour, days and weeks with their respective mean of 33%, 39% and 27%. A high percentage of these women (70%) prefer to be assisted by a nurse for their delivery.

4.2. Binomial results

Table 2 presents the results of a binomial logit model examining the association between women's empowerment and antenatal healthcare use decisions across various geographical settings.

Table 2: Binomial logit model for antenatal healthcare (simple logit regression)

	Dependent variable: Antenatal Healthcare					
VARIABLES	Antenatal visits	Timing to first visit	Place of delivery	Antenatal visits	Timing to first visit	Place of delivery
	Urban areas			**Rural areas**		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Economic empowerment	0.112	0.270**	0.0325	0.212*	-0.135	0.297**
	(0.126)	(0.131)	(0.174)	(0.110)	(0.210)	(0.122)
Decision empowerment	0.109	-0.333*	0.475***	0.0643	-0.0193	0.273***
	(0.138)	(0.178)	(0.170)	(0.0946)	(0.171)	(0.101)
Education: primary	-1.215***	0.755**	-15.75***	-14.87	1.187**	-14.62***
	(0.285)	(0.302)	(0.234)	(0.000)	(0.600)	(0.514)
Education: secondary	-0.556**	0.816***	-14.70***	-14.34	1.337**	-13.67***
	(0.258)	(0.200)	(0.198)	(0.000)	(0.576)	(0.514)
Education: higher	-0.0570	0.676***	-14.38***	-14.07	0.985*	-13.07***
	(0.246)	(0.162)	(0.151)	(0.000)	(0.561)	(0.516)
Exposure to Info	0.233	-0.282	0.620***	0.304***	-0.233	0.728***
	(0.153)	(0.242)	(0.187)	(0.101)	(0.183)	(0.109)
Women's age	0.00160	-0.0114*	0.0341***	0.00775**	-0.00937*	0.00819**
	(0.00564)	(0.00584)	(0.00847)	(0.00329)	(0.00526)	(0.00372)
Household size	-0.0149	0.0226	-0.0946***	-0.0461***	0.0367**	-0.0453***
	(0.0159)	(0.0196)	(0.0196)	(0.00971)	(0.0157)	(0.0111)
Wealth index: middle	-0.0441	-0.460	0.359	0.410***	0.0362	0.542***
	(0.290)	(0.633)	(0.328)	(0.0971)	(0.191)	(0.102)
Wealth index: rich	0.395	-0.643	1.164***	0.823***	-0.115	1.193***
	(0.288)	(0.613)	(0.334)	(0.146)	(0.245)	(0.172)
Wealth index: richer	1.090***	-1.152*	1.833***	1.833***	-0.552	3.315***
	(0.313)	(0.618)	(0.383)	(0.335)	(0.337)	(0.726)
Own lands (no)	-0.441*	0.145	-0.190	0.284**	0.210	-0.179

	(0.262)	(0.243)	(0.324)	(0.126)	(0.220)	(0.146)
Own lands (yes)	-0.0213	0.0513	0.392	0.367*	-0.323	-0.165
	(0.413)	(0.372)	(0.574)	(0.206)	(0.319)	(0.219)
Constant	1.198**	2.267***	14.38***	13.68***	1.339*	13.09***
	(0.535)	(0.709)	(0.585)	(0.215)	(0.693)	(0.552)
Observations	2,180	2,069	2,180	2,753	2,190	2,753
r2_p	0.112	0.0499	0.261	0.0893	0.0239	0.220
df_m	13	13	12	9	13	13
ll_0	-1157	-994.1	-790.7	-1907	-687.5	-1904
Ll	-1027	-944.5	-584.0	-1737	-671.0	-1485
Rank	14	14	13	10	14	14

Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

From table 2, empowerment increases the chances of attending at least four antenatal visits, the timing of the visits and delivering in a health centre in rural and urban areas combined together. This finding is in accordance with the work of Yaya et al. (2021) who affirm that, empowerment is a predictor of skilled birth attendance.

