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Original Research Article

Study of the Determinants of the Nycthemera of Childbirth at the Reference Health Center of Kalaban-Coro, Kati, Mali

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Abstract

Summary: ***Introduction:*** Knowledge of the birth cycle is important in the organization of reproductive health services in a facility. The main objective was to study the determinants of the birth cycle at the Kalaban-Coro health center. However, it seems that there are other determinants of the birth cycle, hence the relevance of this study. Material and methods: This was a cross-sectional analytical study from October 1 to December 31, 2020. Results: The study included 977 parturients who gave birth in the department. It recorded more night deliveries (59.1%) than day deliveries (40.9%). The average age of the women was 25 years. Non-educated births were the most represented with 39% of cases. Nocturnal admissions were predominant (58.8%); 59% of parturients had a history of nocturnal delivery and 40% preferred to give birth at night, while 30% had no preference. At admission, 57.91% of parturients were in the active phase during the night, compared to 42.59% during the day; 52.6% of parturients had a nocturnal onset of labor, compared to 47.4% during the day. Conclusion: The study showed that childbirth is more frequent at night than during the day. It highlighted the admission nycthemer, the previous nycthemer of deliveries and the preference of the parturient as other determinants of the nycthemer of the delivery.

Keywords: Delivery night, determinants, Kalaban-Coro, Mali.

INTRODUCTION

According to some researchers, our ancestors lived in groups and were very active during the day, each on his own. At nightfall, they gathered to spend the night together. Giving birth during the night allowed the mother and the baby to have more chances of survival. As a result, births are excessively frequent at night. Women who give birth naturally are more likely to give birth at night than those who require obstetrical intervention [1].

The distribution of births according to the time of day has been the subject of various observations, but remains a subject that has not been studied in depth. In England, researchers at the City University of London studied more than 5 million pregnant women until their delivery over a period of ten (10) years. Nearly 72% of

deliveries took place between 1 and 7 am with an estimated peak at 4 am [1].

In America, out of 200,000 cases studied (in 1986), the greatest frequency of spontaneous labor occurs between 3 and 3.5 hours and the least between 9 and 14.5 hours. It even seems that the duration of labor is shorter when the first pains appear before midnight and longer when it is in the late morning. However, it is important to note that the curves are currently evolving according to the medicalization of childbirth which no longer follows its natural rhythm [2].

Man, a diurnal animal, has a temporal organization regulated by what has been called the "biological clock" which makes our cells and organs have an activity programmed in time both on a daily and annual basis and which responds to the need to cope, physically and intellectually, with our activity. Thus, in the course of a twenty-four hour day (24 hours), we pass through a time during which we are active; this is the waking time and another during which we are at rest; this is the sleeping time [3].

Without any constraint, spontaneously, when the night comes, we fall asleep. Falling asleep is linked to the secretion of melatonin, which starts before nightfall and stops with the arrival of dawn. The rhythm of hormonal secretions (cortisol, melatonin, thyroid hormones, and testosterone) is significantly modified [4].

This physiological phenomenon is not yet well defined and known. In view of the lack of literature on this subject in Mali, to our knowledge, we propose to study the different epidemiological and clinical factors that may influence the birth cycle, apart from the hormonal factors mentioned above. The main objective was to study the determinants of the birth cycle at the Kalaban-Coro health center.

