

Medical demography and access to prenatal care in the Foumbot agricultural production basin (West Cameroon)

Abstract

This article analyzes the dynamics of medical demography and access to prenatal care in the agricultural production basin of Foumbot, located in western Cameroon. This region, characterized by strong agricultural activity, presents particular challenges in terms of maternal and child health. Lack of adequate access to prenatal care is a major concern that can influence maternal and neonatal health indicators. In our work, we conducted a six-month study in the commune of Foumbot. We used a research methodology that included multidimensional analysis, drawing on data from field surveys of 140 randomly selected women in the villages of Baigom, Fosset, Foubot 1, 2, 3, 4, 5, Maka, Momo and Njone. These data were analyzed using descriptive statistical techniques. This enabled us to highlight the variation in quality of prenatal care according to environment and type of health facility. The results show a significant disparity in access to prenatal care according to different socio-economic and geographical factors. Only 70% of pregnant women made the minimum four visits required, 22% did not use prenatal care, while 8% had fewer than four visits. The study also reveals that the main obstacles are the remoteness of health centers, the costs associated with care and cultural practices that can limit the use of available services. The impact of agricultural activity, which is often the main source of income and subsistence for local populations, exacerbates these challenges by reducing the time available for medical care and increasing economic constraints. In rural areas, the use of medicinal plants also predominates, at 30%. The maternal mortality rate rose from 20 to 25 deaths per 100,000 live births between 2020 and 2023. Life expectancy at birth is 56 years; the infant mortality rate is 54%, and the adult literacy rate is 63%. This research sheds light on the challenges faced by rural populations in terms of prenatal care, and proposes concrete avenues for strengthening the healthcare system in similar contexts. The results of this study could also serve as a reference for public health policies aimed at improving access to care in other rural areas of Africa.

Key words: Medical demography, Foubot, Medial infrastructure, Prenatal care.

Introduction

Maternal and child health is an important issue for community development, particularly in rural and developing regions. In Cameroon, as in many other sub-Saharan African countries, maternal health is a major concern due to high maternal and infant mortality rates, as well as persistent difficulties in accessing care (Ridde, 2012). In this context, analysis of medical demographics and access to prenatal care is of particular importance in identifying gaps and proposing solutions tailored to the specific needs of local populations.

Foumbot, a commune located in the agricultural production basin of western Cameroon, is representative of the challenges facing the country's rural areas. This region, characterized by a large, young population, high fertility and economic development based mainly on agriculture, presents unique challenges in terms of access to prenatal care. Although the population of Foumbot benefits from certain health services, significant disparities persist, both in terms of the availability of health professionals and the accessibility of infrastructures.

Cameroon faces medical constraints in terms of access to prenatal care (Meva'aAbomo, 2017; Tankam, 2014). Thus, in the agricultural production basin of Foumbot (West Cameroon), as elsewhere, prenatal care is an investment in human capital and part of national development policy (Fall, 2017; KouokamMagne, E., 2012). However, women regularly encounter serious health problems during pregnancy, either for themselves or for their child. While the maternal health situation has improved slightly in urban areas, recourse to traditional methods remains predominant in rural areas. Routine prenatal care includes medical consultations and systematic examinations (WHO, 2022; Tourneux, H., 2007). The doctor checks that the pregnant woman and child are in good health (Prual, A., 2020; Lawn, 2016; Ridde, V., 2012).

In Foumbot, our study area, which is a major agricultural production basin with a population of 76,486 and a population density of 7,412 / km² according to the 3rd RGPH 2005 (of which 50,350 in Foumbot Ville and 26,136 in rural areas), access to modern health services remains difficult. Medical staffing levels are low in both rural and urban areas, due to a variety of political, economic, social and cultural factors. It is essential to highlight these factors in order to better target investment in healthcare infrastructure, which remains underdeveloped in relation to demand.

According to data from the latest population census carried out in Cameroon, only 60% of pregnant women had the minimum four prenatal visits required nationwide (INS, 2018). In contrast, 14% did not use antenatal care at all and 26% had fewer than four visits. The overall objective of our study, entitled "Medical demography and access to prenatal care in the Foumbot agricultural production basin", is to analyze the determinants of prenatal care use in this commune. We also analyzed the technical facilities and administrative services, according to specialties such as gynecology, general medicine, radiology, surgery, pneumology, cardiology, and odontology and so on.