Table 3: Binomial logistic regression of antenatal healthcare

VARIABLES	**Dependent variable: Antenatal Healthcare**					
	Antenatal visits	Timing for first visit	Place of delivery	Antenatal visits	Timing for first visit	Place of delivery
	Urban areas			**Rural areas**		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Economic empowerment	1.118	1.310**	1.033	1.236**	0. 873	1.345**
	(0.141)	(0.171)	(0. 179)	(0. 136)	(0. 184)	(0.165)
Decision empowerment	1.116	0.717*	1.607***	1.066	0. 981	1.313***
	(0.154)	(0.127)	(0. 273)	(0. 101)	(0. 168)	(0.132)
Education: primary	0.297***	2.127***	1.451***	3.491***	3.279**	4.496***
	(0.085)	(0.642)	(3.381)	(0.122)	(1.966)	(2.314)
Education: secondary	0.573**	2.261***	4.142***	5.952***	3.808**	1.151***
	(0.148)	(0.453)	(8.191)	(0.312)	(2.195)	(5.947)
Education: higher	0.945	1.965***	5.691***	7.761***	2.679*	2.126***
	(0.232)	(0.319)	(8.582)	(0.144)	(1.504)	(1.096)
Exposure to Info	1.263	0.754	1.859***	1.355***	0. 793	2.071***
	(0.153)	(0.183)	(0. 348)	(0. 137)	(0.145)	(0.226)
Women's age	1.002	0.989*	1.035***	1.007**	0. 990*	1.008**
	(0.006)	(0.006)	(0. 009)	(0.003)	(0.005)	(0.004)
Household size	0.985	1.023	0.909***	0. 955***	1.037**	0.955***
	(0.016)	(0.020)	(0. 018)	(0.009)	(0. 016)	(0.011)
Wealth index: middle	0.957	0.631	1.431	1.506***	1.036	1.720***
	(0.277)	(0.399)	(0. 469)	(0. 146)	(0. 198)	(0.175)
Wealth index: rich	1.484	0.526	3.204***	2.277***	0.891	3.296***
	(0.427)	(0.322)	(1.069)	(0. 333)	(0.218)	(0.567)
Wealth index: richer	2.974***	0.316*	6.251***	6.253***	0.576	27.529***
	(0.931)	(0.195)	(2.397)	(2.097)	(0.194)	(19.985)
Own lands (no)	0.643*	1.156	0. 827	1.327**	1.234	0.836
	(0.169)	(0.281)	(0. 268)	(0. 167)	(0.271)	(0.122)
Own lands (yes)	0.979	1.053	1.479	1.443*	0.723	0.848

	(0.405)	(0.392)	(0. 849)	(0. 297)	(0.230)	(0.185)
Constant	3.313**	9.653***	175***	871***	3.814*	4831***
	(1.772)	(6.842)	(103)	(1877)	(2.644)	(2667)
Number of obs	2180	2069	2180	2753	2190	2753
Wald chi2(13)	231.40	91.55	36.43	33.55	37.49	1459.76
Prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000
Pseudo R2	0.112	0.049	0.2614	0.0893	0.0239	0.220

Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 3 displays the results of a binomial logistic regression analysis of antenatal healthcare. This analysis examines the influence of our independent variable, alongside control variables, on maternal healthcare utilization among urban and rural women in Cameroon. Empowerment increases the likelihood of having an early first antenatal visit and delivering in a health centre for women living in urban areas. Empowerment among women living in rural areas increases the chances of attending at least four antenatal visits and delivering in a health facility. This finding is in line with the work of Nieuwenhuijze and Leahy-Warren (2019) who affirm that when women have power at the macro level, it tends to generate power at the micro level enabling a woman to build her strength and belief to take control over the decisions she faces

Table 4 presents the results of a binomial logit regression model for postnatal care (PNC). This table illustrates how various socio-economic and demographic factors influence the use of three key reproductive healthcare services. These reproductive healthcare services are; postnatal check-up (specifically the baby's postnatal check-up within the first two months); the timing of the first postnatal check-up (measured in hours, days, and weeks); and the type of person who performed the postnatal check-up (which could be a traditional practitioner, a doctor, or a nurse). Our independent variable of interest is women's empowerment, which we hypothesize influences PNC practices.

From what follows, we observe that, empowerment among women in rural areas increase the probability of attaining postnatal checks within two months but it reduces their chances to seek postnatal care hourly and they instead seek this service in weeks. Empowerment equally reduces the probability of meeting a traditionalist or a nurse for reproductive healthcare with great preference for a doctor. This finding is in line with the work of Sado et al. (2014) who affirm that, reproductive healthcare use is influence by the role of empowered women.

