Preventing prematurity: The power of determining factors and challenges in a rural district hospital in Benin

SAIZONOU Jacques1*, MONGBO Virginie1, AFFO Alphonse2, MAKOUTODE Patrick1 and HOUSSOU Gad1

1Regional Institute of Public Health Comlan Alfred Quenum, University of Abomey-Calavi, Benin.
2Population Training and Research Center (CEFORP), Research Group in Population, Health and Development, University of Abomey-Calavi, Benin.

Received 17 May, 2021; Accepted 21 June, 2021

Preterm births remain a major public health issue due to its weight in neonatal mortality and the significant socio-economic costs for its care. The aim of the current study was to identify factors associated with preterm births at Allada-Toffo-Zè zone hospital in Benin. This was a case-controlling study, which took place in April 2019. A total of 222 women’s files were examined, including 74 cases and 148 controlling samples. Socio-demographic data, health status during pregnancy, previous state of being and health system were collected. Conditional logistic regression was used to identify explanatory factors for prematurity via Stata 15. The prematurity rate was 9.4%. Self-medication OR = 4.99 with 95% CI = [1.71-14.5], alcohol consumption OR = 19.55 with 95% CI = [5.89-64.90], threat to premature birth OR = 3.88 with 95% CI = [1.04-14.35], the mother’s occupation OR = 13.22 with a 95% CI = [1.65-105.66] were related to prematurity. Prematurity is a problem that requires corrective actions. Promoting empowerment of women which guarantees good health during pregnancy, as well as enhancing health staff skills will significantly reduce preterm births at Allada-TOFFO-ZÈ district hospital.

Key words: Prematurity, factors, determinants, district, Allada-Toffo-Zè, Benin.

INTRODUCTION

Prematurity is defined as a gestational age birth less than 37 Weeks of Amenorrhea (WA) or 259 days. This duration is calculated from the first day of last menstruation (Abu-Saad and Fraser, 2010). According to a systematic review, the World Health Organization (WHO) identified 115.3 million births, including 12.9 9.6% million premature births, giving a global prevalence of for prematurity (Abu-Saad and Fraser, 2010). The majority of these preterm births (10.9 million) were found in Africa and Asia, that is, around 85% (Abu-Saad and Fraser, 2010; Balaka et al., 2002). According to the WHO, nearly 2.6 million newborns die within the first month of life worldwide, among newborns (Abu-Saad and Fraser, 2010; Faye and Paraíso, 2017). Developing countries

*Corresponding author. E-mail: saizonoujacques@yahoo.fr.

Author(s) agree that this article remain permanently open access under the terms of the Creative Commons Attribution License 4.0 International License
have neonatal mortality rate estimates at 27 deaths per 1,000 live births compared to 3 neonatal deaths per 1,000 live births in developed countries. Several factors explain this high neonatal mortality rate, among which prematurity account for an important part (Garces et al., 2017). The consequences of prematurity are widely enhanced and numerous studies have shown a strong link between prematurity, neonatal and perinatal morbidity and mortality (Balaka et al., 2002). Growth disorders and disorders of psychomotor and cognitive development have also been described in premature infants. The causes of prematurity are varied and can be maternal, fetal or health origin. Several factors have been found to explain the occurrence of prematurity. It occurs most often in the context of preeclampsia, pre-partum hemorrhage, intrauterine growth retardation (IUGR), acute fetal distress (Abu-Saad and Fraser, 2010; Torchin and Ancel, 2016). Maternal age over 35 is a risk factor, as it increases maternal hypertensive pathologies as well as eclampsia, which leads to preterm fetal extractions (Abu-Saad and Fraser, 2010; Torchin and Ancel, 2016). Insufficient technical platform and limited resources make it more difficult to be taken care of (Abu-Saad and Fraser, 2010). In Benin, infant mortality rate was estimated at 68% in 2017. Prematurity has a prevalence of 10.3% (Abu-Saad and Fraser, 2010). It is the third cause of death after asphyxiation and infections (Balaka et al., 2002; Faye and Paraïso, 2017). In view of the extent and consequences of prematurity on child future, it is necessary to conduct an inquiry of this health phenomenon to identify the factors that can make it possible to effectively reduce its occurrence, as well as perinatal morbidity and mortality it induces. That is why the purpose of the current study was to identify factors related to prematurity at Allada-Tofo-Zé Zone Hospital (ATZ) (Table 1).

