International Journal of Healthcare Sciences ISSN 2348-5728 (Online)
Vol. 13, Issue 1, pp: (109-121), Month: April 2025 - September 2025, Available at: www.researchpublish.com

The Fetal and Maternal Complications of Reproductive Age Women with History of Gestational Diabetes Mellitus Including Different Risk Factors in Thi-Qar

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DOI: https://doi.org/10.5281/zenodo.15525229

Published Date: 27-May-2025

Abstract: **Background: Diabetes is a chronic illness that arises when the body either produces insufficient amounts of insulin or is unable to use it effectively. In the second half of pregnancy, glucose intolerance is a defining feature of gestational diabetes mellitus (GDM), a subtype of diabetes mellitus (DM). It is estimated that one in seven pregnant women worldwide has GDM. This study aimed to determine the prevalence of maternal and fetal outcomes in GDM as well as to assess the main risk factors which predict these complications among Thi-Qar's reproductive-aged women. Methodology: A cross-sectional observational study was done on 1504 married women of reproductive age who were enrolled in an endocrine center. All patient information was gathered through direct interviews and the tertiary center's digital records, which were accessed via an internal network system and Microsoft Access. Demographic details, GDM clinical history, macrosomia history, and family history of diabetes were recorded. Results: The mean age of women with GDM was 36 .9±6.8 years old, mean weight 82 ±13 kg, BMI was 32.7±5.3 (Kg/m2), and waist circumference was 101.1±11.2 centimeters. Pregnancy, lipid disorder, kidney disease, heart disease, PCOS, Previous history of GDM, chronic hypertension, macrosomia, and physical activity were significantly association between GDM and DM complications (p-value = 0.001, 0.001, 0.002, 0.001, 0.001, 0.001, 0.001, 0.001, and 0.044, respectively). The correlation between GDM and different risk factors. Residency, age, number of abortions, number of stillbirths, and number of live children, weight, BMI, waist circumference, e.GFR, and RBS were significantly higher among women with GDM. Conclusion: GDM is considered an additive risk factor for the prediction of chronic DM and later complications. Most of the risk factors, like lipid disorder, kidney disease, heart disease, GDM, PCOS, hypertension, macrosomia, physical activity, abortion, number of live births, and number of dead births, are considered dependent risk factors for the prediction of DM complications.**

Keywords: **Fetal, Maternal, Complications, Age, Women, Gestational Diabetes Mellitus, Risk Factors.**

1. INTRODUCTION

The development of gestational diabetes has been associated with a variety of risk factors. The categories of clinical, obstetric, and sociodemographic threat variables may be used to examine these contributing factors. Parity, stillbirth, and previous abortion are some of the prenatal risk factors associated with GDM (1). GDM is thought to affect one in seven pregnant women worldwide (2).

The International Diabetes Federation (IDF) reported in 2017 that GDM affects 14% of pregnancies worldwide, or more than 18 million newborns annually (3). The United States has seen a concurrent rise in the prevalence of diabetes during pregnancy as the light of the global obesity pandemic. Type 1 diabetes (T1D) is not the only condition that is common alongside the rise in Type 2 diabetes (T2D) among those who are fertile, but there is also a sharp rise in the rates of gestational diabetes mellitus (GDM) that are recorded (4). Gestational diabetes usually disappears after delivery, but women who have it throughout pregnancy are at an increased risk of developing T2D and cardiovascular events during the first five to ten years after birth (5).

Women who develop GDM may also have beta cell malfunction in the pancreas associated with insulin resistance. This beta cell dysfunction limits the pancreas's ability to release insulin. It increases the risk of long-term GDM by exacerbating glucose intolerance. Women with GDM after giving birth have a tenfold increased risk of developing T2D, even though GDM is associated with issues for both the mother and the fetus during an index pregnancy (6).

Diabetes dramatically increases the risk to both the mother and the fetus, which is mostly dependent on the degree of high blood sugar levels, but also connected to long-term issues and diabetes comorbidities (4). Neonatal sequels are common among women with gestational hyperglycemia particularly spontaneous abortion, baby malformations, infant death, macrosomia, neonatal hypoglycemia, neonatal respiratory distress syndrome, and hyperbilirubinemia. Diabetes during pregnancy also raises the risk of hypertension, obesity, and T2D in children in future (7).

