**SCHOOL OF PUBLIC HEALTH**

**COLLEGE OF HEALTH SCIENCES**

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# FACTORS INFLUENCING HOME DELIVERY AMONG WOMEN OF REPRODUCTIVE AGE, IN MARGIBI COUNTY, LIBERIA, 2020

**BY**

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**DECLARATION**

I, Leroy S. Maximore, declare that this thesis is my original work undertaken under Dr. Samuel Sackey's supervision, of the School of Public Health, University of Ghana, Legon, except for duly referenced works. No form of this work has been presented elsewhere for another degree in this university or elsewhere.

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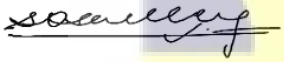
Signature:  Date: 21/11/2021

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## ABSTRACT

**Background:** Pregnancy and childbirth have been documented as a period of increased vulnerability in developing countries compared to developed countries. During pregnancy and childbirth, mothers and babies need help, especially from skilled birth attendants or midwives. The use of institutional delivery services is essential for improving mother and child health. However, in Liberia, only a small percentage of women use institutional delivery services. Furthermore, little is known about the factors that influence home delivery. The main objective of this study is to assess and analyse factors influencing home delivery and its outcome among women of reproductive age in Margibi, County, Liberia**.**

**Methods:** A community-based cross-sectional study was conducted among 438 women in reproductive age. Data was obtained using a structured questionnaire and a face-to-face interview. A systematic random sampling was used to select the participants' houses and we applied our inclusion criteria within each house, and selected a respondent. Data was inputted into Epi Info version 7.1 software and exported to STATA version 16.0 for analysis after cleaning and double-checking the completeness of the obtained data. We performed a binary logistic regression to identify factors influencing home delivery. Findings were summarized into tables displaying the frequencies, percentages, crude, and adjusted odds ratios (ORs), pvalues and 95% confidence intervals (CI). A 5% level of significance was considered for all tests.

**Results:** Out of the 438 respondents, 397 indicated they delivered at home in their most recent delivery. Prevalence of home delivery was therefore 90.6% (95% CI 87.5 – 93.0). The attitude of health workers, season or period of the year, place for ANC services and the number of children alive were significantly associated with the choice of place of delivery among the study participants. Women with two or more children had 15.8 times increased odds of home

delivery (aOR = 15.77, 95% CI 3.95 - 62.89, p < 0.012). Women who mentioned good attitude of health workers had 0.01 times decreased odds of home delivery (aOR = 0.01, 95% CI 0.001 - 0.07, p < 0.001). Season or period of the year the women delivered also influenced their place of delivery, women who delivered during the raining season had 9.87 times increased odds of home delivery (aOR = 9.87, 95% CI 1.17 - 82.89, p< 0.035).

**Conclusion:** The prevalence of home birth was higher than the World Health Organization's guideline. The choice of place of deliver was significantly due to the attitude of health workers, season or period of the year, place for ANC service and the number of children alive. It is advised that women be empowered via educational opportunities especially for those with no formal education, increase prenatal care, and that males be included in maternal health services.

**Keywords**: Margibi, County, Liberia, Home delivery, Childbirth, Pregnancy

## DEDICATION

This thesis is dedicated to my wonderful mother, wife, and four children, all of whom have been a source of inspiration and support. Also, thank you to my brothers and sisters, both at home and abroad, relatives, mentors, friends, and all GFELTP cohort 13 members who have offered me guidance and encouragement in completing my thesis. Finally, I give thanks to God for his direction, mental strength, and the gift of life.

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## LIST OF ABBREVIATIONS

| | |
|---|---|
| ANC | Antenatal Care |
| MDGs | Millennium Development Goals |
| MMR | Maternal Mortality Ratio |
| SDGs | Sustainable Development Goals |
| TBA | Traditional Birth Attendant |
| WHO | World Health Organization |

## DEFINITION OF KEY TERMS

**Maternal mortality** is defined as the death of a woman while pregnant or within 42 days of pregnancy termination, irrespective of the duration and site of the pregnancy, from any cause linked to or exacerbated by the pregnancy or its management but not from accidental or incidental causes.

**Maternal mortality rate** (MMR) is the annual number of female deaths per 100,000 live births from any cause related to or aggravated by the pregnancy or its management (excluding accidental or incidental causes). The MMR includes deaths during pregnancy, childbirth, or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, for a specified year.

**Traditional Birth Attendant** (TBA) refers to any member of the community asides a health professional who provides delivery services. TBA may be trained or untrained.

**Facility delivery** is any delivery conducted at any health-designated facility and attended to by skilled health personnel irrespective of the outcome.

**Home delivery** is any delivery conducted at any other location apart from the health facility. It is usually conducted by the TBA, older females or by the pregnant woman herself.

**Skilled delivery** is a term that refers to any delivery that is being conducted by a health professional trained to conduct deliveries within an environment or facility that is designated for deliveries. The health professionals include a midwife, a medical officer, a medical assistant and a trained community health worker.

# CHAPTER ONE

## 1.0 INTRODUCTION

### 1.1 Background

Pregnancy and childbirth have been documented as a period of increased vulnerability in almost all societies and throughout history, during which mothers and babies need help, especially from skilled birth attendants or midwives (Hidengwa et al., 2020). Home births are ingrained in our country's unique history, and they were our forebears' preferred way of childbirth. It is the desire to give birth in a pleasant, familiar environment without medical interference. Over half a million women, 94% of whom are often from developing countries, lose their lives annually in the reproductive process worldwide (WHO, 2017). Sub-Saharan

Africa accounts for over 66% of the maternal deaths that occur in developing countries (WHO, 2017). In every 26 women, one woman dies in Sub-Saharan Africa because of pregnancy and childbirth. Of the forty countries with the highest maternal death rate in the world, Sub-Saharan Africa accounts for thirty (WHO, 2016).

The amount of births attended by professional health workers is one of two criteria for measuring progress towards achieving MDG 5 (Sarmento, 2014). As one of the measures to enhance maternal and neonatal survival, global policies seek to move the place of delivery from home to health facility (Boah et al., 2018; Centers for Disease Control and Prevention, 2013). In several countries, this has led to significant rises in facility delivery (Baffour-Awuah et al., 2015).

Liberia maternal mortality ratio (MMR) has gradually fallen from 1,370 deaths per 100,000 live births in 1998 to 661 / 100,000 live births in 2017 (Knoema, 2018). Home deliveries in Liberia have since declined from 44% in 2013 to 20 % in 2019. It is more common in rural areas (24%) than in urban areas (17%). Delivery attended to by skilled provider in Liberia has shown a significant increase from 61% in 2013 to 84% in 2019. Women with high Education are more likely than women with no education to have delivery attended to by a skilled provider

(89% and 76%, respectively). There is no direct link between a trained provider and wealth (LDHS, 2019).

The desire of women for at-home delivery is among the reasons for the persistently low use of facilities in developing countries. In contrast to facility delivery based on prior experience or impressions of these services, such desire is due to the satisfaction obtained from home delivery (Olza et al., 2018). Traditional birth attendant services continue to be commonly used, as community members feel that health services are only required when complications arise (Bhattacharyya et al., 2016). On the other hand, unkind treatment by health facility workers has been confirmed. A negative attitude, absenteeism, and poor overall quality of health services are deterrents to seeking health facility delivery (Bhattacharyya et al., 2013). Studies have shown that women with complications; if they had prior experience of insensitive treatment by health workers, prolong or stop seeking care in a health facility (Bhattacharyya et al., 2013; Jawad & Jamil, 2014; Loke et al., 2015; Ntoimo et al., 2018; Sialubanje, Massar, Van Der Pijl, et al., 2015a).

The distance from health facilities, costs, and closer access to traditional birth attendants are other factors related to the degree of satisfaction with or preference for home over facility deliveries in developing countries. Good infrastructure, especially in facilities, is an important determinant as well (Amangbey et al., 2018; Kkonde, 2018; Nunu et al., 2019).

The basic structural requirements that affect women's satisfaction with services are adequate waiting rooms, beds, housekeeping services, power, water and clean toilets (Srivastava et al., 2015; Yuenyong et al., 2012). Human resources, drugs, and equipment are also essential in their availability and quality. Other factors that assess maternal satisfaction are timely treatment, continuous attention, sharing details with the woman about her condition and reassuring her (Berkowitz, 2016; Hasan et al., 2013). Eventually, the effect determines the overall maternal experience. The complimentary appraisal of the treatment of mothers has a

significant impact on the safety and health of mothers and children after birth (Bhattacharyya et al., 2016).

The economic status could often influence decisions concerning delivery place, even beyond access, specifically when deciding among private and public healthcare. The use of private health services is seen as a wealth and status index. The primary source of affordable facility delivery for poor Liberians is public health facilities, and good patient experience will be a significant factor in improving facility deliveries (Bhattacharyya et al., 2016). However, there are cases where women expressed a willingness to deliver in a health facility, but still ended up delivering at home. The common explanation for this has been described as the rapid advancement of labor without time to reach a health facility, resulting in home deliveries (Bhattacharyya et al., 2016). Resistance by older female relatives and often women being sent back home from the facility are other factors that hinder facility delivery since delivery was not due that day. Notwithstanding, in Liberia delivery at the public health facility is free of charge, yet 20 % of deliveries continue to take place at home (LDHS, 2019).In this context, it is vital to comprehend those factors that influence women' decision to give birth at home and analyse any differences so that services can be improved, with the goal to promote facility delivery, particularly in areas where women still prefer home delivery. This study aims to assess those factors influencing home delivery in Margibi County, Liberia.

**1.2 Problem Statement**

In developing countries, a large proportion of mothers still deliver at home as compared to developed countries [68.7% as against 1.3% ] (WHO, 2015). In Liberia home delivery continues to be relatively high as compared to developed countries,44 % and 20% in 2013 and 2019 respectively (LDHS, 2013, 2019; Yaya et al., 2019). While Liberia has embraced WHO's policy of prohibiting deliveries in-home and instead encourage the delivery of any pregnant woman at a health facility, pregnant women are still delivering at home. Therefore, it is essential to evaluate the variables influencing home delivery. Fifty-six per cent of the deliveries

in rural communities are undertaken at home, of which Margibi county contributed a significant amount (LDHS, 2013, 2019; Yaya et al., 2019). In Margibi County, where facility delivery is less than 80% and maternal mortality is among the highest in the country. Data reviewed from the county a year before this study attributed over 85% of maternal deaths to home delivery, which have often been conducted by traditional birth attendants.

