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Factors Associated with Perinatal Mortality in the Maternity Unit of the Regional Hospital of Mamou (Level II) in Guinea

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Abstract

Introduction: Perinatal mortality is defined as any death occurring after the 22nd week of gestation (stillbirth) or within 7 days of birth (early neonatal mortality). This study aims to assess the perinatal mortality rate and to determine the causes and risk factors associated with perinatal death. **Methodology:** This was a prospective, descriptive and analytical observational study, conducted from May 1 to August 1, 2023, at the Level II Maternity Unit of the Mamou Regional Hospital. All stillbirths of at least 22 weeks' gestational age and weighing ≥ 500 g, and those who died within seven (7) days of birth, were included. Data were entered and analyzed using Epi-info software, Version 7.2.2.6. Informed consent was obtained from the patients. Anonymity and confidentiality were respected. **Results:** During this study, 483 births were recorded, among which we identified 83 perinatal deaths, *i.e.* a perineal mortality rate of 172 per 1000 live births; we recorded 46 stillbirths, *i.e.* 55.42% against 44.58% of early perinatal deaths, *i.e.* twenty deaths in less than 24 hours of life (54.05%). Half of the births had mothers whose age was between 15 and 24 years, *i.e.* 51.1%; the average age was 24.88+/−2 years with extremes of 14 and 43 years. They were married mothers (98.8%), housewives (68.5%), and uneducated (66.4%). The type of pregnancy, inter-birth space (OR = 0.19 CI [0.09 - 0.40] p = 0.00), anemia in the mother (OR = 0.38 CI [0.19 - 0.76] p = 0.008), gestational age (OR = 7.7 CI [3.7 - 16.6] p = 0.00) and birth weight (OR = 1.9 CI [5.79 - 24.62] p = 0.00) were statistically associated with early perinatal death. The causes were dominated by acute fetal distress (38.60%) followed by low birth weight (21.68%). **Conclusion:** Perinatal mortality, a good indicator of child health, is a real problem in the poorest populations of each country. Im-

proving the perinatal mortality rate in its various components requires strict prenatal monitoring by providing advice on family planning and labor, raising awareness of the benefits of iron supplementation, and providing adequate care for problematic newborns, taking into account the factors that influence it.

Keywords

Associated Factors, Perinatal Mortality, Mamou Regional Hospital

1. Introduction

Perinatal mortality is defined as any death occurring after the 22nd week of gestation (stillbirth) or within 7 days of birth (early neonatal mortality) [1]. The perinatal period is considered the most critical phase of life.

Indeed, it reflects both the health of the population in general and that of the mother and child in particular. Perinatal mortality is a sensitive indicator of the quality of maternal and newborn care [1].

The highest perinatal mortality rates are found in sub-Saharan Africa, followed by Asia and Latin America. These rates are around 10 deaths per 1,000 births in developed countries, 50 per 1,000 in developing countries, and exceed 60 per 1,000 in the least developed countries [2].

The literature reports numerous causes and risk factors, which are categorized as maternal, fetal, obstetric, or unknown [3]. Overall, pre-existing chronic maternal conditions (such as diabetes) and other pregnancy-related conditions (e.g., high blood pressure) significantly increase antenatal death [1]. Similarly, birth complications (hemorrhage, prolonged labor, etc.) are responsible for both stillbirths and neonatal deaths. Furthermore, three main factors influence neonatal death, namely asphyxia, infections and prematurity [4]. The majority of these deaths are preventable through the implementation of simple interventions [5]. Furthermore, even when delivery takes place in a health facility offering maternity services, the latter are not always able to provide optimal care the newborn and its mother. This inability of structures is often linked to insufficient training, a shortage of essential medicines, and a lack of equipment [6] [7]. Determining the extent of perinatal mortality and identifying its causes and risk factors constitutes the first step in designing and implementing interventions aimed at reducing this problem. It is with this in mind that this study was conducted at the maternity ward of the Mamou Regional Hospital. The aim of this study was to assess the perinatal mortality rate and determine the causes and risk factors associated with perinatal death.

2. Methodology

We conducted a prospective, descriptive and analytical observational study lasting

three months from May 1 to August 1, 2023.

This study included all stillbirths of at least 22 weeks' gestational age and weighing ≥ 500 g, newborns who died within seven days of birth, and their mothers during the study period. Stillbirths with a gestational age of less than 22 weeks and/or weighing less than 500 g, and newborns whose births were not heard from by the end of the first week of life, were excluded.