**Methodology**

**Study settings**

The current survey took place at Allada-Tofo-Zé health district hospital. The hospital is located in Atlantic Department and covers an area of 1526 km². The main ethnic groups encountered were: Aizo, Fon, Xwla, Sahoüé, Pédah, Peulh, Yorouba, Adja, Nago, Mina. The main religions practiced are: Animism, Christianity, and Islam (Abu-Saad and Fraser, 2010; Ministry of Public Health of Benin, 2018). The socioeconomic level is low and people live mainly on farming, fishing and hunting (Ministry of Public Health of Benin, 2018).

**Type of study and target population**

This was a case-controlling study that took place in April 2019 in ATZ Zone Hospital. The target population consisted of children born from August 2018 to April 2019 at the ATZ Zone Hospital, the mothers of these children, managers and skilled health personnel from Neonatal and Gynecology Department. The cases were infants born prematurely whose mothers gave birth at ATZ Hospital. The controlling samples were the children born at term in the same period as the cases of babies and whose mothers also gave birth in this hospital. The matching criteria were two: the sex of children and age group of selected mothers. The completeness technique was used for the cases. The controlling sample was selected by a reasoned choice, namely the births registered immediately after the cases; and the controlling samples (not premature) were selected taking into account matching criteria stated above. The match design consisted of a case against two controls. A total of 74 cases were registered during the study period. The controlling samples retained after matching were 148.

**Study variables**

Whereas prematurity was the dependent variable, the independent variables were: factors related to mother (socio-demographic characteristics, type of activity, marital status, level of education, ethnicity, municipality of residence, means of travelling, lifestyle (tobacco, alcohol, traditional medicines, self-medication); obstetrical record (pregnancy, parity, prematurity record, abortion record, maternal pregnancy factors, namely ailments during pregnancy (placental diseases, threats of premature birth, premature rupture of membranes, Antenatal Care (ANC), Sexually Transmitted Infection (STI)/Sexually Transmitted Disease (STD), diabetes, malaria, hypertension, anemia); prevention during pregnancy (Intermittent Preventive Therapy IPT, Long lasting insecticidal nets LLIN); means of delivery (cesarean section or vaginal delivery); factors related to child: gestational age, birth weight, sex, APGAR score, twining and factors linked to the health system: qualification of the staff, technical platform, referral system versus referral.

**Data collection technique and tools**

Documentary analysis was used for the cases and controlling samples by using screening sheet and individual interviews conducted by the staff. The study was based on records of women with limited risk of information bias by triangulation data. Sampling bias was limited because the cases and controlling samples were selected from the same population and under the same working conditions. A pre-test was carried out in the neighboring zone hospital, Ouidah-Kpomassé-Tori Bissolo, to identify and correct deficiencies in the data collection tools. Experienced investigators such as midwives and external nurses were responsible for this collection under the supervision of the authors of this work to have valid data.

**Data analysis**

Daily data checking were carried out to ensure completeness and quality of the data. Data analysis was performed through STATA version 15 software. Distribution of qualitative variables was collected by calculating the proportions with their confidence interval. In terms of quantitative variables, mean and standard deviation were used when the distribution was normal or the median and interquartile range (Q1; Q3) when the distribution was not normal. The bivariate analysis allowed investigating on the link between dependent variable and independent variables using Pearson's Chi-square statistical test. The associations between independent variables and dependent variable were assessed by the odds ratios (OR) of exposure or odds ratio (OR) and their 95% confidence interval. Any variable with a p-value less than 20% was included in the multivariate analysis model. Searching for possible associations between independent variables while identifying
Table 1. Factors associated to prematurity at bivariate level at ATZ Zone Hospital.

