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Original Research Article

Maternal and perinatal outcomes in multiple versus singleton pregnancies in Dakar, Senegal: a cross sectional study over 10 years

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ABSTRACT

Background: The birth of twins is a singular event in most societies, and even more when it comes to multiple births. The objective of this study was to investigate maternal and perinatal outcomes in multiple versus singleton pregnancies.

Methods: Cross-sectional study carried out at Philippe Maguilen Senghor health center in Dakar, Senegal from January 1, 2011 to June 30, 2019. Data were extracted from this E-perinatal electronic database and then analyzed in statistical package for social science software (SPSS 24, Mac version).

Results: A total 42,870 mothers delivered 44,149 newborns including 1250 twins (2.8%) and 29 triplets. The mean maternal age was 27 years. Mothers with multiple pregnancies had 3 times the odds of poor maternal outcome compared to mothers with single pregnancies (OR 2.42, 95% CI: 1.98-2.94, $p < 0.001$, for high blood pressure; OR, 2.66; 95% CI, 2.11-3.32, $p = < 0.001$, for severe pre-eclampsia; and OR, 3.04; 95% CI, 1.64-5.66, $p < 0.001$, for postpartum hemorrhage). Likewise, women with multiple gestations had significantly higher rates of preterm birth (OR 5.62; 95% CI: 4.91-6.41, $p < 0.001$), breech presentations (OR = 11.02; CI = 9.68-12.53, $p < 0.001$) and neonatal deaths (OR = 2.94; CI = 9.6852-12.5328 $p = 0.004$) as compared to women with singleton gestations. Furthermore, women with multifetal gestations had increased risk for caesarean section (OR 2.14; 95% CI: 1.91-2.41, $p < 0.001$) compared with their singleton counterparts. The risks for episiotomy and perineal injuries were higher for women with singleton gestations as compared to multiple gestation mothers.

Conclusions: This study results are in line with previous findings and contradict others. Particular attention should always be paid to multiple pregnancies' management. However, the pattern of certain complications traditionally correlated with multiple pregnancies is to be confirmed.

Keywords: Maternal outcome, Multiple pregnancy, Perinatal outcome

INTRODUCTION

The birth of twins is a singular event in most societies, and even more when it comes to multiple births. With the progress of science, the evolution of medicine, assisted reproductive technology and the postponement of the age

of maternity, the rate of multiple pregnancies has not stopped increasing over the years, thus becoming a major challenge in obstetrics.^{1,2} Indeed, these pregnancies pose problems at all stages: during follow-up, delivery and postpartum. They are exposed, more than singleton pregnancies, to many potentially serious complications,

both for the expectant mother and for fetuses. The delivery of a multiple pregnancy should be considered a specific delivery and potentially at high risk.³ Perinatal mortality is mainly due to two factors: prematurity and fetal growth restriction. Maternal mortality is mainly due hypertensive disorders and postpartum hemorrhage.

Several studies around the world report that the risk of maternal morbidity and obstetric complications is increased in triple, quadruple and higher pregnancies compared to twin pregnancy.^{4,5}

In Africa, little is known on outcome of multiple pregnancies compared with that of single pregnancies. On this background, study have designed this study to offer clarity and define outcome of multiple and singleton pregnancies.

METHODS

A hospital-based analytical cross-sectional study was conducted at Philippe Maguilen Senghor Health Center (PMSHC) in Dakar,, using patients and their newborns records. Senegalese health system is made of three types of facilities: national and regional hospitals, health centers and health posts. PMSHC is a level 2 health center. It does not have the performance of a hospital but surgical procedures are performed. Teams of residents in obstetrics, midwives and nurses provide continuous, obstetric emergency and neonatal care (EmONC). The on-call duties are carried under the supervision of an obstetrician. The setting has 34 beds. In 2018, the number of deliveries encountered in the study department was 8,172 and the number of outpatients encountered was 16,945.

Study population

The study population was comprised of all mothers who had delivered at PMSHC and their newborns. A total of 48,270 mothers who met the eligibility criteria were enrolled into the study.

The dataset included information on various maternal characteristics, including age, obstetric risk factors comprising baby's birthweight, parity, fetal presentation, newborn's well-being and mode of delivery.

Outcomes were selected to reflect different aspects of maternal and perinatal morbidity and mortality. Neonatal outcomes were measured using 5-minute Apgar score, referral to neonatal care unit and death. Maternal outcomes were described by high blood pressure, diabetes, premature rupture of membrane, perineal injury, ante partum and postpartum hemorrhage, pre-eclampsia/eclampsia, prolonged labor and postpartum sepsis. Caesarean section and episiotomy were used as indicators of obstetric activity.