We conducted exhaustive recruitment.

The variables were sociodemographic (age, education level, occupation, marital status, residence); obstetric history (parity, mode of delivery, number of prenatal consultations, interbirth space, pre-existing pathologies: hypertension, diabetes); causes of death (maternal causes: pre-eclampsia: eclampsia, antenatal hemorrhage, placenta previa, retroplacental hematoma, uterine rupture, anemia during pregnancy), gestational age and fetal causes: low birth weight, intrauterine growth restriction, maternal-fetal infection, early neonatal infection, acute fetal distress, congenital malformation.

All patients who had two deliveries were pauciparous, and grand multiparous were those who had at least five deliveries.

3. Results

Table 1. Stillbirth rate, early neonatal mortality, and perinatal mortality.

Period	Total Births (N)	Live Births	Stillbirths	Early Neonatal Deaths	Total Perinatal Deaths	PMR (‰)
May-August 2023	483	400	46	37	83	172

Note: Perinatal Deaths (N = 83).

1) Stillbirths: 46 (55.42%) Fresh stillbirths: 32 (69.57%) Macerated stillbirths: 14 (30.43%), **Early neonatal deaths**: 37 (44.58%), Deaths within 24 hours: 20 (54.1%), Deaths after 24 hours: 17 (45.9%) (Table 1).

2) Frequency: During the study, 483 births were recorded, among which 83 perinatal deaths were observed, yielding a perinatal mortality rate of 172 per 1000 live births. Of the deaths, 46 were stillbirths (55.42%)—32 fresh (69.57%), and 37 were early neonatal deaths (44.58%), with 20 occurring within 24 hours of life (54.05%) (Table 2).

Table 2. Sociodemographic characteristics of mothers and perinatal deaths.

Characteristics	N = 483	Percentage (%)
Maternal age (years)		
<15	3	0.6
15 - 24	**247**	**51.1**
25 - 34	169	35.0

Continued

35 - 44	64	13.3
Occupation		
Student	66	13.7
Housewife	330	68.5
Informal jobs	80	16.6
Salaried	6	1.2
Education level		
None	321	66.4
Primary	55	11.4
Secondary	93	19.3
University	14	2.9
Marital status		
Single	3	0.6
Divorced	1	0.2
Married	477	98.8
Widowed	2	0.4

3) Sociodemographic Profile:

247 of the 483 births were to mothers aged 15 - 24 (51.1%), with a mean age of 24.88 ± 2 years (range: 14 - 43). Most mothers were married (98.8%), housewives (68.5%), and uneducated (66.4%) (Table 3).

Table 3. Maternal obstetric history.

Obstetric History	N = 483	Percentage %
Parity		
Primiparous	**159**	**32.92**
Pauciparous	151	31.26
Multiparous	119	24.63
Grand multiparous	54	11.18
History of stillbirths		
None	**390**	**80.75**
≥ 1	93	19.25
Antenatal care (ANC)		
No ANC	99	20.5
1 - 3 ANC visits	**266**	**55.1**
≥ 4 ANC visits	118	24.4
Interpregnancy interval		
< 24 months	69	20.66
≥ 24 months	265	79.34

4) Obstetric and Medical History:

a) 165 mothers were in their second pregnancy (34.20%).

b) 159 were primiparous (32.92%).

c) 93 mothers had a history of stillbirth (19.25%).

d) 266 mothers had at least 3 ANC visits (55.1%), while 99 had none (20.5%).

e) 265 had interpregnancy intervals ≥ 24 months.

Table 4. Pregnancy characteristics.

Characteristics	N = 483	Percentage %
Type of pregnancy		
Multiple	34	7.04
Singleton	449	92.96
Gestational age (weeks)		
< 36 weeks	35	7.24
37 - 42 weeks	393	81.36
> 42 weeks	55	11.40
Mode of delivery		
Vaginal delivery	356	73.7
Cesarean section	127	26.3
Sex of newborn		
Female	214	44.5
Male	267	55.5
Birth weight (grams)		
< 2500	60	12.4
2500 - 3999	378	78.3
≥ 4000	45	9.3

Table 5. Causes of perinatal deaths.