Increase in the number of home deliveries can lead to high maternal and newborn morbidities and mortalities as consequence of complications related to the delivery (Scott et al., 2018).This study sought to describe and assess factors influencing home delivery among pregnant women in Margibi, County, Liberia.

### 1.3 Justification

Although comprehensive studies have been conducted on home delivery issues in other countries across Africa and Asia, there is still a literature gap since many of the studies are undertaken outside Liberia (Adedokun & Uthman, 2019; Anwar et al., 2012; Bohren et al., 2014; Sarker et al., 2016; Sialubanje, Massar, Hamer, et al., 2015a; Titaley et al., 2010; Titaley Christiana et al., 2018; Westgard et al., 2019). With variations between countries in geographical and cultural perceptions, this study is to provide additional details that will reinforce findings from other countries and also offer a fresh outlook on understanding factors influencing home delivery.

### 1.4 Conceptual Framework

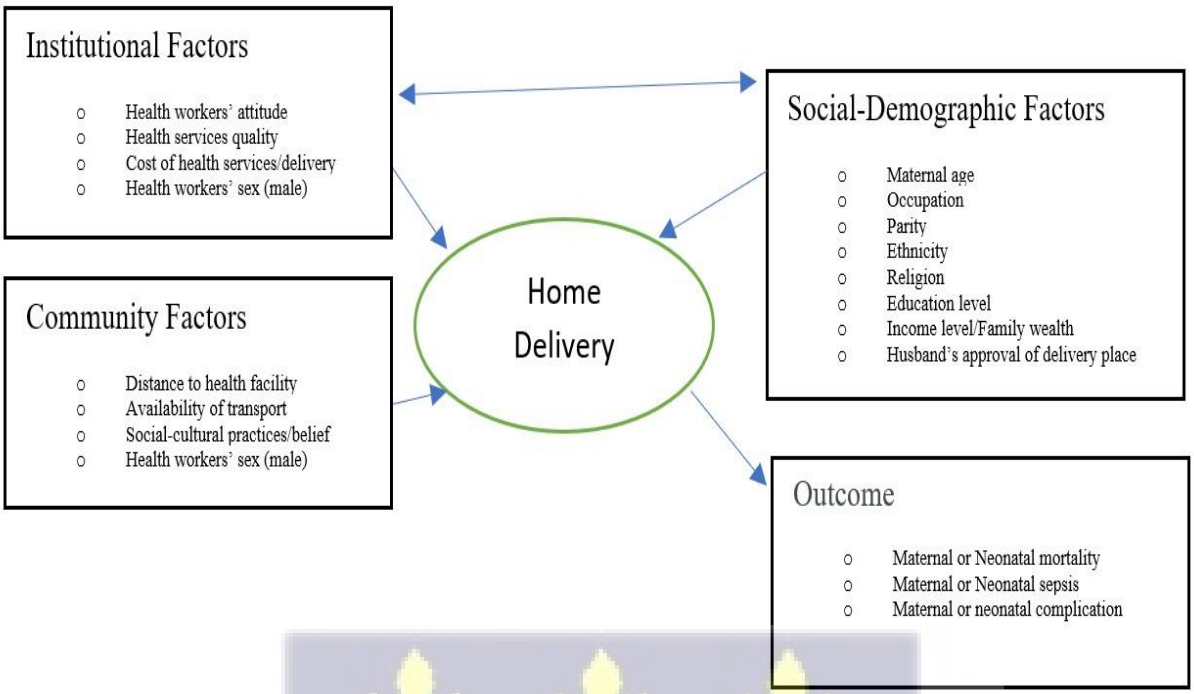


**Figure 1.1: Conceptual Framework of Factors influencing home delivery amongst pregnant women, in Margibi County, Liberia, 2021 Narrative of Conceptual Framework**

To boost or decrease the rate of home delivery, many variables could be adjusted. The factors influencing home delivery in Margibi County can be grouped into three main factors. This includes; sociodemographic characteristics of the women, the institutional or health factors and community level factors. All these factors could influence the occurrence of home delivery in the County.

In terms of the sociodemographic characteristics, woman's age, education level, parity, ethnicity, income level, and antenatal visit are factors found elsewhere to be significantly contribute to an increased or decreased home delivery rate. Women with higher level of education are more likely to deliver at health facilities compared to women with low or no education. Also, the income level of women can also influence home delivery, women with higher income who can afford payment for heath facility delivery are more likely to deliver at

the health facility compared to those with low income who might not be able to foot bills for health facility delivery.

The rate of facility delivery can also be increased or decreased by institutional factors in one direction or the other. Studies have found that most of the institutional factors that lead significantly to home delivery are related to the attitude of health workers, sex of health workers, the quality of health care and cost of delivering in the health. Women who have been treated poorly by health workers are more likely to deliver at home compared to women who are treated good by health workers.

Community factors that may lead to an increase or decrease in-home delivery rates. Sociocultural practices and beliefs, husband's endorsement of delivery location, transportation, and distance to health facility are some of the contributory factors correlated with home delivery from the evidence of other studies.

On the consequences of home delivery, maternal or neonatal mortality, maternal or neonatal sepsis are all possible complications of home delivery.

Refining the little coverage of facility deliveries hinge on large measures that efficiently apply the existing strategy known to work best. Therefore, this study is designed to understand factors influencing home delivery amongst pregnant women.

**1.5 Research Questions**

1. What is the prevalence of home delivery among women of reproductive age in Margibi County?
2. Which social-demographic factors influence home delivery in Margibi County?
3. Which institutional-level factors influence home delivery in Margibi County?
4. Which community-level factors are associated with home delivery in Margibi county?
5. What is the delivery outcome among women of reproductive age in Margibi county?

1.6 Objectives

### 1.6.1 General Objectives

To assess the factors influencing home delivery among women of reproductive age 15-49 years in Margibi, County, Liberia

### 1.6.2 Specific Objectives

1. To determine the prevalence of home delivery among women of reproductive age 15-49 years in Margibi county
2. To identify social-demographic factors that influence home delivery among women of reproductive age 15-49 years in Margibi County
3. To identify institutional-level factors that influence home delivery among women of reproductive age 15-49 years in Margibi County
4. To identify community-level factors that influence home delivery among women of reproductive age 15-49 years in Margibi county
5. To determine the delivery outcome among women of reproductive age 15-49 years in Margibi county

# CHAPTER TWO

## 2.0 LITERATURE REVIEW

### 2.1 Factors Contributing to Home Delivery

Studies conducted in Liberia highlighted some perceived reasons for poor utilisation of maternal health services, such as the education level, health workers attitude, distance from health services and cultural practices (LDHS, 2019; Yaya et al., 2019).

A practical approach to reducing maternal deaths has been recognised to be facility delivery (WHO, 2018). The elevated level of maternal mortality in developing countries is partly associated with the limited or insufficient use of available health facilities services. Many women face a lot of socio-cultural, geographical and economical limitations to accessing professional attendance at delivery, as the situation could be in many cases. Possible obstacles to access to health facility delivery include the distance from a health facility, transportation issues, service costs, husband's approval of delivery place, quality of health care in health facilities, or social-cultural practices and beliefs or social norms, stigma, level of Education, sex of health worker (LDHS, 2019; Shah et al., 2018; Sialubanje, Massar, Van Der Pijl, et al., 2015b).

In Tanzania, Ghana, and Eritrea, home delivery increased with increasing distance (>5km) from a health facility (Dotse-Gborgbortsi et al., 2020; Hanson et al., 2015; Kifle et al., 2018). The delay in pursuing facility-based care in Kenya is increased by long distances and the lack of transport (Rombosia et al., 2019). Also, in west Pokot county of Kenya, Spouses and family, Traditional Birth Attendant (TBA), self-efficacy, prior experience are influenced by access to health facilities (Ogolla, 2015). Work time, along with transportation and long-distance challenges, plays a key role in deciding the place of delivery. In Zambia and Uganda, when labour begins at night, long distances to health facilities, bad roads, and lack of transport were leading contributors to home delivery (Kkonde, 2018; Nunu et al., 2019).

In Kenya and Tanzania, the role of husbands in care-related decisions greatly influence home delivery. The opposite of a study is that males were most likely to restrict women's access to health care in low-income countries. The decision-making power of a woman within the family and her past childbearing experiences may influence her determination on a place she wishes to give birth (Ogolla, 2015; Roggeveen et al., 2013). A study conducted in Kenya, Rwanda, Tanzania and Uganda pointed out the need to engage with individuals through their social networks to influence decision-making and resources for seeking care. Research conducted in Kenya, Rwanda, Tanzania and Uganda highlighted no relation between the obstetric risk of a woman and place of delivery in any country; furthermore, increased wealth and Education were highly correlated to facility delivery. Moreover, the need to connect with people across their social media platforms to influence decision-making as well as caregiving tools (Virgo et al., 2017).

Although most low-income countries operate under release policies for delivery fees, supply costs such as gloves, diapers, soaps, and antiseptics are barriers to facility delivery. This can lead to high trust in-home delivery care services. Most Liberians prefer facility delivery for professional treatment and safety (LDHS, 2013, 2019; Yaya et al., 2019). Women with a normal pregnancy in West Pokot County of Kenya see no need to give birth in a health facility (Ogolla, 2015).

In some instances, low quality of care and disrespectful treatment by service providers at health facilities, such as poor reception, screaming or shouting and refusing to respond to women in distress during pregnancy, deter pregnant women and their families from using maternal health facilities services (Nations et al., 2013). This allows community members to favour community-based health providers such as traditional birth attendance deemed loving and compassionate, albeit less professional (Lewis Kulzer et al., 2012; Nations et al., 2013).

Women expect dignity, professionalism and courtesy from health practitioners and a suitable physical environment (Bishai et al., 2016). They will not suggest non-friendly health facilities to others and change their delivery place for proper care and fair treatment (Iftikhar ul Husnain et al., 2018). Many factors, including the following, determine usage of health facilities for delivery service.