MATERIALS AND METHODS

Our prospective cross-sectional analytical study over a period of three (03) months from October 01 to December 31, 2020 was conducted at the Kalaban-Coro referral health center (CSRéf). The study population included all parturients who gave birth at the maternity ward of the CSRéf Kalaban-de Coro during the study period. All women who delivered at the CSRéf Kalaban-de Coro maternity hospital during the study period and who agreed to participate in the study were included in our study. The criteria for non-inclusion were: all deliveries by prophylactic caesarean section, all deliveries after artificial labor induction and all deliveries with incomplete records. Sampling was carried out through an exhaustive registration of all parturients in the maternity ward of the CSRéf of K. Coro during the study period using a pre-established and tested survey form. The variables studied were grouped into: dependent variables (the nycthemer of delivery, i.e., the time of delivery) and independent variables: sociodemographic characteristics (the nycthemer of previous deliveries and the preference for the nycthemer of delivery, the nycthemer of admission, parity, age of pregnancy, the phase of labor at admission, maternal and fetal prognosis) The data collection technique was based on an interview and a reading of documents such as delivery books and/or registers and their recording on a pre-established form. We proceeded to systematically recruit newborns until the end of the collections (3 months). As for the conduct of the survey, the observations were made with the utmost discretion and in a completely passive manner. The observation guides used made it possible to answer questions quickly. The investigation lasted three months (03).

For data processing and analysis, Microsoft Word 2010 was used for word processing. Data entry and analysis was done using SPSS version 21.0 software. The chi-2 test was used to test our hypotheses and see the relationship between certain variables. The significance level was set at 5%. Finally, verbal informed consent was requested and obtained from the pregnant women before the questionnaire was administered. They were informed of the importance of the study. Confidential data were not taken into account.

RESULTS

From October 1 to December 31, 2020, we recorded 977 cases of delivery out of 1109 deliveries, including 577 cases of night delivery (59.1%) and 400 cases of day delivery (40.9%). Socio-demographic characteristics of patients

- Age: we have divided the deliveries according to age in graph 1

Level of education: the women who gave birth were divided in table I according to their level of education.

Table-I: Distribution of births by level of education

Level of education	Numbers	Percentage (%)
Not in school	**381**	**39**
Primary	251	25,7
Secondary	197	20,2
Higher	72	7,4
Koranic school	76	7,8
Total	**977**	**100**

The admission nyctheme: the deliveries were distributed in table II according to the admission nyctheme.

Table-II: Distribution of the babies according to the day of admission

Intake Nycthemer	Numbers	Percentage (%)
Daytime 06h-17h59	403	41,2
Nocturne 18h-05h59	**574**	**58,8**
Total	**977**	**100**

Clinical characteristics

- Parity: we have distributed the patients according to their parity in table III.
- Presumed age of pregnancy: the distribution of the deliveries was made according to the presumed age of pregnancy in table III.
- The stage of labor at admission: it was mentioned in table III.

Table-III: Distribution of women according to parity, age of pregnancy and stage of labor

Parameter	Numbers	Percentage (%)
Parity		
Nulliparous	312	31,9
Primiparous	207	21,1
Pauperous	236	24,2
Multiparous	140	14,3
Great multiparous	82	8,4
Age of pregnancy		
28 to 33 SA	24	2,5
34 to 36 SA	50	5,1
37 to 42 SA	891	91,2
More than 42 weeks of pregnancy	12	1,2
Phase of labor		
Latency phase	212	21,7
Active phase	765	78,3

