

The Complications of Cesarean Section at Teaching Hospital Gabriel TOURE, Bamako Mali

Abdoulaye Sissoko^{1*}, Alassane Traore², Ibrahim Kante³, Amadou Bocoum¹, Soumana Oumar Traore⁴, Seydou Fane¹, Daniel Dembele¹, Aminata Kouma⁵, Mamadou Sima³, Fatoumata K. Tounkara⁶, Amadou Fomba¹, Ibrahima Teguede¹, Youssouf Traore¹, Soumaila Keita³, Niani Moukoro¹

¹Teaching Hospital Gabriel TOURE, Bamako, Mali

²Teaching Hospital, Bamako, Mali

³Teaching Hospital Point G, Bamako, Mali

⁴District Hospital Commune V, Bamako, Mali

⁵Teaching Hospital Kati, Bamako, Mali

⁶Research Center CHU of Quebec, University of Laval, Quebec, Canada

Email: *asissoko65@yahoo.fr, abocoum2000@yahoo.fr, seydoufane@yahoo.fr, amadoufomba@yahoo.fr, dembele.daniel87@gmail.com, teguedeibra@hotmail.com, aichaniani@yahoo.fr, dryoussouf.traore@gmail.com, fatoumata-korika.tounkara.1@ulaval.ca, fatoumatakorika.tounkara@fmed.ulaval.ca, koumamit@yahoo.fr, alassanetraore200@yahoo.fr, traoreoumar69@yahoo.fr, Ibrahimkante197462@gmail.com, drmsima@gmail.com, keita_soumi@yahoo.fr

How to cite this paper: Sissoko, A., Traore, A., Kante, I., Bocoum, A., Traore, S.O., Fane, S., Dembele, D., Kouma, A., Sima, M., Tounkara, F.K., Fomba, A., Teguede, I., Traore, Y., Keita, S. and Moukoro, N. (2020) The Complications of Cesarean Section at Teaching Hospital Gabriel TOURE, Bamako Mali. *Open Journal of Obstetrics and Gynecology*, 10, 546-557.
<https://doi.org/10.4236/ojog.2020.1040049>

Received: March 21, 2020

Accepted: April 20, 2020

Published: April 23, 2020

Copyright © 2020 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

Cesarean operation permits to save the mother and fetus. However, in developing countries as ours, complications related to this cesarean are not to be neglected. It constitutes an important cause of maternal and fetal morbidity and mortality. Here we rapport the experience of our structure about the complications of cesarean. **Objectives:** The objectives of this study were to study the complications the complications of cesarean section at teaching hospital Gabriel TOURE, Bamako Mali. **Materials and methods:** We have carried out a cross sectional analytic study from January 1st 2003 to December 31st 2013. All the patients who gave birth by cesarean operation in gynecology-obstetric service of teaching hospital Gabriel TOURE were included during this period of study. Descriptive statistics were used, Chi-square test Pearson, and Cochran Armitage test have been used to calculate the P-value of trend. We performed multivariate analyses with a high alpha threshold of 10%, and then logistic regression multivariate. **Results:** We have registered 28,376 deliveries with 9509 cases of cesarean (33.5%) and a complication cesarean rate of 32% (3049/9509). The main risk factors for cesarean operation completions were adolescence primiparity, obesity, the non-realization of antenatal care, evacuations and co-morbidities. Intraoperative complications were dominated by he-

morrhage 8.3% and bladder lesion 1.1%, whereas anemia (58.8%) and parietal infection (21.1%) dominated the postoperative complications table. The evacuation (Odds Ratio adjusted (ORa) = 1.96) as well pre-eclampsia/eclampsia (ORa = 2.34) and the sickle cell disease (ORa = 9.99) were the main influencing factors of maternal death. Praevia placenta (ORa = 1.75) abruption placenta (ORa = 11.08) and fetal malformation (ORa = 2.21) dominated the influencing factors of perinatal death. **Conclusion:** The cesarean complications rates were high in our improvement of the quality of antenatal care. The reorganization and revitalization of the reference and against reference system will permit to program some cesarean operation to reduce the morbidity related to caesarean.