Deliveries registered over a 102 month-period (1st January 2011 to 30th June, 2019) were extracted from E-Perinatal, our electronic medical record. Furthermore, data extracted were entered into Statistical Package for social science database, cleaned and then analyzed. Mean, median, standard deviation, frequencies and percentages were reported to describe the variables and inferential statistics were used to establish associations between rank of pregnancy and the various risk factors using a chi-square test.

Direct obstetric complications of the World Health Organization considered in this paper were preeclampsia and eclampsia, antepartum and postpartum hemorrhage, postpartum sepsis and ruptured uterus.⁶

The Apgar scoring system was used to assess newborns at first minute after they were born. Apgar score was further categorized as less than 7 and greater than or equal to.⁷

Neonatal referrals refer to as neonates transferred from PMSHC to a neonatal care unit while neonatal death is defined as the death of a live born infant, regardless of gestational age at birth, within the first 28 completed days of life.

Statistical analysis

All statistical tests were two-sided and the level of significance was set at $p < 0.05$.

RESULTS

Characteristics of participants

During the study period, 48,270 mothers delivered a total of 49,459 babies comprising 1,250 pairs of twins (2.8%) et 29 triplets (0.1%). The mean maternal age was 27 years with majority (54%) being aged between 20 and 29 years. Most of the mothers (61.7%) were multiparous.

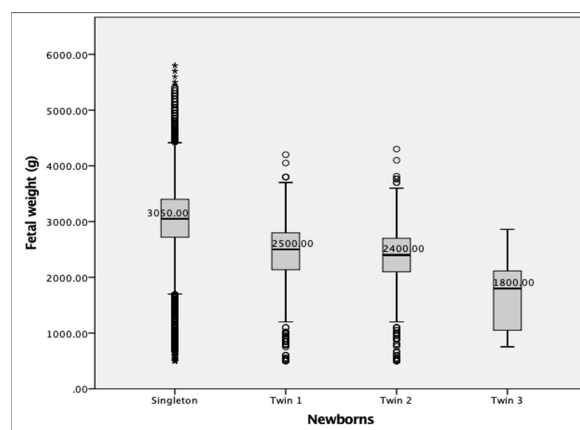


Figure 1: Boxplot for weight distribution of new-borns.

Women with singleton pregnancies shared similar demographic characteristics to women with multiple pregnancies as shown in Table 1.

The mean birth weight was 3044.15 g (500-5800 g, SD: 563.4 - median: 2500 g) for new-borns from singleton pregnancies.

For twins, mean weights were 2419.24 g (500-4200 g, SD: 547.11 - median: 2500 g), 2359.67 g (500-4200 g, SD: 544.22 - median: 2040 g) and 1759.44 g (755-2860 g, SD: 636.36 - median: 1800 g) for the first, second and third twins respectively (Figure 1).

Table 1: Patients' characteristics.

	Multiple pregnancies (N = 1250)	Singleton pregnancies (N = 41620)	p value
Age (years)	28.54	27.28	<0.001
Admission	Referral	16.9%	<0.001
	Direct access	83.1%	
Parity	Primiparity	38.7%	<0.001
	Multiparity	61.3%	
Gestational age(weeks)	37.62	39.36	<0.001
Mode of delivery	Caesarean section	23.3%	<0.001
	Vaginal delivery	76.7%	

Table 2: Maternal and neonatal outcomes by type of pregnancy.

	Multiple pregnancies (N = 1250)	Single pregnancies (N = 41620)	Odds ratio	95% CI	p value
High blood pressure	118 (9.4%)	1,720 (4.1%)	2.42	1.98-2.94	<0.0001
Diabetes mellitus	16 (1.3%)	906 (2.2%)	0.59	0.35-0.95	0.0334
Placenta previa	7 (0.6%)	221 (0.7%)	1.05	0.49-2.24	0.8895
Abruptio placentae	8 (0.6%)	546 (1.3%)	0.48	0.24-0.97	0.0428
Premature rupture of membrane	61 (4.9%)	2,309 (5.5%)	0.87	0.67-1.13	0.3091
Severe preeclampsia	87 (7%)	1,141 (2.7%)	2.66	2.11-3.32	<0.0001
Ante partum hemorrhage	14 (1.1%)	742 (1.8%)	0.62	0.36-1.06	0.0822
Postpartum hemorrhage	11 (0.9%)	121 (0.3%)	3.04	1.64-5.66	<0,001
Prolonged labor	40 (3.2%)	2,977 (7.2%)	0.43	0.31-0.59	<0.0001
Caesarean section	493 (39.4%)	9,696 (23.3%)	2.14	1.91-2.41	<0.0001
Breech presentation	395 (31.6%)	1,675 (4%)	11.02	9.68-12.53	<0.0001
Episiotomy	101 (8.1%)	7,805 (18.8%)	0.38	0.31-0.46	<0.0001
Perineal tear	58 (4.6%)	2,544 (6.1%)	0.75	0.57- 0.97	0.0323
Preterm birth	322 (25.8)	2,421 (5.8%)	5.62	4.91-6.41	<0.0001
Fetal asphyxia	34 (2.7%)	2,495 (6%)	0.44	0.31-0.62	<0.0001
Stillbirth	14 (1.1%)	686 (1.6%)	0.68	0.39-1.15	0.1491
Apgar score <7	265 (21.2%)	5,510 (13.2%)	1.69	1.46-1.94	<0.0001
Neonatal death	12 (1%)	135 (0.3%)	2.94	1.62-5.31	0.0004
Neonatal referral	16 (1.3%)	175 (0.4%)	0.41	0.25-0.67	0.0005