We examined how economic factors also influence the choice of health professionals and limit the total number of antenatal visits below the eight recommendations. We also analyzed the determinants of access to antenatal care and medical demography in the Foubot region. More specifically, the study aimed to estimate the demand for antenatal care addressed to different health practitioners and to identify the variables influencing the use of their services. In our Hypothesis 1, we verified the unequal distribution of health professionals influencing access to antenatal care. Then, in Hypothesis 2: economic and socio-cultural factors limit the use of antenatal care in rural areas. To this end, we used several data sources and conducted field surveys.

methodology

Our research methodology for this study on "Medical demographics and access to prenatal care in the Foubot agricultural production basin" was designed to provide an in-depth understanding of the factors influencing access to prenatal care and the effectiveness of health infrastructures in the region. The methodology used a mixed-methods approach, combining quantitative and qualitative methods to gather, analyze and interpret data collected in the

agricultural production basin. We conducted direct surveys among pregnant women and health professionals.

We also used secondary data from local health statistics, health center reports and census data. We selected a random sample of 140 pregnant women from the villages of Baigom, Fosset, Foubot 1, 2, 3, 4, 5, Maka, Momo and Njone. The villages were chosen to represent the socio-economic and geographical diversity of the commune. Structured questionnaires were administered to collect data on antenatal visits, health practices, barriers to accessing care and socio-economic characteristics. We also conducted semi-structured interviews with 20 health professionals to obtain detailed information about difficulties in providing care and barriers to accessing services. We held focus group discussions with pregnant women and local community members to explore perceptions and attitudes towards antenatal care and traditional practices. Finally, we conducted in-depth interviews with community leaders and health center representatives to understand local dynamics and the strategies in place to improve access to care.

We used descriptive statistics to present the characteristics of pregnant women, the distribution of healthcare professionals and the frequencies of prenatal consultations (Table 1). We also performed Chi-square tests for comparisons of proportions and non-parametric median tests for quantitative variables. Analyses were performed using Stata 13.1 software.

Table 1: Distribution of women of childbearing age in the villages studied (15-49 years)

Municipality	Village	Effectifs (15-49 years)	%
	Baigom 1	2 129	7
	Baigom 2	1 163	4
	Fosset	6 269	19

	Foumbot 1	5 557	17
	Foumbot 2	3 320	10
Foumbot	Foumbot 3	3 751	12
	Foumbot 4	4 296	13
	Foumbot 5	2 967	9
	Maka 2	1 955	6
	Momo	658	2
	Njone	250	1
	Total	32 315	100

Source: field survey, 2024

Results and discussion

The population of western Cameroon is also very young (40% under 15), with high fertility (4.6 children per woman on average) and high mortality (life expectancy at birth 54

years). Some 1,250 medical specialists work in this part of the country. With a population of 2.77 million in 2019, the region's health centers offer comprehensive care to the population.

