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Original article

Risk Factors Associated with Gestational Diabetes Mellitus Among Pregnant Women

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ABSTRACT

Gestational diabetes mellitus (GDM) represents 84% of hyperglycemia during pregnancy throughout the world. Moreover, being black is a risk factor to develop the disease. Our objective was to determine the prevalence and the associated factors of GDM in Tripoli. A descriptive cross-sectional study was conducted over the period from March to April 2024. We have selected 3 diagnostic laboratories inside Tripoli to collect the data. Pregnant women were enrolled at each center where we had stayed for a week. Majority of participants 42.5% were in the age ⩾ 35 years, and the lowest 11.5% were from the age of 20-24 years. The mean body mass index (BMI) was higher 60.5% for those with ⩾25 and was lower 39.5% for those ⩽25. For gestational ages, most of participants 48.5% were between 24-28 gestational week, while the minority 11.5% were within 24 gestational weeks. The highest percentage 42.5% regarding the parity was for pregnant with Pauciparous (1-4), and minority of participants 92.5% had history for GDM. Careful surveillance is required for these pregnancies in high-risk units for early detection and treatment of possible complications, in order to try to reduce maternal and neonatal morbidities. Further prospective studies among these high-risk populations with gestational diabetes should investigate the efficacy of possible surveillance programs.

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INTRODUCTION

Gestational diabetes mellitus (GDM) is a common medical complication that occurs during pregnancy. It is characterized by glucose intolerance that begins or is first recognized during pregnancy. The prevalence of gestational diabetes varies across different populations and regions, but on average, it affects approximately 2% to 10% of pregnancies worldwide [1]. Several risk factors contribute to the development of gestational diabetes. These include advanced maternal age, obesity, a family history of diabetes, previous history of gestational diabetes, polycystic ovary syndrome (PCOS), and certain ethnic backgrounds such as Hispanic, African American, Native American, South or East Asian, and Pacific Islander descent [2].

During pregnancy, the placenta produces hormones that can lead to insulin resistance in some women. If the pancreas cannot produce enough insulin to overcome this resistance, high levels of glucose can accumulate in the blood, leading

to gestational diabetes [3]. Untreated or poorly managed gestational diabetes can have serious consequences for both the mother and the baby. Women with gestational diabetes are at an increased risk of developing type 2 diabetes later in life. Additionally, they may experience complications during pregnancy such as high blood pressure, delivering a large baby (macrosomia), requiring a cesarean section, or having difficulties during labor [4].
Babies born to mothers with uncontrolled gestational diabetes are at risk of being born with low blood sugar (hypoglycemia), having a higher birth weight, experiencing respiratory distress syndrome, or even facing an increased risk of developing type 2 diabetes later in life. The diagnosis of gestational diabetes is typically made through screening tests that assess blood sugar levels during pregnancy. Women at higher risk may undergo additional testing earlier in their pregnancy. Once diagnosed, managing gestational diabetes involves closely monitoring blood sugar levels through diet modifications, regular physical activity, and sometimes insulin therapy [5]. Healthcare providers may recommend a specific meal plan tailored to control blood sugar levels and ensure proper nutrition for both the mother and the baby. Regular prenatal check-ups are essential to monitor the baby's growth and development while managing gestational diabetes effectively. This study was conducted to assess the risk factors for GDM, and its relation to BMI and maternity age.

METHODS

Study design

A descriptive cross-sectional study was carried out from March to April 2024 at selected 3 diagnostic laboratories inside Tripoli to collect the data. Pregnant women were enrolled at each center where we had stayed for a week.

Study population selection criteria

Asymptomatic pregnant women diagnosed with GDM that had given their written and informed consent and have been living in Tripoli for at least two years were included in this study. Diabetic women or women who didn´t give us an informed and written consent were excluded from this study.

Data collection

The purpose and procedures of the study were discussed with pregnant women each day before enrollment began. Data was collected using a standardized data collection form. All pregnant women included in this study were subsequently contacted after their expected delivery date in order to record the anthropometric data of their respective newborns and their delivery modalities.
For each participant, blood samples were collected from peripheral venous blood in sodium fluoride and potassium oxalate tubes (5ml) for glucose determination. Once collected, blood samples were stored in a cooler at 4°C and immediately sent to the clinical biochemistry laboratory of the faculty of medicine. Plasma glucose levels were determined daily in each sample using enzyme tests with the Mindray BS200® chemistry analyzer (Shenzhen, China).

Studied variables pregnant women

We have collected socio demographic data, parity, personal history of GDM (PHD) or familial history of T2D (FHD), gestational age at delivery. Gestational age was first determined by the last menstrual period date and confirmed by ultrasonographic evaluation. This last data was collected from the pregnancy health record of each pregnant woman.

