Study of Relationships of Various Factors Leading to Premature Birth at the University Teaching Hospital of Bogodogo (UTH-B) in Ouagadougou from January to June 2021

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

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ABSTRACT

Objective: To study the risk factors associated with premature birth at the Bogodogo University Teaching Hospital in Ouagadougou.
Materials and Methods: This was a prospective analytical case-control study involving 115 cases of premature delivery and 230 controls, i.e. two controls per case, recruited over a 6-month period

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from January to June 2021. The study was conducted at the maternity ward of the Bogodogo University Teaching Hospital in Ouagadougou. The notion of stillbirth was a criterion for non-inclusion in the group of cases whose inclusion gestational age varied from 28 to 37 weeks of amenorrhea.

Results: During the study period, the preterm birth rate was 6.1%. Univariate analysis identified the following factors associated with preterm birth: maternal age OR=0.4 [0.2-0.8], history of abortion OR=3.3 [1.43-7.6], stress OR=4.03 [2.14-3.39], insufficient Antenatal Care (ANC) OR=4.92 [3.03-8], fever during pregnancy OR=1, 59 [1.01-2.5], rupture of membranes OR=3.72 [1.11-4.34], episode of urinary tract infection OR=2.55 [1.55-4.19] and previous threat of preterm birth OR=3.3 [1.43-7.6].

Conclusion: Premature delivery is very common at the UTH-Bogodogo in Ouagadougou. There are many factors associated with this scourge, including the patient's socio-demographic characteristics and clinical features. The fight against this situation, which is a source of neonatal morbidity, must be reinforced during the refocused antenatal consultation.

1. INTRODUCTION

Prematurity is a public health problem throughout the world, due to its high incidence and the significant neonatal morbidity and mortality associated with it. It is responsible for 80% of perinatal mortality and approximately 75% of morbidity [1-7]. Despite the prevention policies that have been adopted such as avoiding heavy work during pregnancy, and the use of calcium antagonists and corticoids during uterine contractions, it is clear that the scale of the problem remains high in developing countries, which pay a heavy price. In Africa, prematurity rates vary between 11 and 22% depending on the author [8-13]. Moreover, in these regions, the impact of prematurity is compounded by other factors such as poverty. In addition, the high cost of neonatal care makes the treatment of prematurity a "luxury medicine" in our countries [6]. Studies carried out in France have suggested the need for risk factors to be assessed at regular intervals, as the risk factors present do not always correspond to those that are well known [10,14]. In Burkina Faso, few studies have been carried out on this issue of national interest. Through this work, we propose to contribute to the study of risk factors currently associated with prematurity in two centers for the care of premature babies in Ouagadougou.

2. MATERIALS AND METHODS

The maternity wards and neonatology departments of the Centre Hospitalier Universitaire (UTH-B) served as the study setting. This was a prospective analytical case-control study involving 115 cases of premature delivery and 230 controls. Cases and controls were recruited between January and June 2021.

All mother-child pairs whose babies were born between the 28th and 37th week of amenorrhea (WA) and who visited the site during the study period were considered cases in accordance with the definition adopted by the african society of gynecology and obstetrics. The date of last menstrual period (LMP) or an early ultrasound scan were used to define gestational age. Controls were mother-child pairs whose babies were born at term. The "cases", i.e. those who had given birth prematurely and who agreed to take part in the study, were matched with consenting "controls" made up of patients of the same age who had given birth at term on the same day. We selected two controls per case.

Univariate analysis enabled us to calculate odds ratios (OR) with their 95% confidence intervals for each of the different factors studied. The significance level was set at 5%.

In our study, thee evaluation of the stress was done according to the PSS level in three level [A, B]

3 RESULTS

3.1 Frequency of Premature Delivery

During the study period, we recorded 210 cases of premature deliveries, of which only 115 cases met our inclusion criteria. During the same period, we recorded 3468 deliveries in the site. Preterm birth accounted for 6.1% of deliveries.

3.2 Analysis of Socio-Demographic Risk Factors for Preterm Birth

Analysis of the socio-demographic and clinical characteristics associated with preterm birth is presented in Tables 1 and 2.

