Journal of Epidemiology and Public Health (2024), 09(04): 472-479
Masters Program in Public Health, Universitas Sebelas Maret

Research
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# Determinants of Promoting Assisted Delivery in the Lagdo Health District in Northern Cameroon

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*Received: 1 August 2023; Accepted: 24 September 2024; Available online: 16 October 2024*

## ABSTRACT

**Background:** Discrepancies in findings on assisted delivery (AD) in the Northern Cameroun persist. In order to reduce maternal mortality, it is hypothesized that specific determinants may help promote the use of AD. This study aimed to assess the possible association between these determinants and AD.
**Subjects and Method:** A cross-sectional study was carried out on 1,175 postpartum women, in the Lagdo health district from May 10th to June 5th, 2023. A three-stage cluster sampling technique was used. Independent variables included the factors related to AD. The dependent variable was the use or no use of AD. A validated questionnaire was employed to gather information. Data analysis was performed with SPSS software version 25. Frequencies, odds ratios (OR), and corresponding 95% confidence intervals (CI) were calculated. The statistical significance was 0.05.
**Results:** The prevalence of AD was 43.9%. After adjustment for age, educational attainment, and parity, a direct association was detected between AD and funded delivery fees (OR=2.5; 95%CI= 1.95 to 3.40; p<0.001), and the presence of motorcycle taxi driver (OR=1.70; 95%CI =1.31 to 2.19; p<0.001). An inverse relationship was observed between AD and distance to health centers (OR= 0.32; 95%CI = 0.18 to 0.58; p<0.001), and lack of community leaders' involvement (OR=0.45; 95%CI = 0.31 to 0.67; p<0.001).
**Conclusion:** Our findings suggest funding delivery fees, reducing distance to health facilities, and sensitizing women by community leaders may help promote AD.

**Keywords:** Assisted delivery, health district, community leaders, Cameroon

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**Cite this as:**
Kami A, Nkondjock A, Socpa A (2024). Determinants of Promoting Assisted Delivery in the Lagdo Health District in Northern Cameroon. J Epidemiol Public Health. 09(04): 472-479. https://doi.org/10.26911/je-publichealth.2024.09.04.07.



## BACKGROUND

Assisted delivery (AD) is childbirth that occurs in the presence of trained health personnel, that is a doctor, nurse, midwife, or auxiliary midwife, in a health center (Ag-Ahmed et al., 2018). Community acceptability of this practice remains a major public health challenge, especially in the context where normal or pathological pregnancy reveals indissociable and uncertain charac-

teristics. It was shown that 15% of pregnant women exhibit a risk of complication that is not known in advance, meaning that pregnant women are potentially considered as women at risk, as it is extremely difficult to determine those who will have complications (WHO, 2017). This situation leads to not only the death of the mother or child but also to disabilities, which may result in social rejection of woman and baby. Yet, this could be avoided if women observed good practices.

Recent results published by WHO in 2019 indicate approximately 830 women worldwide die from childbirth complications, with the majority occurring in less developed countries. Moreover, these pregnant women live more in remote areas with modest incomes and have less chance of receiving appropriate maternal care, approximately 49%. In addition, West and Central Africa account for more than 40% of maternal deaths and about one-third of child deaths (WHO, 2022). In Cameroon, 47% of women in rural areas continue to give birth at home, without assistance or medical follow-up (DHS, 2020).

The worst-case scenario is that 26.8% of these deliveries were conducted by family members, 22.2% by traditional midwives, and 5.9% by women themselves (DHS, 2018). Consequently, the maternal mortality ratio attributed to this risky behavior is estimated at 467 deaths per 100.000 live births, a percentage of 17%. This dramatic situation has allowed African leaders and their partners to intensify activities that can reduce the risk of death when a woman wants to give life. In Lagdo, the 2022 health district report estimates a 50% unassisted childbirth rate. These risky behaviors observed in that rural locality remain a barrier to achieving the set objectives for 2030. Being aware of that situation, it is of great importance to search for new determinants that can inverse the trend.