Table 5 shows a binomial logistic regression of postnatal healthcare. This table gives an over view of the influence of our independent variable alongside control variables on maternal

healthcare utilization among women in Cameroon. The analysis distinguishes between urban and rural women to explore potential differences in PNC utilization. Our result show that, when there is an increase in empowerment among women in rural areas, the chances for babies to receive postnatal checks within the first two months of delivery increases, it equally increases the time after delivery postnatal check both in hours and weeks.

Table 4: Binomial logit regression of postnatal healthcare (simple model)

	Dependent Variable: Postnatal healthcare													
	Postnatal check	Duration to first postnatal care			Person who performed first postnatal			Postnatal check	Duration to first postnatal care			Person who performed first postnatal		
VARIABLES	First 2months	Hours	Days	Weeks	Traditionalist	Doctor	Nurse	First 2months	Hours	Days	Weeks	Traditionalist	Doctor	Nurse
	Urban areas				Urban areas			Rural areas						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Economic empowerment	0.113	-0.323	0.240	0.0404	-0.590	0.155	0.0102	0.398***	-0.862***	0.410	0.588*	-0.521*	0.397	0.247
	(0.110)	(0.211)	(0.196)	(0.211)	(0.428)	(0.220)	(0.206)	(0.134)	(0.264)	(0.266)	(0.313)	(0.314)	(0.530)	(0.277)
Decision empowerment	0.0502	0.159	-0.122	0.00184	-0.132	0.152	-0.0633	0.246**	0.317	-0.217	-0.123	0.330	1.436**	-0.578***
	(0.130)	(0.258)	(0.225)	(0.251)	(0.474)	(0.289)	(0.257)	(0.111)	(0.206)	(0.200)	(0.220)	(0.243)	(0.614)	(0.221)
Education: primary	-0.805***	-0.281	0.340	-0.0635	-0.331	-0.842	0.871*	1.331	11.37***	-13.76***	11.66***	10.08***	-22.21	13.70***
	(0.245)	(0.464)	(0.420)	(0.468)	(1.136)	(0.557)	(0.491)	(1.058)	(1.182)	(1.108)	(1.122)	(1.486)	(0)	(1.130)
Education: secondary	-0.299*	0.0829	0.372	-0.508	0.0588	-0.847***	0.833***	1.793*	11.39***	-13.53***	11.37***	9.617***	-20.34***	13.98***
	(0.177)	(0.337)	(0.289)	(0.310)	(0.882)	(0.314)	(0.304)	(1.052)	(1.176)	(1.097)	(1.123)	(1.452)	(1.083)	(1.117)
Education: higher	-0.394**	0.0522	0.186	-0.244	0.173	-0.421*	0.416*	1.775*	11.20***	-13.36***	11.38***	9.090***	-20.26***	14.18***
	(0.154)	(0.282)	(0.245)	(0.248)	(0.783)	(0.241)	(0.240)	(1.051)	(1.164)	(1.096)	(1.115)	(1.426)	(1.104)	(1.116)
Exposure to Info	0.407**	-0.685**	0.136	0.672*	-1.576***	0.285	0.464	0.323***	-0.730***	0.335*	0.491**	-0.292	1.775***	-0.347*
	(0.175)	(0.300)	(0.299)	(0.377)	(0.498)	(0.446)	(0.337)	(0.115)	(0.198)	(0.186)	(0.224)	(0.250)	(0.461)	(0.209)