### 2.2.1 Social-Demographic Factors of Home Delivery

In Amhara region, Ethiopia, a study showed that the lack of women's awareness of obstetric treatment, delay in beginning antenatal care, illiteracy and rural residence were affected by health facility delivery (Abeje et al., 2014).

Research performed using in-depth interviews, focus group dialogue, and participant observation in rural Zambia found that individual factors of home delivery include lack of women's decision-making power in families, poverty, gender structure, lack of formal Education and poor transport system (N. A. Scott et al., 2018).

Prospective cross-sectional research conducted in rural coastal Kenya proved that old age for women and their husbands, polygamous marriage, distance and high illiteracy among women and their husbands were the critical factors associated with home delivery (Moindi et al., 2016).

A focus group discussion and in-depth interviews conducted between stakeholders, opinion leaders, health workers and women in rural Zambia showed that the preference for home deliveries were due to a lack of women's freedom to determine the place of delivery, poverty, distance to the health facility, transport system and poverty (Sialubanje, Massar, Hamer, et al., 2015a).

Research conducted in Ghana in 2014 found that the deciding factors for home delivery were women's level of Education, parity, rural or urban residence, household income, distance to the nearest health facility and the number of prenatal visits (Moyer, 2014).

### 2.2.2 Community Factors of Home Delivery

A study conducted in Liberia shows that health facilities delivery among women living in rural areas was low but high among women with higher Education, residing in urban areas, using electronic media, and living in households with a high wealth index (Yaya et al., 2019). Likewise, a cross-sectional analysis performed in Morogoro, Tanzania, found that 89% of women who gave birth at home remained far beyond 5 kilometres from health facilities. In comparison, 94% of women who gave birth at healthcare facilities were closer to healthcare facilities (Kruk et al., 2017). In Indonesia, women used traditional birth attendance because of poverty, distance, and transportation mode in the West Java Province (Titaley Christiana et al., 2018). In a study on the use of maternity facilities by mothers living in rural communities in Eritrea, it was concluded that accessibility to a maternity facility influenced the choice of delivery place (Fisseha, 2017; Kifle et al., 2018).

Similarly, in Indonesia and Bangladesh, a study carried out by Scott also looked at birth with health workers and distance to obstetric care (Scott et al., 2013). Additionally, a study conducted in Sherkole District, Western Ethiopia and rural Tanzania considering the magnitude of home delivery and associated factors among childbearing age mothers (Berhe & Nigusie, 2020). These studies show that distance from a maternity centre was a significant factor influencing the choice of delivery location and maternity facilities(Kruk et al., 2017).

A study conducted in the Brong Ahafo region of Ghana indicates that health facilities' distance and proximity affect facility delivery (Nesbitt et al., 2016). Similarly, a situational analysis was performed in urban slums of Delhi, in India; among 824 women who gave birth in the prior year, 53 per cent had given birth at home. Low educational levels and the status of migrants were indicative of home delivery separately. 36% hospital anxiety, 20.7% home comfort and 12.2% lack of family support for child care emerged as the main reasons for home births (Devasenapathy et al., 2014).

In West Java Province of Indonesia, because of poverty, lack of transport and distance, women preferred giving birth at home delivery (Titaley et al., 2010).

A cross-sectional study conducted in the Congwa district of Tanzania showed that home delivery factors were traditional activities, accessibility to delivery settings, acceptable birth attendants, and unsatisfactory health workers' approaches (Simfukwe, 2011). Prospective research conducted in the Obstetrics and Gynecology Department of Karachi Civil Hospital in Pakistan showed that factors influencing home deliveries among women admitted due to severe delivery complications. Such as low socioeconomic status among family members, recognition by the traditional birth attendant, traditional family beliefs and lack of transport (Shah et al., 2018). In rural Zambia, a qualitative analysis of home delivery reasons found that women neglect facility delivery due to indecisiveness on birthplace, reliance on married couples and family members to determine birthplace, socioeconomic barriers to poverty, distance, cost of food. In contrast, women in rural communities perceived traditional birth attendants as friendly, gentle, skilful, respectful, trust-worthy, and always available (Sialubanje, Massar, Hamer, et al., 2015b). The results of a study conducted in the Oti Region, Krachi Nchumuru District of Ghana, indicate that the primary factors influencing home delivery among women in the district were delivery costs at health facilities, unexpected labour onset, lack of health facilities and staff, availability and support from traditional birth attendants, the lack of transportation, the intervention and opportunity for spiritual assistance (Djan et al., 2020).

### 2.2.3 Institutional Factors of Home Delivery

Midwives are in the perfect position to support pregnant women by supplying them with sufficient knowledge of all the resources and options accessible to them to make educated choices, including the place of delivery. Nevertheless, women are not necessarily given adequate knowledge to help them make the right choices (Reed, 2019). A study conducted in Bangladesh showed that social stigma and mistrust of doctors' advice for caesarian sections and the assumption that they were not always necessary, stopped women from delivering in a health care facility with trained attendants (Parkhurst & Rahman, 2017). A survey performed in Rufiji, Kilombero, and Ulanga districts of Tanzania showed that the greater the likelihood of health facility delivery, the greater the prenatal care level. Similarly, an improvement in the probability of health facility delivery was correlated with improved socioeconomic status (Exavery et al., 2014). In Ghana, health care administrators investigated how midwives' actions impact the preference of health care for pregnant women. Women who engaged in the research as a severe impediment highlighted severe negligence and misconduct by midwives. Midwives sometimes screamed at them, became disrespectful and declined to give support. They also targeted women at work in some situations. Therefore, many women who were treated poorly searched elsewhere for care the next time they got pregnant. They would not recommend such midwives to other women either (Amu & Nyarko, 2019). A study conducted in eastern Zimbabwe found that multidimensional and integrated factors lead to midwives' attitudes and behaviours towards their patients. In rural and under-resourced populations, midwives' subjective expectations, women's social status, and health system limitations frequently contribute to inadequate services, hostile behaviours, aggressive treatment, and insensitive actions towards women. Poor maternity care treatment leads significantly to unfavourable health conditions and women's satisfaction with facilities (Kanengoni et al., 2019).

A related study conducted in Bangladesh observed that the actions of midwives were sometimes reported as unacceptable. Most midwives have been accused of screaming at their patients, insulting them for crying during labour, taking too long to deliver, or refusing to reveal their genitals. The study suggested that practicing midwives be guaranteed to demonstrate respect for the women in their care. It also suggested encouraging family childbirth education and the midwife's role to help families feel reassured (Parkhurst & Rahman, 2017).

Research conducted in rural Zambia, linking demographic health survey, geographic information system and national facility data, disclosed that, in several health facilities, the shortage of emergency obstetric services in rural communities caused women to deliver at home (Central Statistical Office, Ministry of Health, 2019; Sialubanje et al., 2017).

# CHAPTER THREE

## 3.0 METHODS

### 3.1 Study Design

A Community based cross-sectional study was conducted in Margibi County among women who had given birth between June 2020 to May 2021. The research included all four health districts in the county. The research participants were distributed among districts based on the proportion of women's population in their reproductive age. Data were collected in June 2021

### 3.2 Study Area

#### 3.2.1 Location and Demographic Characteristics

Margibi County is located in the Southcentral of the Republic of Liberia. It is bounded on the east by Grand Bassa County, west by Montserrado county, on the North by Bong County and the south by the Atlantic Ocean. The county is subdivided into four health districts and 938 communities, with two major ethnic groups, namely Bassa and Kpelle. Margibi County has a population of 269,570 for the fiscal year 2019/2020. Annual population growth is 2.44%, the delivery rate is 4%, and Women in the Fertile Age (WIFA) is 23%**,** which implies that WIFA is 62,001 within that period.

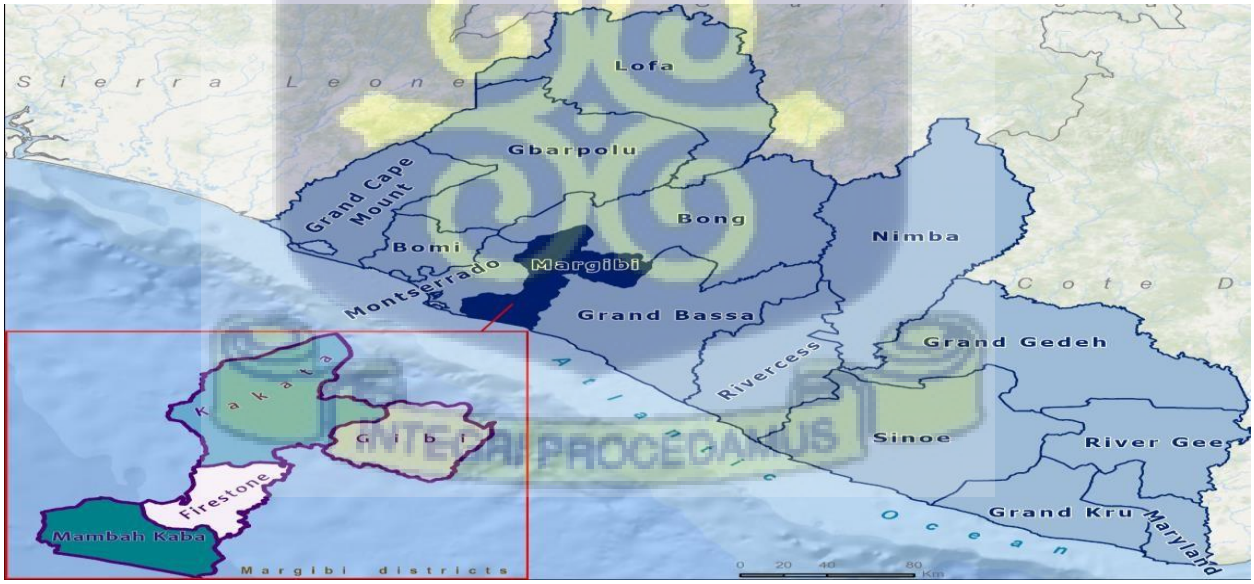

**Figure 3.1: Map of Liberia showing Margibi County and its four health districts**

### 3.2.2 Health System

The county has 62 health facilities: 2 Hospitals, 14 Health Centers and 46 Clinics. Twenty-four (24) of the 62 health facilities are government-owned. C. H. Rennie Hospital is the county only referral hospital; located in Kakata. It has the majority of the skilled and qualified public health workforce. Health services are provided to the population based on the Essential Package of Health Services (EPHS) with support from the Liberian Government, international and local partners.

