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MATERNAL AND NEONATAL OUTCOMES OF ADMISSIONS FOR GESTATIONAL DIABETES MELLITUS IN A PUBLIC MATERNITY HOSPITAL

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José Francisco Ribeiro[1], Francisca Aline Amaral da Silva[2], Maria Eliane Martins Oliveira da Rocha[3], Tatiana Custódio das Chagas Pires Galvão[4], Janaiara de Sousa Almeida[5] and Emérson de Sousa Oliveira[6]

ABSTRACT

Objectives: To analyze maternal and neonatal outcomes of admissions for gestational diabetes mellitus in a public maternity hospital. Methods: This is a retrospective, quantitative descriptive study consisting of a sample of 120 dockers of women diagnosed with gestational diabetes mellitus under clinical treatment. Results: regarding the sociodemographic and clinical profile of the admissions studied, it was observed that most were single (44.2%); diagnosed with gestational diabetes mellitus in the first trimester of pregnancy (73.3%); drug therapy insulin administration (83.3%). Maternal outcomes evidenced, abdominal delivery (82.5%); It was detected that there was a statistically

[1] Dr.
Prof.
State University of Piauí
Bachelor's Degree in Nursing
Health Sciences Center
ORCID: https://orcid.org/0000-0003-3133-010
[2] Dr.
Prof.
State University of Piauí
Bachelor's Degree in Nursing
Health Sciences Center
ORCID: https://orcid.org/000-0003-4931-808X
[3] Dr.
Prof.
State University of Piauí
Bachelor's Degree in Nursing
Health Sciences Center
ORCID: https://orcid.org/0000-0002-7743-6107
[4] Me.
Infuse.
New Dona Evangelina Rosa Maternity
State Department of Health
ORCID: https://orcid.org/0000-0001-9907-0831
[5] Graduate.
Infuse.
State University of Piauí
Bachelor's Degree in Nursing
Health Sciences Center
ORCID: https://orcid.org/0000-0003-2082-7622
[6] Focus.
New Dona Evangelina Rosa Maternity
ORCID: https://orcid.org/0009-0007-5846-1431

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significant enough percentage of conceptuses with adequate weight for gestational age (65.8%). For the neonatal outcome, it was found that most were referred to rooming-in (86.7%). Conclusion: The responses to the objectives of this research reflect and sensitize obstetricians, neonatologists, pediatricians and generalists to adapt a common scientific language for the development of qualified care practice for pregnant women diagnosed with gestational diabetes mellitus, since referrals for high-risk prenatal care should be as early as possible and that there is feedback among the attention of health services.

Keywords: High-Risk Pregnancy. Gestational Diabetes. Infant mortality.

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INTRODUCTION

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A worldwide trend of increasing obesity was reported from 1975 to 2016, affecting mainly women when compared to men.(1) given that in women, the number of obesity led to an increase in the incidence of gestational diabetes mellitus (GDM), as well as pregnancy linked to perinatal and/or neonatal complications. Non-variable risk factors for GDM inclination include: advanced maternal age, ethnicity, and family history of GDM type II.(2)

GDM traditionally refers to glucose intolerance with onset or first detection during pregnancy. GDM has been associated for many decades with obstetric and neonatal complications, essentially related to the higher birth weight of the fetus, therefore, it is increasingly understood as a risk factor for future cardiometabolic diseases of the mother/child binomial.(3.4)

The prevalence of GDM continues in increasing order internationally with regard to epidemiological factors, integrating the addition to the baseline rates of obesity in women of childbearing age and advancing maternal age, as well as the implementation of the revised diagnostic criteria and procedures of the International Association of Diabetes and Pregnancy Study Groups. The current lack of international adjustment for the diagnosis of GDM portrays its intricate historical growth and pragmatic ideas about prenatal resources, since GDM is pointed out as one of the current complications and quite common in pregnancy. (4.5)

Diabetes mellitus (DM) is reported as a metabolic disorder characterized by insistent hyperglycemia, resulting from a deficit in insulin production or its action, or in both mechanisms. The most recent updates reveal that this infection reaches epidemic proportions, with an estimated 425 million people with DM worldwide. (6.7)

Following this context, it is important to highlight that this complication is constantly advanced around the 3rd trimester of pregnancy, since there is insulin resistance produced by pregnancy hormones that are extinguished after delivery and rarely produce sequelae. However, for the recovery of this disease after pregnancy, it is essential that women proceed with the treatment guided by the doctor. The treatment of GDM should be started during pregnancy, following a convenient diet and consuming compatible medications specifically. (7.8)