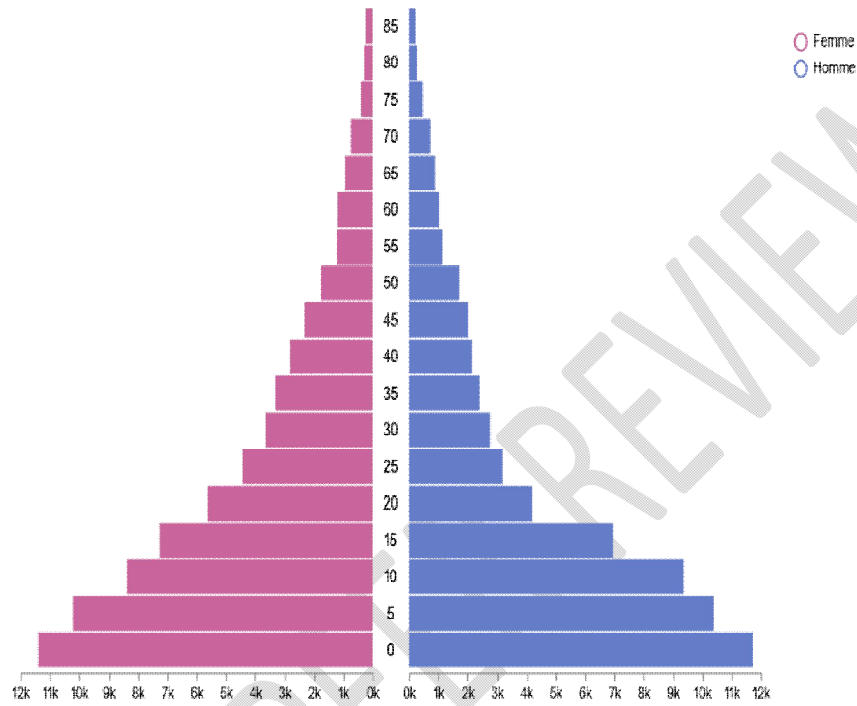
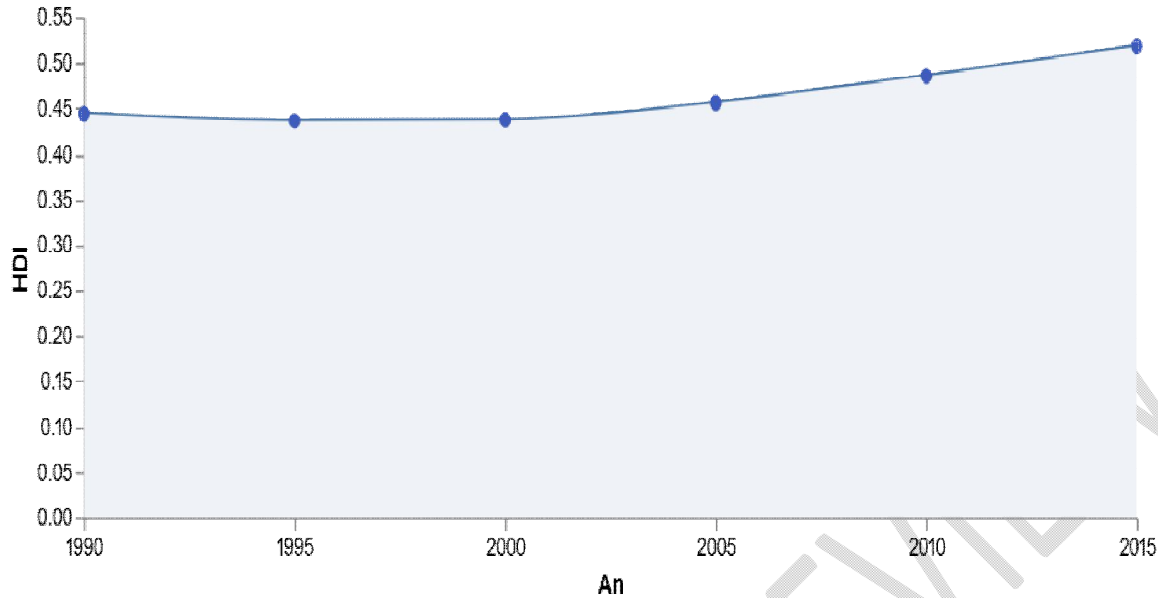


Figure 1: Demographic tree of the population of Foubot-West, Cameroon



Sources: Kummu, M., Taka, M. & Guillaume, J. Global gridded datasets for Gross Domestic Product and Human Development Index from 1990 to 2015. *Sci Data* 5, 180004 (2018) doi:10.1038/sdata.2018.4

Figure 2: The Human Development Index (HDI)

For Cameroon as a whole, the HDI (Human Development Index) value for 2019 is 0.563, placing the country in the "average human development" category and 153rd out of 189 countries and territories. The population of Foubot (see figures 1 and 2) is also still living in poverty, although agriculture plays an important socio-economic role.

1. Fertility rate of study population

The age-specific fertility rate is derived. We calculated it by dividing the number of births during the reference period to women of a given age at the time of delivery by the number of women of the same age during the same period in our study area.