The Margibi County Health Team manages the county's health sector with technical and financial support from central MOH and partners. The health care delivery system in Margibi County is challenged by many factors, including the following: A large and growing population, some of which are in very hard to reach areas, shortage of ambulances to cover the referral system, limited beds and space at the only referral hospital result in some patients being turned away, difficulty in recruiting CMs/RMs and staff retention, especially in hard to reach facilities, Limited training opportunities and poor attitudes of service providers toward clients, Inadequate infrastructure (especially in hard to reach facilities). Low health services utilization, hard to reach communities and the high cost of health services in private clinics. The MaCHT has very few health partners contributing significantly to the county's health care delivery system. The county has a county health officer (CHO) that runs the county health team.

### 3.2.3 Transportation System

The county had four ambulances for referral of cases from one level to another, but only one is functional. The county transport system is sound only in urban communities, while rural communities are difficult or hard to reach. During the heavy raining season, many rural communities become completely cut off because of flooding. There are many commercial motorbikes in the communities owned by individuals that pregnant women sometimes use for movement and during emergencies.

### 3.2.4 Education

The county has two government Senior high school, eight junior high schools, thirty-four primary schools, two Catholic Senior high schools. Over 80% of women at childbearing age in the county has no formal education.

## 3.3 Variables

### 3.3.1 Dependent Variable

The primary outcome variable is the place of delivery categorized into home delivery or not home delivery.

### 3.3.2 Independent variables

**Table 3.1: SOCIAL -DEMOGRAPHIC FACTORS**

| VARIABLES | OPERATIONAL DEFINITION | SCALE OF MEASUREMENT/ POSSIBLE VALUES |
|---|---|---|
| Participant's age | It refers to the age of the woman in years, as stated during the interview. | Continuous |
| Occupation | Refers to the work of the woman as reported during the interview. Employed refers to women who are employed by government or any agency. Self-employed refers to women working for themselves. Unemployed refers to women not working. And others refer to women who are students etc. | Categorical<br>Values:<br>- Trader<br>- Housewife<br>-Farmer<br>- Unemployed<br>- Tapper<br>- Others |
| Educational status | Refers to the educational status mentioned by the participant during the interview. | Continuous<br>Values:<br>- No Formal education<br>- Primary/ Elementary<br>- Junior high school<br>-Secondary/ Senior high school<br>- Tertiary |
| Marital status | Refers to the marital status stated by the participant during the interview. | Categorical<br>Values:<br>- Single<br>- Married<br>-Cohabiting<br>-Divorced/separation/widow |
| Gravidity | Refers to the number of times the woman has been pregnant as mentioned by the participant | Numerical |
| Parity | Refers to the number of surviving children of participants | Numerical |
| Religion | Refers to the type of Religion reported by the participant during the interview. | Categorical<br>Christianity<br>Islam<br>Traditional |
| Average monthly Income | Refers to the level of Income reported by the participant during the interview. | Numerical values:<br>$\leq$ 50 USD<br>$\geq$ 50 USD |
| Number of ANC visit | Refers to the number of times a woman visited the ANC clinic | Numerical values: (discrete) |

| | | |
|---|---|---|
| Place of delivery | Refers to the place of delivery as reported by the participant during the interview. | Categorical values:<br>-Home<br>-Health facility |

**Table 3.2: COMMUNITY LEVEL FACTORS**

| VARIABLES | OPERATIONAL DEFINITION | SCALE OF MEASUREMENT/ POSSIBLE VALUES |
|---|---|---|
| Distance from community to facility | Refers to the distance in kilometers from the woman's community to the health facility. | Continuous values: |
| Availability of transport | Refers to whether there were means of transport available for the woman to deliver at health facility | Categorical: Yes / No |
| Season/period in the year | Refers to the season/time of year of delivery as reported by the participant. | Categorical values:<br>-Rainy season<br>-Dry season |
| Rural or urban setting | Refers to whether the residential location of the participant is rural or urban | Categorical values:<br>-Rural<br>-Urban |
| Affordability | Refers to whether the cost affordability was a problem as reported by the participant. | Categorical values:<br>Yes / No |
| Rapid labour | Refers to whether the participant's labour occurred rapid. | Categorical: Yes / No |
| Culture /traditional norms | Refers to if there is a traditional culture or norms that influence the woman's place of delivery | Categorical values: Yes / No |
| Influence of TBA | Refers to whether the participant's place of delivery was influenced by TBA. | Categorical values: Yes / No |
| Desired for child | Refers to the seriousness that a woman desired for a child. | Categorical values: Yes / No |

| | | |
|---|---|---|
| Previous delivery experience | Refers to the previous delivery encounter and experience as reported by the participant. | Categorical values: |

**Table 3.3: HEALTH FACILITY LEVEL FACTORS**

| VARIABLES | OPERATIONAL DEFINITION | SCALE OF MEASUREMENT/ POSSIBLE VALUES |
|---|---|---|
| Availability of skilled personnel | Refers to the availability of skilled personnel who conduct facility delivery. | Categorical: Yes / No |
| Attitude of staff | Refers to the attitude of health staff perceived by the women when they go for health services. | Ordinal values:<br>-Good<br>-Poor |
| Cost of health facility delivery | Refers to whether the cost of health facility delivery influenced the participant the choice of place delivery. | Ordinal values:<br>-Very high<br>-High<br>-Moderate<br>-Cheap |
| Privacy at the health facility | Refers to whether there is privacy at the health facility as reported by the participant during the interview. | Categorical: Yes / No |
| Availability of essential drugs and laboratory services | Refers to whether essential drugs and laboratory services are available to conduct facility delivery | Categorical: Yes / No |
| Availability of male personnel in the facility | Refers to whether male personnel conducting facility delivery. | Categorical: Yes / No |

3.4 Study Population

The study population was Women between the ages of 15 and 49 years old who were residents of the county, alive and delivered between June 2020 and May 2021 before the study**.**

**3.5 Sampling**

**3.5.1 Sample Size**

This sample size was determined by using Cochran formula(Cochran, 1997). Therefore, n is the required sample size. Z = indicator for a level of confidence (e.g. 1.96 for 95% confidence level), n = minimum sample size, P = prevalence of home delivery was 54% found in a study conducted in southern Ethiopia (Yetwale et al., 2020)**,** and d = Precision 5%. The sample size estimation is shown below.

$$n = \frac{Z^2 p(1-p)}{d^2}$$

n= 3.8416 x 0.54 (1-0.48)

$(0.05)^2$

n= 3.8416 x 0.54(0.48)

0.0025 n =

3.8416 x 0.2592

0.0025

N = 0.99574

0.0025

n = 398

Using an approximate non- response rate 10%

0.10×398 = 39.8

398 + 39.8 = **438**

After substituting the Cochran formula and a non-response rate of 10% to calculate the number of women of reproductive age, a minimum sample size of 438 was required in this study.In each of the district, the sample was distributed proportionately based on the women's population in their fertility age. The unique population of each of the four districts were used to determine the sample size required per district using the formula nk= n / Nk*N, where nk was the number of participants needed for the interview in each district k, N was the number of females of fertility age from every district, and Nk was the total number of females at fertility age in the county. The appropriate sample size for the analysis was represented by N.

**Table 3.4: Proportionate to size sampling approach used for sampling women.**

| District | District Population (WIFA) | Estimated proportion to be sampled | Proportion sampled |
|---|---|---|---|
| Firestone | 17,733.9 | 125 | 125 |
| Gibi | 7,131.6 | 50 | 50 |
| Mamba-Kaba | 13,819.8 | 97 | 97 |
| Kakata | 23,315.8 | 166 | 166 |
| Margibi | 62001.1 | 438 | 438 |

### 3.5.2 Sampling Method

The study was carried out in all four health districts in Margibi county. Samples were distributed proportionately to districts based on their projected population of women in their fertility age for 2020.

**Sampling of communities**

For each of the districts as described above, we obtained a list of communities and applied Simple random sampling to select the communities in each district.

When choosing the communities, the names of the district communities were written on pieces of paper and put in a closed box and shaken thoroughly, during which a neutral individual was appointed to select ten communities from each district one after another. The first selected community was marked number one; the second selected community was also marked number two in that order until all the communities were marked.

**Selection of respondents**

After the selection of the community, a systematic random sampling was used to select the participants' house and we applied our inclusion criteria within each house, we selected a respondent. To select the house, we started data collection from the town chief or the community chairman house within that community. If the community had no chief or chairman, the starting point was an influential person house (women or religious leader). From the starting point, the next house was the fifth house away in the southward direction until there were no more houses in that direction, then the houses were selected westward, then eastward in a zigzag fashion. Houses were visited in this sequence until the required number of respondents had been obtained. In smaller communities where all respondents could not be obtained, the next community was added within the same district.

A respondent was recruited at the starting point and at every fifth house visited (as described above). Inclusion criteria were any woman in the reproductive age and delivered between June 2020 and May 2021 before the study, available in the house at the time of data collection who consent to be part of the study. If two or more women in a house met the inclusion criteria, one respondent was randomly selected by balloting from the list of potential respondents. At the starting point (chief, community chair or religious leader house), any one person meeting the inclusion criteria was interviewed. Each interviewer sought and documented consent from respondents prior to every interview.

### 3.6 Data Collection Methods & Tools

A structured questionnaire was administered by research assistants during the data collection. Study participants included women aged 15-49 years that gave birth between June 2020 to May 2021 before the study's date. Research assistants performed face-to-face interviews with study participants in their various communities. Sociodemographic variables such as age, marital status, ethnic group, religion, education level, and employment history were obtained using the questionnaire. Research assistants ensured all study participants' provision and extensive use of face masks before an interview was conducted. Each research assistant took a hand sanitiser with them to ensure that their hands are disinfected before and after every interview. The research assistants were instructed not to shake hands or to have any direct or physical contact with any respondent. All interviewer ensured that all venue meets the two (2) metres distance as a requirement before conducting an interview.