Sampling and data analysis

The sample size was calculated using OpenEpi, version 3, SSPropor [6]. There is a 5% margin of error (α), a power of 80% with a precision of 3.1%; the studied sample size was 200. Data were presented as descriptive statistics using SPSS version 22.

RESULTS

Description of the studied population at enrollment

Table 1 summarizes the characteristics of the 200 pregnant women enrolled in this study. Regarding the age, majority of participants 42.5% were in the age ≥ 35 years, and the lowest 11.5% were from the age of 20-24 years. The mean body mass index (BMI) was higher 60.5% for those with ≥25 and was lower 39.5% for those ≤25.
For gestational ages, most of participants 48.5% were between 24-28 gestational week, while the minority 11.5% were within 24 gestational weeks. The highest percentage 42.5% regarding the parity was for pregnant with Pauciparous (1-4), and minority of participants 92.5% had history for GDM.

Table 1. The characteristics of the 200 pregnant women

Variables	N (200)	%
Age		
20 – 24	23	11.5
25 – 30	33	16.5
31 – 34	59	29.5
≥ 35	85	42.5
BMI at recruitment (Kg/m$^{2)}$		
≤ 25	79	39.5
≥25	121	60.5
Gestational age at recruitment (week of gestation)		
≤23	23	11.5
24-28	97	48.5
≥28	80	40
Parity		
Primiparous (0)	55	27.5
Pauciparous (1-4)	85	42.5
Multiparous (≥5)	60	30
Personal history of GDM		
Yes	15	7.5
No	185	92.5

DISCUSSION

Gestational diabetes is a common health condition that affects pregnant women. The prevalence of gestational diabetes varies depending on the population studied and the criteria used for diagnosis. Generally, it is estimated that around 2% to 10% of pregnancies are affected by gestational diabetes [7]. Age is a significant factor when considering the risk of developing gestational diabetes during pregnancy. Advanced maternal age, typically defined as women over the age of 35, is associated with a higher risk of developing gestational diabetes. This increased risk is due to various factors such as hormonal changes, decreased insulin sensitivity, and overall health status [8]. Women who are older when they become pregnant may have a higher likelihood of developing gestational diabetes compared to younger women. This is because as women age, their bodies may become less efficient at processing glucose, leading to insulin resistance and potentially gestational diabetes. Additionally, older women may already have underlying health conditions such as obesity or prediabetes, which can further increase their risk of developing gestational diabetes during pregnancy. Proper prenatal care and monitoring are essential for older pregnant women to manage and mitigate the risks associated with gestational diabetes [9].

In present study, gestational diabetes increased with increase of age, majority of participants 42.5% were in the age ≥ 35 years, and the lowest 11.5% were from the age of 20-24 years. In similar study, Singh et al., [10] recorded that gestational diabetes in pregnant women were 29.0±4.9 years, and concluded that increased maternal age is an important risk factor for the development of GDM. Also, Parnas et al., [11] reported that pregnant women with gestational diabetes were significantly older (30.7 ± 5.9 versus 28.7 ± 5.7; p = 0.001) compared with pregnant women without gestational diabetes. Our study shows that only over-weight and/or obesity at the time of screening, and not before the current pregnancy, personal history of GDM, and family history of T2D were associated factors. Surprisingly, maternal age was not correlated with GDM in our study and becomes an associated factor in our population.

CONCLUSION

It can be concluded that gestational diabetes in pregnancy is very common, and increased with increase of age. Careful surveillance is required for these pregnancies in high-risk units for early detection and treatment of possible complications, in order to try to reduce maternal and neonatal morbidities. Further prospective studies among these high-risk populations with gestational diabetes should investigate the efficacy of possible surveillance Programs.

Conflicts of Interest

The authors declare no conflicts of interest.