For all women, the average number of children increases from 0.2 at 15-19, to 6.7 at 20-24, reaching 12 at 45-49, at the end of their fertile life. Our results are consistent with those of Mboua et al, 2021, and Prual, 2020, on the health of pregnant women. Table 1 shows that the Fosset health zone leads the way, with 19% of women of childbearing age living in peri-urban areas. Our results concur with those of Meka et al, 2020, and Kaam, 2021, on the health of pregnant women. It is followed by Foubot 1 with 17%, and in third place we have Foubot 4 with 13%, both located mainly in urban areas.

These health zones include both private and public health services (WHO, 2022). Two chi-square tests were used to check whether the frequencies observed in one or more categories corresponded to the expected frequencies. In the most remote areas, many health centers have difficulty maintaining medical staff and supplies. These health centers, sometimes without accommodation, regularly provide primary health care and, where necessary, secondary care, and combine preventive, diagnostic and curative activities, sometimes in patients' homes. 15% were registered during our study.

2. Medical infrastructure in the commune of Foubot

In the West Cameroon region, there are 20 health districts, divided into 220 health zones. There are 854 health establishments, 425 public and 429 private. There are 2 referral hospitals, 10 district hospitals, 34 District Medical Centers (CMA) and 359 Integrated Health Centers (CSI) (MINSANTE 2023). The maternal mortality rate in this region is 469 maternal deaths per 100,000 live births. Among women who gave birth in the five years prior to the 2018 survey, 87% received antenatal care for their last delivery from a qualified provider. Around 65% of these women had at least four antenatal visits, and 41% started their visits during the first trimester of pregnancy. 71% of recent births received protection against neonatal tetanus.

However, these figures show that the issue of prenatal care remains problematic for certain populations in this region. This is particularly true of certain localities in the Foubot district. The public health sector in Foubot is struggling to serve the population. The following table shows the structures of the integrated health centers (CSI).

Table 2: Public healthfacilities

Health area	Health training	Category	Distribution
Baigom 1	CSI BaigomKwen	CSI	Rural
Foumbot 1	Foumbot Hospital	HD	Urban
Foumbot 3	CSI Nkoundoumbain	CSI	Urban
Foumbot 4	CSI Mbantou	CSI	Urban
Foumbot 5	CSI Mbamjou-Kounoure	CSI	Rural
Maka 2	CSI MAKA II	CSI	Rural
	CSI Pont	CSI	Rural

Source: field survey, 2024

As for the public sector in our study area, we have a district hospital in Foumbot 1, located in the town center (table 2). Then there are 6 integrated health centers, of which Maka 2 holds the record with 2 centers.

There is a statistically significant association between income level and access to prenatal care in the Foumbot agricultural production basin. This indicates that income level is related to the probability of access to prenatal care in this region.

3. Privatehealthfacilities

The private sector includes 3 not-for-profit health establishments: 1 CMA de l'ECC in Baigom, and 1 Centre Médicoprivé, namely the Centre médico-sanitaire Notre-Dame de l'Espérance located in the Foumbot 3 health zone. We also have 3 CSPs (Protestant health centers), namely CSP LA REFERENCE, CSP ALDINE and CSP MARATHANA. In addition, we have 1 CSC (Catholic health center), the CS Catholique Jeanne Mance. These non-profit centers are complemented by the NGO HEALTH HOPE GIVER.

In addition, there are non-profit health structures such as 2 CM (cabinetsmédicalisés): CM la Grâce and CM Al Nourr, located in Foumbot 1 and 4 respectively. In addition, there are 14 CS (healthcenters), including CS Sosahedu, CS Ste Dorothée, CS LA MODESTIE, CS le Bon Samaritain, CS la Miséricorde, CS Bon Secours, CS Patience, CS Souvenir, CS Ad-Lucem, CS EL "SHADAI" Kounoure, CS la Clémence, CS St Blaise, CS la Paix, and Clinique Fondation

Nfiya Madeleine. There are a total of 22 training centers. The private sector's contribution to healthcare provision is therefore far greater than that of the public sector.

4. Technical facilities in the commune of Foubot

The technical platform covers all the facilities, equipment and medical devices used for the diagnosis and treatment of patients registered in our study area. We have medical analysis laboratories, medical imaging equipment, operating theatres and so on. These facilities are often grouped together in the same area. Mothers-to-be give birth in the maternity hospital of their choice, in a natural room, accompanied by their midwife or a doctor who has signed an agreement with the maternity hospital to attend the birth of their patients.