Five research assistants (health workers from the districts) were recruited and adequately trained to observe all COVID-19 protocols and ensure that the questionnaires were understood and administered afterwards. The questionnaires were written in English, and the research assistants were fluent in the two major local languages within the county (Kpelle and Bassa).

Pretesting of the questionnaire was done in the local dialect and back-translated before the final data collection.

### 3.7 Quality Control

The training was provided to all research assistants on the processes used in the interview procedures for data collection and field entry personnel. During field data collection, ten per cent of completed questionnaires containing raw data were randomly chosen and reviewed by supervisors to check for mistakes or omissions, and corrective steps were taken where appropriate.

Those checks were replicated during data entry to identify mistakes; data were double entered into Epi Info and merged. The external storage device backs up all the data. Kakata district was Conveniently selected for Pretesting of the questionnaires.

### 3.8 Pretesting of Questionnaire

Due to the Kakata district's proximity, a pretesting was carried out to detect the questionnaires' mistakes. To ensure that the questions were explicit and that respondents could easily comprehend the questions as expected. The trained field staff performed the final data collection.

### 3.9 Data Processing and Analysis

#### 3.9.1 Statistical Methods

Data was entered into Microsoft excel spreadsheet Windows 10. It was cleaned and imported into STATA software version 16.0 for analysis. Categorical variables were reported as frequencies and percentages. Results were presented in tables and bar charts. Prevalence was determined using cross-tabulations. At the bivariate level, Chi-square tests or Fisher's exact tests were performed to determine the relationship between independent variables and home delivery. Level of significance was set at a p-value < 0.05. Parameter estimates were reported as percentages with their corresponding 95% confidence interval. Simple logistic regression

analysis reporting odds ratio was used to determine the magnitude of the association. Variables that were statistically significant at the bivariate analysis level were selected and put into a multiple logistic regression analysis model for statistical significance (p-value < 0.05).

Adjusted odds ratio with their corresponding 95% Confidence Interval were reported. Prior to performing multiple logistic regression, a multicollinearity test using variance inflation factor was performed. Collinear variables and variables with several zero observations within their categories were excluded from the multiple logistic regression. A goodness-of-fit test was performed after the multiple logistic regression to determine if model was a good fit.

### 3.9 Ethical Issues

We obtained ethical approval from the Ethical Review Committee of the University of Liberia. Permission was also being sought from the Ministry of Health, precisely the Margibi County Health Team (MCHT), to conduct the research and data collection in the area. Before the questionnaire was administered, written informed consent was obtained from individual research participants. Participants, less than 18 years were excluded from the study. Letters of approval and consent forms were available in English, and detailed explanations in the local language were offered to ensure that participants thoroughly understood the research's aims, possible risks, benefits, and confidentiality assurance. At any point in the interview process, participants were offered the option to refuse to participate and the choice to back out. During questionnaire administration and interactions, the confidentiality and privacy of participants were maintained. To maintain adequate confidentiality and privacy, participant identities were not included in the write-up, as the questionnaires were coded. The analysis results were published in such a manner that the respondents' names were not included. All participant details were handled as private.

The obtained data were only viewed exclusively by those engaged with the study. All information was stored with a password or under lock and key and destroyed a year later.

# CHAPTER FOUR

## 4.0 RESULTS

### 4.1 Social-demographic characteristics of respondents in Margibi County, Liberia, 2021.

Overall, 438 respondents were surveyed in the study. Out of this number, majority, 159 (36.3%) were residents of Kakata district. Majority of respondents, 225 (51.4%) were within the age group 31 - 40 years. Of the 438 respondents, 348 (79.5%) were farmers. Majority, 343 (78.3%) were cohabiting. Of the 438 respondents, 310 (70.8%) had no formal education. Only 32 (7.3%) of study participants were Muslims. Most 307 (70.1%) of the 438 respondents had an average monthly income ≥ USD 50. Only 77 (15.6%) of the 438 respondents expressed willingness to allow a male health worker to conduct delivery on them (**Table 4.1**).

**Table 4.1a: Socio-demographic characteristics of study participants in Margibi County, Liberia, 2021.**

| Variables | Frequency (N= 438) | Proportion (%) |
|---|---|---|
| **District of resident** | | |
| Firestone | 104 | 23.7 |
| Gibi | 50 | 11.4 |
| Kakata | 159 | 36.3 |
| Mamba Kabah | 125 | 28.5 |
| **Participant's age (years)** | | |
| < 21 | 51 | 11.6 |
| 21 - 30 | 155 | 35.4 |
| 31 - 40 | 225 | 51.4 |
| > 40 | 7 | 1.6 |
| **Occupation** | | |
| Housewife | 56 | 12.8 |
| Farmer | 348 | 79.5 |
| Other | 34 | 7.8 |
| **Marital Status** | | |
| Single | 44 | 10.1 |
| Cohabiting | 343 | 78.3 |
| Married | 39 | 8.9 |
| Other | 12 | 2.7 |

**Table 4.1b: Socio-demographic characteristics of study participants in Margibi County, Liberia, 2021.**

| Variables | Frequency (N=438) | Proportion (%) |
|---|---|---|
| **Highest level of Education** | | |
| No formal education | 310 | 70.8 |
| Elementary | 103 | 23.5 |
| Junior High School | 17 | 3.9 |
| Senior High School | 8 | 1.8 |
| **Religion** | | |
| Christianity | 406 | 92.7 |
| Islam | 32 | 7.3 |
| **Average monthly Income** | | |
| < 50 USD | 131 | 16.9 |
| ≥ 50 USD | 307 | 70.1 |
| **Will you allow a male health worker to deliver you** | | |
| No | 361 | 82.4 |
| Yes | 77 | 15.6 |
| **Residence** | | |
| Rural | 409 | 93.38 |
| Urban | 29 | 6.62 |

**4.2 Study participants delivery history factors, Margibi County, Liberia, 2021.**

Of the 446 women interviewed, 270 (61.65%) had two or three past deliveries. In terms of their number of children, majority 258 (58.9%) had two to three children. Almost all the women interviewed mentioned they attended ANC services during their most recent pregnancy. On where participants first intended to deliver after their most recent conception, 430 (98.17%) of the 438 women mentioned home though not all participants executed their intentions at the time of labour (**Table 4.2**).

**Table 4.2: Delivery history of study participants, Margibi County, Liberia, 2021**

| Variables | Frequency (N) | Proportion (%) |
|---|---|---|
| **Number of deliveries** | | |
| 1 delivery | 55 | 12.56 |
| 2 - 3 deliveries | 270 | 61.65 |
| 4 - 5 deliveries | 113 | 25.8 |
| **Number of Children alive** | | |
| 1 child | 75 | 17.12 |
| 2 - 3 children | 258 | 58.9 |
| 4 - 5 children | 105 | 23.97 |
| **Received ANC** | | |
| No | 1 | 0.23 |
| Yes | 437 | 99.77 |
| **Where ANC was received** | | |
| Health facility | 9 | 2.05 |
| Traditional maternity home | 429 | |
| **ANC booking** | | |
| 1 - 3 months | 104 | 23.74 |
| 4 - 6 months | 231 | 52.74 |
| 7 - 9 months | 103 | 23.52 |
| **Place first intended to deliver** | | |
| Health facility | 8 | 97.95 |
| Home | 430 | 98.17 |

**4.3 Community level factors of the study participants, Margibi County, Liberia**, 2021.

On the community level factors of the study participants, majority 288 (65.75%) of the 438 women mentioned the decision on the place of delivery must be taken by their in-laws. Almost all 417 (95.21%) of the 438 women studied mentioned long distance to health facility as a problem leading to home delivery. Most 288 (65.75%) of the 438 women mentioned the decision on the place of delivery is usually taken by their in-laws. On whether there are sanctions mated out by communities to women who deliver at home, almost all 438 (99.77%) the women mentioned they were no such sanctions in their communities. majority 384 (87.67%) of the 438 women mentioned they travel less than 5 kilometers to access health services. Majority 409 (93.38%) of the 438 women were living in rural communities (**Table 4.3**).

**Table 4.3: Community level factors of the study participants, Margibi County, Liberia, 2021.**

| Community factors | Frequency (N=438) | Proportion (%) |
|---|---|---|
| **Permission before seeking h care** No | | |
| | 431 | 98.40 |
| Yes | 7 | 1.60 |
| **If yes, from whom** | | |
| My husband/partner | 7 | 100 |
| **Decision on delivery** | | |
| Myself | 77 | 17.58 |
| My husband/partner | 73 | 16.67 |
| My in-laws | 288 | 65.75 |
| **Community sanction on home deliver** | | |
| No | 438 | 99.77 |
| Yes | 1 | 0.23 |
| **Distance to health facility** | | |
| No | 21 | 4.79 |
| Yes | 417 | 95.21 |
| **Distance to health facility** | | |
| < 5 kilometers | 384 | 87.67 |
| > 5 kilometers | 54 | 12.33 |
| **Availability of transport** | | |
| No | 429 | 97.95 |
| Yes | 9 | 2.05 |
| **Season/period in the year** | | |
| Dry season | 154 | 35.16 |
| Rainy season | 284 | 64.84 |
| **Rapid labour** | | |
| No | 134 | 30.59 |
| Yes | 304 | 69.41 |

### 4.4: Institutional or health facility related factors, Margibi County, Liberia, 2021

On the institutional or health facility related factors, majority 263 (60.05%) of the 446 women mentioned cost of health facility delivery was very high. More than two thirds 388 (88.58%) of them mentioned the lack of skilled personnel at the health facility. Majority 325 (74.20%) of the women studied, stated the attitude of health staff at the health facilities were poor (**Table 4.4a,b**).

