

## Research Article

# Fetal and Neonatal Complications of Gestational Diabetes: A Survey in Two Referral Hospitals of Yaoundé, Cameroon

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## Abstract

The in-utero exposition of fetuses to Gestational Diabetes (GDM) is known to induce a wide range of metabolic modifications, with possible complications in neonates. We intended to investigate these outcomes in such fetuses and neonates delivered in two referral hospitals of Yaoundé in Cameroon. We conducted an observational study with cross-sectional design at the Yaoundé Central Hospital (YCH) and the Yaoundé Gynaeco-Obstetric and Pediatric Hospital (YGOPH). The study lasted for seven months and consisted of investigations from files of all women admitted with GDM and their neonates, from January 2018 to January 2020. Data were analyzed using SPSS software (Statistical Package for the Social Sciences) version 20. The main results obtained were the following: a total of 34 pregnant women were diagnosed with GDM out of 652 women admitted in the service during the same period, with 5.2% incidence. The majority of neonates were big and macrosomes (22: 64.7%). Prematurity occurred in 14 (41.7%), while hypoglycemia was found in 13 (38.4%) neonates. Neonatal infection was manifested by 8 (23.52%) neonates. Fetal distress was recorded in 8 (23.3%) cases, with respiratory distress being noted in 4 (11.7%) neonates, while 3 (8.3%) neonates suffered jaundice. There were 2 abortions (5.8%) and 2 (5.8%) stillbirths, making a death rate of 4 on 34 pregnancies (11.6%). Birth obstetrical trauma was found in 1 (2.5%) neonate, while no complications occurred in 2 (5.2%) cases. From these results, we deduced neonatal complications in GDM in our context were not very different from those expected, as macrosomia, preterm and hypoglycemia were predominant complications. However, it appeared that fetuses from such pregnancies are particularly vulnerable, with significant rates of distress, prematurity, and high death rate. This indicates the need for keen fetal monitoring and effective neonatal management of such babies.

**Keywords:** Gestational diabetes, Fetal distress, Macrosomia, Cameroon

## Introduction

The prevalence of GDM is continuously increasing worldwide, including in sub-saharan Africa and Cameroon. According to results from systematic reviews of studies conducted in the continent, this rate is estimated around 13.6%, of which central Africa alone is believed to account for more than 20.4% [1]. GDM is thought to increase perinatal morbidity, through a number of fetal and neonatal adverse outcomes. Such outcomes mainly comprise macrosomia with metabolic and hematological disorders which are mostly described, beside obstetrical birth trauma due to dystocia, just to name a few [2-6]. On the other hand, this is in turn responsible for increased rates of admissions to the neonatal intensive care unit in babies delivered from such pregnancies [7-9]. However, there is paucity of contextual investigations of such complications in fetuses and neonates in our milieu, especially from an epidemiological stand point. As such, the local clinical practice has mainly relied on findings from foreign experiences which may not absolutely be adapted, nor always true to African conditions. This study was therefore, intended to contribute as a beginning of response to this need, in quest of confirming, comforting or refuting past knowledge with new findings. This survey was also meant to provide updated data as an indirect evaluation of considerable advances in obstetrics, perinatology, and pediatric practice at large, as far as the management of GDM in our hospitals is concerned [10].

## Methodology

We carried out an observational study with cross-sectional design at the Yaoundé Central Hospital and the Yaoundé Gynaeco-Obstetric and Pediatric Hospital, which are two referral and university teaching hospitals in Yaoundé, Cameroon. This was a seven-month investigation from files of all women admitted with GDM and their babies from January 2018 to January 2020. Data on sociodemographic, clinical and therapeutic characteristics were collected using a collection sheet. Data was then registered and analyzed using the Statistical Package for the Social Sciences (SPSS) software version 20.

## Results

A total of 34 pregnant women with gestational diabetes were identified in both hospitals, out of 652 women admitted in the service during the same period. This corresponded to an incidence of 5.2% for GDM. The average GA at delivery was 37.7 weeks of gestation  $\pm$ 1.8. Most of these women (27: 79.2%) were being followed by both gynecologist and endocrinologist (21: 61.6%). All neonates were assessed and followed-up by pediatrician. Most deliveries were at term (20: 58.3%). The rate of caesarean delivery was 22 out of 34 deliveries (64.1%), and there were 20 live births (88.4%) (Table 1).

**Table 1:** Fetal and neonatal complications of gestational diabetes.

Variables	Women who had GDM (N=34)	
	N	%
<b>Fetal and Neonatal Complications</b>		
Fetal distress	8	23.3
Preterm	14	41.7
Big baby (3500-4000g)	9	26.7
Macrosomic baby (>4000g)	13	38.4
Hypoglycemia	12	35.9
Respiratory distress	4	11.7
Abortions	4	11.76
Birth obstetrical trauma	1	2.5
Neonatal infection	8	23.2
Neonatal Jaundice	3	8.3
Still birth	3	8.82
Abortion	2	5.8
Still birth	2	5.8
Total deaths	4	11.6
None	2	5.8

## Discussion

In this survey, the prevalence of GDM was 5.2% and fell within the estimated range previously described by Sobgwi et al who conducted a study on gestational diabetes in six regions of Cameroon in 2010. They found that the prevalence fluctuated within 5-17% in the country. This was reproducible in our survey, probably due to context-related specificities of common population characteristics [11]. However, our finding is lower than Egbe et al investigation results, who reported a prevalence of GDM as high as 20% in a study carried out in three hospitals in the southwest region of Cameroon. This discrepancy can be explained by the lack of uniformity in diagnostic protocols, which varied from one study to the other [12].