REFERENCES

1. Atia A, Elmahmoudi H. Influence of Anemia on Prevalence of Gestational Diabetes among Pregnant Women in Tripoli, Libya. Libyan Med J. 2024;16(1):19-24.
2. Crowther C, Hiller J, Moss J, McPhee A, Jeffries W, Robinson J. Australian Carbohydrate Intolerance Study in Pregnant Women (ACHOIS) Trial Group Effect of treatment of gestational diabetes mellitus on pregnancy outcomes. N. Engl. J. Med. 2005;352:2477–2486. doi: 10.1056/NEJMoa042973.
3. Wang H, Li N, Chivese T, Werfalli M, Sun H, Yuen L, et al. IDF Diabetes Atlas: Estimation of Global and Regional Gestational Diabetes Mellitus Prevalence for 2021 by International Association of Diabetes in Pregnancy Study Group's Criteria. Diabetes Res. Clin. Pract. 2022;183:109050.
4. Kondracki A, Valente M, Ibrahimou B, Bursac Z. Risk of large for gestational age births at early, full and late term in relation to pre-pregnancy body mass index: Mediation by gestational diabetes status. Paediatr. Perinat. Epidemiol. 2022;36:566–576. doi: 10.1111/ppe.12809.
5. Lee KW, Ching SM, Ramachandran V, Yee A, Hoo FK, Chia YC, Wan Sulaiman WA, Suppiah S, Mohamed MH, Veettil SK. Prevalence and risk factors of gestational diabetes mellitus in Asia: a systematic review and meta-analysis. BMC Pregnancy Childbirth. 2018 Dec 14;18(1):494. doi: 10.1186/s12884-018-2131-4.
6. Torloni MR, Betrán AP, Horta BL, Nakamura MU, Atallah AN, Moron AF, Valente O. Prepregnancy BMI and the risk of gestational diabetes: a systematic review of the literature with meta-analysis. Obes Rev. 2009 Mar;10(2):194-203. doi: 10.1111/j.1467-789X.2008.00541.x.
7. Landon MB, Spong CY, Thom E, Carpenter MW, Ramin SM, Casey B, Wapner RJ, Varner MW, Rouse DJ, Thorp JM Jr, Sciscione A, Catalano P, Harper M, Saade G, Lain KY, Sorokin Y, Peaceman AM, Tolosa JE, Anderson GB; Eunice Kennedy Shriver National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network. A multicenter, randomized trial of treatment for mild gestational diabetes. N Engl J Med. 2009 Oct 1;361(14):1339-48. doi: 10.1056/NEJMoa0902430.
8. Horvath K, Koch K, Jeitler K, Matyas E, Bender R, Bastian H, Lange S, Siebenhofer A. Effects of treatment in women with gestational diabetes mellitus: systematic review and meta-analysis. BMJ. 2010 Apr 1;340:c1395. doi: 10.1136/bmj.c1395.
9. Aubry EM, Raio L, Oelhafen S. Effect of the IADPSG screening strategy for gestational diabetes on perinatal outcomes in Switzerland. Diabetes Res Clin Pract. 2021 May;175:108830. doi: 10.1016/j.diabres.2021.108830.
10. Singh S, Yadav M. Gestational Diabetes Mellitus among Pregnant Women Delivering in a Tertiary Care Hospital: A Descriptive Cross-sectional Study. JNMA J Nepal Med Assoc. 2022 Mar 11;60(247):229-233. doi: 10.31729/jnma.7304.
11. Parnas M, Sheiner E, Shoham-Vardi I, Burstein E, Yermiahu T, Levi I, et al. Moderate to severe thrombocytopenia during pregnancy. Eur J Obstet Gynecol Reprod Biol. 2006 Sep-Oct;128(1-2):163-8. doi: 10.1016/j.ejogrb.2005.12.031.

العوامل المرتبطة بسكري الحمل لدى النساء الحوامل

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المستخلص

يمثل داء السكري خلال فترة الحمل 84% من حالات ارتفاع السكر في الدم أثناء الحمل في جميع أنحاء العالم. علاوة على ذلك، فإن لون البشرة السمراء يعد عامل خطر للإصابة بالمرض. كان هدفنا هو تحديد مدى انتشار داء السكري خلال فترة الحمل والعوامل المرتبطة به في طرابلس. تم إجراء دراسة وصفية خلال الفترة من مارس إلى أبريل 2024. وقد اخترنا 3 مختبرات تشخيصية داخل طرابلس لجمع البيانات. تم تسجيل النساء الحوامل في كل مركز أقمنا فيه لمدة أسبوع. كانت أعمار غالبية المشاركين 42.5% ≤ 35 عامًا، وأدنى 11.5% كانوا تتراوح أعمارهم بين 20-24 عامًا. كان متوسط مؤشر كتلة الجسم أعلى بنسبة 60.5% لأولئك الذين لديهم ≤25 وكان أقل بنسبة 39.5% لأولئك الذين لديهم ≤25. بالنسبة لأعمار الحمل، كان معظم المشاركين 48.5% بين 24-28 أسبوع حمل، بينما الأقلية 11.5% كانوا ضمن 24 أسبوع حمل. أعلى نسبة 42.5% فيما يتعلق بالتكافؤ كانت للحوامل مع Pauciparous (1-4)، وأقلية من المشاركين 92.5% لديهم تاريخ داء السكري خلال فترة الحمل. يلزم إجراء مراقبة دقيقة لحالات الحمل هذه في الوحدات عالية الخطورة للكشف المبكر عن المضاعفات المحتملة وعلاجها، من أجل محاولة الحد من أمراض الأمهات والأطفال حديثي الولادة. ينبغي إجراء المزيد من الدراسات المستقبلية بين هؤلاء السكان المعرضين لخطر الإصابة بسكري الحمل للتحقق من فعالية برامج المراقبة المحتملة.

الكلمات الدالة. داء السكري خلال فترة الحمل، عوامل الخطر، النساء الحوامل.