The risk of diabetes, which is primarily based on the degree of elevated blood sugar levels but is also linked to long-term problems and diabetes comorbidities, greatly rises for both the mother and the fetus (7). To avoid GDM, it is essential to identify modifiable risk factors and evaluate their potential impact on this prevalent illness. A lower incidence of GDM has been linked to several of possibly changeable prenatal factors and lifestyle modifications (8).

2. METHODS AND MATERIALS

Design of the Study

To meet the research objectives, a cross-sectional observational study strategy was used.

Data Collection

A regular daily sample was collected by simple randomization from all work time (8:00 a.m. to 1:30 p.m.) for 5 days in each work week starting September 2024 until January 2025. Throughout this time, a sample of married women of reproductive age (16-45 years) was collected through direct interviews depending on the study's exclusion or inclusion criteria. Aside from that, a number of data were gathered from TDEMC digital records, which the center stores all patient data in a Microsoft Access Program (MSAP).

Sample Size

The equation blow was used to measure the study sample size.

$$\text{Sample size} = \frac{Z(1-\alpha/2)^2\, P\,(1-P)}{d^2}$$

Here, $\mathbf{Z_{1\text{-}a/2}}$ is a ordinary normal variate with 5% form one error with (P<0.05); the value is 1.96, as this study considered the level of significance at 0.05.

P = proportion of GDM in the population, which was (14.1%) according to the following evidence (9).

d = the researcher greetings to estimate this sample size using a precision/absolute error of 5% in addition a type 1 error of 5%. The minimal size of the sample required to conduct this survey was 187, while the actual number of participants in this study was 1504 for greater approval.

Inclusion Criteria

To participate in the study, only women had to satisfy the following requirements:

1. All married women of reproductive age from 16 to 45 years who were getting pregnant with or without GDM.

2. Women with type 1 or 2 diabetes with a history of GDM.

3. All women who are qualified and prepared to participate in the research.

Exclusion Criteria

Participants who met any of the following situations were not included in the research.

1. Women with type 1 or 2 diabetes, drug-induced diabetes, or, last of all, transitory hyperglycemia are excluded prior to marriage.

2. Exclusion of unmarried women from registration.

3. Patients who refused to interview on the questionnaire

Questionnaire and Study Variables

Participants were asked to complete questionnaires regarding demographic information, such as age, marital status that is classified as married, divorced, or widowed; residency (rural or urban); parity; and education level for people who were classified as illiterate, primary, intermediate, university, or post-institutional. Clinical history of the illness GDM during pregnancy, history of macrosomia (who has given birth to a child weighing more than 4 kg), history of the illness diabetes in the family (first-degree relatives including parents, father, mother, sister, brother, daughter, son).

Women who have a history of hypertension, lipid disorders, kidney illness, heart disease, polycystic ovarian syndrome, or chronic diabetes. Further clinical data was recorded such as the obstetric history, which included the number of live births, include the number of fatalities, abortions, and any congenital anomalies.

Anthropometric Measurements

Height, weight, in addition, waist circumference (WC) in centimeters were the three anthropometric measurements that were computed. The patient was asked to remove their shoes and, if feasible, leave their head exposed while standing upright on level ground. The height of the patient was then measured using the Seca®217 mobile stadiometer. The patient was dressed as thinly as possible, without shoes, with an empty stomach and bladder, and the weight was recorded using this Seca®763 electronic weigh station. After squaring it, Weight measured in kilos divided by height measured in meters yielded the BMI, which is classified as in the table below (10).

Table (2-1): Classification of BMI

BMI	Classification
< 18.5 kg/m²	Underweight
18.5 - 24.9 kg/m²	Normal weight
25.0 - 29.9 kg/m	Overweight
30.0 - 34.9 kg/m²	Class-I obesity
35.0 - 39.9 kg/m²	Class-II obesity
> 40 kg/m²	Class-III obesity

While standing, a flexible inch tape was used to take the woman's waist circumference midway between the lower coastline border and the iliac crest. According to a local study conducted in 2007 on a healthy adult from Basrah, central obesity has been identified when the WC is equal to or greater than 99 cm (11).