Most pregnant women, and hence fetuses (21: 61.6%) benefited from specialized follow-up, as well as the management of intercurrent acute health issues in order to reduce in utero and perinatal complications as much as possible [13-18]. Nevertheless, there was high rate of fetal distress (23.3%), with consequent increase in the rate of abortions (5.8%) and still births (5.8%), making a total death rate of 11.6%, which was quite high in this population [8]. In effect, it is believed that intermittent hyperglycemia in GDM due to maternal insulin resistance is responsible for elevated glucose trans placental transfer to the fetus, with consequent increase of fetal insulin secretion. This induces high substrate tissue tension with immediate and increased needs for oxygen consumption. Thus, "oxygen debt" may rapidly set, leading to distress and eventually fetal death or perinatal asphyxia if not satisfied [3,13]. It is through this phenomenon that high rates of abortion and stillbirths are recorded in GDM. This therefore shows a need for continuous antenatal follow-up of such fetuses and immediate assessment of neonates from mothers with GDM [14-21]. Nevertheless, mothers should be continuously monitored and reassured as well, to prevent

complications due to stressful delivery and/or caesarean section [22-32].

A high rate of premature delivery up to 41.7% was noted in our survey, but is consistent with findings from most studies on GDM. This is explained by the mechanical effects due to a fast growing fetus, which is larger for gestational age. It is responsible for precocious hyper uterine distension and increased pressure on cervix from a large fetal head. When this does not lead to premature delivery, cephalo-pelvic disproportion may occur later on during term delivery, with mechanical dystocia, and eventually an absolute indication of emergency caesarean section. However, an effective obstetrical follow-up allows anticipation of such outcomes and permits prophylactic caesarean section. The surgical delivery would thus be elective in this case, with relative indication rendering the intervention less risky and with favorable outcome [19]. Therefore, the large prescription of caesarean section appears to be indispensable and beneficial in most cases with macrosomia to prevent perinatal complications [22-33]. As a matter of fact, the rate of live births above 88% found in this survey with marked reduction of birth obstetrical trauma as low as 2.5%, justifies the high rate of caesarean section practice in this context.

Macrosomia and big babies, just as being large for gestational age were major complications in this survey (64.7%). This is very common in GDM as fetal hyperglycemia from maternal insulin resistance stimulates fetal pancreatic  $\beta$ -cells to release insulin which is a growth factor. The natural outcome is fetal macrosomia, characterized by increased subcutaneous fat, muscle mass, and head circumference. On the other hand, a sudden interruption of maternal trans placental glucose alimentation or convey takes place after delivery. Coupled with transient fetal hyperinsulinism, this may lead to acute hypoglycemia during the following hours or few days after birth, according to neonatal glycogen stock or reserves [3,13].

Respiratory distress occurred in 11.7% neonates from pregnancies with GDM. This is a regular and documented neonatal complication, which has been reported in a number of studies. It is believed that hyperinsulinism is associated with low secretion of surfactant in fetus, thereby inducing the hyaline membrane disease which is a main cause of respiratory distress. Furthermore, this is aggravated by high rates of prematurity or preterm delivery as was found in our results, bearing in mind that prematurity is strongly associated with hyaline membrane disease [34]. Another cause of respiratory distress in neonates (apart from GDM) is neonatal sepsis with pneumonia, which was quite prevalent in this population as well, although lower than that of the general neonatal population [8].

Some neonates (8.3%) in our sample manifested jaundice with hyperbilirubinemia in this survey, which is an expected complication in infants from mothers with GDM. This is associated with mild hemolysis from polycythemia originating from fetal hypoxia or perinatal asphyxia [34]. However, hypocalcemia, hypertrophic cardiomyopathy, and congenital malformations often described in the literature were not identified in our survey. This may be due to the fact that our sample size was not broad enough to see more complications, and so this constituted a limit to our study. Nevertheless, there is a need to monitor the growth of such infants in the short and long term [39-42].

## Conclusion

From these results, we observed that GDM is a major issue during pregnancy in our milieu, this with the capability to induce serious fetal and neonatal complications of which macrosomia, prematurity and hypoglycemia are the most frequent. Although other expected complications including polycythemia and jaundice, neonatal infection, birth trauma with shoulder dystocia and respiratory distress can occurred as well, but with lower frequency. However, the relative high rates of death, premature delivery, and caesarean section among this population calls for prompt diagnosis, effective follow-up and management as long as after delivery.

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