Cause	N = 83	Percentage %
Acute fetal distress	**33**	**39.80%**
Prematurity	13	15.66%
Low birth weight	**18**	**21.68%**
Pneumonia	1	1.20%
Maternal-fetal infection	1	1.20%
Congenital malformation	1	1.20%
Early neonatal infection	2	2.40%
Unexplained causes	14	16.86%

5) Main causes:

Out of the 83 perinatal deaths, acute fetal distress was the leading cause (39.80%), followed by low birth weight (21.68%) (Table 4 and Table 5).

Table 6. Risk factors for early neonatal deaths.

Risk Factor	No Death	Death	p-value	OR (95% CI)
Parity			0.631	1.26 (0.6 - 2.52)
Primiparous	145	14		
Multiparous	**301**	**23**		
ANC visits			0.725	0.82 (0.39 - 1.68)
≤3 visits	**320**	**25**		
>3 visits	126	12		
Interpregnancy interval			0.000	0.19 (0.09 - 0.40)
<24 months	51	18		
≥24 months	**248**	**17**		
Mode of delivery			0.531	0.74 (0.36 - 1.52)
Vaginal	**329**	**25**		
Cesarean	117	12		
Birth weight			0.000	1.9 (5.79 - 24.62)
<2500 g	40	20		
≥2500 g	**206**	**17**		
Maternal anemia	110	17	0.008	0.38 (0.19 - 0.76)
Hypertensive disorder			0.55	0.63 (0.23 - 1.70)
Yes	2	1		
No	**444**	**36**		
Malaria			0.32	1.7 (0.72 - 4.13)
Yes	53	7		
No	**393**	**30**		

6) Significant risk factors for early neonatal deaths were (Table 6):
Interpregnancy interval <24 months (OR = 0.19; p = 0.000).
Maternal anemia (OR = 0.38; p = 0.008).
Low birth weight (OR = 1.9; p = 0.000).

Table 7. Multivariate analysis of risk factors for early perinatal death.

Risk factors	Early neonatal deaths		P-value	OR (95%CI)
	No	Yes (%)		
Interbirth interval				
< 24 months	51	18 (16.4%)		
≥ 24 months	248	17 (16.4%)	0.000	0.19 (0.09 - 0.40)

Continued

Birth weight				
<2500 g	40	20 (33.32%)		
≥2500 g	206	17 (3.3%)	0.000	1.9 (5.79 - 24.62)
Anemic mother				
Yes	127	15 (11.8%)		
No	356	112 (88.2%)	0.034	0.38 (0.19 - 0.76)
Type of pregnancy				
Single	450	26 (5.8%)		
Twin	28	07 (25%)	0.000	6.5 (2.82 - 14.99)
Triple	01	03 (50.0%)		
Gestational age				
<36 weeks	35	15 (42.9%)		
36 - 38 weeks	392	17 (4.3%)	0.000	7.7 (3.7 - 16.26)
≥ 38 weeks	55	3 (5.5%)		

Overall, the introduction of our variables into a bivariate analysis model showed that the risk factors statistically associated with early perinatal death were the type of pregnancy (OR = 6.5; 90% CI = 2.82 - 14.99; p = 0.000), the interbirth interval (OR = 0.19; 90% CI = 0.09 - 0.40; p = 0.000) maternal anemia (OR = 0.38; 90% CI = 0.19 - 0.76; p = 0.008), gestational age (OR = 7.7; 90% CI = 3.7 - 16.26; p = 0.000) and birth weight (OR = 1.9; 90% CI = 5.79 - 24.62; p = 0.000) (Table 7).

4. Discussion

In Table 1, of the 483 deliveries recorded at the Mamou Regional Hospital, we recorded 83 perinatal deaths, representing a perinatal mortality rate of 172 per 1,000 live births. This rate is higher than the 61.6‰ reported by Diakité *et al.* [8] at the Kayes maternity ward in 2006 and lower than the perinatal mortality of 27‰ per live birth reported per study conducted in Lubumbashi, Congo, in 2013 by Ntambue *et al.* [9].

The high perinatal mortality in our study demonstrates the efforts still needed to reduce mortality, which remains a real public health problem.

Depending on the time of their occurrence, we recorded 46 stillbirths, or 55.42%, including 69.7% of stillbirths.

Based on the time of onset, we recorded 46 stillbirths, or 55.42%, including 69.7% fresh stillbirths.

This result is lower than that reported by Fawole *et al.* [10] in Nigeria in 2011, which accounted for 90% of stillbirths.