| Factor                        | Odds ratio | [95% Conf. Interval] | P>|z|  |
|-------------------------------|------------|----------------------|------|
| **Mother's individual factors** |            |                      |      |
| Socio demographic             |            |                      |      |
| **Marital status**            |            |                      |      |
| Married /consensual union      | 1          |                      |      |
| Single                        | 4.16       | [1.12 – 15.48]       | 0.033*|
| **Mother's occupation**       |            |                      |      |
| Civil servant                 | 1          |                      |      |
| Trader                        | 4.78       | [1.44 – 15.91]       | 0.011*|
| Artisan                       | 4.86       | [1.41 – 16.76]       | 0.012*|
| Farmer                        | 7.58       | [1.61 – 35.61]       | 0.001*|
| Housewife                     | 2.17       | [0.58 – 8.19]        | 0.249 |
| Pupil/student                 | 6.42       | [1.28 – 32.3]        | 0.024*|
| **Residential commune**       |            |                      |      |
| Allada                        | 1          |                      |      |
| Zè                            | 0.96       | [0.42 – 2.21]        | 0.93  |
| Toffo                         | 0.43       | [0.19 – 0.95]        | 0.039*|
| Other                         | 0.64       | [0.22 – 1.84]        | 0.409 |
| **Ethnic group**              |            |                      |      |
| Fon                           | 1.97       | [1.04 – 3.72]        | 0.037*|
| Aïzo                          | 1          |                      |      |
| Mina                          | 2.59       | [0.79 – 8.50]        | 0.117 |
| **Obstetrical record**        |            |                      |      |
| Gesture                       |            |                      |      |
| No                            | 1          |                      |      |
| Yes                           | 1.01       | [0.67 – 1.53]        | 0.136 |
| **Parity**                    |            |                      |      |
| No                            | 1          |                      |      |
| Yes                           | 1.2        | [0.81 – 1.76]        | 0.365 |
| **Stillbirths’ record**       |            |                      |      |
| No                            | 1          |                      |      |
| Yes                           | 0.43       | [0.12 – 1.49]        | 0.18  |
| **Spontaneous abortion**      |            |                      |      |
| No                            | 1          |                      |      |
| Yes                           | 0.52       | [0.52 – 1.44]        | 0.209 |
| **Premature record**          |            |                      |      |
| No                            | 1          |                      |      |
| Yes                           | 3.87       | [0.38 – 39.5]        | 0.25  |
| **Lifestyle**                 |            |                      |      |
| Tobacco                       |            |                      |      |
| No                            | 1          |                      |      |
| Yes                           | 9.12       | [2.10 –39.56]        | 0.053 |
| Alcohol                       |            |                      |      |
| No                            | 1          |                      |      |
| Yes                           | 9.43       | [3.66 – 24.25]       | 0.000*|
| Traditional medicine          |            |                      |      |
| No                            | 1          |                      |      |
| Yes                           | 1.75       | [0.36 – 8.42]        | 0.485 |
| Self-medication               |            |                      |      |
Table 1. Contd.

| Maternal factor of pregnancy | No | Yes | 95% CI         | P-value |
|------------------------------|----|-----|---------------|---------|
| Consultation reason         | 1  | 2.16| 0.99 – 4.71   | 0.003*  |
| Setting date                | 1  | 0.74| [0.39 – 1.41] | 0.366   |
| Ultrasound                   | 1  | 0.74| [1.00 – 4.39] | 0.05*   |
| Delivery threat              | 1  | 0.69| [0.12 – 3.87] | 0.68    |
| Diabetes                     | 1  | 0.67| [0.13 – 3.30] | 0.61    |
| HTA                          | 1  | 1.89| [0.90 – 3.96] | 0.093   |
| Pre-eclampsia                | 1  | 0.87| [0.36 – 2.13] | 0.766   |
| Malaria                      | 1  | 3.48| [1.03 – 11.72]| 0.044*  |
| Anemia                       | 1  | 3.06| [1.27 – 7.35] | 0.013*  |
| Placenta praevia             | 1  | 0.91| [0.33 – 2.54] | 0.860   |
| Hydramnios                   | 1  | 1.69| [0.23 – 12.23]| 0.605   |
| STIs/STDs                    | 1  | 2.64| [0.43 – 16.02]| 0.292   |
| Urinary tract infection      | 1  | 1.59| [0.31 – 8.05] | 0.575   |
| Amniotic liquid              | 1  | 1.06| [0.54 – 2.06] | 0.865   |
| Delivery mode                | 1  | 0.46| [0.22 – 0.92] | 0.02*   |

* Significant at the 0.05 level.
Table 1. Contd.