Keywords

Cesarean, Complication, Risk Factors, Morbidity, Mortality

1. Introduction

Cesarean section rates are increasing worldwide; the highest rates are in China 46.2%, South America 41% and Vietnam 35.6% [1], in Western Europe 24.5% and North America 32% [1] [2]. In several African countries an increase in cesarean section rates is between 6.8% and 38.8% according to hospital studies [3] [4]. It has been reported that 68.5% of the 54 countries that had a cesarean rate below 10% were African [5]

Cesarean permits to treat difficulties related to vaginal delivery and risk situations of fetal asphyxia [6]; however its realization needs a well justified medical direction [7], which will effectively permit to avoid maternal and perinatal morbidity and mortality [8]. Cesarean operation increases maternal and fetal morbidity from 5 to 7 times compared with vaginal delivery [9] [10]. It's not harmless, and may cause major complication and sometimes permanent, disability or death, especially in structures where there are insufficient infrastructures and able to guarantee an adequate care [11]. The risk of complications is increased, especially in developing countries [12] [13].

The current situation complications of cesarean delivery rates in developing countries are very complex with large differences between countries, within countries, and between health centers. Complication rates of 14.5% to 33.5% have been reported by Van *et al.* [14], Norway 21.4% [15] and United States 5.7% [16]. According to African literature 16.95% is in Yaoundé (Cameroun), Ouagadougou (Burkina Faso) 18.8% and 11.6% Democratic Republic of Congo.

In Bamako Mali the rates of complications related to cesarean are variable: 22.7%, 31.3%, and 33.3% respectively with Mariko SL in 2008 [14]; Siby O in 2009 [17] and Kone AD in 2005 [18]. We have initiated this work to study the complications of maternal fetal cesarean in obstetric gynecology service of CHU-GT, determine the frequency of caesarean complication, identify the risk factors for

complicated cesarean and establish the maternal fetal prognostic of complicated cesarean operation.

2. Materials and Methods

Our study was carried out in teaching hospital Gabriel TOURE (CHU-GT) of Bamako, Mali. It dealt with the third level of health pyramid of the country. It's a referral hospital. This may have an influence on the children and mothers prognosis [17] [18]. It's about a cross sectional analytic study on hospital data bases from January 1st 2003 to December 31st 2013, equal to a consecutive period of 11 years. Selection of samples has been comprehensive.

All the patients who gave birth through cesarean in obstetric gynecology service of teaching hospital Gabriel TOURE were included during the period of study.

This database contains more than 700 variables related to patients' demographic, medical and obstetric factors as well as pregnancy outcomes. A complete obstetric database of all obstetric admissions focusing on characteristics of delivered women, mode of delivery, cesarean indications, and maternal, fetal and immediate neonatal outcome was built to include all cesarean delivery recorded at teaching hospital Gabriel TOURE during the period of study. Data were collected from these complete obstetric files, as well as hospital birth registries, registries of on-call midwives, surgical reports, admissions records for the intensive care service.

The main variables of interest are related to socio-demographic characteristics (mother's age, marital status, level of education); behaviour characteristics (antenatal care); previous medical and obstetrical (previous cesarean, hypertension, diabetes, parity, gestity); pregnancy outcomes (maternal and perinatal death, Route of delivery, cesarean indications, prognosis maternal and fetal). It has been designed on the software SPSS version 20.0 and analyzed o software SAS (SAS Institute TNC, 9.4, Cary, North caroling a 27513).

Descriptive statics were used, Pearson's chi-square test, the cochram-armitage test has been used to calculate the p-value of trend $P < 0.05$ was considered statistically significant. We performed multivariate analyses with a high alpha threshold of 10%, then logistic regression multivariate. Logistic regression has been applied to appreciate the effect of maternal characteristics, obstetric practice, systemic factors on caesarean delivery rate and the complication. The database used for this analysis was reviewed and approved by the ethics committee of the Faculty of Medicine, Pharmacy, and Dentistry at the University of Bamako, Mali.

3. Results

3.1. Frequency

We have registered 33,784 obstetric admission including 28,376 dewberries with 9509 cases of cesarean 33.5% (9509/28,376). The complication of maternal cesarean represented 3049 cases refers to 32.1% (3049/9509).

3.2. Sociodemographic Characteristic

The epidemiologic and obstetric characteristics of the population are listed in **Table 1**.

3.3. Risks Factors Complications of Cesarean

They are listed in **Table 2**.