Women's age	0.00353	-0.00839	-0.00405	0.0129	-0.0481**	0.00341	0.00642	-0.00478	-0.00157	0.00157	-0.000109	-0.00747	0.00250	0.00423
	(0.00476)	(0.00892)	(0.00830)	(0.00884)	(0.0227)	(0.00898)	(0.00852)	(0.00369)	(0.00690)	(0.00653)	(0.00779)	(0.00865)	(0.0111)	(0.00712)
Household size	0.00804	0.0256	0.0218	-0.0610**	0.119**	-0.0392	-0.00380	0.0298***	-0.0163	0.0201	-0.00471	-0.00724	-0.0457	0.0239
	(0.0143)	(0.0284)	(0.0264)	(0.0285)	(0.0527)	(0.0314)	(0.0280)	(0.00999)	(0.0182)	(0.0177)	(0.0215)	(0.0247)	(0.0319)	(0.0202)
Wealth index: middle	0.290	-0.655	-0.0575	1.095	-1.255	11.77***	0.728	0.281**	-0.206	0.189	0.0249	-0.525**	0.00255	0.440**
	(0.362)	(0.667)	(0.714)	(1.147)	(0.860)	(0.575)	(0.748)	(0.112)	(0.200)	(0.200)	(0.224)	(0.244)	(0.431)	(0.217)
Wealth index: rich	0.313	-0.130	-0.0734	0.580	-1.458*	12.25***	0.506	-0.0967	0.177	-0.399	0.261	-0.825*	0.102	0.520
	(0.358)	(0.643)	(0.698)	(1.143)	(0.816)	(0.496)	(0.712)	(0.164)	(0.288)	(0.290)	(0.319)	(0.424)	(0.499)	(0.320)
Wealth index: richer	0.488	-0.461	0.0848	0.720	-1.889**	13.01***	-0.170	0.133	-1.231**	0.459	0.480	-1.958*	0.350	0.649
	(0.368)	(0.659)	(0.711)	(1.148)	(0.878)	(0.520)	(0.727)	(0.254)	(0.580)	(0.414)	(0.455)	(1.077)	(0.596)	(0.495)
Own lands1(no)	-0.359*	0.108	0.0949	-0.220	1.134	0.321	-0.473	0.0283	-0.470**	0.196	0.361	-0.605**	0.00902	0.408
	(0.189)	(0.336)	(0.293)	(0.317)	(0.965)	(0.376)	(0.346)	(0.141)	(0.235)	(0.243)	(0.287)	(0.283)	(0.417)	(0.249)
Own lands (yes)	-0.195	-0.328	-0.604	0.757	1.970	0.177	-0.530	0.0155	-0.179	0.0460	0.189	-0.352	-0.488	0.413
	(0.295)	(0.601)	(0.502)	(0.494)	(1.351)	(0.564)	(0.525)	(0.225)	(0.397)	(0.414)	(0.436)	(0.463)	(0.789)	(0.425)
Constant	-1.211***	0.114	-0.748	-1.916	0.0604	-13.81***	-0.0465	-3.578***	-10.23***	12.11***	-13.53***	-9.546***	15.51***	-13.60***
	(0.465)	(0.883)	(0.864)	(1.298)	(1.970)	(0.759)	(0.933)	(1.091)	(1.203)	(1.127)	(1.151)	(1.556)	(1.243)	(1.161)
Observations	2,173	646	646	646	646	646	646	2,751	669	669	669	669	669	669
Ll	-1290	-369.7	-438.0	-378.6	-104.7	-350.1	-389.2	0.0355	0.0540	0.0255	0.0200	0.0773	0.181	0.0294
ll_0	-1322	-378.3	-441.8	-392.2	-124.4	-383.2	-408.8	106.2	185.0	211.2	141.7	161.1	.	223.7
chi2	59.74	17.59	7.065	22.78	43.17	1804	37.91	-1526	-447.4	-436.1	-378.1	-319.2	-192.5	-388.6
P	5.85e-08	0.174	0.899	0.0444	4.21e-05	0.000	0.000298	-1472	-423.3	-425.0	-370.5	-294.6	-157.6	-377.1
r2_p	0.0243	0.0229	0.00848	0.0347	0.159	0.0862	0.0480	14	14	14	14	14	13	14

Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 5: Binomial logistic regression of postnatal healthcare