|                        | Yes | No  | OR (95% CI)   | p-value |
|------------------------|-----|-----|---------------|---------|
| **Milda use**          |     |     |               |         |
| Yes                    | 1   |     |               |         |
| No                     | 1.07| [0.57 – 2.01] | 0.830 |
| **Iron grip**          |     |     |               |         |
| Oui                    | 1   |     |               |         |
| Non                    | 1.01| [0.59 – 1.73] | 0.960 |
| **Prise de TPI**       |     |     |               |         |
| Yes                    | 1   |     |               |         |
| No                     | 1.54| [0.84 – 2.80] | 0.161 |
| **Factors related to the child** |     |     |               |         |
| **Birth weight**       |     |     |               |         |
| Low weight             | 35.22|   | [8.51 – 145.75] | 0.000*  |
| Normal weight          | 1   |     |               |         |
| **Moaning**            |     |     |               |         |
| No                     | 1   |     |               |         |
| Yes                    | 1.87| [0.82 – 4.28] | 0.136 |
| **APGAR score**        |     |     |               |         |
| 3-6                    | 1   |     |               |         |
| 7-10                   | 0.4 | [0.18 – 0.88] | 0.022* |
| **Revived**            |     |     |               |         |
| No                     | 1   |     |               |         |
| Yes                    | 1.37| [0.68 – 2.78] | 0.374 |
| **Health system factors** |     |     |               |         |
| **Qualification of referral staff** |     |     |               |         |
| Gynecologist           | 1   |     |               |         |
| Midwife                | 6.14| [0.72 – 51.92] | 0.096 |
| Nurse                  | 3.67| [0.33 – 41.33] | 0.293 |
| **Admission mode**     |     |     |               |         |
| CPN                    | 1   |     |               |         |
| Referred               | 1.67| [0.66 – 4.18] | 0.275 |
| **Means of transport** |     |     |               |         |
| Taxi                   | 1   |     |               |         |
| Motor                  | 0.305|   | [0.71 – 1.30] | 0.108 |
| **Reference/Versus reference** |     |     |               |         |
| Yes                    | 1   |     |               |         |
| No                     | 0.59| [0.18 – 1.91] | 0.375 |

confounding variables or effect modifiers on each other was carried out. A conditional logistic regression model was used for multivariate analysis. Associations were tested by the odds ratio (OR) and its 95% confidence interval. Then, "step-by-step top-down" modeling followed to eliminate the explanatory variables with a p-value greater than 5% to achieving final model.

**RESULTS**

**Prematurity rate**

The number of living births during the study period was 789 and there were 74 preterm infants. The prematurity rate at ATZ Zone Hospital was then estimated at 94 per 1000 living births (Table 2).

**Sample description**

The average age of the women was 26.42 (Min 13 Max: 42) years. Almost (90.91%) of them live in Allada Municipality. The most represented ethnic groups were the Fon (48.64%), the Aizo (40%). The majority of women surveyed were in a common-law relationship (88.77%). Apart from pupils, the majority of women surveyed were...
Identification of factors significantly related to prematurity in bivariate analysis

After bivariate analysis of 40 independent factors, 14 factors were significantly associated with prematurity, it was about Mother's individual factors: Marital status, mother's profession, town of residence, ethnicity, alcohol consumption and self-medication.

Pregnancy-related factors: Having had at least one ultrasound, undergone preterm delivery threat, age of pregnancy at childbirth, malaria and method of delivery.

Factors related to child: Low birth weight and APGAR score.

Identification of factors significantly related to prematurity in multivariate analysis

After eliminating variables having p-value less than 20%, four (4) variables were retained as factors associated to prematurity in ATZ health zone for final modelling. These were: self-medication, alcohol, mother's occupation, the threat of premature delivery.

By adjusting the factors of premature delivery threat, alcohol consumption and self-medication administration, women who were students or farmers were 13 times more likely to have a premature child than female civil servant. This risk was much higher than that of trader’s women, housewives and artisans.

Parturients who have consumed alcohol during pregnancy are 20 times more likely to have a preterm delivery than those who have not consumed it, adjusted to the parturient occupation, the threat of premature delivery and self-medication.

Self-medication increases the risk of giving birth to a premature child 5 times more, when adjusted to alcohol, threat of premature delivery factors, and the occupation of the parturient.