3.4. Maternal Prognosis

3.4.1. Maternal Morbidity

We have observed that bleeding was the most frequent intraoperative complication (8.3%). The prevalence of bladder lesion was 1.1% and cardiorespiratory attack was 0.6%. Maternal parameters strongly associated to the highest prevalence of intraoperative complications were: maternal age > 35 years old (ORa = 1.43), evacuation (ORa = 3.07) absence of antenatal care (ORa = 1.66) and premature rupture of membranes (ORa = 2.04). The main complications have been: anemia and parietal infection respectively represented 52.51% and 18.89% and with 6, 72% case of endometritis. The other types of complications were represented less than 5% of each case. The highest prevalence of postoperative complications were observed among teenager (ORa = 1.49), evacuated (ORa = 2.32), for patients who have developed pre-eclampsia/eclampsia (ORa = 8.18) in case of praevia placenta (ORa = 2.01), abruption placenta (ORa = 2.38) and the absence of antenatal care (ORa = 3.42).

3.4.2. Maternal Mortality

The death rate was multiplied by 2 for women referred in emergency compared to those who come by themselves. We noted a death rate diminution of 40% among primipares, when compared to multiparas with an ORa = 0.61 [IC 95%: 0.40 - 0.93]. Women who went through cesarean operation before the term of the pregnancy had the highest death rate with an ORa = 1.57 [IC95%: 1.10 - 2.25]. There is also a statistically significant association between pre eclampsia/eclampsia and the occurring of death among mothers who presented maternal complications of cesarean ORa = 2.34 [IC 95%; 1.49 - 3.68].

The death rate was multiplied by 10 for disease sickle cell mothers with the complications of cesarean operation ($P < 0.05$).

3.5. Fetal Prognosis

3.5.1. Perinatal Morbidity

The prevalence of trauma, fetal anomalies, and low birth weight were respectively 0.7%, 1.8% and 4.5% in new born baby for caesarean mothers. The main observed trauma were broken clavicle (28 cases) elongation of brachial plexus (8 cases) and scalpel stroke (10 cases).

3.5.2. Perinatal Mortality

We have registered 1618 prenatal death with 1071 stillborn and 547 neonatal

Table 1. The main sociodemographic characteristic:

Variable	Complications of caesarean	
	Yes No = 3049 (%)	No No = 6460 (%)
Years		
≤19	775 (25.4)	980 (15.2)
20 - 34	1773 (58.2)	4366 (67.6)
≥35	501 (16.4)	114 (17.2)
Body Mass Index, kg/m²		
Normal	2439 (80.0)	5393 (83.6)
Overweight	525 (17.2)	1003 (15.4)
Obese	85 (2.8)	64 (1.0)
Level of study		
No schooling	1962 (64.3)	1579 (24.4)
Primary	249 (8.2)	1984 (30.7)
Secondary	649 (21.3)	1599 (24.8)
Superior	98 (3.2)	416 (6.4)
Unspecified	91 (3.0)	882 (13.7)
Admission		
Self admission	1019 (33.4)	3572 (55.2)
Referred without emergency	392 (12.9)	905 (14.0)
Referred Emergently	1638 (53.7)	1983 (30.8)
Gestity		
1	1065 (34.9)	1669 (25.9)
2 - 6	1410 (46.2)	3739 (57.9)
≥7	574 (18.8)	1052 (16.3)
Parity		
1	1651 (54.1)	3247 (50.2)
2 - 6	1077 (35.3)	2667 (41.4)
≥7	321 (10.5)	546 (8.5)
Antenatale care		
Yes	2630 (86.3)	6140 (95.0)
No	419 (13.7)	320 (5.0)
Context of caesarean		
Emergency	2880 (94.5)	5301 (82.1)
No emergency	169 (5.5)	1159 (17.9)

BMI normal: 18 - 25 kg/m²; BMI overweight: >25 - 30 kg/m²; BMI obese > 30 kg/m².

Table 2. The main risks factors complications of cesarean.