	Dependent Variable: Postnatal Healthcare													
	Postnatal check	Duration to first postnatal care			Person who performed first postnatal			Postnatal check	Duration to first postnatal care			Person who performed first postnatal		
VARIABLES	First 2months	Hours	Days	Weeks	Traditionalist	Doctor	Nurse	First 2months	Hours	Days	Weeks	Traditionalist	Doctor	Nurse
	Urban areas				Urban areas			Rural areas						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Economic empowerment	1.120	0.724	1.271	1.041	0.554	1.168	1.010	1.489***	0.422***	1.506	1.800*	0.594*	1.488	1.280
	(0.124)	(0.153)	(0.249)	(0.220)	(0.237)	(0.257)	(0.208)	(0.199)	(0.111)	(0.401)	(0.563)	(0.186)	(0.789)	(0.354)
Decision empowerment	1.051	1.172	0.885	1.002	0.876	1.165	0.939	1.278**	1.373	0.805	0.884	1.390	4.204**	0.561***
	(0.137)	(0.302)	(0.199)	(0.252)	(0.415)	(0.337)	(0.241)	(0.142)	(0.283)	(0.161)	(0.194)	(0.339)	(2.580)	(0.124)
Education: primary	0 .447***	0.755	1.405	0.938	0.718	0.431	2.389*	3.786	87080.95***	1.06e-06***	116036.5***	23801.33***	2.26e-10	889539.7***
	(0.110)	(0.351)	(0.590)	(0.440)	(0.816)	(0.240)	(1.173)	(4.006)	(102847.7)	(1.17e-06)	(130719.2)	(35358.71)	(0)	(1005450)
Education: secondary	0.741*	1.086	1.450	0.602	1.061	0.429***	2.299***	6.008*	88405.6***	1.33e-06***	86504.78***	15013.12***	1.46e-09***	1181186***
	(0.131)	(0.366)	(0.420)	(0.187)	(0.935)	(0.135)	(0.699)	(6.319)	(103866.3)	(1.46e-06)	(97534.44)	(21793.34)	(1.58e-09)	(1319257)
Education: higher	0.675**	1.054	1.204	0.784	1.189	0.656*	1.516*	5.900*	73047.65***	1.57e-06***	87955.98***	8869.869***	1.59e-09***	1446403***
	(0.104)	(0.298)	(0.296)	(0.194)	(0.931)	(0.158)	(0.364)	(6.203)	(85180.2)	(1.72e-06)	(98422.92)	(12655.29)	(1.75e-09)	(1613761)
Exposure to Info	1.502**	0.534**	1.146	1.958*	0.207***	1.330	1.590	1.381***	0.482***	1.398*	1.634**	0.747	5.898***	0.707*
	(0.263)	(0.151)	(0.342)	(0.738)	(0.103)	(0.594)	(0.537)	(0.158)	(0.095)	(0.260)	(0.366)	(0.187)	(2.719)	(0.148)
Women's age	1.004	0.992	0.996	1.013	0.953**	1.003	1.006	0.995	0.998	1.002	1.000	0.993	1.003	1.004
	(0.005)	(0.009)	(0.008)	(0.009)	(0.022)	(0.009)	(0.009)	(0.004)	(0.007)	(0.007)	(0.008)	(0.009)	(0.112)	(0.007)
Household size	1.008	1.026	1.022	0.941**	1.127**	0.962	0.996	1.030***	0.984	1.020	1.995	0.993	0.955	1.024
	(0.014)	(0.029)	(0.027)	(0.027)	(0.059)	(0.030)	(0.028)	(0.010)	(0.018)	(0.018)	(0.021)	(0.0246)	(0.030)	(0.021)
Wealth index: middle	1.336	0.519	0.944	2.989	0.285	129778.6***	2.070	1.325**	0.814	1.208	1.025	0.591**	1.003	1.553**
	(0.484)	(0.347)	(0.674)	(3.428)	(0.245)	(74585.75)	(1.549)	(0.148)	(0.163)	(0.241)	(0.230)	(0.144)	(0.432)	(0.338)
Wealth index: rich	1.368	0.879	0.929	1.786	0.233*	208834.7***	1.659	0.908	1.194	0.671	1.299	0.438*	1.108	1.683
	(0.489)	(0.565)	(0.648)	(2.041)	(0.190)	(103608.3)	(1.182)	(0.149)	(0.344)	(0.195)	(0.414)	(0.186)	(0.553)	(0.539)
Wealth index: richer	1.630	0.631	1.088	2.055	0.151**	445633.6***	0.844	1.142	0.292**	1.582	1.616	0.141*	1.420	1.913
	(0.599)	(0.416)	(0.774)	(2.360)	(0.133)	(231571.2)	(0.613)	(0.290)	(0.169)	(0.654)	(0.736)	(0.152)	(0.845)	(0.947)
Own lands (no)	0.699*	1.115	1.100	0.802	3.107	1.378	0.623	1.029	0.625**	1.217	1.434	0.546**	1.009	1.503
	(0.132)	(0.374)	(0.322)	(0.254)	(2.999)	(0.518)	(0.216)	(0.146)	(0.147)	(0.295)	(0.412)	(0.154)	(0.421)	(0.375)
Own lands (yes)	0.823	0.720	0.547	2.133	7.173	1.194	0.588	1.016	0.836	1.047	1.208	0.703	0.614	1.512
	(0.243)	(0.433)	(0.275)	(1.054)	(9.695)	(0.673)	(0.309)	(0.229)	(0.332)	(0.434)	(0.537)	(0.325)	(0.484)	(0.642)
Constant	0.298***	1.120	0.473	0.147	1.062	1.01e-06***	0.955	0.028***	0.00003***	182179.5***	1.33e-06***	-9.546***	5455741***	1.24e-06***
	(0.139)	(0.989)	(0.409)	(0.191)	(2.093)	(7.65e-07)	(0.891)	(0.30)	(0.00004)	(205243.6)	(1.53e-06)	(0.00011)	(6783824)	(1.44e-06)
Number of obs	2173	646	646	646	646	646	646	2751	669	669	669	669	669	669
Wald chi2(13)	59.74	17.59	7.06	22.78	43.17	1803.99	37.91	106.24	186.40	211.24	140.61	161.99	0.000	223.70