Table 1. Socio-demographic risk factors for preterm birth

Variable	Case	indicators	RC or OR	p
Maternal age				
• 15- 19 years	26 (22.7%)	57(24.8%)	0.7[0.4-1.2]	≤0.30
• 20-29 years	78(67.8%)	128(55.6%)	1	
• ≥ 30 years	11(9.5%)	45(19.6%)	0.4[0,2-0.8]	≤ 0.02
Marital statuts				
• Living alone	70 (60.8%)	114 (49.6%)	1.6[1.1-2.48]	≤ 0.05
• Married	45(39.2%)	116 (50.4%)	1	
Professionnal statuts				
• Non salaried employee	106 (92.2%)	216 (93.9%)	0.79 [0.33-1.9]	≤ 0.90
• salaried employee	09 (7.8%)	14 (6.1%)	1	
Home address				
• Serviced area	48 (41.7%)	99 (43%)	0.95 [0.6-1.49]	≤ 0.30
• Unserviced area	67 (58.3%)	131 (57%)	1	
Socio-economic level				
• Low	43(37.4%)	85(36.9%)	1.08 [0.62-1.89]	≤ 0.90
• medium	40 (34.8%)	77 (33.6%)	1.10 [0.62-1.94]	≤ 0.90
• High	32 (27.8%)	68 (33.5%)	1	
Education level				
• No schooling	42 (36.5%)	72 (31.3%)	1.26 [0.79-2.02]	≤ 0.50
• educated	73 (63.5%)	158 (68.7%)	1,00	
Number of birth				
• Primiparous	40.9%	47.4%	0.77 [0.49-1.21]	≤ 0.30
• Pauciparous	51.3%	42.1%	1.21[0.43-3.42]	≤ 0.90
• multiparous	7.8%	9.5%	1	
Previous abortion				
• Yes	12 (10.4%)	16 (7%)	3.3 [1.43-7.6]	≤ 0.01
• No	103 (89.6%)	214 (93%)	1	

Table 2. Studies of clinical risk factors for preterm birth

Variable	Case	Indicators	RC ou OR	p
Stress				
• Not stressful	17.4%	43%	1	
• Low stress	52.2%	39.1%	3.30 [1.85-5.9]	≤ 0.001
• Very stressful	30.4%	17.9%	4.23[2.19-8.18]	≤ 0.001
Intergenerational interval				
• <12 months	04 (3.5%)	08 (3.5%)	1.00 [0.29-3.39]	≤ 0.90
• ≥12 months	111 (96.5%)	222 (96.5%)	1	
Antenatal consultation				
• 0-1ANC	29.5%	9.1%	4.92 [3.03-8.00]	≤ 0.001
• 2-4 ANC	68.7%	85.6%	1.12 [1.03-3.06]	≤ 0.001
• ≥5 ANC	1.8%	5%	1.00	
Fever during pregnancy				
• Yes	56 (48.7%)	86 (37.4%)	1.59 [1.01-2.5]	≤ 0.05
• No	59 (51.3%)	144 (62.6%)	1.00	
Rupture of membranes				
• Yes	21 (18.3%)	13(5.7%)	3.72 [1.79-7.76]	≤ 0.001
• no	94 (81,7%)	217(94.3%)		
Metrorrhagia-pelvic pain				
• Yes	19(16.5%)	19(8.3%)	2.20[1.11-4.34]	≤0.05
• no	96 (83.5%)	211(91.7%)	1	
Episode of urinary infection				
• Yes	44 (38.3%)	45 (19.6%)	2.55 [1.55-4.19]	≤ 0.001
• no	71(61.7%)	185 (80.4%)	1.00	
History of threatened premature delivery				
• Yes	15 (13%)	10 (4.3%)	3.3 [1.43-7.6]	≤ 0.01
• no	100 (87%)	220 (95.7%)	1	1

ANC : antenatal care

4. DISCUSSION

4.1 Frequency of Premature Delivery

The incidence of premature delivery in our series was 6.1%. This figure is lower than that of most studies conducted in the sub-region, which found figures varying from 11 to 22%. The non-inclusion criteria, such as stillbirths, and the study period (January to June) could explain our results, which seem fairly low.

According to LANSAC [10], the preterm birth rate in France is 11.2%. This figure, which is much higher than ours, may be explained by the definition of preterm birth, which starts at 22 weeks in the European context and according to the WHO, compared with 28 weeks for the African Society of Gynecology and Obstetrics.

4.2 Factors Associated with Preterm Birth

4.2.1 Stress and pregnancy

In our series, stress was strongly associated with preterm birth (OR=3 to 4). Maternal stress is currently one of the new areas of research in the fight against preterm birth. Several authors have identified it as a risk factor.