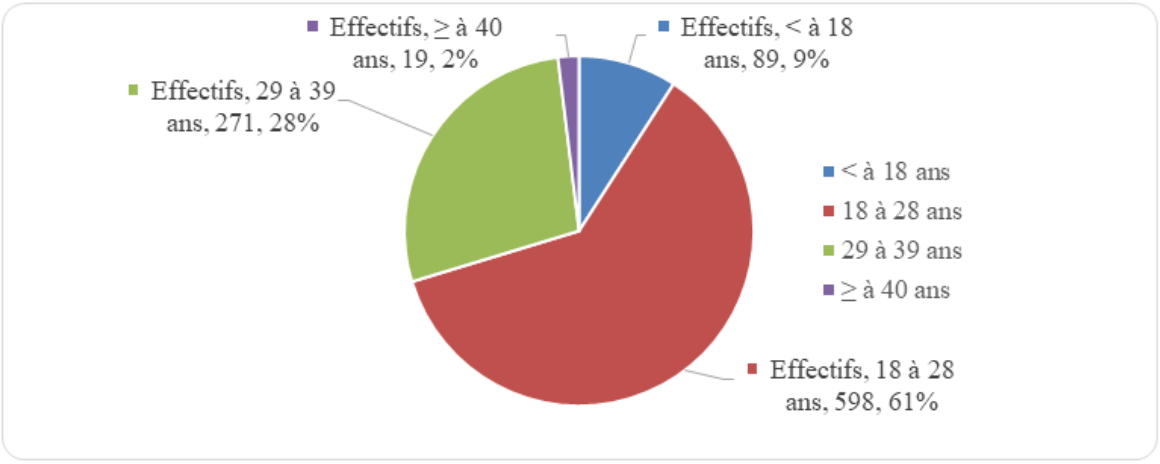

Fig-1: Distribution of births by age group

The previous delivery nyctheme: the deliveries were distributed according to the previous delivery nyctheme in Figure 2.

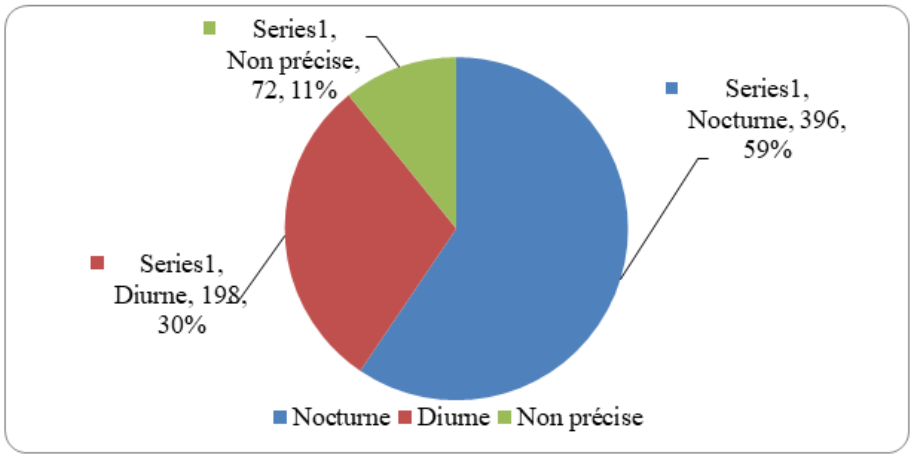

Fig-2: Distribution of births according to the previous delivery nyctheme

Preference for the delivery nyctheme: we have divided the women according to their preference for the delivery nyctheme in Figure 3.

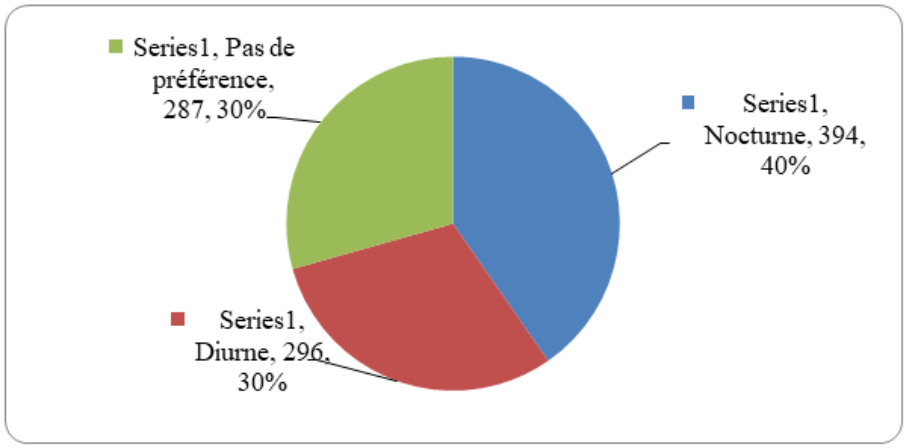

Fig-3: Distribution of women according to their preference for the birth calendar

Relationship between the nycthemer and certain explanatory variables

- Relationship between the birth calendar and the level of education: we have associated the birth calendar and the level of education in Table 4.
- Relationship between delivery nycthemer and admission nycthemer: This has been recorded in Table IV.
- Relationship between the nycthemer of delivery and the previous nycthemer of deliveries: It was mentioned in table IV.