## SUBJECTS AND METHOD

### 1. Study Design

The study was a cross-sectional study carried out in the Lagdo health district from May 10 to June 5, 2023, using a three-stage cluster sampling technique.

### 2. Study Population

The study's target population was women who had given birth between January 1st, 2022, and May 18th, 2023. The three-stage cluster sampling technique was used and a total of 1.956 women were identified through the admission of Lagdo Health District. 781 cases (39.9%) were ineligible for the following reasons: 668 (34.1%) lived outside selected areas and 11 (0.5%) were excluded because of the refusal of their spouses. This study was not able to contact 102 (5.2%) because they were busy with fieldwork. This study finally interviewed 1.175 postpartum women giving a response rate of 60% of eligible recruited subjects.

### 3. Study Variables

The following independent variables were selected: socio-demographic data (age, educational attainment, parity, number of children delivered, number of life births), community leaders' involvement, funded delivery fees, pre-payment of health checks in installments, creation of a toll-free number, delimitation, and recruitment of midwives at intervention zones, mobilization of funds to purchase a community motorcycle, donation of a community motorcycle, construction of a satellite health hut, availability of a medical ambulance, involvement of midwives in the maternity service and the establishment of a telephone fleet. The dependent variable was the use of assisted delivery.

**4. Operational Definition of Variable**

**Assisted Delivery:** It is any delivery that takes place in the presence of qualified health personnel, who may be a doctor, nurse, or midwife in a health center

**5. Study Instruments**

The data collection tool used was a validated questionnaire, with several sections, and was administered to women in interviews.

**6. Data Analysis**

The collected data underwent statistical analysis using SPSS version 23. Frequencies, odds ratios (OR), and corresponding 95% confidence intervals (CI) were calculated using unconditional logistic regression. The statistical significance was 0.05.

**7. Research Ethics**

This study was approved by the Institutional Ethics Committee of the School of Health Sciences of the Catholic University of Central Africa. A certificate of ethical compliance bearing number 2023/0220-61/CEIRSH was issued on March 10, 2023.

## RESULTS

**1. Sociodemographic characteristics and place of delivery**

Out of 1.175 women who participated in the study, only 43.9% reported benefiting from an assisted delivery. The proportion of adolescent girls and young women is estimated at 38%, the median age was 26. Likewise, multiparous were the most numerous (51.7%); the median parity was 2. Almost all participants (93.3%) lived as a couple (married or free union). Most had a primary education level (57.4%) (Table 1).

**Table 1. Sociodemographic characteristics and place of last delivery of the study (N=1,175)**

| Variables | Category | Frequency (n) | Percentage (%) |
|---|---|---|---|
| **Age** | Less than 25 years | 447 | 38.0 |
| | 25 years and more | 728 | 62.0 |
| **Parity** | Primiparous | 228 | 19.4 |
| | Multiparous | 947 | 80.6 |
| **Number of living children** | from 0 to 3 living children | 632 | 53.8 |
| | 4 and more living children | 543 | 46.2 |
| **Marital status** | Lives alone | 79 | 6.7 |
| | Live as a couple | 1,096 | 93.3 |
| **Level of education** | No formal level of education | 319 | 27.1 |
| | Primary | 674 | 57.4 |
| | Secondary and more | 182 | 15.5 |
| **Religion** | Catholic | 335 | 28.5 |
| | Presbyterian | 412 | 35.1 |
| | Muslim | 283 | 24.1 |
| | Others | 145 | 12.3 |
| **Place of the last delivery birth** | Home | 659 | 56.1 |
| | Hospital | 516 | 43.9 |

**2. Sociocultural Elements Determining Hospital Deliveries**

Independent of age, educational level, and parity, the availability of a motorcycle taxi driver in the community, whose role is to accompany women in labor to hospitals, was positively and significantly related to AD (OR=1.70; 95% CI =1.33 to 2.19; p<0.001). On the other hand, the non-involvement of community leaders reduces the probability of motivating women to seek AD by 55% (OR=0.45; 95% CI = 0.31 to 0.67; p<0.001).