**Table 4.4a: Institutional or health facility related factors, Margibi County, 2021**

| Variables | Frequency (N=438) | Proportion (%) |
|---|---|---|
| **Cost of health facility delivery** | | |
| Cheap | 6 | 1.37 |
| Moderate | 12 | 2.74 |
| High | 157 | 35.84 |
| Very high | 263 | 60.05 |
| **Availability of skilled personnel** | | |
| No | 388 | 88.58 |
| Yes | 50 | 11.42 |
| **Attitude of staff** | | |
| Good | 113 | 25.80 |
| Poor | 325 | 74.20 |
| **Health facility staff relationship** | | |
| Friendly | 47 | 10.73 |
| Respectful | 8 | 1.83 |
| Shout at women | 383 | 87.44 |
| **Community view on facility delivery** | | |
| Expensive | 29 | 6.62 |
| No midwife | 3 | 0.68 |
| No drugs | 368 | 84.02 |
| Not expensive | 38 | 8.68 |

**Table 4.4b: Institutional or health facility related factors, Margibi County, 2021**

| Variables | Frequency (N=438) | Proportion (%) |
|---|---|---|
| **Thought of health facilities** | | |
| **Means of transport** | 332 | 75.80 |
| Have insurance card | 4 | 0.91 |
| Poverty | 40 | 9.13 |
| Cost of services | 62 | 14.16 |
| **Community delivery cost** | | |
| <1001 LD | 35 | 7.99 |
| 1001 – 2000 LD | 263 | 60.05 |
| 2001 – 3000 LD | 82 | 18.72 |
| >3000 LD | 58 | 13.24 |
| **Who assisted recent delivery** | | |
| Doctor | 3 | 0.68 |
| Midwife/nurse | 61 | 13.93 |
| Relatives/friends | 44 | 10.05 |
| Traditional midwife | 330 | 75.34 |

### 4.5 Prevalence of home delivery in Margibi County, Liberia, 2021.

Out of the 438 respondents studied, 397 (90.6%) (95% CI 87.5 – 93.0) indicated they delivered at home in their most recent delivery (**Figure 4.1**).

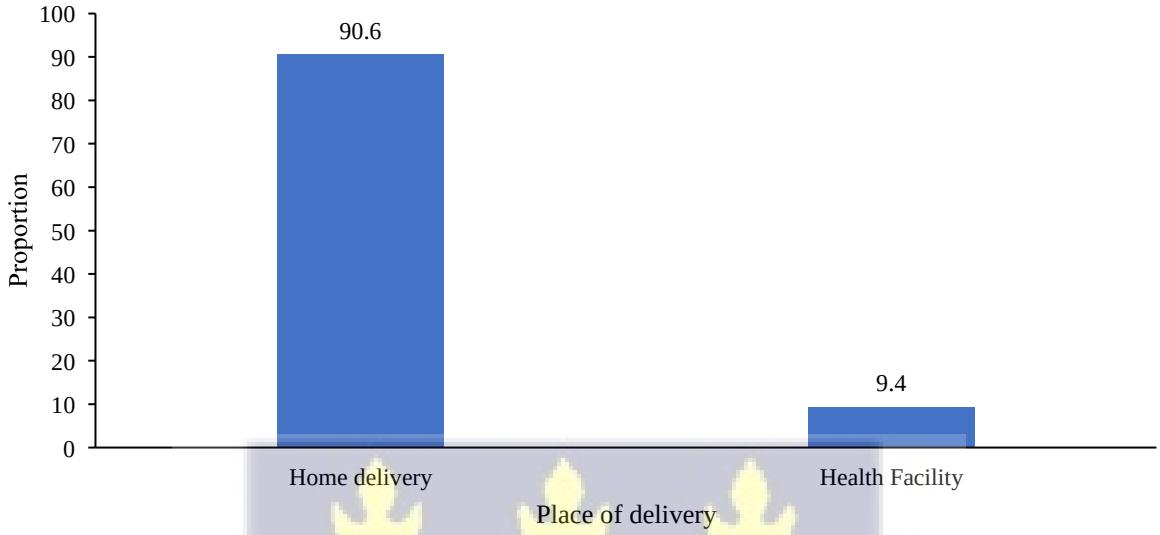


**Figure 4.1: Prevalence of home delivery Margibi County, Liberia, 2021**

### 4.6 Chi square test of association between respondents' social-demographic characteristics and their practice of home delivery in Margibi County, Liberia, 2021

The Chi-square analysis showed that respondents' age group ($p<0.001$), occupation ($p<0.001$), marital status ($p<0.04$), partner's educational level ($p<0.023$), monthly income ($p<0.001$) and allowing male birth attendant ($p<0.001$) were significantly associated with the choice of place of delivery among the study participants. However, district of residence, partner's occupation, educational level and religion were not significantly associated with choice of place of delivery ($p>0.05$) (**Table 4.5**)

**Table 4.5: Bivariate analysis of participant's sociodemographic characteristics and choice of place of delivery in Margibi County, Liberia, 2021**

| Variables | Home Delivery | Health facility delivery | χ2 | p-value |
|---|---|---|---|---|
| **District of respondent** | | | 4.39 | 0.222 |
| Firestone | 92 (23.2) | 12 (29.3) | | |
| Gibi | 44 (11.1) | 6 (14.6) | | |
| Kakata | 142 (35.8) | 17 (41.5) | | |
| Mamba Kabah | 119 (30.0) | 6 (14.6) | | |
| **Participant's age** | | | | **<0.001 †*** |
| < 21 years | 51 (12.8) | 0 (0.0) | | |
| 21 - 30 years | 121 (30.5) | 34 (82.9) | | |
| 31 - 40 years | 218 (54.9) | 7 (17.1) | | |
| > 40 years | 7 (1.8) | 0 (0.0) | | |
| **Occupation** | | | | **0.001 †*** |
| Housewife | 56 (14.1) | 0 (0.0) | | |
| Farmer | 307 (77.3) | 41 (100.0) | | |
| Other | 34 (8.6) | 0 (0.0) | | |
| **Marital Status** | | | | **0.04 †*** |
| Single | 37 (9.3) | 7 (17.1) | | |
| Cohabiting | 309 (77.8) | 34 (82.9) | | |
| Married | 39 (9.8) | 0 (0.0) | | |
| Other | 12 (3.0) | 0 (0.0) | | |
| **Highest level of Education** | | | | 0.672 † |
| No formal education | 277 (69.8) | 33 (80.5) | | |
| Elementary | 96 (24.2) | 7 (17.1) | | |
| Junior High School | 16 (4.0) | 1 (2.4) | | |
| Senior High School | 8 (2.0) | 0 (0.0) | | |
| **Partner's highest level of Education** No | | | | **0.023 †*** |
| formal education | 261 (65.7) | 33 (80.5) | | |
| Elementary | 69 (17.4) | 5 (12.2) | | |
| Junior High School | 18 (4.5) | 3 (7.3) | | |
| Senior High School | 49 (12.3) | 0 (0.0) | | |
| **Religion** | | | | 0.175 † |
| Christianity | 366 (92.2) | 40 (97.6) | | |
| Islam | 31 (7.8) | 1 (2.4) | | |
| **Average monthly Income** | | | | **<0.001 †*** |
| < 50 USD | 131 (33.0) | 0 (0.0) | | |
| ≥ 50 USD | 266 (67.0) | 41 (100.0) | | |
| **Allow a male health worker to conduct delivery** | | | 65.59 | **<0.001*** |
| No | 346 (87.2) | 15 (36.6) | | |
| Yes | 51 (12.8) | 26 (63.4) | | |

† Fisher's exact test; †*Significant (p<0.05) using Fisher's exact test; *Significant (p<0.05) using chi-square test.

**4.7 Chi square test of association between respondents' delivery history and their choice of place of delivery in Margibi County, Liberia, 2021.**

The Chi-square analysis showed that the number of children alive ($\chi 2$: 75.69, p<0.001), the place they went for ANC services (p<0.001) and where they delivered in their most recent delivery (p<0.001) were significantly associated with the choice of place of delivery among the study participants. However, the parity, month of first ANC attendance and ANC attendance were not significantly associated with choice of place of delivery (p>0.05) (**Table 4.6**).

**Table 4.6: Bivariate analysis of association between participant's delivery history and their choice of place of delivery in Margibi County, Liberia, 2021.**

| Variables | Home delivery | Health Facility delivery | $\chi 2$ | p-value |
|---|---|---|---|---|
| **Parity** | | | 2.2 0 | 0.333 |
| 1 delivery | 48 (12.1) | 7 (17.1) | | |
| 2 - 3 deliveries | 243 (61.2) | 27 (65.8) | | |
| 4 - 5 deliveries | 106 (26.7) | 7 (17.1) | | |
| **Children alive** | | | 75.69 | **<0.001*** |
| 1 child | 48 (12.1) | 27 (65.8) | | |
| 2 or more children | 349 (87.9) | 14 (34.15 | | |
| **ANC service** | | | | |
| No | 0 (0.0) | 0 (0.0) | | |
| Yes | 397 (100.0) | 41 (100.0) | | |
| **Place for ANC service** | | | | **<0.001*** |
| Health facility | 2 (0.5) | 7 (17.1) | | |
| Traditional maternity home | 395 (99.5) | 34 (82.9) | | |
| **ANC booking** | | | 4.06 | 0.131 |
| 1 - 3 months | 99 (24.9) | 5 (12.2) | | |
| 4 - 6 months | 204 (51.4) | 27 (65.9) | | |
| 7 - 9 months | 94 (23.7) | 9 (22.0) | | |
| **Place for previous delivery** | | | | **<0.001*** |
| Health facility | 0 (0.0) | 8 (19.5) | | |
| Home | 397 (100.0) | 33 (80.5) | | |

**†Fisher's exact test; †*Significant (p<0.05) using Fisher's exact test; *Significant (p<0.05) using chi-square test.**

**4.8 Chi square test of association between community factors and choice of place of delivery in Margibi County, Liberia, 2021.**

The Chi-square analysis showed that women who make their own decision on place of delivery ($p<0.001$), their partners' response to their decision ($p<0.001$), distance to health facility ($p<0.001$), availability of transport ($\chi2= 218.28$; $p<0.001$), season or period in the year ($\chi2= 45.27$; $p<0.001$) and the decision to the health facility ($p<0.001$) were significantly associated with the choice of place of delivery among the study participants.

However, permission seeking, traditional norms, community sanctions against home delivery, affordability of transport and type residence were not significantly associated with choice of place of delivery ($p>0.05$) (**Table 4.7**).