Prob > chi2	0.000	0.174	0.899	0.044	0.000	0.000	0.0003	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Pseudo R2	0.024	0.023	0.009	0.0347	0.159	0.086	0.048	0.036	0.054	0.026	0.020	0.077	0.1814	0.029

Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

5. Discussion

The primary aim of this study is to examine the effects of women's empowerment on their use of reproductive healthcare services in Cameroon. Using data from the CDHS (2018). Most authors who have had interest on empowerment and reproductive healthcare have affirm that there is a positive relationship between women's empowerment and the use of reproductive healthcare services. However, the results of this study present a complex structure in both rural and urban settings. Based on our findings, economic empowerment has a significant and positive impact on women's reproductive healthcare behaviours, but the specific areas of impact differ between urban and rural settings. Urban women benefit in terms of starting antenatal care earlier, while rural women benefit in terms of attending the full course of antenatal visits and opting for healthcare facilities for delivery.

This can be because economically empowered urban women might have jobs that offer more flexibility, allowing them to attend antenatal appointments early without significant time or income loss. While In rural areas, where healthcare infrastructure is often less developed, economic empowerment becomes crucial for accessing even basic healthcare services, highlighting its impact on attending multiple visits and choosing safe delivery options. Women who are empowered in terms of decision making, have higher chances of delivering in a health centre for both urban and rural women. This finding is in accordance with the work of Mokam and Zamo Akono (2022).

From what follows, we observe that, economic empowerment among women in rural areas increases the probability of attaining postnatal checks within two months but it reduces their chances to seek postnatal care hourly and they instead seek this service in weeks. This increase in economic empowerment reduces the probability of meeting a traditionalist for reproductive healthcare. These trends can be explain based on the fact that economic empowerment translates to access to resources, higher education and prioritizing healthcare leading therefore to babies receiving postnatal checks within the first months and valuing medical healthcare rather than traditional care. The poor nature of roads in rural areas makes postnatal checks more feasible in weeks rather than hours or days.

Considering women's empowerment in terms of decision-making, decision-making positively relates with PNC use for rural women. Women empowered in rural areas in terms of decision-making are more likely to have received postnatal care for their babies within the first

two months and a doctor with less preference for a nurse to provide this service. This finding is in accordance with Sado et al. (2014) work.

6. Conclusion and implication

This study explored the effects of women's empowerment on the utilization of reproductive healthcare services in Cameroon, using data from the 2018 Cameroon Demographic and Health Survey (CDHS). The findings indicate that both economic and decision-making empowerment significantly influence maternal healthcare behaviours, although their effects vary across urban and rural settings. Specifically, economically empowered urban women are more likely to initiate antenatal care early, while their rural counterparts are more likely to complete the full course of antenatal visits and opt for institutional deliveries. Decision-making empowerment is positively associated with facility-based deliveries and timely postnatal care across both settings. These findings highlight the importance of situating empowerment strategies within local contexts, acknowledging how infrastructural, cultural, and socioeconomic factors shape women's healthcare decisions.