During the neonatal period, we recorded 37 deaths, including 20 cases (54%) during the first 24 hours of birth.

In contrast, in 2005, Lawn JE *et al.* [11] reported in their study that approxi-

mately 25% to 45% of neonatal deaths occur within the first 24 hours of birth. This observation could be justified by the absence of a neonatology service for the correct management of cases of acute fetal distress, prematurity, low birth weight, hypothermia, especially the study is carried out in the rainy season where humidity is high in Middle Guinea and during the winter the disastrous state of the roads would lead to a delay in evacuation.

The most represented age group of mothers was 15 to 24 years (51%), the average age was 24.88+ -2 years with extremes of 14 to 43 years. A higher frequency of perinatal death was reported by Diakité *et al.* [8] in Kayes, whose age group (20 - 34 years) was 60.5%. This result could be explained by the fact that marriages take place in most cases during this age group due to the frequency of early marriages and the fact that it is a sexually active and more fertile age group.

Housewives represented 68.5%, lower than the 91.5% found by Diakité *et al.* [8] in Kayes. This high proportion of housewives could be due to the fact that they are the largest group in the general population in our country, but also and especially to their poor knowledge of family planning methods. Educated women were the most represented in our study, at 66.4%. This result is similar to that of Diakité *et al.* [8] in Kayes, who reported that illiterate women made up the bulk of their sample, at 72%. This could also be explained by the fact that schooling for young girls is still not systematic in the region.

This could also be explained by the fact that schooling for young girls is still not systematic in the region.

In our sample, 98.8% of parturients were married, higher than the 86.4% of married mothers reported by Diakité *et al.* [8] in Kayes. This high frequency of married women may be related to the weight of culture and tradition in our society, where the marital home constitutes the ideal situation for procreation. Primiparous women dominated our sample with a frequency of 32.92%. In contrast, Ntambue *et al.* [9] reported that 28.7% of women were primiparous, while 20.8% had already given birth at least five times. This difference could be explained by the lack of use of family planning in rural areas where the majority of parturients came from.

The history of stillbirths was 19.25%, however Diakité *et al.* [8] reported that 16.9% (66/390) of women who had experienced perinatal death had a history of stillbirth. This could be explained by the fact that dystocia and prolonged labor increase the frequency of stillbirths.

The interbirth interval was dominated by a duration greater than or equal to 24 months, or 76.1%. This could be related to the quality of counseling provided during ANC by health personnel.

This study shows that most mothers had had at least 3 ANCs and 20.5% of women had not undergone any ANC. This result is comparable to the 22% of women who had not undergone any ANC reported by Diakité *et al.* [8] in the city of Kayes in 2005. A study carried out by Ntambue *et al.* [9] reported that the majority of women surveyed had attended the CPN at least once during pregnancy.

In Africa, ANC, considered a fundamental axis to reduce perinatal mortality and morbidity, poses serious problems related to socio-cultural obstacles. Pregnancy was considered a shameful illness, and women only seek medical attention when the pregnancy is advanced, which could explain these low ANC rates.

The majority of births were from a singleton pregnancy, *i.e.*, 98.1%, compared to 1.9% for multiple pregnancies. These proportions are comparable to those of Ntambue *et al.* [9] in 2013, who reported 99.2% and 0.8% of singleton and twin pregnancies, respectively. This result could be explained by the frequency of singleton pregnancies in the general population, whereas a multiple pregnancy would be considered a pathological pregnancy.

Pregnancies with a gestational age between 37 and 42 weeks represented 81.36%. A study conducted by Ntambue *et al.* [9] found that only 2.8% of women gave birth before 38 weeks of amenorrhea.

This study found that 73.7% of women gave birth vaginally, lower than the 89.7%. Thus, obstructed vaginal delivery and prolonged labor would increase the risk of perinatal death.

The male sex dominated our sample, at 55.5%, compared to the female sex (44.5%). This result is contrary to that of the EDS [12], which reported a female predominance of newborns. Regarding birth weight, we recorded 70.3% of newborns with a normal weight. This could be explained by the regular monitoring of ANC and the good quality of these.