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Research involving this theme has published a large collection revealing complications that can occur in GDM, such as: prolonged labor, difficulty of the fetus to adapt to the maternal pelvis, soft tissue laceration, increase in cesarean sections, postpartum hemorrhages, uterine atony followed by placental retention, fracture of the fetus clavicle related to macrosomia, impairment of brachial plexus innervation and resulting from this can generate Erb-Duchenne palsy.(9)

It is essential that they have skillful measures to monitor weight gain during pregnancy, to prevent neonatal damage and childhood obesity. There are some therapies operated to obtain advances in GDM and obesity, which are changes in lifestyle habits, through the acceptance of timely diets and the practice of physical activity. A sedentary lifestyle and uncontrolled eating lead to an increase and worsening of GDM. (10-11)

In addition to these treatment managements, there are also pharmacological measures, metformin hydrochloride is an oral antidiabetic that manifests good results in gestational obesity, the drug when associated with changes in eating patterns and physical activities have positive results, with convalescence of glycemic level, blood pressure and decrease in body mass. The treatment for GDM aims to maintain glycemic control, so that there is a decrease in maternal and infant morbidities and mortality, as well as pregnancies in which the mother does not have GDM.(10-11)

In this sense, the research is justified by the finding that Gestational Diabetes Mellitus is one of the frequent obstetric complications in pregnancy, according to the global context, there is a need to seek information on maternal and neonatal outcomes, so this knowledge will serve as tools for health professionals and related areas regarding the planning of health actions directed and balanced to this public, as well as to stimulate capacities in the involvement of factors intrinsic to maternal and neonatal outcomes in gestational diabetes mellitus.

Thus, the present study aimed to analyze maternal and neonatal outcomes of admissions for gestational diabetes mellitus in a public maternity hospital.

METHODOLOGY

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This is a cross-sectional study based on a quantitative approach, since it aims to describe the characteristics of a given population or phenomenon in parallel with the establishment of relationships between variables.

The participants in this study were made up of all the medical records of women admitted to the maternity hospital, for follow-up or clinical treatment of gestational diabetes mellitus, from 01/01/2022 to 12/31/2022, resulting in a sample of 120 medical records.

The inclusion criteria were intended for the medical records of women with a clinical diagnosis of gestational diabetes mellitus confirmed in the medical records. The exclusion criteria were directed to medical records that did not show completeness of information for filling out the data collection form.

The study was developed in Teresina, capital of the State of Piauí, which has approximately a population of 871,126 inhabitants, according to data obtained from the Institute of Geography and Statistics. The study site was a public maternity hospital in the state of Piauí, located in the southern region of the city of Teresina-PI. It is an institution that offers low, medium and high complexity, urgent and emergency care, outpatient clinic, hospitalizations, diagnosis and therapy, which has a total number of 248 obstetric beds, 167 neonatal beds and a maternal intensive care unit.

It is the largest maternity hospital in the state and is responsible for 63% of births in the city of Teresina. It has about 1200 hospitalizations per month, of which 900 are normal and cesarean deliveries. With the implementation of the Full Municipal Management of the Unified Health System, it became a reference in the municipal network for the care of high-risk pregnant women, and is also a state reference.

Data collection took place between December 26, 2022 and January 17, 2023, in medical records completely completed by professionals in the sector, through the waiver of the Informed Consent Form, considering that the data collection consisted of this information contained in medical records, thus presenting the TCUD.

The research instrument was a form previously prepared with information from the patients' medical records, an instrument organized with the following information: maternal socioeconomic characteristics, obstetric maternal characteristics and clinical characteristics of the newborn. The data collection product was planned to be processed in the *Microsoft Excel* program - version 2019 (16.0), of the X86 and x64 platform, of the *Microsoft Windows* operating system and the research instrument was tested to identify any problems related to the completion of the data.

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The statistical analysis was descriptive, using descriptive tables to summarize the observed characteristics of the sample and cross-tables in order to observe the interaction between the variables. *Microsoft Excel* is a powerful statistical analysis and data handling software, developed by *the Microsoft* company. To carry out the tables presented in the research, the pivot table function was used.

To carry out the study, it was registered with the Research Ethics Committee (CEP) of the State University of Piauí-UESPI and with the ethics committee of the researched Hospital Institution, in accordance with resolution 466/12 of the National Health Council. It was a research entitled: "maternal and neonatal outcomes of premature birth in a public maternity hospital" part of an integrated project approved by the CEP/CCS with opinion No. 5.287.474 CAAE: 56090522.8.0000.5209.

RESULTS

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Table 1 shows that: single women (44.2%); diagnosis of GDM 1st trimester (73.3%); insulin therapy (83.3%); cesarean delivery (82.5%). Regarding the Neonatal outcome, it was detected that full-term delivery (65.8%), AGA weight (65.8%); ALCON (86.7%). The final outcome reveals the existence of neonatal death (1.7%).