The Foubot integrated health centers are designed in an H-shape, with an office for the center manager, a reception area, a pharmacy, a meeting room and a vaccination room. There are also staff toilets, a store, a labor room and a maternity room. Equipment represents 25% of the neonatology medical technical platform, infrastructure 40%. Human resources account for 35%. The level of maintenance skills among users is very low (10%). Heavy equipment is responsible for 30% of the most frequent breakdowns.

The Foubot hospital stands out with 72 beds, followed by the Baigom CMA with 40 beds, and the Koundoumbain, Kounoure, Matam, Mbantou and Maka 2 CSIs with 15, 11 and 10 beds respectively. The information and communication technologies used to operate these facilities are virtually unknown.

5. Prenatal consultation services in the commune of Foubot

Pregnancy, childbirth and postpartum follow-up services offer proven techniques and specific guidelines for each level of the study area. These services vary according to the period: during pregnancy, labor and delivery, and post-partum. Prenatal consultations regularly emphasize quality of care from the very beginning of pregnancy. Whatever the usual risk factors, every woman benefits from appropriate medical follow-up. These consultations are conducted by qualified staff to detect medical problems at an early stage, prevent complications such as miscarriage and premature delivery, and prepare expectant mothers for childbirth by ensuring that the necessary equipment is available. In the event of complications, the consultations provide for a transition to a safe hospital birth. This comprehensive approach to prenatal care

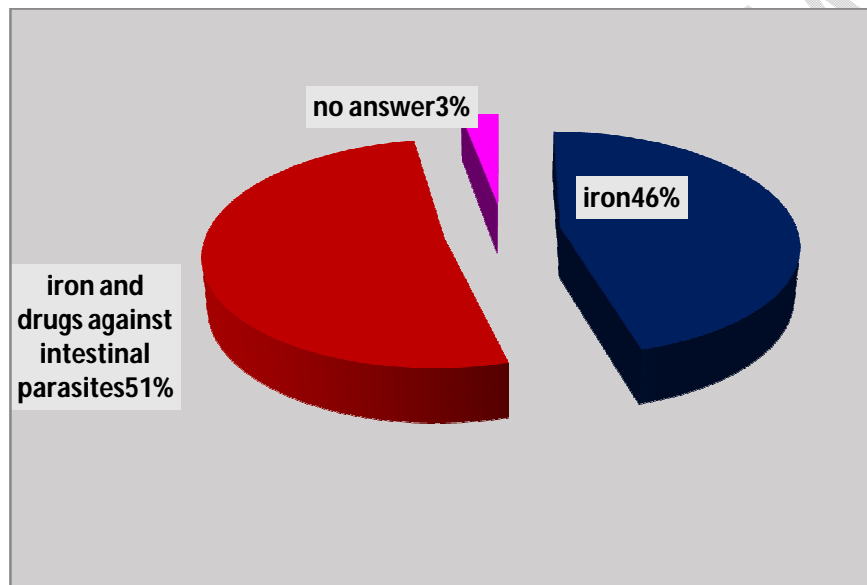
actively addresses maternal health needs, supported by a socio-political environment conducive to improving health outcomes for mothers and their babies. However, only 70% of pregnant women received the minimum of four visits, 22% received no prenatal care at all, while 8% received fewer than four visits. Pregnant women are increasingly visiting healthcare facilities. This result is confirmed by the work of Meva'aAbomo, 2017, and Tankam, 2014.

6. Risks and care related to complications among women surveyed

The risk of complications during pregnancy and/or childbirth is around 5% in the villages studied, particularly in the presence of certain pathologies or a history of at least seven medical consultations (gynecologist, anesthetist, midwife or general practitioner). The results show that 60% of the interviews are individual and 40% are conducted as a couple during the 1st trimester of pregnancy in the study area. These pregnant women benefit from medical follow-up at 80% (at the basic rate) of all medical costs borne by the patient. Compulsory biological tests are paid for at 100% by the pregnant woman, as are ultrasounds (at 20 weeks), prevention of mother-to-child transmission of HIV (screening, ART for the mother, psychological support), intermittent preventive treatment against malaria, STI screening and syphilis screening.