Blood glucose measurements:

According to the ADA defining criteria, each woman who was pregnant was diagnosed with the illness GDM as presented in table (2-2) below (12). Qualified procedure "(Bio-Rad Variant II Turbo HbA1c Kit – 2.0 Quick Guide 270-2455EX)" was used to determine glycated hemoglobin (HbA1c) levels of 6.5% or higher; they were used to establish that certain pregnant mothers had newly diagnosed gestational diabetes. The GDM period was defined as the time interval (to the nearest month) between the patient's diagnosis time and the visit time (13).

Table (2-2): GDM diagnosing results according to ADA

Test	ADA GDM (mg/dL)	ADA GDM (mmol/L)
fasting blood glucose level	>92	5.1
one-hour glucose tolerance	180	10.0
two-hour glucose tolerance	153	8.5

Other Variables

The research evaluated the fasting lipid profile for each participant (LDL-C, HDL-C, TC, and TG). Measured serum creatinine to assess renal function, and creatinine clearance (eGFR) was calculated Glomerular Filtration Rate (GFR) by using the CKD-EPI Creatinine Equation, with a value less than 60 ml/min/1.79 m² indicating CKD (14).

Statistical Analysis

The Kolmogorov-Smirnov test (the one-sample) was used to identify the normal distribution of the parametric variables, and the findings were shown as mean and standard deviation (SD). Continuous variables were examined via assessment of variance (ANOVA). Also, chi-square tests were used with independent student t-tests and non-parametric data. Moreover, Statistical Packages for Social Sciences (SPSS) in version 23.0, with a significance level of $P < 0.05$, was used to analyze the data

3. RESULTS

Baseline and sociodemographic characters of the enrolled women

One thousand five hundred and four women were enrolled in this study. The mean age of the whole participant group was 33 ±8 years old, mean weight was 76 ±15 kg, BMI was 30.8±5.7 (kg/m²), and the mean waist circumference was 94.5±12.5 centimeters (Table 3.1).

The mean glycemic parameters of the participants were RBS 128±82 mg/dl, FBS 187±101 mg/dl, and HbA1c 9.1± 9.1±2.4%. The mean lipid profile of the participants was found to be total cholesterol (TC 187±45.8 mg/dL), LDL-C 163±57 mg/dL, HDL-C 48±14 mg/dL, and TG 171±121 mg/dL. The renal function of them was assessed by creatinine 0.67±0.12 mg\dl, and creatinine clearance was measured by e.GFR 109±22 ml\min\1.73 m2 for the participants (Table 3.1).

Table 1: baseline demographic characters of the reproductive age women (n=1504).

Variables	Mean ±SD	Minimum	Maximum
Age (years) (n=1504)	33 ±8	16	45
Weight (kg) (n=1504)	76 ±15	43	140
BMI (kg/m2) (n=1504)	30.8 ±5.7	16.5	54.7
Waist circumference (cm) (n=1504)	94.48±12.5	59	134
FBS (mg/dl) (n=347)	187±101	45	563
RBS (mg/dl) (n=1195)	128±82	50	650
HBA1C (%) (n=366)	9.1± 2.4	4.4	15.2
LDL (mg/dl) (n=19)	163± 57	42	235
HDL (mg/dl) (n=217)	48 ± 14	7	124
Cholesterol (mg/dl) (n=431)	187± 45	74	350
Triglyceride (mg/dl) (n=292)	171± 121	24	856
Creatinine (mg/dl) (n=397)	0.67±0.12	0.4	1.59
e.GFR (ml/min) (n=397)	109± 22	37	207

Distribution of educational level of the participants (n=1504).

For education level, those women were distributed as illiterate (30.5%), primary school (36.0%), intermediate school (16.9%), secondary school (4.2%), and university (12.4%).