Table 1. Sociodemographic and clinical characterization of maternal and neonatal outcomes of gestational diabetes mellitus in a public maternity hospital. Teresina (PI). Brazil, 2024.

Maternal outcome			Neonatal outcome		
Description	N	%	Description	N	%
Marital status			Age at birth		
Stable union	36	30	Not informed	8	6,7
Married woman	31	25,8	Forward	79	65,8
Single	53	44,2	Preterm	33	27,5
Diagnosis of GDM			Postterm	0,0	0,0
Q1	88	73,3	Birth weight		
Q2	26	21,7	Not informed	8,0	6,7
Q3	6,0	5,0	PIG	30	25,0
Therapeutics			AIG	79	65,8
Insulin	100	83,3	GIG	3,0	2,5
Metformin	12	10,0	Neonatal outcome		
Non-pharmacological	8,0	6,7	Not informed	8,0	6,7
Maternal Outcome			ALCON	104	86,7
Discharged	8,0	6,7	UTIN	6,0	5,0

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Normal delivery	12	10	Death	2,0	1,7
Caesarian delivery	99	82,5	-	-	-
Death	1,0	0,8	-	-	-
NOTE: Term (37 to 42 weeks gestation): SGA: small for gestational age: AGA: adequate for gestational age; LGA: large for gestational age: ALCON: rooming-in: NICU: neonatal intensive care unit					

SOURCE: Public Maternity Hospital.

Regarding the maternal outcomes associated with the therapy used, it was observed that there was a prevalence for abdominal delivery in the administration of insulin (82%); metformin (83.3%) and the most used was non-pharmacological therapy (87.5%). For neonatal outcomes related to therapy, small for gestational age newborns were found with the following therapy: Insulin (65%); Metformin (66.7%) and non-pharmacological (75%).

Table 2. Distribution of maternal and neonatal outcomes in a public maternity hospital according to therapy. Teresina (PI). Brazil. 2024.

Maternal Outcome	Therapeutics		
	Insulin	Metformin	Non-pharmacological
	%	%	%
Discharged	8,0	0,0	0,0
Normal delivery	9,0	16,7	12,5
Abdominal delivery	82,0	83,3	87,5
Death	1,0	0,0	0,0
Neonatal Outcome			
Not informed	8,0	0,0	0,0
AIG	24,0	33,3	25,0
PIG	65,0	66,7	75,0
GIG	3,0	0,0	0,0
NOTE: AGA: appropriate for gestational age; SGA: small for gestational age; LGA: great for gestational age			

SOURCE: Public Reference Maternity.

Regarding maternal age, according to the final result of pregnancy, it was found that abdominal parum is more related to ages over 40 years. Although there is a small difference for outcomes younger than 40 years.

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Table 3. Distribution of maternal outcomes according to maternal age, mode of delivery, and final outcome of hospitalization. Teresina (PI). Brazil, 2024.

Maternal outcome	Ages	
	≤ 40 years	> 40 years
	%	%
Discharged	6,6	7,1
Normal Delivery	11,3	0,0
Abdominal delivery	81,1	92,9
Death	0,9	0,0

SOURCE: Public Maternity Referral

DISCUSSION

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The results of this study reveal that the sample exhibits particularities that validate other studies carried out with pregnant women assisted in public health services in Brazil, with a predominance of women of reproductive age, brown, with marital cohabitation and economically without formal salary. In a This was a cross-sectional study conducted in 2016 in a specific maternity hospital for high-risk pregnancies in the city of Rio Branco, Acre State, Brazil. The mean age of the pregnant women in the sample was 28 years. Significantly, 2.7% of these women were under 15 years of age and 21% were over 35 years of age. It is found that pregnancy in adolescence and after 35 years of age has been related to low birth weight, low APGAR index, prematurity and higher occurrence of abdominal delivery.[12]

Although the influence of advanced maternal age and delayed procreation on adverse maternal and perinatal outcomes has been extensively researched, there is no universal consensus on the definition of advanced maternal age. This terminology currently refers to the last years of a woman's reproductive life and generally applies to women aged ≥35 years.[13]

Advanced maternal age increases the risk of pregnancy complications, including ectopic pregnancy, miscarriage, fetal chromosomal abnormalities, congenital anomalies, placental abruption, gestational diabetes, preeclampsia, and cesarean delivery. Such complications can be the cause of preterm birth and increase the risk of perinatal mortality. For women who have a chronic illness, pregnancy can lead to an additional risk that requires greater monitoring or surveillance.[13.14]