Variables	OR crude (IC _{95%})	P-value	OR _{adjusted} (IC _{95%})	P-value
Years				
20 - 34	1.00	-	1.00	-
≤19	1.97 (1.77 - 2.20)	<0.0001	1.37 (1.17 - 1.60)	<0.0001
Level of study				
Schooling	1.00	-	1.00	-
No Schooling	5.01 (4.55 - 5.51)	<0.0001	4.32 (3.84 - 4.85)	<0.0001
Body mass index, kg/m²				
Normal	1.00	-	1.00	-
Overweight	1.17 (1.04 - 1.31)	0.009	2.03 (1.73 - 2.37)	<0.0001
Obese	2.94 (2.12 - 4.08)	<0.0001	9.30 (6.36 - 13.59)	<0.0001
Admission				
Self admission	1.00	-	1.00	-
Referred without	1.52 (1.32 - 1.74)	<0.0001	1.89 (1.59 - 2.24)	<0.0001
Referred Emergently	2.88 (2.62 - 3.17)	<0.0001	2.39 (2.11 - 2.70)	<0.0001
Parity				
Multipara	1.00	-	1.00	-
Primipara	0.87 (0.75 - 1.01)	0.061	1.23 (1.08 - 1.41)	0.003
Duration of gestation				
Terme	1.00	-	1.00	-
Before terme	1.44 (1.29 - 1.60)	<0.0001	1.19 (1.03 - 1.36)	0.017
Antenatal care				
Yes	1.00	-	1.00	-
No	3.05 (2.62 - 3.55)	<0.0001	3.72 (3.07 - 4.50)	<0.0001
Vulvovaginal infection during pregnancy				
No	1.00	-	1.00	-
Yes	1.25 (0.86 - 1.83)	0.246	1.53 (0.95 - 2.44)	0.078
Pre-eclampsia/eclampsia				
No	1.00	-	1.00	-
Yes	10.24 (8.22 - 12.75)	<0.0001	8.50 (6.60 - 10.95)	<0.0001
Fever labor				
No	1.00	-	1.00	-
Yes	2.39 (1.81 - 3.16)	<0.0001	1.75 (1.22 - 2.52)	0.003
Premature rupture of membrane				
No	1.00	-	1.00	-
Yes	1.29 (0.93 - 1.79)	0.134	1.18 (0.78 - 1.79)	0.427

Continued

Praevia placenta				
No				
Yes	1.79 (1.41 - 2.26)	<0.0001	2.11 (1.57 - 2.82)	<0.0001
Prolonged labor				
No	1.00	-	1.00	-
Yes	1.41 (1.13 - 1.77)	0.003	1.63 (1.23 - 2.17)	0.001
Context of caesarean				
No emergency	1.00	-	1.00	-
Emergency	1.10 (1.01 - 1.20)	0.032	2.07 (0.70 - 6.15)	0.191
Length of caesarean				
<60 mn	1.00	-	1.00	-
>60 mn	13.68 (11.61 - 16.14)	<0.0001	16.40 (13.63 - 19.74)	<0.0001

death. The highest death rate has been observed in cold and emergency referred patients compared to patients who came by themselves; ORa were respectively 1.71 [IC 95%: 1.35 - 2.26] and 2.25 [IC 95%; 1.88 - 2.69].

The death rate was respectively multiplied by 2.33 and 1.46 for new born babies from mothers who gave birth before term and who didn't realize antenatal care. Light amniotic liquid 8.33 [IC 95%: 6.90 - 10.05]; the meconial liquid ORa: 28.01 [IC 95%: 19.51 - 40.20], aspect liquid amniotic pea puree ORa: 4.87 [IC 95%: 3.07 - 7.72]; yellowish and hematic liquid amniotic ORa: 33.41 [IC 95%: 25.53 - 43.72] were strongly associated with perinatal death rate.

4. Discussion

The limitations in our study: we report here an analysis of the complication caesarean delivery during 11 years period in a teaching hospital in Mali (West Africa). This obstetric database hospital it is not the results of the global population in Mali.

The current situation complications of caesarean delivery rates in developing countries is very complex with large differences between countries, within countries, and between health centers in **Table 3**.

In sub-Saharan Africa caesarean is very often realized in emergency even extreme one [22] [23] [24]. According to several authors, the high frequency of complications is linked to the insufficiency of competent human resources and material resources [16] [17] [20] [24].

In fact, south Africa of the Sahara has only 1%, qualified human resources in the world in the context where our region supports 25% the burden of the disease [25] [26]. This insufficiency, associated with the poor organization coverage of the referral system, explains a significant part of the complications associated with caesarean section affect 1/5 to 1/3 parturient women who have given birth by caesarean.

Table 3. Complications of cesarean in African countries.