Table-IV: Relationship between the nycthemer of delivery, the level of education, the nycthemer of admission and the previous nycthemer of deliveries.

Explanatory variables	Nocturnal	Daytime	Total
Level of education			
Not in school	225 (59,06%)	156 (40,94%)	381
Educated	352 (59,06%)	244 (40,94%)	596
Admission time frame			
Diurnal 06h to 18h	103 (25,56%)	300 (74,44%)	403
Nocturnal	474 (82,58%)	100 (17,42%)	574
Previous Nyctheme of deliveries			
Nocturnal	258 (65,15%)	138 (34,85%)	396
Diurnal	96 (48,48%)	102 (51,52%)	198
Not precise	36 (50%)	50%)	72

- The relationship between delivery nycthemer and education level was statistically significant (Chi-2=0.012; ddl=1; P=0.000).
- The relationship between delivery nycthemer and admission nycthemer was statistically significant (Chi-2=318.369; ddl=1; P=0.000).
- There was a statistically significant relationship between the delivery nycthemer and the previous nycthemer of deliveries (Chi-2=17.547; ddl =2; p = 0,001).
- Relationship between delivery nycthemer and preference of delivery nycthemer. It is recorded in Table V.
- Relationship between delivery nycthemer and maternal prognosis: we associated delivery nycthemer and maternal prognosis in Table V.
- Relationship between delivery nycthemer and fetal prognosis: this relationship is recorded in Table V.

Table-V: Relationship between delivery nycthemer, preference and prognosis

Explanatory variables	Nocturnal	Daytime	Total
Préférence			
Diurne	67 (22,64%)	229 (77,36%)	296
Nocturne	339 (86,04%)	55 (13,96%)	394
Sans préférence	171 (59,58%)	116 (40,42%)	287
Phase du travail d'accouchement			
Phase de latence	134 (63,21%)	78 (36,79%)	212
Phase active	443 (57,91%)	322 (42,59%)	765
Pronostic maternel			
Vivante	575 (58,87%)	400 (41,15%)	975
Décédée	2 (100%)	0 (0%)	2
Pronostic foetal			
Mort-né	19 (63,33%)	11 (36,67%)	30
Mort apparent	3 (37,50%)	5 (62,50%)	8
Morbide	27 (56,25%)	21 (43,75%)	48
Normal	535 (59,25%)	368 (40,75%)	903

There was a statistically significant relationship between delivery nycthemer and preference of delivery nycthemer (Chi-2= 281.071 ddl=2 p=0.000)

There was no statistically significant relationship between delivery night and maternal prognosis (Chi-2=1.421 ddl=1; p=0.515).

Among 30 stillbirths, 63.33% occurred at night versus 36.67% during the day. There was no statistically significant relationship (Fisher's exact P-value=0.70).

DISCUSSION

Frequency of delivery: Over a period of three (3) months from October 1 to December 31, 2020, 977 deliveries were recorded, of which 577 were at night, i.e. 59.1% of cases, and 400 were during the day, i.e. 40.9%. This result is higher for daytime and lower for nighttime than those of the British researchers [1], who found 28.5% between 09:00 and 17:59 compared to 71.5% outside these hours. This difference could be explained by the location, the duration of the study and the time slot.