7. Medication use among the survey population

Results show that 70% of these women take their medication as prescribed during pregnancy, but 30% use herbal remedies. Folic acid (vitamin B9) is frequently prescribed, usually during the first two or three months of pregnancy. Over-the-counter medications that the patient usually buys are also taken into account. Iron can be used occasionally during the first five months of pregnancy (24 weeks).



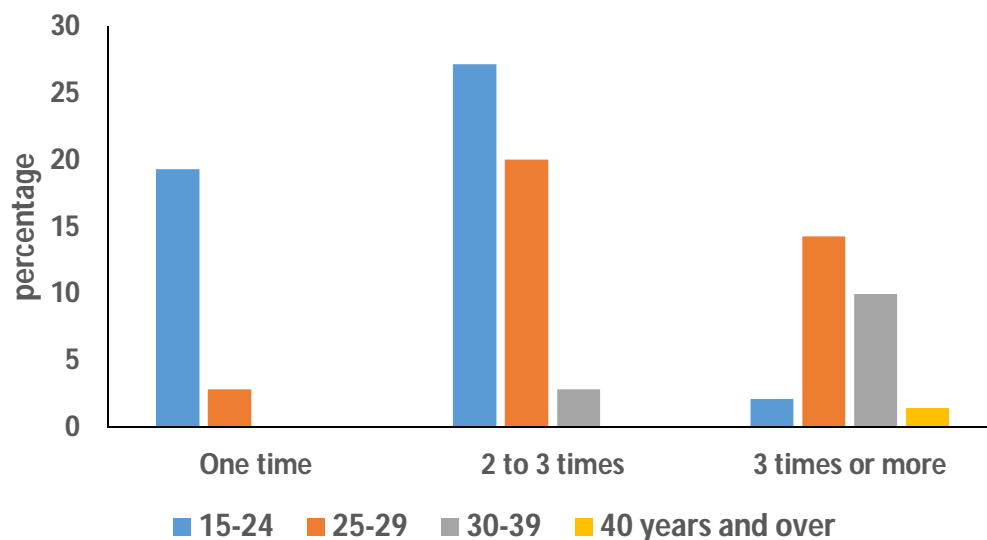
Source: field survey, 2024

Figure 3: Medications taken by pregnant women

The results presented in the figure show that around 46% of women who gave birth in the years preceding our survey took iron tablets or syrups during their last pregnancy (Figure 3). The use of medication against intestinal parasites is less widespread. A significant proportion of women used both types of medication, i.e. 51% of those surveyed. The proportion of women who took iron during pregnancy increased with the level of education, rising from 7.14% among women with no education to 38.6% among those with at least primary education, as far as taking iron alone was concerned. On the other hand, the combined use of iron and medication against intestinal parasites is more widespread. This proportion varies from 9.3% among women with no education to 22.9% among women with secondary education, and 19.3% among those with primary education.

8. Number of births per year in Foubot

The birth rate is the ratio between the number of live births in a given year and the total population of that year. The number of births corresponds to the number of live births observed and recorded in the various health facilities in Foubot, as shown in the figure.



Source: field survey, 2024

Figure 4: Number of deliveries per household

The graph shows that 50% of women had to go to the maternity hospital 2 to 3 times. 27.9% gave birth more than 3 times, and 22.1% were primiparous (figure 4). Live births recorded in the various health services of the Foubot commune health zones (Baigom, Foubot 1, 2, 3 and 4; Foussan; Maka; Momo) have changed over the years. The number of births has risen from 2,859 in 2018 to 3,616 in 2023, after passing through 2,896 and 3,538 live births in 2020 and 2022 respectively. These birth figures justify the high fertility of women and the predominantly young local population.

9. Women's recurring illnesses

Foumbot is making efforts to improve its hygienic environment. However, some people continue to neglect the rules of hygiene and environmental health, notably by throwing plastic bags, bottles and household waste into nature. This poor waste management encourages the spread of mosquitoes and the proliferation of diseases such as malaria and water-borne diseases. These conditions contribute to recurrent illnesses among pregnant women.