Authors	Countries	Years	Complications of cesarean	Effective	Study
Benkirane S. <i>et al.</i> [19]	Maroc	2017	19.45%	2416	Descriptive and retrospective
Kinenkinda X. <i>et al.</i> [20]	RDC	2017	11.6%	3643	Descriptive analytical and retrospective
Ouattara A. <i>et al.</i> [21]	Burkina Faso	2015	18.8%	5027	Cross sectional
Ngowa J.D.K. <i>et al.</i> [16]	Cameroun	2012	16.95%	460	Cohort
Siby O. <i>et al.</i> [17]	Mali	2009	31.3%	1081	Prospective
Our study	Mali	2003-2013	32.1%	3049	Cross sectional analytic

That poor organization of the referral during emergency explains that this modality is the factor which is associated with the occurring of post-cesarean complications overall, but also with each of the complications taken individually in our work. The means of transport used were often unsuitable, no medical with precarious hygiene conditions [27] [28]. A strong statistically significant association between abruption placenta and the prevalence of post-operative complications such as hemorrhage, anemia and parietal infections was found. Abruptio placenta can cause a high blood loss requiring a blood transfusion [29] [30]. These extreme emergencies do not accommodate the delay in treatment and the insufficient unavailability of blood products in our contexts [30]. Otherwise, abruption placenta was among the main factors influencing the perinatal death in our study. This explained by the anoxia at causes and aggravated by the delay in treatment in case of the emergency [31] [32]. In our study, the risk of intrapartum asphyxia was multiplied by 3.7 in mothers who have an abruption placenta [33]. In some developing countries, the perinatal mortality in case of abruption placenta can reach or exceed 60% [26], whereas in the developed countries it's about 9% and 12% [34] [35]. Mortality associated with abruption placenta is 25 times higher [34] [36]. Our stillborn rate is 11.3% among all cesarean mothers. This rate is in the interval of stillborn rates associated with cesarean section [37] [38].

In our work, the mode of admission in emergency or without emergency was among the main factors influencing perinatal death. The criteria of morbidity are very difficult to determine according to Racine *et al.*, because several aspects are taking into account [39] and it's the reflect of fetus previous pain rather than it's due to cesarean operation [40]. If cesarean is only performed for medical reason, the neonatal result is excellent [41] [42]. More than 50% of deaths occurred during the night between 8:00 p.m. and 8:00 a.m. [43]. The nursing quality, the residents experience used for guards and their insufficient supervisions as well the health workers tiredness as risk factors of perinatal death were demonstrated [43] [44].

In 2015, 25% of emergency cesarean operation was performed in Mali at least in 64 minutes after making decision [45].

Several studies report that deaths are often due to delayed care [46] [47]. Insufficient of poor quality of intra-partum care on new born future was reported in an African maternity by Maaloe *et al.* [48].

5. Conclusion

Complications of cesarean rate were high in our study. The improvement of quality of prenatal care, the reorganization and revitalization of reference and non-reference system will help to program cesarean and reduce morbidity related to cesarean operation.

Conflicts of Interest

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

References

- [1] Betran, A.P., Ye, J., Moller, A.B., *et al.* (2016) The Increasing Trend in Caesarean Section Rates: Global, Regional and National Estimates: 1990-2014. *PLoS ONE*, **11**, e0148343. <https://doi.org/10.1371/journal.pone.0148343>
- [2] Gibbons, L., Belizan, J., Lauer, J.A., *et al.* (2010) The Global Numbers and Costs of Additionally Needed and Unnecessary Caesarean Sections Performed per Year: Overuse as a Barrier to Universal Coverage. World Health Report No. 30.
- [3] Teguete, I., Traore, Y., Sissoko, A., *et al.* (2012) Determining Factors of Cesarean Delivery Trends in Developing Countries: Lessons from Point G National Hospital (Bamako-Mali). In: Salim, R., Ed., *Cesarean Delivery*, InTech, London, 161-200. <http://www.intechopen.com/books/cesarean-delivery/determining-factors-of-cesarean-delivery-trends-in-developing-countries-lessons-from-point-g-nat>
<https://doi.org/10.5772/47914>
- [4] Ngowa, J.D.K. (2015) Complications maternelles précoces de la césarienne: À propos de 460 cas dans deux hôpitaux universitaires de Yaoundé, Cameroun. *Pan African Medical Journal*, **21**, 1. <https://doi.org/10.11604/pamj.2015.21.265.6967>
- [5] Gibbons, L., Belizan, J.M., Lauer, J.A., *et al.* (2012) Inequities in the Use of Cesarean Section Deliveries in the World. *American Journal of Obstetrics & Gynecology*, **206**, 331.e1-19. <https://doi.org/10.1016/j.ajog.2012.02.026>
- [6] Hannah, M.E., Hannah, W.J., Hewson, S.A., *et al.* (2000) Planned Cesarean Section versus Planned Vaginal Birth for Breech Presentation at Term: A Randomised Multicentre Trial. *The Lancet*, **356**, 1375-1383. [https://doi.org/10.1016/S0140-6736\(00\)02840-3](https://doi.org/10.1016/S0140-6736(00)02840-3)
- [7] World Health Organization (WHO) (2015) Cesarean Sections Should Only Be Performed When Medically Necessary in 10 April 2015. Geneva. <https://www.who.int/mediacentre/news/releases/2015/caesarean-sections/en/>
- [8] Hannah, M.E., Whyte, H., Hannah, W.J., *et al.* (2004) Maternal Outcomes at 2 Years after Planned Cesarean Section versus Planned Vaginal Birth for Breech Presentation at Term: The International Randomized Term Breech Trial. *American Journal of Obstetrics & Gynecology*, **191**, 917-927.