Maternal and neonatal outcomes

Mothers with multiple pregnancies had 3 times the odds of poor maternal outcome compared to mothers with single pregnancies (OR 2.42, 95% CI: 1.98-2.94, p <0.001, for high blood pressure; OR, 2.66; 95% CI, 2.11-3.32, p = <0.001, for severe pre-eclampsia; and OR, 3.04; 95% CI, 1.64-5.66, p <0.001, for postpartum hemorrhage).

Likewise, women with multiple gestations had significantly higher rates of preterm birth, breech presentations and neonatal deaths (Table 2) as compared to women with singleton gestations. Furthermore, women with multifetal gestations had increased risk for caesarean section (OR 2.14; 95% CI: 1,91-2,41, p <0.001) compared with their singleton counterparts. The risk for episiotomy and perineal tears was higher for women with singleton gestations as compared to multiple gestation mothers.

DISCUSSION

The prevalence of high blood pressure in multiple pregnancies has been described in the literature. Study have found the odds of hypertension in multiple pregnancies to be twice as high as the odds of hypertension in single pregnancies. This was consistent with the results of Sibai et al, who reported a 2-fold risk of high blood pressure in a multiple pregnancy. Buhling et al, also found that the risk of high blood pressure was increased during multiple pregnancies.^{7,8}

A negative correlation was found between gestational diabetes and multiple pregnancies. This study results contradict those reported by Gérardin et al, who found a risk 1.9 times of developing gestational diabetes in a multiple pregnancy.⁹ Gestational diabetes results from a relative insulin deficiency owing to the diabetogenic effect of placental hormones (placental lactogenic hormone, progesterone and cortisol). The larger placental mass of multiple pregnancies increases the amount of these placental hormones and, therefore, theoretically, the risk of developing gestational diabetes.^{5,10} Even if fasting blood sugar is recommended in the prenatal check-up in Senegal, it is common to notice that women did not benefit from it during their antenatal care. Further studies with more comprehensive data on this variable are needed to rule on the relationship between gestational diabetes and multiple pregnancy in this study setting.

Compared to women with singleton pregnancies, women with twin pregnancies had a 4-fold increased risk of having serious maternal complications both before and after delivery as stated Madar and Andriamady.^{11,12}

The odds of postpartum hemorrhage and severe preeclampsia among women with multiple pregnancies were 3 times as high as the odds of those with single pregnancies. These results are in line with other findings.^{7,9,13-15} Major direct obstetric complications are known to lead to maternal mortality if not managed properly. As recommended by the WHO, the goal is that all women who have obstetric complications will receive EmONC, the minimum acceptable level is 100%. However, improving quality of antenatal care might contribute consistently to reducing morbidity associated to these complications.

In the present study, mothers with multiple gestations had a 5-fold increased risk of preterm birth and 2-fold increased risk of neonatal death compared with singleton gestations mothers. This study findings are consistent with previous published studies where twin pregnancies were to be associated with a 3-fold greater perinatal mortality than singleton pregnancies. Furthermore, prematurity was considered as the main contributor, with 50% of twin pregnancies delivering before 37 weeks and 10% delivering before 32 weeks of gestation.¹⁶ The cause of preterm delivery in multiple pregnancies is likely multifactorial and different from that of singletons.

Cervical cerclage reduces preterm birth rates in singletons but has mixed results in twins with some studies showing harm.¹⁶

This study findings suggest reinforcing in neonatal care unit to enable it to manage preterm newborns in regard with the rate of preterm births.