ANDRIAMADY [15] noted that 73.9% of patients who experienced physical overwork and stress during pregnancy gave birth prematurely. Other authors such as SAMIM [16] in Iraq, SHI [17] in India found that stress during pregnancy was a risk factor for preterm delivery with an OR=2.16. MORTEM [18] in England made the same finding on prospective cohorts with a relative risk of 1.75.

Our context of underdevelopment, with its corollaries of low socio-economic status, unemployment and illiteracy, is a source of stress for our young pregnant women.

4.2.2 Insufficient prenatal monitoring of pregnancies

Insufficient prenatal consultations were found to be a risk factor for preterm birth in our study. Monitoring the state of health of the mother and fetus is the main objective of antenatal consultations. Preterm birth is detected during the 6th and 7th months of pregnancy, i.e. at the 3rd antenatal visit [12,17]. ANDRIAMADY [15] found that in 86.7% of cases of preterm delivery,

antenatal visits were either not made or not made at all. In the VANIA series [19], preterm birth was associated with inadequate pregnancy monitoring, with a relative risk (RR) of 1.5.

More in-depth cohort studies could demonstrate that the quantitative aspect of antenatal care is not the real exposure variable and that we should probably look more at the qualitative aspect of this care in line with the new refocused healthcare policy.

4.2.3 Obstetrical history and pathology during pregnancy

➢ **History of threatened premature delivery**

A history of threatened preterm birth was analysed as a significant predictor of preterm birth (OR=3.3). Our results are in line with PAPIERNICK [13] who identified it as a risk factor. Also CARLINI in Italy with an adjusted OR of 5.7 and Janet with an OR of 5.9 found results concordant with ours [5,9].

➢ **Previous abortion**

In our study, this history was statistically associated with a risk of preterm birth (OR=3.3). It was cited as a proven risk factor by PAPIERNICK and SAMIN and included in the CRAP [13,16]. As voluntary termination of pregnancy is forbidden by law in our context, patients tend to undergo clandestine induced abortions, whose enduterine manoeuvres dilate the muscle fibres and predispose to cervico-isthmic hollowness and subsequent cervical incompetence.

➢ **Urinary tract infections**

In our study we found a statistically high risk of preterm delivery associated with this variable (OR=2.55). Urinary tract infections are classically cited as risk factors for preterm birth [13,19, 20,21]. Upper or lower urinary tract infections are responsible for 5 to 10% of preterm deliveries [22,23].

SAMIM in Iraq found an ORss of 2.85 [16]. The low socio-economic level of our populations combined with low attendance at pregnancy monitoring centres could explain these results. This is all the more worrying given that urinary tract infections during pregnancy are often discreet in their clinical expression.

> **Pelvic pain and metrorrhagia in the second trimester**

We wanted to study the effect that pelvic pain in the second trimester might have on the risk of preterm birth. We found a statistically significant association between pelvic pain and preterm birth in our study (OR=2.2).

Inadequate completion of pregnancy follow-up diaries and imprecision in estimating gestational age could be a source of confusion with the threat of preterm birth and these items.

> **Premature rupture of membranes**

In our study premature rupture of the membranes was associated with preterm delivery with an OR= 2.55. Premature rupture of the membranes is a major cause of genital infection during pregnancy. The low level of education, the poverty of our populations, the inadequacy of antenatal follow-up and the delay in consultation may explain this result, which should be put into perspective, however, by the fact that in reality a stratification according to gestational age at the time of rupture would have been necessary to better eliminate a possible confounding factor**.**

5. CONCLUSION

Our study carried out in urban Burkina Faso showed an association between certain socio-demographic characteristics, certain pathologies during pregnancy and preterm delivery in Ouagadougou. The need to conduct studies in rural areas for the purpose of comparison with urban areas is obvious, given that most of our population lives in rural areas. In our context as a developing country, the fight against this scourge must be stepped up during the refocused antenatal consultation.

Suggestions to prevent premature deliveries:

1. Intensive monitoring of cervical length especially by transvaginal ultrasound starting preferably 22-24 weeks, weekly. The cutoff of transvaginal ultrasound (TVS) cervical length should be 2.5 cm.
2. Liberal use of vaginal progesterones in cases of high risk factor patients till 34 weeks.
3. Prophylactic use of Mcdonald cervical stitch in cases of twins with short cervix or patients with previous history of preterm delivery.
4. Liberal use of prebiotics to maintain healthy vaginal flora, thereby preventing risk of vaginal / urinary infections.

CONSENT AND ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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