- <https://doi.org/10.1016/j.ajog.2004.08.004>
- [9] Chauvin, C., Raynal, P., Soltane, S., et al. (2009) Fetal Injuries during Cesarean: Frequency, Risk Factors and Prevention. *Gynécologie Obstétrique & Fertilité*, **37**, 321-324. <https://doi.org/10.1016/j.gyobfe.2009.01.009>
- [10] Robson, M., Hartigan, L. and Murphy, M. (2013) Methods of Achieving and Maintaining an Appropriate Caesarean Section Rate. *Best Practice & Research: Clinical Obstetrics & Gynaecology*, **27**, 297-308. <https://doi.org/10.1016/j.bpobgyn.2012.09.004>
- [11] Lumbiganon, P., Laopaiboon, M., Gulmezoglu, A.M., et al. (2010) Method of Delivery and Pregnancy Outcomes in Asia: The WHO Global Survey on Maternal and Perinatal Health 2007-08. *The Lancet*, **375**, 490-499. [https://doi.org/10.1016/S0140-6736\(09\)61870-5](https://doi.org/10.1016/S0140-6736(09)61870-5)
- [12] Villar, J., Carroli, G., Zavaleta, N., et al. (2007) Maternal and Neonatal Individual Risks and Benefits Associated with Caesarean Delivery: Multicentre Prospective Study. *BMJ*, **335**, 1025. <https://doi.org/10.1136/bmj.39363.706956.55>
- [13] Mariko, S.L. (2008) Les complications maternelles de la césarienne au centre de santé de référence de koutiala. Thèse de médecine Bamako, No. 546.
- [14] van Ham, M.A., van Dongen, P.W. and Mulder, J. (1997) Maternal Consequences of Caesarean Section. A Retrospective Study of Intra-Operative and Postoperative Maternal Complications of Caesarean Section during a 10-Year Period. *European Journal of Obstetrics & Gynecology and Reproductive Biology*, **74**, 1-6. [https://doi.org/10.1016/S0301-2115\(97\)02725-5](https://doi.org/10.1016/S0301-2115(97)02725-5)
- [15] Renate, M.I., Häger, E., Daltveit, K.A., et al. (2004) Complication of Cesarean Delivery: Rates and Risk Factors. *American Journal of Obstetrics & Gynecology*, **190**, 428-434. <https://doi.org/10.1016/j.ajog.2003.08.037>
- [16] Jennifer, L. (2006) The MFMU Cesarean Registry: Impact of Time of Day on Cesarean Complications. *American Journal of Obstetrics and Gynecology*, **195**, 1132-1137. <https://doi.org/10.1016/j.ajog.2006.06.009>
- [17] Siby, O. (2009) Etude des suites de couches post césariennes dans le service de gynécologie et d'obstétrique du CHU Gabriel Touré. Thèse de médecine Bamako, No. 537.
- [18] Koné, A.D. (2005) Facteurs de risque des complications maternelles post-césariennes à l'hôpital gabriel touré et à l'hôpital du point G. Thèse de médecine Bamako, No. 224.
- [19] Benkirane, S., Saadi, H. and Mimouni, A. (2017) Epidemiological Profile of Maternal Complications Related to Cesarean Section at the Al Farabi Hospital in Oujda. *The Pan African Medical Journal*, **27**, 108. <https://doi.org/10.11604/pamj.2017.27.108.10036>
- [20] Kinenkinda, X., Mukuku, O., Chenge, F., et al. (2017) Césarienne à Lubumbashi, république démocratique du Congo I: Fréquence, indications et mortalité maternelle et périnatale. *The Pan African Medical Journal*, **27**, 72. <https://doi.org/10.11604/pamj.2017.27.72.12147>
- [21] Ouattara, A., Yameogo, R.B., Kabore, F.X.G., Kiemtore, S., Kain, D.P., Sawadogo, Y.A., Dao, Y., Ouedraogo, I., Ouedraogo, C.M., Ouedraogo, A., Millogo, T.F. and Thieba, B.B. (2017) Prognosis of Misgav-Ladach Cesarean Sections in an African Environment: Case of the Banfora Regional Hospital in Burkina Faso about 110 Cases. *Open Journal of Obstetrics and Gynecology*, **7**, 1006-1015. <https://doi.org/10.4236/ojog.2017.79101>
- [22] Diallo, F.B., Bangoura, S. and Camara, Y. (1998) Césarienne: Facteur de réduction de