Methodological considerations

A strength of this study is that it is based on a large dataset of over 45,000 deliveries that occurred over 8 years. It therefore provides a description practices in Dakar, Senegal.

Data collection is reliable because the recording is continuous and does not only consider the variables included in the study, but a large number of demographics, obstetrical and neonatal characteristics. This is the first large study in West African region in particular to utilize a large sample size relating to the subject. This increases the power to detect the association between exposure and outcomes assessed. This study results therefore can be generalized to other women who deliver in similar settings in Senegal. The identified maternal outcome associated with multiple gestations agrees with several studies. However, the data in this study comes from medical records and some details of management as well as the complications encountered may be missing.

CONCLUSION

This study results confirm some already established factors regarding the outcome of multiple pregnancies (considering Bradford Hill criteria) and contradict others. Particular attention should always be paid to multiple pregnancies management. However, the epidemiology of certain complications conventionally correlated with multiple pregnancies is to be confirmed.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Guèye M, Ndiaye Guèye MD, Mbaye M, Abdoulaye M, Pison G, Monden C, et al. Twinning rates in developed countries: trends and explanations. *population and development review.* 2015;41:629-49.
2. Antoine JM, Audebert A, Avril C, Belaisch-Allart J, Blondel B, Bréart G, et al. Treatments de la sterility et grossness's multiples en France: analyse et recommendations. *Gynécol Obstét Fertil.* 2004;7(32):670-83.

3. Gaucherand P, Polzin K. Accouchement des jumeaux et des triplés. In: Marpeau L, ed. *Traité d'obstétrique*. Paris: Elsevier Masson; 2010:388-93.
4. Luke B, Brown MB. Maternal morbidity and infant death in twin vs triplet and quadruplet pregnancies. *Am J Obstet Gynecol.* 2008;198(4):401.
5. Wen SW, Demissie K, Yang Q, Walker MC. Maternal morbidity and obstetric complications in triplet pregnancies and quadruplet and higher-order multiple pregnancies. *Am J Obstet Gynecol.* 2004;191(1):254-8.
6. Organisation Mondiale de la Santé. Surveillance des soins obstétricaux d'urgence. *Manuel Utilization.* 2011;173.
7. Sibai BM, Hauth J, Caritis S, Lindheimer MD, MacPherson C, Klebanoff M, et al. Hypertensive disorders in twin versus singleton gestations. *Am J Obstet Gynecol.* 2000;182(4):938-42.
8. Buhling KJ, Henrich W, Starr E, Lubke M, Bertram S, Siebert G, et al. Risk for gestational diabetes and hypertension for women with twin pregnancy compared to singleton pregnancy. *Arch Gynecol Obstet.* 2003;269:33-6.
9. Gérardin P, Boumahni B, Choker G. Grossness's gémellaires dans le sud de l'île de la Réunion. *J Gynécol Obstét Biol Reprod.* 2006;35(8):804-12.
10. Bricker L. Optimal antenatal care for twin and triplet pregnancy: The evidence base. *Best Pract Res Clin Obstet Gynaecol.* 2014;28:305-17.
11. Madar H, Goffinet F, Seco A, Rozenberg P, Dupont C, Deneux-Tharoux C. Severe acute maternal morbidity in twin compared with singleton pregnancies. *Obstet Gynecol.* 2019;133(6):1141-50.
12. Andriamady R, Rasoarinavalona A, Ranjalahy R. Prise en charge des grossness's multiples à la Maternity de Befelatanana Center Hospitalize Universitario d'Antananarivo (Madagascar): à propos de 143 cas. *Arch Inst Pasteur Madagascar.* 1999;65(2):103-6.
13. Connolly KA, Getrajdman CS, Bigelow CA, Weintraub AS, Stone JL. Maternal clinical disease characteristics and maternal and neonatal outcomes in twin and singleton pregnancies with severe preeclampsia. *Eur J Obstet Gynecol Reprod Biol.* 2016;201:36-41.
14. Chiwanga ES, Massenga G, Mlay P, Obure J, Mahande MJ. Maternal outcome in multiple versus singleton pregnancies in Northern Tanzania: a registry-based case control study. *Asian Pacific J Reprod.* 2014;3(1):46-52.
15. Duckitt K, Harrington D. Risk factors for pre-eclampsia at antenatal booking: systematic review of controlled studies. *The BMJ.* 2005;330:565.
16. Murray SR, Stock SJ, Cowan S, Cooper ES, Norman JE. Spontaneous preterm birth prevention in multiple pregnancy. *Obstet Gynaecol.* 2018;20(1):57-63.

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