Women who had undergone a threatened preterm birth were 4 times more likely to have a preterm birth than those who did not. (Appendix 1)

**DISCUSSION**

The purpose of this study was to investigate factors associated with prematurity at ATZ Zonal Hospital. The prematurity rate was 9.4% in the current study. Studies conducted in Lomé (Balaka et al., 2002) reported a similar prematurity rate estimated at 11.1% while in Ghana (Adu-Bonsaffoh et al., 2019), 19% prematurity rate was reported. This difference could be explained by
duration of their study which was one calendar year.

Factors associated with prematurity at ATZ zone hospital

The current survey did not find association between matching criterion. In France, no relationship between the mother’s age and prematurity was found as evidences are inconsistent (Lorthe, 2017). However, in other settings (Tseng et al., 2019), significant and positive relationship was found where mother’s age over 35 years was associated with higher prematurity risk. This difference can be explained by the differences between characteristics of the target populations. Self-medication was strongly associated with prematurity in the current study. Women who took drugs without a referral from trained health workers were 5 times more likely to give birth prematurely to their product of conception. This is explained by the fact that the women admitted to ATZ Zone Hospital come from the villages and have recourse to traditional medicines for socio-cultural considerations, and also prefer not to come to hospital in case of health problems “called minors”, and buy street drugs. With very few studies focusing on self-medication to pregnancy outcome; we have not found any authors finding such link between self-medication and prematurity.

In Paris, significant association between alcohol consumption and onset of prematurity was found (Toutain et al., 2010). The findings of that research are in agreement with this study where alcohol consumption increases the risk of giving birth to premature baby by 20 times. On the other hand, there was no significant relationship between alcohol consumption and the onset of prematurity at Zinguinchor Regional Hospital (Niokhor et al., 2017). This difference could be explained by the fact that alcohol consumption is prohibited to the majority of Muslim communities in Senegal, and therefore difficult to inspect. In this survey, mother occupation influenced the occurrence of prematurity. In Brazil, significant association between mother occupation and occurrence of prematurity was reported (Oliveira et al., 2016). In Madagascar, it was found that the occupation considered hard had significant link with preterm birth (Rakotomalala et al., 2019). This study did not investigate painful side of occupations. Also, another study found significant association between occupation of mother and onset of prematurity (Saurel-Cubizolles et al., 2003). Elsewhere, the mother’s occupation did not influence prematurity (Dumas et al., 2014). The difference from this study would be the type of study and sample size. Preterm delivery was 3 times more common among mothers at risk of preterm delivery (PAD) in this survey while a strong association between PAD and prematurity was found in other settings (Wagura et al., 2018). An experimental study did not find any significant association (Jagusiak, 2016). Being multiparous in this survey did not influence birth of a child prematurely while a significant relationship with multiparity was reported elsewhere (Niokhor et al., 2017). This difference could be explained by births that are spaced, although women are mostly multiparous in Benin. The literature reports that prenatal checkup and antenatal care frequency strongly influenced the outcome of the pregnancy. It was found that having low ANC frequency during pregnancy increases the risk of preterm birth (Balaka et al., 2002; Niokhor et al., 2017). The current study did not find significant association between prematurity and ANC frequency, although it was significant in bivariate analysis (p-value < 20%).

Conclusion

The prematurity rate was 9.4% at ATZ Zone Hospital in 2019. Factors associated to mother such as occupation, alcohol consumption, self-medication and those related to pregnancy such as premature delivery threat could explain this prematurity. Also, many difficulties exist in the health system for parturients adequate caring, such as the referral and counter-referral system, breakdown of blood products, and lack of qualified human resources. It is necessary to raise public awareness about the proper planning and delivery of pregnancy and educational work among the population. Interventions to enhance the capacity of health staff and promoting empowerment of women will help reduce prematurity rate and its severe consequences for child at ATZ Zone Hospital and in Benin.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

REFERENCES

Abu-Saad K, Fraser D (2010). Maternal nutrition and birth outcomes. Epidemiologic Reviews 32(1):5-25.
Adu-Bonsafoh K, Gynamo-Bannerman C, Oppong SA, Seffah JD (2019). Determinants and consequences of preterm births in a tertiary hospital in Ghana. Placenta 79:62-67. pmid:30654915
Balaka B, Baeta S, Agbere AD, Boko K, Kessie K, Assimadi K (2002). Risk factors associated with prematurity at the University Hospital of Lome, Togo. Bulletin de la Societe de Pathologie Exotique (1990) 95(4):280-283.
Faye A, Paraiss I (2017). Tal-Tal A Study of the factors related with the occurrence of ectopic growth retardation in premature newborns in the neonatology department of the Albert Royer children’s hospital in Dakar. Journal of Epidemiology and Public Health 65:77.
Garces AL, McClure EM, Perez W, Hambridge KM, Krebs NF, Figueroa L, Goldenberg RL (2017). The Global Network Neonatal Cause of Death algorithm for low-resource settings. Acta Paediatrica 106(6):904-911.
Torchin H, Ancel PY (2016). Epidemiology and risk factors for
prematurity. Journal of Obstetrics Gynecology and Reproductive Biology 45(10):1213-1230.