- la morbidité et de la mortalité foeto-maternelle. *Médecine d'Afrique Noire*, **45**, 359-364.
- [23] Pete, Y., Ouattara, A., Koffi, N., *et al.* (2012) Césariennes en urgence: Pronostic materno-foetal au CHU de Cocody d'Abidjan. *African Journal of Emergency Medicine*, **17**, N1.
- [24] Biccard, B.M., Madiba, T.E., Kluyts, H.L., *et al.* (2018) Perioperative Patient Outcomes in the African Surgical Outcomes Study: A 7-Day Prospective Observational Cohort Study. *The Lancet*, **391**, 1589-1598. [https://doi.org/10.1016/S0140-6736\(18\)30001-1](https://doi.org/10.1016/S0140-6736(18)30001-1)
- [25] WHO (2006) Working Together for Health. The World Health Report. http://apps.who.int/iris/bitstream/handle/10665/43432/9241563176_eng.pdf?sequence=1
- [26] Ozumba, B.C. and Nwogu-Ikojo, E.E. (2008) Avoidable Maternal Mortality in Enugu, Nigeria. *Public Health*, **122**, 354-360. <https://doi.org/10.1016/j.puhe.2007.04.018>
- [27] Hussein, J., Hirose, A., Owolabi, O., *et al.* (2016) Maternal Death and Obstetric Care Audits in Nigeria: A Systematic Review of Barriers and Enabling Factors in the Provision of Emergency Care. *Reproductive Health*, **13**, 47. <https://doi.org/10.1186/s12978-016-0158-4>
- [28] Nyengidiki, T. and Allagoa, D.O. (2011) Rupture of the Gravid Uterus in a Tertiary Health Facility in the Niger Deltaregion of Nigeria: A 5-Year Review. *Nigerian Medical Journal*, **52**, 230-234. <https://doi.org/10.4103/0300-1652.93794>
- [29] Tikkanen, M., Gissler, M., Metsaranta, M., *et al.* (2009) Maternal Deaths in Finland: Focus on Placental Abruption. *Acta Obstetrica et Gynecologica Scandinavica*, **88**, 1124-1127. <https://doi.org/10.1080/00016340903214940>
- [30] Gabbay-Benziv, R., Ashwal, E., Lahav-Ezra, H., *et al.* (2014) Decision-to-Delivery Interval in Suspected Placental Abruption—Association with Pregnancy Outcome. *The Journal of Maternal-Fetal & Neonatal Medicine*, **27**, 1680-1683. <https://doi.org/10.3109/14767058.2013.871703>
- [31] Allred, L.S. and Batton, D. (2004) The Effect of Placental Abruption on the Short-Term Outcome of Premature Infants. *The American Journal of Perinatology*, **21**, 157-162. <https://doi.org/10.1055/s-2004-823770>
- [32] Matsuda, Y., Maeda, T. and Kouno, S. (2003) Comparison of Neonatal Outcome Including Cerebral Palsy between Abruption Placentae and Placenta Previa. *European Journal of Obstetrics & Gynecology and Reproductive Biology*, **106**, 125-129. [https://doi.org/10.1016/S0301-2115\(02\)00219-1](https://doi.org/10.1016/S0301-2115(02)00219-1)
- [33] Heinonen, S. and Saarikoski, S. (2001) Reproductive Risk Factors of Fetal Asphyxia at Delivery: A Population Based Analysis. *Journal of Clinical Epidemiology*, **54**, 407-410. [https://doi.org/10.1016/S0895-4356\(00\)00329-2](https://doi.org/10.1016/S0895-4356(00)00329-2)
- [34] Ananth, C.V. and Wilcox, A.J. (2001) Placental Abruption and Perinatal Mortality in the United States. *American Journal of Epidemiology*, **153**, 332-337. <https://doi.org/10.1093/aje/153.4.332>
- [35] Kyrklund-Blomberg, N.B., Gennser, G. and Cnattingius, S. (2001) Placental Abruption and Perinatal Death. *Paediatric and Perinatal Epidemiology*, **15**, 290-297. <https://doi.org/10.1046/j.1365-3016.2001.00352.x>
- [36] Konje, J.C. and Taylor, D.J. (2006) Bleeding in Late Pregnancy. 3rd Edition, WB Saunders Co., Edinburgh, 1259-1275.
- [37] Mongbo, V., Ouendo, E.M., Agueh, V., *et al.* (2016) Factors Associated with Post-Cesarean Stillbirth in 12 Hospitals in Benin: A Cross-Sectional. *The Pan African*