However, the negative influence of the midwife on women's search for AD (OR=0.74; 95% CI=0.58 to 0.94; p=0.015) and sensitization through municipal agents have always been confirmed (OR=0.28; 95% CI =0.09 to 0.84; p=0.02) (Table 2).

**Table 2. Association between sociocultural factors and assisted delivery**

| Variables | Frequency (n) | Percentage (%) | B(SE) | OR | 95% CI | | p |
|---|---|---|---|---|---|---|---|
| | | | | | Lower Limit | Upper Limit | |
| **Implication of community leaders** | | | | | | | |
| Yes | 77 | 14.9 | 1 | 0.45 | 0.31 | 0.67 | <0.001 |
| No | 439 | 85.1 | -0.75*(0.19) | | | | |
| **Traditional midwife** | | | | | | | |
| No | 267 | 47.3 | 1 | | | | |
| Yes | 220 | 39.7 | -0.30*(0.12) | 0.74 | 0.58 | 0.94 | 0.015 |
| **Motorcycle Driver** | | | | | | | |
| No | 288 | 39 | 1 | | | | |
| Yes | 199 | 52.2 | 0.53*(0.13) | 1.70 | 1.31 | 2.19 | <0.001 |
| **Sensitization through municipal agents** | | | | | | | |
| No | 483 | 44 | 1 | | | | |
| Yes | 4 | 17.3 | -1.27(0.56) | 0.28 | 0.09 | 0.84 | 0.02 |

### 3. Financial Protection Elements Determining Hospital Deliveries

After adjustment for age, educational attainment and parity, the establishment of a mutual fund to cover childbirth expenditures (OR=0.57; 95% CI=0.37 to 0.87; p=0.01), telephone to alert hospital services when a woman is in labor (OR=0.45; 95% CI= 0.28 to 0.73; p<0.001), and the creation of a community field whose financial resources from the sale of products will feed into a community solidarity fund (OR=0.57; 95% CI=0.37 to 0.89; p=0.013) are negatively and significantly associated with the search for assisted delivery. However, the subsidizing of delivery fees increases the probability of seeking assisted delivery by 2.5 times, (OR=2.50; 95% CI= 1.95 to 3.40; p<0.001) (Table 3).

**Table 3. Association between financial protection elements and assisted delivery**

| Variables | Frequency (n) | Percentage (%) | B(SE) | OR | 95% CI | | p |
|---|---|---|---|---|---|---|---|
| | | | | | Lower Limit | Upper Limit | |
| **Childbirth expenses subsidy** | | | | | | | |
| No | 98 | 18.9 | 1 | | | | |
| Yes | 418 | 81.1 | 0.94(0.14) | 2.5 | 1.95 | 3.34 | <0.001 |
| **Setting up a mutual fund** | | | | | | | |
| No | 54 | 56.3 | 1 | | | | |
| Yes | 462 | 42.8 | -0.58(0.21) | 0.57 | 0.37 | 0.87 | 0.01 |
| **Creation of a community field** | | | | | | | |
| No | 71 | 59.7 | 1 | | | | |
| Yes | 445 | 42.1 | -0.73(0.20) | 0.47 | 0.32 | 0.71 | <0.001 |

### 4. Elements Related to the Functioning of the Health System Determining Hospital Deliveries

Sensitization through community agents and the construction of a health facility located more than 5 km away from the villages hinder the search for assisted childbirth by women. Indeed, women living more than 5 km from a hospital have a 65% reduced chance of seeking assisted child-

birth (OR=0.35; 95% CI =0.19 to 0.64, p<0.001). Similarly, those who have been sensitized by community agents have a 41% reduced chance of seeking assisted childbirth (Table 4).