The study underscores that women's empowerment is a multidimensional construct that goes beyond economic resources, encompassing autonomy, agency, and the ability to make informed decisions regarding reproductive health. By demonstrating that empowerment operates differently across urban and rural contexts, this study adds depth to our understanding of the nuanced pathways through which empowerment translates into improved maternal and child health outcomes.

6.1. Theoretical Implications

The findings contribute to theory in several key ways. First, they extend the empowerment-health nexus**,** confirming that women's empowerment is a critical determinant of health service utilization. Importantly, the study emphasizes that empowerment is context-specific; the same dimensions of empowerment (economic or decision-making) yield different outcomes depending on geographic and infrastructural conditions. This supports Sen's Capability Approach**,** which frames empowerment as the expansion of women's capabilities to convert resources, knowledge, and agency into meaningful health and well-being outcomes. Second, the study highlights the need for multidimensional conceptualizations of empowerment in health research. Prior studies often focus on either economic or decision-making empowerment; this study demonstrates that a combination of these dimensions produces more complete

insights into maternal healthcare behaviours. Finally, the findings suggest that theoretical models of empowerment and health should incorporate urban–rural differentials, recognizing that structural inequalities, access to healthcare facilities, and local cultural norms mediate the empowerment-health relationship.

6.2. Practical Implications

The results have importante implication for policymakers, program designers, and development practitioners. First, they point to the need for targeted interventions that consider the unique challenges faced by urban and rural women. In urban areas, strategies could include workplace flexibility, early maternal health education, financial incentives for early antenatal attendance, and campaigns to raise awareness about the importance of completing the full antenatal schedule. In rural areas, practical interventions should focus on economic empowerment programs, such as microfinance, vocational training, and conditional cash transfers, which can enhance women's access to healthcare. Improving rural healthcare infrastructure, transportation networks, and outreach services is also critical for enabling women to attend multiple antenatal visits, deliver in healthcare facilities, and access timely postnatal care.

Additionally, programs that enhance decision-making autonomy through community engagement, male involvement, and gender-sensitivity education can strengthen women's capacity to make informed reproductive health choices. Health education campaigns should target both women and their partners to foster supportive environments that respect women's autonomy and encourage equitable decision-making. Taken together, these findings suggest that empowering women is not only a matter of increasing access to resources but also of expanding their ability to make choices and act on them, thereby improving maternal and child health outcomes in a sustainable way.

6.3. Limitations

Despite its contributions, this study has several limitations. First, the cross-sectional nature of the CDHS data limits causal inference; the associations observed cannot confirm directionality. Second, the reliance on self-reported measures of empowerment and healthcare utilization may be subject to recall or social desirability bias. Third, some contextual and cultural factors, such as partner influence, local norms, and quality of care, were not fully captured, which could have affected the observed relationships. Future research could address these limitations by employing longitudinal designs**,** qualitative methods, and mixed-method approaches to better

understand the dynamic processes through which empowerment affects maternal healthcare utilization over time.

Ethics approval and consent to participate: This study used secondary data from the Cameroon Demographic and Health Survey (CDHS). The data were obtained from an existing, publicly available dataset, and no new data were collected directly from human participants. Therefore, ethical approval and additional consent to participate were not required for this secondary data analysis.

Consent for publication: Not applicable. This manuscript does not contain identifiable personal information or images of individual participants.

Availability of data and materials: The data supporting the findings of this study are available from the corresponding author upon reasonable request, subject to applicable ethical requirements and participant confidentiality.

Competing interests: The authors declare that they have no competing interests.

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Authors' contributions:

NRC: Conceptualization, Methodology, Investigation, Data curation, and Writing – original draft. **AEW:** Conceptualization, Methodology, Data curation, Validation, Formal analysis, Writing – review and editing, and Supervision. **AT:** Methodology, Validation, Formal analysis, Writing – review and editing, and Supervision. All authors read and approved of the final manuscript.

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