Medical Journal, **25**, 117. <https://doi.org/10.11604/pamj.2016.25.117.9827>

- [38] McClure, E.M., Pasha, O., Goudar, S.S., et al. (2011) Epidemiology of Stillbirth in Low-Middle Income Countries: A Global Network Study. *Acta Obstetrica et Gynecologica Scandinavica*, **90**, 1379-1385. <https://doi.org/10.1111/j.1600-0412.2011.01275.x>
- [39] Racinet, C. and Favier, M. (1984) La césarienne: Indications, Techniques, Complications. Paris, 186 p.
- [40] Palot, M. (2000) Césarienne: technique d'anesthésie et soin post-opératoire. *Journal de Gynécologie Obstétrique et Biologie de la Reproduction*, **29**, 96-107.
- [41] World Health Organization (WHO) (2004) Maternal Mortality in 2000: Estimates Developed by WHO, UNICEF, and UNFPA. Vol. 85, WHO, Geneva, 460-471.
- [42] Picaud, A., Nlome-Nze, A.R., Kouvahe, V., et al. (1990) Les indications de césarienne et leur évolution au centre hospitalier de Libreville. *Revue Française de Gynécologie et d'obstétrique*, **85**, 393-398.
- [43] Gould, J.B., Qin, C. and Chavez, G. (2005) Time of Birth and the Risk of Neonatal Death. *Obstetrics & Gynecology*, **106**, 352-358. <https://doi.org/10.1097/01.AOG.0000168627.33566.3c>
- [44] Lee, K.A. and Lipscomb, J. (2003) Sleep among Shiftworkers—A Priority for Clinical Practice and Research in Occupational Health Nursing. *AAOHN Journal*, **51**, 418-420. <https://doi.org/10.1177/216507990305101003>
- [45] Traoré, P.B. (2017) La césarienne dans les structures sanitaires au Mali: Fréquence, indication, pronostic. Thèse Médecine, Bamako, No. 14.
- [46] Issah, K., Nang-Beifubah, A. and Opoku, C.F. (2011) Maternal and Neonatal Survival and Mortality in the Upper West Region of Ghana. *International Journal of Gynecology & Obstetrics*, **113**, 208-210. <https://doi.org/10.1016/j.ijgo.2011.01.007>
- [47] Bloom, S.L., Leveno, K.J., Spong, C.Y., et al. (2006) Decision-to-Incision Times and Maternal and Infant Outcomes. *Obstetrics & Gynecology*, **108**, 6-11. <https://doi.org/10.1097/01.AOG.0000224693.07785.14>
- [48] Maaløe, N., Housseine, N., Bygbjerg, I.C., et al. (2016) Stillbirths and Quality of Care during Labour at the Low Resource Referral Hospital of Zanzibar: A Case-Control Study. *BMC Pregnancy Childbirth*, **16**, 351. <https://doi.org/10.1186/s12884-016-1142-2>