**Table 4. Association between elements of health system functioning and assisted delivery**

| Variables | Frequency (n) | Percentage (%) | B(SE) | OR | 95% CI | | p |
|---|---|---|---|---|---|---|---|
| | | | | | Lower Limit | Upper Limit | |
| **Sensitization through community health workers** | | | | | | | |
| No | 82 | 57.3 | 1 | | | | |
| Yes | 434 | 42.1 | -0.56(0.18) | 0.51 | 0.35 | 0.74 | <0.001 |
| **Building of hospitals less than 5 km from remote areas** | | | | | | | |
| No | 41 | 69.5 | 1 | | | | |
| Yes | 475 | 42.6 | -1.11(0.29) | 0.32 | 0.18 | 0.58 | <0.001 |
| **Setting up of a fleet telephone** | | | | | | | |
| No | 45 | 57.7 | 1 | | | | |
| Yes | 471 | 42.9 | -0.78(0.24) | 0.45 | 0.28 | 0.73 | <0.001 |

## DISCUSSION

### 1. Place of childbirth

The proportion of assisted childbirths in this study was estimated at 43.9%, lower than the 6% reported in the 2022 annual report for the district. The observed differences could be explained by the chosen method for data collection in this study, which differs from that used for compiling the district's annual report. However, this result reveals a 4% improvement compared to the 2018 Demographic and Health Survey conducted in the Northern regions of Cameroon. Furthermore, these numbers are significantly lower than the 90% expected by 2030 as set by the World Health Organization.

### 2. Key sociocultural actors promoting assisted childbirth

#### a. Involvement of community leaders

The lack of community leaders' involvement reduces the risk of pregnant women not resorting to assisted childbirth by 55% (OR=0.45; 95%CI= 0.31 to 0.67). This result is in agreement with that of Datiko et al. (2019) and Lebongo et al. (2021), who suggested that, the involvement of community leaders in the process of raising awareness and mobilizing pregnant women through village chiefs, religious authorities, and community relays to generate concerted and organized synergistic actions to motivate women to seek quality maternal care. Our results can be explained by the fact that in the Northern Cameroon region, the population still adheres to rules and customs issued by the chief of tribe. Transcending their recommendations means going against God or causing several consequences.

#### b. Traditional birth attendant

The presence of traditional birth attendants in maternity services reduces the chance of encouraging women to search for assisted childbirth by 26% (OR=0.74; 95% CI =0.58 to 0.94;). This finding is different from that by Sanogo and Giani (2009) who in their experimental study found that the involvement of traditional birth attendants in maternity services improved the rate of assisted childbirth from 40% to 55%, as well as the rate of referred and evacuated cases from 65% to 110%. This difference could be explained by the design of their study which was experimental and hypothesis testing oriented.

#### c. Motorcycle driver

The availability of motorcycle drivers in the community, whose role is to carry women in labor to hospitals is positively related to

childbirth in health facilities (OR=1.70; 95% CI= 1.33 to 2.19;). This finding is in agreement with the study carried out in Malawi by Hofman et al. (2008), indicating that the implementation of the alternative ambulance in rural areas made it possible to refer 35% of obstetric emergencies to the district hospital and to reduce the travel time by 2.5 hours.

**d. Municipal agents**

Awareness through municipal agents reduces the chance of looking for assisted childbirth by 72% (OR=0.28; 95% CI =0.04 to 0.84). This result is different from that by Beaujoin et al. in 2021 in their ecological study who found that the sensitization through community health workers allowed couples to discuss the benefits of assisted childbirth. This result could be explained by the unilateral choice of community sensitization agents, by community leaders, targeting more political than community interests. In addition, these municipal agents may not be supported or trained by health professionals. For this reason, the implementation of community interventions is the responsibility of dialogue structures subject to skills transfer from health personnel.