Table 3: Recurrent illnesses among women surveyed

Disease	numbers	Percentage%
Malaria	85	60,7
Typhoid	17	12,1
Anemia	16	11,4
malaria and anemia	6	4,3
typhoid and anemia	2	1,4
no response	14	10

Source: field survey, 2024

According to this table, 61% of women responding to the survey frequently suffer from malaria during pregnancy. This is followed by typhoid fever (12%) and anaemia (11%). 4% indicated that they frequently observed both malaria and anaemia during pregnancy. 1.4% suffered from typhoid fever combined with anemia. The high rate of malaria justifies the fact that women do not take the trouble to sleep under a mosquito net and maintain a healthy environment. The 12% rate of typhoid fever shows that pregnant women do not have access to sources of drinking water that are safe for their health (Baigom, Foumbot 1, 2, 3 and 4; Foussan; Maka; Momo). The maternal health situation has improved in the urban areas of Foumbot, but in rural areas, recourse to traditional practitioners predominates at 30% (table 3).

Table 4: Other pathologies recorded during pregnancy

Illness during pregnancy in Foubot	%
Hypertension or pre-eclampsia	20
Gestationaldiabetes	15
Threat of prematuredelivery	35
Intrauterinegrowth retardation	30

Source: fieldsurvey, 2024

Bleeding and pain are more frequent in the first trimester. Some normally progressive pregnancies are accompanied by abdominal or pelvic pain, generally of moderate intensity. Fever and vomiting are also observed. We recorded 35% of threatened premature deliveries and 15% of gestational diabetes, attributed to poor diet on the part of the pregnant woman (Table 4). For gestational diabetes, we recommend citrus fruits: mandarins, grapefruits, oranges, as well as vegetables and green leafy vegetables, different types of lettuce, carrots and wholegrain cereals: brown rice, oat flakes, wholewheat pasta, etc.

10. Traditionalmedicine

Traditional medicine, particularly the use of medicinal plants, is well established in Cameroon. Long marginalized, this medicine is increasingly recognized and integrated into the healthcare system. The country benefits from a rich heritage of medicinal plants, thanks to the diversity of its climate and the abundant variety of plants available, widely exploited by traditional practitioners. They use the plants in raw or processed form. However, this heritage has not yet been extensively studied to assess appropriate dosages and safety for large-scale development and integration into modern medicines. Our results show that 90% of the women surveyed also use medicinal plants for their health.

11. Maternal mortality rates in the study area

In our study area, infectious diseases such as pneumonia, diarrhea and malaria, as well as premature births, birth asphyxia, trauma and congenital anomalies remain the main causes of death in children under 5. The recorded maternal mortality rate rose from 20 to 25 deaths per 100,000 live births between 2020 and 2023. Life expectancy at birth is 56 years, the infant mortality rate is 54 ‰ and the adult literacy rate is 63%.

12. Access to healthcare in the study area

Access to healthcare is generally satisfactory, with only 40% of the population surveyed having access to local care in less than thirty minutes. Similarly, most specialist doctors, midwives and standard medical equipment are accessible by road in more than 30 minutes on average, and financial resources are essential. Analyses of hospitalization costs carried out in recent year's show that a day's hospitalization costs an average of 3,500 CFA francs in a public ward, compared with 5,000 CFA francs in a private ward. Consultation fees are around 1,200 CFA francs.

UNDER PEER REVIEW

Conclusion

Free health care does not exist throughout the country. Patients choose their doctor and pay directly for the care they receive. However, these costs are not reimbursed, as there is no health insurance system, with the exception of a few private companies that cover their employees' medical expenses.

Proximity to a health center does not necessarily guarantee accessibility, as other factors, notably economic and social, play a crucial role. Indeed, according to the current definition, "physical accessibility refers to the ability to move between patients' places of residence and points of service delivery. It takes into account both patient mobility and available means of transport, including travel time, distance and cost".

Interviews with healthcare providers highlighted the existence of social measures to help disadvantaged populations gain access to care. This facilitated access results from a context of solidarity, mobilizing the various urban players in the healthcare sector, all committed to reducing inequalities in access to care. The main difficulties associated with pregnancy care are the high cost of services, the reluctance of families, the low number of female gynecologists and the lack of adequate information.

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