Socio-demographic characteristics of the patients. Age: in the study, the majority of our patients were between 15 and 25 years of age, i.e. 57.8%, with an average age of 20 years. The extremes of age were respectively 13 and 47 years. According to the age below 35 years, the occurrence of childbirth was more frequent at night than during the day, i.e. 60.53% of cases against 39.47% of cases. There was no statistically significant relationship between the age group and the nycthemer of delivery (Chi-2=0.462; p=0.314). Furthermore, using Demographic Health Survey (DHS) data from 21 Sub-Saharan African (SSA) countries, Magadi, Agwanda and Obare (2007) [5], show that women aged 20-49 years use maternal care more than adolescents under 20 years. In another study analyzing DHS data from six African countries, age and assisted delivery were significantly associated in the three East African countries, but not in the other three West African countries (Stephenson, Baschieri, Clements, Hennink, & Madise, 2006) [6]. This difference can be explained by the type and location of the study.

Level of education: The rate of non-enrolment in Mali among women of childbearing age is very high (85%); it is estimated at 59% in Bamako according to the CERPOD [7], which is higher than that of our study (39% of the women who gave birth did not attend school). This can be explained by the low schooling rate of girls in our country. Among the out-of-school births, 59.06% of the cases gave birth at night compared to 40.94% of the cases during the day. These results could be explained by the fact that the low level of education is a risk factor for exposure to unassisted childbirth, but in all cases the majority of the uneducated are in the majority. The study showed that there was a statistically significant relationship between

the timing of delivery and the level of education (P=0.000).

Clinical data

Nycthemer of admission: the study showed that 58.8% of admissions were made during the night and 41.2% during the day, with the most frequent hours between 10 pm and 2 am at night and the least frequent hours between 2 pm and 6 pm during the day. The nycthemer of admission was significantly associated with the nycthemer of delivery (p=0.00). In Uganda, similar results were obtained reported by Rutaremwa & *et al.*, 2015 [8]. This may be explained by the numerous daytime occupations. In Uganda, similar results were obtained reported by Rutaremwa & *et al*. 2015 [8].

Parity: nulliparous females were the most represented with a rate of 31.9%. This can be explained by the fact that the majority of our parturients were primigravida, this frequency is lower than Kawakatsu [9] in Kenya in 2014, about 48% of cases. This result proved that the delivery nyctheme is associated with the number of children, their birth order, the number of previous pregnancies and their outcomes. However, in our study, there was no statistically significant relationship between the delivery nyctheme and parity (chi-2 = 3.638; p = 0.406) and nulliparous women, who were in the majority, represented a rate of 60.26% of cases of night delivery against 39.74% of cases of day delivery.

The previous delivery nyctheme and the preference for the delivery nyctheme: 40% and 30% of parturients preferred to deliver at night, during the day, for reasons of discretion and delivery assisted by qualified personnel, respectively, and 30% had no preference. This result is similar to those reported in Ethiopia in 2015 by Asres&Davey [10].

Stage of labor: at the admission examination, 78.3% of parturients were in the active stage of labor compared to 21.7% in the latent stage. The fact that parturients come to the health center at an advanced stage could be explained by the inadequacy of information and awareness sessions during their prenatal follow-up by health providers.

Maternal prognosis: it was good in the majority of cases. However, the study recorded 02 cases of maternal death, i.e. a frequency of 0.2%. Fetal prognosis: the study recorded 3% of stillbirths secondary to complications of hypertension, retro placental hematoma, placenta previa, uterine rupture and diabetes.

CONCLUSION

The study demonstrated that childbirth is more frequent at night than during the day. It highlighted the admission nycthemer, the previous nycthemer of deliveries and the preference of the parturient as other determinants of the nycthemer of delivery.

Determining the role of day and night on hormone secretion was a limitation of our study. In view of the high frequency of nocturnal deliveries, it is necessary to strengthen the on-call teams to ensure better availability of services in the maternity hospitals.

Authors' contributions

All authors have read and approved the final version of the manuscript.

Conflict of Interest:

None

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