**3. Financial protection elements determining childbirth in hospitals**

**a. Subsidy of childbirth costs**

Women who benefit from maternity fee subsidized are 2.5 times more likely to give birth in the nearest health center (OR=2.5; 95% CI =1.95 to 3.40). this result is contradictory to that of Edu et al. (2017) and Gitobu et al. (2018), who found that the expected positive effect of the free childbirth program implementation has not been demonstrated nationally. This situation could be explained by the imprecision of the medical acts to be paid by the husband or family during childbirth or postpartum and the negative behavior towards beneficiaries by care providers.

**b. Community fields**

The creation of a community field, which generated revenue is allocated to the care of pregnant women, would reduce the tendency of seeking assisted childbirth by 53% (OR=0.47; 95% CI =0.32 to 0.71). However, according to Beaujoin et al. (2021), this approach is seen as an added value because women no longer worry about money issues to get to a health facility. This discrepancy could be explained either by the non-productivity of the field, so the proceeds from the sale will be insufficient to take care of pregnant women in the village. It could also be explained by the fact that the number of births may exceed the available means despite the good annual production.

**c. Health insurance scheme**

The establishment of a health mutual fund in our study population is set to reduce the likelihood of seeking assisted childbirth by 43% (OR=0.57; 95% CI = 0.37 to 0.88). This result contradicts the current policy of the Minister of Public Health of Cameroon for whom, the establishment of universal health insurance including health checks would lead women to give birth in health facilities. This inconsistency could be justified by Bita's et al. (2023) insight into data evaluation of the "health check" project in 2023 in North Cameroon, indicating that despite a marked increase in AD, administrative delays in reimbursing fees to healthcare facilities and stock shortages of essential materials for patient care were observed. This administrative delay negatively affected the quality of care for women having the vouchers. Consequently, some women pay for the vouchers but prefer to give birth in the hands of traditional birth attendants.

**4. Related elements to the functioning of the health system determining childbirth in hospitals**

**a. Construction of hospitals close to urban areas**

The construction of a hospital far off 5 km from urban areas opposes the search for assisted childbirth by women. Indeed, women who live far from hospitals have a 68% reduced chance of seeking assisted childbirth (OR=0.32; 95% CI =0.18 to 0.59). This finding contradicted the results of a small study (n=23) by Ouattara (2019) in the Namassi village who found out that women continue to give birth in their homes despite the proximity of modern maternity. The fear of recourse to cesarean section, the weight of tradition, and the household economic instability could explain this discrepancy.

**b. Mobile phone fleet**

The use of the mobile phone fleet can reduce the chance of benefiting from assisted childbirth by 55% (OR=0.45; 95% CI =0.28 to 0.74). Our finding is in disagreement with the result of a qualitative study carried out by Ag Ahmed et al., (2018) with 26 nomads from Gossi county who found out that a better use of mobile phones could help facilitate the decision-making process and enable rapid recourse to assisted delivery.

This study aimed to identify the determinants promoting AD in the Lagdo Health District. Our findings showed that the involvement of community leaders and the designation of motorcycle taxis in their role to accompany women having labor in healthcare facilities could help them adopt AD. As well, funding delivery fees, reducing the distance to health centers in urban areas, and establishing a mobile phone fleet, may increase the likelihood of searching for AD. Taking into consideration these specific determinants could help promote AD among North Cameroonian women. More research with extensive date is warranted to confirm these relationships.

## AUTHOR CONTRIBUTION

Kami planned and designed the study, helped with data entry, analyzed the data, and wrote the manuscript. Nkondjock helped with the study design, analyzed the data, interpreted the analyses, and edited the manuscript. Socpa helped with the study design and helped edit the manuscript. All the authors approved the final version of the manuscript.

## ACKNOWLEDGMENT

The research team thanks the participants for their collaboration in conducting this study.

## FUNDING AND SPONSORSHIP

This research was funded in part by the Ministry of Defense of Cameroon

## CONFLICT OF INTEREST

None of the authors had any personal or financial conflicts of interest.

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