This analysis shows that there is a statistically significant association between gestational age and perinatal deaths (OR = 7.7; 95% CI = 3.7 - 16.26 and p = 0.000). This link would be higher in premature newborns than those born at term. The predominance of deaths among premature babies in our sample could be explained by complications related to prematurity (hypothermia, hypoglycemia), and their immaturity in the face of external aggressions, particularly infections, but also and above all the difficulties of their care in the maternity ward (resuscitation in the delivery room), and the absence of a neonatology service in the region

Regarding birth weight, the findings reveal a statistically significant relationship between birth weight and perinatal death (OR = 1.9; 95% CI = 5.79 - 24.42 and p = 0.000). In low birth weight newborns, this relationship appears to be more significant compared to those with normal birth weight.

Newborns who are fragile due to organ immaturity are exposed to complications, resulting in higher mortality compared to newborns from full-term pregnancies.

In this analysis, we did not find any statistically significant relationships between mode of delivery and perinatal death (OR = 0.74; 95% CI = 0.36 - 1.52 and p = 0.531).

In our sample, there was no statistically significant relationship between parity and perinatal death (OR = 1.26; 95% CI = 0.61 - 2.52 and p = 0.631).

In this study, there is no statistically significant association between ANC and perinatal deaths (OR = 0.82; 95% CI = 0.39 - 1.68 and p = 0.725). A study con-

ducted in Zimbabwe by Munjana *et al.* [13] showed that a reduction in the number of ANC did not lead to an increase in perinatal mortality.

Regarding the type of pregnancy, we found that there is a statistically significant relationship between the type of pregnancy and perinatal deaths (OR = 6.5; 95% CI = 2.82 - 14.99 and p = 0.000). Our result corroborates that found by Ntambue *et al.* in Lubumbashi who found a significant relationship between the type of pregnancy and perinatal deaths with $p < 0.05$. The high rate of perinatal deaths in multiple pregnancies is thought to be due to prematurity and low birth weight.

Regarding the interbirth interval, there is no statistically significant relationship between the interbirth interval and perinatal deaths. However, Tiruneh *et al.* [14] found a relationship between perinatal mortality and an interbirth interval of less than 24 months, with $p > 0.05$.

In this series, there is no statistically significant relationship between anemia during pregnancy and perinatal death (OR = 0.38; 95% CI = 0.19 - 0.76 and p = 0.008), however our study did not find a statistically significant association between malaria, diabetes, pregnancy-induced hypertension and perinatal death with $p > 0.05$. Overall, the introduction of our variables into a bivariate analysis model showed that the risk factors statistically associated with early perinatal death in this study were the type of pregnancy (OR = 6.5; 90% CI = 2.82 - 14.99; p = 0.000), inter-genetic space (OR = 0.19; 90% CI = 0.09 - 0.40; p = 0.000), maternal anemia (OR = 0.38; 90% CI = 0.19 - 0.76; p = 0.008), gestational age (OR = 7.7; 90% CI = 3.7 - 16.26; p = 0.000) and birth weight (OR = 1.9; 90% CI = 5.79 - 24.62; p = 0.000).

In the same findings, another study conducted in Nigeria by Nwokoro *et al.* [15] reported that the absence of antenatal consultation [OR = 1.8 (95% CI 1.4 - 2.2)], antepartum hemorrhage [OR = 2.8 (95% CI 1.2 - 6.7)], previous perinatal death [OR = 2.3 (95% CI 1.7 - 3.1)] and age ≥ 35 years [OR = 1.4 (95% CI 1.0 - 1.8)] were associated with an increased risk of perinatal death.

Acute fetal distress is the leading cause of perinatal deaths in our sample, with a frequency of 39.80%. However, a study conducted in Nigeria shows that asphyxia, early neonatal infection and immaturity were the main probable causes of perinatal mortality in this study [16].

5. Conclusions

Perinatal mortality, a good indicator of child health, is a real problem in the poorest populations of each country.

The perinatal mortality rate was 172,000 births, and acute fetal distress ranked first among the causes.

Risk factors are dominated by prematurity, multiple pregnancies, and low birth weight. Improving the perinatal mortality rate and its components therefore requires good prenatal care, regular, careful, and rigorous monitoring of labor, and adequate care for problematic newborns, taking into account the factors that influence it.

Limitations

As this was a hospital-based study, its results may not reflect the outcomes of deliveries outside of health facilities.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Zupan, J. (2005) Perinatal Mortality in Developing Countries. *New England Journal of Medicine*, **352**, 2047-2048. https://doi.org/10.1056/nejmp058032

[2] United Nations Children's Fund (2004) The Progress of Nations. UNICEF.