Ministry of Public Health of Benin (2018). Benin health statistics yearbook. Benin 143 p.

Lorthe E (2017). Premature rupture of membranes before 33 weeks of amenorrhea: antenatal management and determinants of the prognosis of the child [Internet] [thesis]. Pierre and Marie Curie University - Paris VI; 2017 [cited 19 Feb 2019]. Available on: https://tel.archives-ouvertes.fr/tel-01895129/document

Tseng KT, Peng CC, Chang JH, Hsu CH, Lin CY, Jim WT, Chang HY (2019). The impact of advanced maternal age on the outcomes of very low birth weight preterm infants. Medicine 98(5).

Toutain S, Simmat-Durand L, Crenn-Hébert C, Simonpoli AM, Vellut N, Genest L (2010). Consequences for the unborn child of continuing to drink alcohol during pregnancy. Pediatric Archives 17(9):1273-80.

Niokhor DF, Bintou DF, Lamine T, Yaya K, Demba Bl, Abouba B, Maotar FP, Osmane N, Modou G, Ramatoulaye DN (2017). Evaluation De La Prematurité Superieure Ou Égale À 32 Semaine D’amenorrhée À L’hôpital Regional De Ziguinchor Au Sud Du Sénégal (Afrique De L’ouest). European Scientific Journal 13(36):325. https://doi.org/10.19044/esj.2017.v13n36p325

Oliveira LLD, Gonçalves ADC, Costa JSDD, Bonilha ALDL (2016). Maternal and neonatal factors related to prematurity. Revista da Escola de Enfermagem da USP 50(3):382-389.

Rakotomalala ZN, Rakotozanhary B, Ramarokoto MPM, Randriambola N, Johannes RF, Fenomananana SM (2019). Factors related to premature delivery in maternity hospital Befelatanana Madagascar. Rev Méd Périsan 11(1):48-53.

Saurel-Cubizolles M-J, Blondel B, Kaminski M (2003). Inégalités sociales de morbidité périnatale. Données nationales en France, Social and Economic Patterning of Health among Women / Les facteurs sociaux et économiques de la santé des femmes, Arber S. and Khlat M., (eds.), Paris, CICRED, 2003, pp. 159-173.

Dumas A, Lejeune C, Simmat-Durand L (2014). Tobacco alcohol and cannabis during pregnancy: who are the women at risk? Public Health Flight 26(5):603-612.

Wagura P, Wasunna A, Wamalwa D, Ng’ang’a P (2018). Prevalence and factors associated with preterm birth at kenyatta national hospital. BMC Pregnancy Childbirth 18(1):107.

Jagusiak A (2016). Benefit of cervical elastography in patients at risk of preterm delivery: a prospective study. Gynecology and obstetrics. dumas-01449608
APPENDIX

Factors related to mother

Socio-demographic
- Age
- Parity
- Size
- Types of occupation
- Marital status
- School backgrounds
- Ethnicity

Lifestyle
- Tobacco
- Alcohol
- Traditional medicines
- Self-medication

Obstetrical factors
- Gesture
- Prematurity antecedent
- IVG antecedent
- Residential commune
- Means of transports
- Multiple pregnancies

Factors related to child age
- Gestational age
- Birth weight
- Child sex
- Apgar score
- Moanings

Maternal factors of pregnancy

Pregnancy ailments
- Placental diseases
- Threatened premature birth
- Premature rupture of membranes
- ANC
- Anemia
- Genitourinary infection
- STI / STD
- Malaria
- Diabetes
- HTA

Prevention during pregnancy
- Treatment
- Mosquito net

Mode of delivery

Health system factors:
- Staff qualification (technical skills)
- Technical platform
- System of references against references (Transport / communication)