**Table 4.7a: Bivariate analysis of association between community factors and their choice of place of delivery in Margibi County, Liberia, 2021**

| Variables | Home delivery (90.6%) | Health Facility Delivery (9.4%) | $\chi 2$ | p-value |
|---|---|---|---|---|
| **Seek Permission before health care** | | | | 0.5† |
| No | 391 (98.5) | 40 (97.6) | | |
| Yes | 6 (1.5) | 1 (2.4) | | |
| **Decision on place of delivery** | | | | **<0.001†*** |
| Myself | 76 (19.1) | 1 (2.4) | | |
| My husband/partner | 52 (13.1) | 21 (51.2) | | |
| My in-laws | 269 (67.8) | 19 (46.3) | | |
| **Partner's response on delivery place** | | | | **0.001†*** |
| He will agree | 332 (83.6) | 41 (100.0) | | |
| He will disagree | 65 (16.4) | 0 (0.0) | | |
| **Community sanction against home deliver** | | | | 0.094† |
| No | 397 (100.0) | 40 (97.6) | | |
| Yes | 0 (0.0) | 1 (2.4) | | |
| **Distance problem** | | | 14.94 | **<0.001 †*** |
| No | 14 (3.5) | 7 (17.1) | | |
| Yes | 383 (96.5) | 34 (82.9) | | |

†Fisher's exact test; †*Significant ($p<0.05$) using Fisher's exact test; *Significant ($p<0.05$) using chi-square test 4.9 :

**Table 4.7b: Bivariate analysis of association between community factors and their choice of place of delivery in Margibi County, Liberia, 2021**

| Variables | Home delivery (90.6%) | Health Facility Delivery (9.4%) | $\chi 2$ | p-value |
|---|---|---|---|---|
| **Distance to health facility** | | | | **<0.001†*** |
| < 5 kilometers | 343 (86.4) | 41 (100.0) | | |
| ≥ 5 kilometers | 54 (13.6) | 0 (0.0) | | |
| **Availability of transport** | | | 218.28 | **<0.001*** |
| No | 379 (95.5) | 7 (17.1) | | |
| Yes | 18 (4.5) | 34 (82.9) | | |
| **Season/period in the year** | | | 45.27 | **<0.001*** |
| Dry season | 120 (30.2) | 34 (82.9) | | |
| Rainy season | 277 (69.8) | 7 (17.1) | | |
| **Residence** | | | | 0.221† |
| Rural | 369 (93.0) | 40 (97.6) | | |
| Urban | 28 (7.0) | 1 (2.4) | | |
| **Rapid labour** | | | 58.34 | **<0.001*** |
| No | 100 (25.2) | 34 (82.9) | | |
| Yes | 297 (74.8) | 7 (17.1) | | |

**†Fisher's exact test; †*Significant (p<0.05) using Fisher's exact test; *Significant (p<0.05) using chi-square test 4.9** :

Chi square test of association between institutional/health facility factors and choice of place of delivery in Margibi County, Liberia, 2021.

The Chi-square analysis showed that the cost of health facility delivery (p<0.001), availability of skilled personnel (p<0.001), attitude of health workers (p<0.001), cost of community delivery (p<0.001) and the person who assisted with their most recent birth (p<0.001) were significantly associated with the choice of place of delivery among the study participants

However, what people say about health facility delivery was not significantly associated with choice of place of delivery (p>0.05) (**Table 4.8**).

**Table 4.8: Bivariate analysis of association between institutional/health facility factors and choice of place of delivery in Margibi County, Liberia, 2021**

| Variables | Home delivery (90.6%) | Health Facility delivery (9.4%) | χ2 | p-value |
|---|---|---|---|---|
| **Cost of health facility delivery** | | | | **<0.001†*** |
| Cheap | 6 (1.5) | 0 (0.0) | | |
| Moderate | 12 (3.0) | 0 (0.0) | | |
| High | 116 (29.2) | 41 (100.0) | | |
| Very high | 263 (66.3) | 0 (0.0) | | |
| **Attitude of staff** | | | | **<0.001†*** |
| Poor | 112 (28.2) | 1 (2.4) | | |
| Good | 285 (71.8) | 40 (97.6) | | |
| **Perception on heath facility delivery** | | | | **<0.001†*** |
| Means of transport | 291 (73.3) | 41 (100.0) | | |
| Have insurance card | 4 (1.0) | 0 (0.0) | | |
| Poverty | 40 (10.1) | 0 (0.0) | | |
| Cost of services | 62 (15.6) | 0 (0.0) | | |
| **Cost of delivery** | | | | **0.038*** |
| ≤ 2000 LD | 276 (69.5) | 22 (53.7) | | |
| > 2000 LD | 121 (30.5) | 19 (46.3) | | |

†Fisher's exact test; †*Significant (p<0.05) using Fisher's exact test; *Significant (p<0.05) using chi-square test

**4.10 Multivariate logistic regression analysis for factors associated with choice of place of delivery in Margibi County, Liberia.**

In a multivariate logistic regression attitude of health workers, season or period of the year, place for ANC services and the number of children alive were significantly associated with the choice of place of delivery among the study participants.

Women with two or more children had 15.8 times increased odds of home delivery compared with those with one or no child (aOR = 15.77, 95% CI 3.95 - 62.89, p < 0.012).

Women who mentioned good attitude of health workers had 0.01 times decreased odds of home delivery compared to those who mentioned health workers has poor attitude (aOR = 0.01, 95% CI 0.001 - 0.07, p < 0.001)

Season or period of the year the women delivered also influenced their place of delivery, women who delivered during the raining season had 9.87 times increased odds of home delivery compared to those who delivered during the dry season of the year (aOR = 9.87, 95% CI 1.17 - 82.89, p< 0.035).

Similarly, women who attended ANC services at traditional maternity homes had 183.26 times increased odds of home delivery compared to those who attended ANC services at a health facility (aOR = 183.26, 95% CI 4.71 - 7123.14, p < 0.005) (**Table 4.9**).

**Table 4.9a: Factors associated with pregnant women choice of delivery, Margibi County, 2021**

| Variables | Choice of place of delivery | | | |
|---|---|---|---|---|
| | Unadjusted OR (95% CI) | P-value | Adjusted OR (95%CI) | P-value |
| **Allow male birth attendant** | | | | |
| No | Ref | | Ref | |
| Yes | 0.09 (0.04 - 0.17) | <0.001* | 1.54 (0.40 - 6.04) | 0.532 |
| **Number of Children alive** | | | | |
| 1 child | Ref | | Ref | |
| 2 or more children | 14.02 (6.88 - 28.59) | <0.001* | 15.77 (3.95 - 62.89) | < 0.001* |
| **ANC services** | | | | |
| Health facility | Ref | | Ref | |
| Traditional maternity home | 40.66 (8.13 - 203.43) | <0.001* | 183.26 (4.71 - 7123.14) | 0.005* |
| **Problem with distance to facility** | | | | |
| No | Ref | | Ref | |
| Yes | 5.63 (2.13 - 14.90) | <0.001* | 0.87 (0.07 - 10.87) | 0.915 |
| **Attitude of staff** | | | | |
| Poor | Ref | | Ref | |
| Good | 0.06 (0.01 - 0.47) | 0.007* | 0.01 (0.001 - 0.07) | < 0.001* |

*Significant (p<0.005)

**Table 4.9b: Factors associated with pregnant women choice of delivery, Margibi County, 2021**

| | Choice of place of delivery | | | |
|---|---|---|---|---|
| **Variables** | **Unadjusted OR(95 % CI)** | **P-value** | **Adjected OR P-value (95 % CI)** | **P-value** |
| **Cost of delivery in community** | | | | |
| ≤ 2000 LD | Ref | | Ref | |
| > 2000 LD | 0.51 (0.27 - 0.97) | 0.041* | 0.91 (0.30 - 2.75) | 0.866 |
| **Season/period in the year** | | | | |
| Dry season | Ref | | Ref | |
| Rainy season | 11.21 (4.83 - 26.00) | <0.001* | 9.87 (1.17 - 82.89) | 0.035* |
| **Rapid labour** | | | | |
| No | Ref | | Ref | |
| Yes | 14.43 (6.20 - 33.56) | <0.001* | 64.95 (5.40 - 781.02) | 0.001* |

***Significant (p<0.005)**

### 4.11 Outcome of delivery, Margibi County, 2021

Overall, 77 (17.6%) of the 438 respondents surveyed had a stillbirth. Of these 77 women, 75 (97.4%) were delivered at home (**Figure 4.2**). Adjusting for number of deliveries, there was 4.81 times increased odds of stillbirth among neonates delivered at home compared to neonates who were delivered at health facility (aOR = 4.81, 95%CI = 1.13 – 20.45) (**Table 4.10**).