[3] Lawn, J.E., Gravett, M.G., Nunes, T.M., Rubens, C.E. and Stanton, C. (2010) Global Report on Preterm Birth and Stillbirth (1 of 7): Definitions, Description of the Burden and Opportunities to Improve Data. *BMC Pregnancy and Childbirth*, **10**, Article No. S1. https://doi.org/10.1186/1471-2393-10-s1-s1

[4] Lawn, J.E., Wilczynska-Ketende, K. and Cousens, S.N. (2006) Estimating the Causes of 4 Million Neonatal Deaths in the Year 2000. *International Journal of Epidemiology*, **35**, 706-718. https://doi.org/10.1093/ije/dyl043

[5] Osrin, D. and Prost, A. (2010) Perinatal Interventions and Survival in Resource-Poor Settings: Which Work, Which Don't, Which Have the Jury Out? *Archives of Disease in Childhood*, **95**, 1039-1046. https://doi.org/10.1136/adc.2009.179366

[6] Lawn, J.E., Kinney, M., Lee, A.C., Chopra, M., Donnay, F., Paul, V.K., *et al.* (2009) Reducing Intrapartum-Related Deaths and Disability: Can the Health System Deliver? *International Journal of Gynecology & Obstetrics*, **107**, S123-S142. https://doi.org/10.1016/j.ijgo.2009.07.021

[7] Darmstadt, G.L., Bhutta, Z.A., Cousens, S., Adam, T., Walker, N. and de Bernis, L. (2005) Evidence-Based, Cost-Effective Interventions: How Many Newborn Babies Can We Save? *The Lancet*, **365**, 977-988. https://doi.org/10.1016/s0140-6736(05)71088-6

[8] Diakite, A.L. (2006) Etude de la mortalité périnatale dans la ville de Kayes. Master's Thesis, Université de Bamako.

[9] Ntambue, A., Malonga, F., Dramaix-Wilmet, M. and Donnen, P. (2013) La mortalité périnatale: Ampleur et causes à Lubumbashi, République démocratique du Congo. *Revue d'Épidémiologie et de Santé Publique*, **61**, 519-529. https://doi.org/10.1016/j.respe.2013.07.684

[10] Fawole, A.O., Shah, A., Tongo, O., Dara, K., El-Ladan, A.M., Umezulike, A.C., *et al.* (2011) Determinants of Perinatal Mortality in Nigeria. *International Journal of Gynecology & Obstetrics*, **114**, 37-42. https://doi.org/10.1016/j.ijgo.2011.01.013

[11] Lawn, J.E., Cousens, S. and Zupan, J. (2005) 4 Million Neonatal Deaths: When? Where? Why? *The Lancet*, **365**, 891-900. https://doi.org/10.1016/s0140-6736(05)71048-5

[12] Institut ational de la statstique, Ministere du plan (2012) Enquête démographique de la santé et à indicateurs multiples, Conakry, Guinée 2012.

[13] Munjanja, S.P., Lindmark, G. and Nyström, L. (1996) Randomised Controlled Trial of a Reduced-Visits Programme of Antenatal Care in Harare, Zimbabwe. *The Lancet*, **348**, 364-369. https://doi.org/10.1016/s0140-6736(96)01250-0

[14] Tiruneh, D., Assefa, N. and Mengiste, B. (2021) Perinatal Mortality and Its Determinants in Sub Saharan African Countries: Systematic Review and Meta-Analysis. *Maternal Health, Neonatology and Perinatology*, **7**, Article No. 1. https://doi.org/10.1186/s40748-020-00120-4

[15] Nwokoro, U.U., *et al.* (2020) Déterminants de la mortalité périnatale dans les établissements de santé publics secondaires, Conseil municipal d'Abuja, Territoire de la capitale fédérale, Abuja, Nigéria. *Revue Médicale Panafricaine*, **37**, Article 114.

[16] Uzoechina, U., Dahiru, T., Olorukooba, A., Daam, C.K., Waziri, H.S., Adebowale, A.S., *et al.* (2020) Determinants of Perinatal Mortality in Public Secondary Health Facilities, Abuja Municipal Area Council, Federal Capital Territory, Abuja, Nigeria. *Pan African Medical Journal*, **37**, Article 114. https://doi.org/10.11604/pamj.2020.37.114.17108