In the research entitled "Risk factors for adverse pregnancy outcomes in Chinese women: a meta-analysis" the authors concluded that the number of pregnancies, low level

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of education, GDM and maternal age are quite significant for high-risk pregnancies in Chinese women, while gestational age, smoking and parity had no relevant effect on high-risk pregnancies.(15)

Regarding the diagnosis of GDM, the seminal study Hyperglycemia and Adverse Outcomes in Pregnancy (HAPO) sought to provide an evidence base to guide the risk in GDM, and its results were published in 2008. This robust, international, prospective, observational study evaluated the relationship between glucose levels in the 2-hour 75 g OGTT conducted between 24 and 32 weeks' gestation (mean 27.8 weeks' gestation) in more than 25,000 pregnant women with the following primary perinatal symptoms: birth weight > 90th percentile for gestational age, primary cesarean delivery, neonatal hypoglycemia, and umbilical cord serum C-peptide > the 90th percentile. Secondary outcomes were preeclampsia, preterm birth (defined as delivery before 37 weeks' gestation), shoulder dystocia or birth injury, hyperbilirubinaemia, and admission to neonatal intensive care. The results showed a continuous positive linear relationship between maternal fasting; Plasma glucose levels at 1 and 2 hours obtained in the OGTT, below those that were diagnosed with diabetes outside pregnancy; and primary outcome risk. Therefore, there were no specific glucose thresholds in which obstetric and neonatal complications suggested a significant increase.(16)

As for the therapy used, insulin, as well as oral medications, has been administered for the treatment of hyperglycemia in women with GDM. During pregnancy, insulin has the safest profile. Oral agents that have been studied include sulfonylureas, such as glyburide (also known as glibenclamide), as well as metformin. In the USA, both the ADA (*American Diabetes Association*) and the ACOG (*American College of Obstetrics and Gynecology*) recommend insulin as the first line for controlling hyperglycemia in patients with GDM. Insulin is a large molecule and does not cross the placenta. Metformin and glibenclamide have been shown to cross the placenta and reach the fetus.(17)

Oral drugs for patients with diabetes have not been adequately researched for possible long-term effects on neonatal outcomes, and yet they are not recommended as the first choice in the treatment of persistent hyperglycemia in women with GDM. They have also been reported to fail to control hyperglycemia in about a quarter of women with GDM.(17.18)

In cases where patients are unable to obtain insulin or refuse insulin, oral medications may be prescribed. When confronted with the two oral agents, metformin appears to be

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safer than glibenclamide. Glyburide has been linked to neonatal hypoglycemia and higher birth weight, which may increase the risk of shoulder dystocia or the need for cesarean delivery. In addition, glyburide has been shown to be present in umbilical cord blood samples at concentrations that are 50-70% of maternal levels, which can lead to neonatal hypoglycemia. Although metformin is claimed to have a lower risk of neonatal hypoglycemia, cord blood metformin levels are reported to be similar to or higher than maternal levels.(18)

The most common adverse effect of GDM in pregnancy is accelerated fetal growth. Exacerbated blood glucose stimulates the fetal pancreas to release insulin. In the fetus, insulin acts as a growth-promoting hormone. Increased perinatal risks associated with GDM include emergency cesarean section, instrumental delivery, shoulder dystocia and birth trauma for the infant, and perineal trauma for the mother. Some of these complications could potentially be prevented through planned elective caesarean section or induction of labour in a previous pregnancy, before the baby gets too big.(19)

Maternal diabetes is associated with pregnancy complications and increased rates of adverse maternal and neonatal outcomes. Short-term complications include macrosomia, large conceptus for gestational age, respiratory distress syndrome, neonatal hypoglycemia, admission to the neonatal intensive care unit, intrauterine growth restriction, congenital anomalies, preterm delivery, preeclampsia, cesarean section. and premature birth, while in the long term the mother/baby binomial have an increased risk of metabolic diseases.(20)

Because it was a study carried out with information contained in medical records, the following limitations were faced: insufficient characterization of patient data, order of sheets constituting the medical records outside the conventional order of pagination, gaps in the completion of notes on the evolution of the clinical condition, grammatical errors and reading difficulties in the writing of some professionals. However, the results found showed qualified nursing care, thus focusing on spaces to sensitize researchers on this theme, professionals and health managers, regarding the extension of care to women, according to each level of care care.

CONCLUSION

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The results observed corroborate national and international research, since maternal and neonatal outcomes are intrinsically related to the characterizations of obstetric and neonatal clinic in gestational diabetes, so early diagnosis, qualified prenatal care, and specific therapy are determining factors for favorable outcomes for the mother/baby binomial. Thus, the importance of facilitating the entry of pregnant women into the health system according to the level of complexity.

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