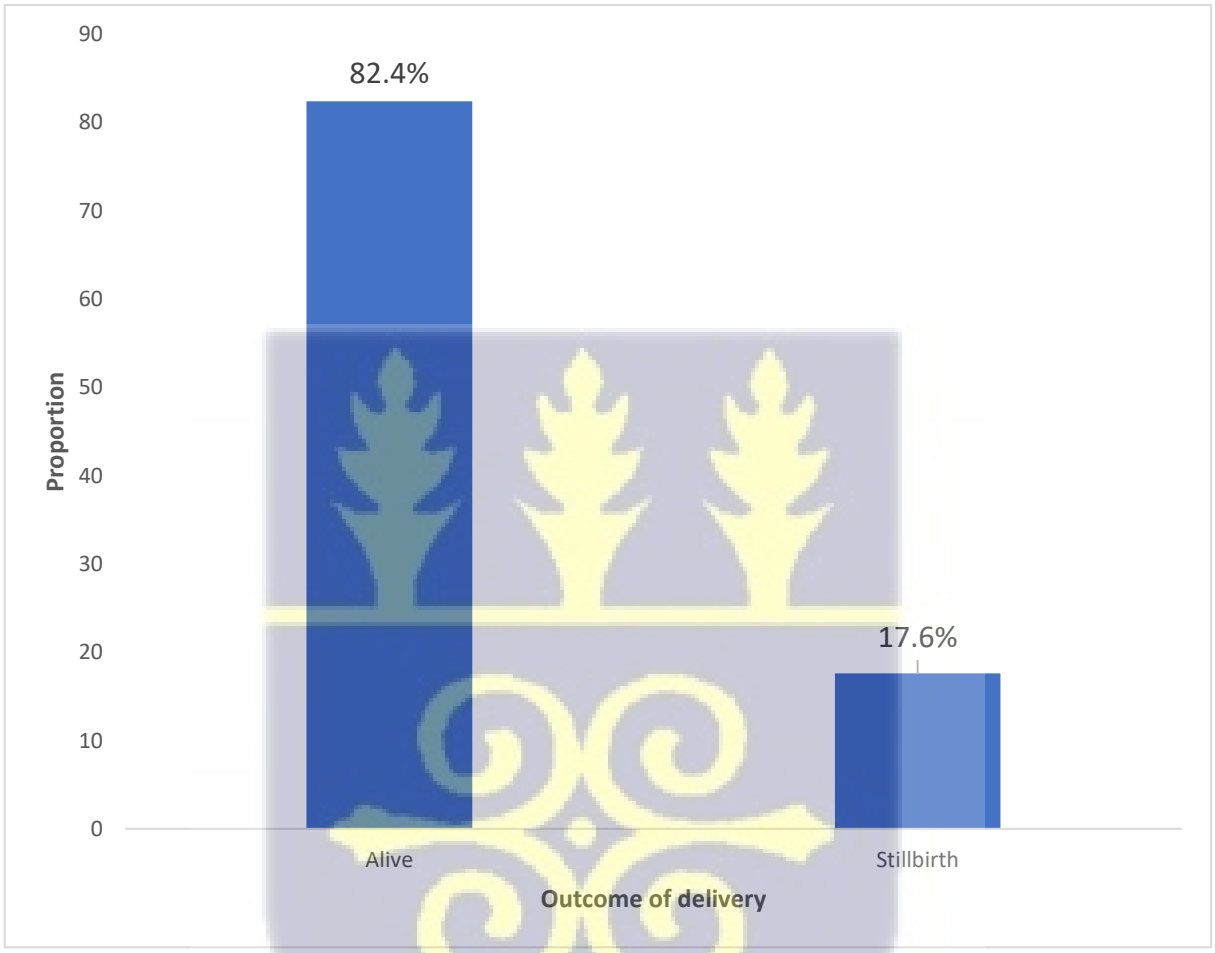


**Figure 4.2: Delivery Outcome amongst women studied in Margibi County, 2021**

**Table 4.3: Adjusted analysis of the association between place of delivery and birth outcome in Margibi County, 2021**

| Variables | Alive | Stllbirth | Adjusted OR (95%CI) | p-value |
|---|---|---|---|---|
| **Place of delivery** | | | | |
| Health facility | 39 (10.8) | 2 (2.6) | Ref | |
| Home | 322 (89.2) | 75 (97.4) | 4.81 (1.13 - 20.45) | **0.033*** |
| **Number of deliveries** | | | | |
| 1 delivery | 41 (11.4) | 14 (18.2) | Ref | |
| 2 - 3 deliveries | 224 (62.1) | 46 (59.7) | 0.58 (0.29 - 1.16) | 0.122 |
| 4 - 5 deliveries | 96 (26.6) | 17 (22.1) | 0.48 (0.21 - 1.07) | 0.074 |

***Significant (p<0.05)**

# CHAPTER FIVE

## 5.0 DISCUSSION

The study-enrolled four hundred and thirty eight (438) women of reproductive age. According to the choice of place of delivery by pregnant women is usually an important decision taken by women at the final stage of their gestational period. Some of these pregnant women ends up delivering at homes whereas some go to the health facility. Despite the numerous interventions by the WHO and programmes implemented by various governments of Liberia, the outcome of home delivery remains one of the significant challenge the country faces due to increase(97.4%) in still birth. The current study revealed that more than 90% of the women studied delivered at home in their most recent delivery in Margibi County.

### Prevalence of Home delivery

The study revealed a high prevalence of home delivery in the Margibi County. The high prevalence rate (i.e. 90.6%) recorded is consistent with the findings of a study conducted in Zala Woreda,southern Ethiopia, where 77% of the women studied reported delivering at home in their most recent delivery (Bedilu & Niguse, 2017). In a similar study conducted in Dodota district of Northwest Ethiopia, almost 80% of the women studied reported delivering at home (J. et al., 2013). The high prevalence of home delivery among pregnant women is further substantiated by another study conducted in Akure, Nigeria, where 81.8% women studied mentioned delivering at home in their most recent delivery (Adejumo et al., 2018).

However, other studies encountered to assess prevalence of home delivery reported much lower levels. In a different studies conducted in Mukono District-Uganda and Jimma Zone, Southwest Ethiopia reported a prevalence level of less than 35% (Kkonde, 2018; Yetwale et al., 2020), this prevalence levels are much lower than the WHO target for home delivery. Unlike these studies, our study considered women who delivered within one year prior to the study as our inclusion criteria. This could have

accounted for the inconsistency in the prevalence level recorded. The high prevalence level of home delivery indicates the low uptake of all vaccines given at birth and treatment given to the mothers. This will expose these neonates to possible infectious disease. The Government of Liberia, to tackle the issue of low vaccine uptake and high infant mortality, will have focus more resources into increasing institutional deliveries which will intend control these occurrences.

**Sociodemographic Characteristics of the Women**

On the sociodemographic characteristics of the women studied, the number of liv births by the women was significantly associated with home delivery. The number of deliveries by these women had an association with home delivery. Women who had given birth more than one time had increased odds of home delivery compared to women who gave birth for the first time. This study is in accordance with studies done in Southwest Ethiopia, Trincomalee, Sri Lanka and Nepal (Adde et al., 2020; Yahya & Pumpaibool, n.d.; Yetwale et al., 2020). This might be because women who have given birth several times perceive themselves to be more experienced in labour, motivated and have a lower chances of complications, thereby developing more interest in using homedelivery services (Journal & Medical, 2014; Kifle et al., 2018).

Our study did not find any significant association between women level of education, income status, residence and religion. However, in similar studies conducted in Tanzania, India, and Ghana, these factors were significantly associated with home delivery (Acharya, 2018; Adedokun & Uthman, 2019; Dankwah et al., 2019; Withers et al., 2018).

**Institutional or Health Facility level factors**

The attitude of health workers towards persons who access health care services is instrumental to the care seeking participation rate of these persons. Individuals who perceive health workers to be of good attitude

are more likely to seek health care from health facilities, likewise, those who perceive health workers to be of poor attitude might not seek care from health facilities. The revealed, the attitude of health workers was significantly associated with home delivery. Women who rate health workers attitude as poor had an increased odds of home delivery compared to their counterparts. This finding corroborates the findings of a study conducted in Uganda, where women who rated health workers attitude as poor had 5.4 times increased odds of home delivery. Similarly, in a study conducted in Bahirdar Ethiopia, pregnant women who rated health workers attitude as poor had 4.4 times increased odds of home delivery compared to their counterparts. In Sekela district of West Ethiopia, in a study involving women, the odds of home delivery was 6.0 times increased among those who perceive health workers to be of poor attitude compared to those who perceive them to be of good attitude (Adde et al., 2020; Alemayehu et al., 2012; Gebresilasea et al., 2017; Journal & Medical, 2014). The attitude of health workers towards clients they are meant to serve is an area, the government and other stakeholders can tackle to reduce the home delivery rate in the County and Liberia at large. Resources should be channel into attitude training of these health workers and supportive supervision to ensure they act accordingly.

In some instances, low quality of care and disrespectful treatment by service providers at health facilities, such as poor reception, screaming or shouting and refusing to respond to women in distress during pregnancy, deter pregnant women and their families from using maternal health facilities services (Nations et al., 2013). This allows community members to favour community-based health providers such as traditional birth attendance deemed loving and compassionate, albeit less professional (Lewis Kulzer et al., 2012; Nations et al., 2013). Women expect dignity, professionalism and courtesy from health practitioners and a suitable physical environment (Bishai et al., 2016). They will not suggest nonfriendly health facilities to others and change their delivery place for proper care and fair treatment (Iftikhar ul Husnain et al., 2018). Many factors, including the following, determine usage of health facilities for delivery service.

**Community level factors**

Our study further revealed that the period of the year in which the women give birth was a significant predictor of home delivery. Women who deliver during the raining season had an increased odds of home delivery compared to those who delivered during the dry season of the year. This is so because, most of these women are rural dwellers with poor road network connecting them to the health facilities. Because of this poor road network health facility accessibility becomes difficult compared to the dry season which could have accounted for the high rate of home delivery during the dry season compared to the wet seasons. The findings of this study corroborate the results of a study conducted in rural Mozambique where they detected the predicted association between season of birth and the likelihood of home delivery. The association was marginally significant when seasonality was measured as the amount of precipitation but was highly statistically significant when we dichotomized time of birth as rainy season versus dry season.

However, our study did not find any significant association between home delivery and the distance to health facility. It can therefore be ruled out that distance was a barrier and influenced women to deliver at home. A study conducted by Moindi in Kenya, contradicts these findings as it found that most women who delivered at home lived far away from the facilities and those delivering in facilities being those who stayed closer (Moindi et al., 2016).

The study had few limitations, one limitation detected at the design stage of the study was the problem of recall bias since mothers had to recall their past experiences in their last childbirth which could be as long as 12 months prior to the survey. To curtail this limitation, research assistants reviewed the women ANC cards to support their responses.

# CHAPTER SIX

## 6.0 CONCLUSIONS AND RECOMMENDATIONS

### 6.1 Conclusion

The prevalence of home delivery in the Margibi County was higher then WHO expected target. The recorded prevalence level was over 90%. Various factors were found to be significantly associated with home delivery among women of reproductive age in Margibi County. The number of deliveries by the women was the sociodemographic characteristic significantly associated with their choice of place if delivery. This factor is non modifiable and so other predictors which are modifiable could be addressed and reduce the high prevalence rate of home delivery. The institutional factors that were significant predictors of the choice of place of delivery and attitude of health care workers. The attitude of health workers could be modified in addressing the problem. Distance to the health facility and the seasonality were the community level factors significantly associated with choice of place of delivery among the women.

### 6.2 Recommendations

1. The MOH should conduct in-service training for health care provider on positive attitude towards patients
2. The MOH and MaCHT should empower women via educational opportunities especially for those with no formal education, and that male be included in maternal health services

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