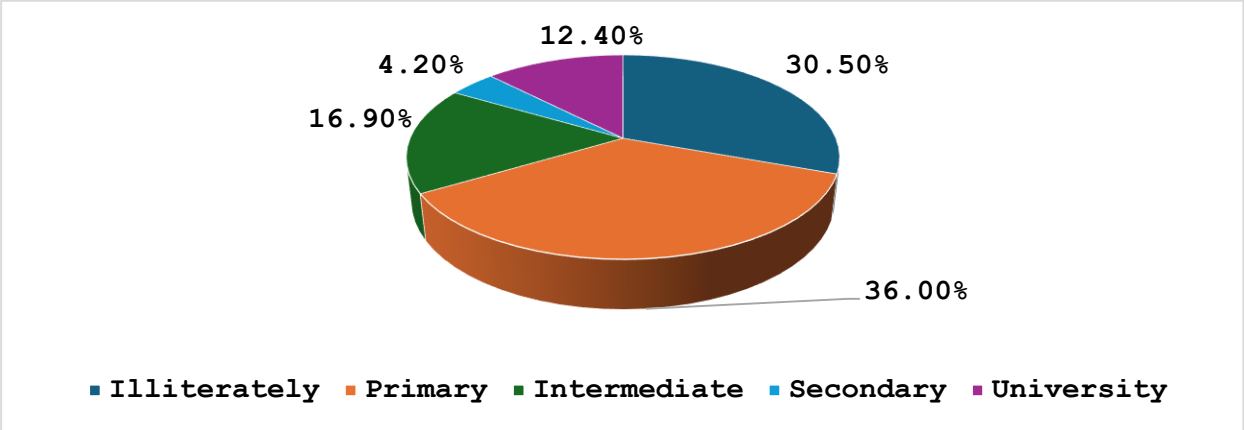

Figure 1: distribution of educational level of the participants (n=1504).

Distribution of residency of the participants (n=1504).

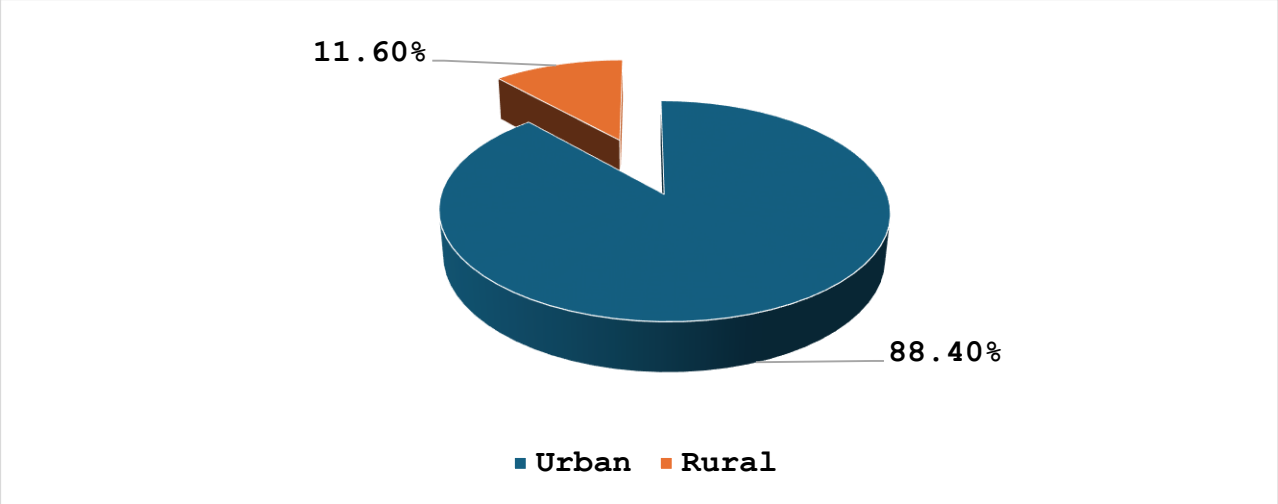

Figure 2: distribution of residency of the participants (n=1504).

Distribution of occupation of the participants

Most women were housewives (1366, 90.8%), while others were employed (138, 9.2%).

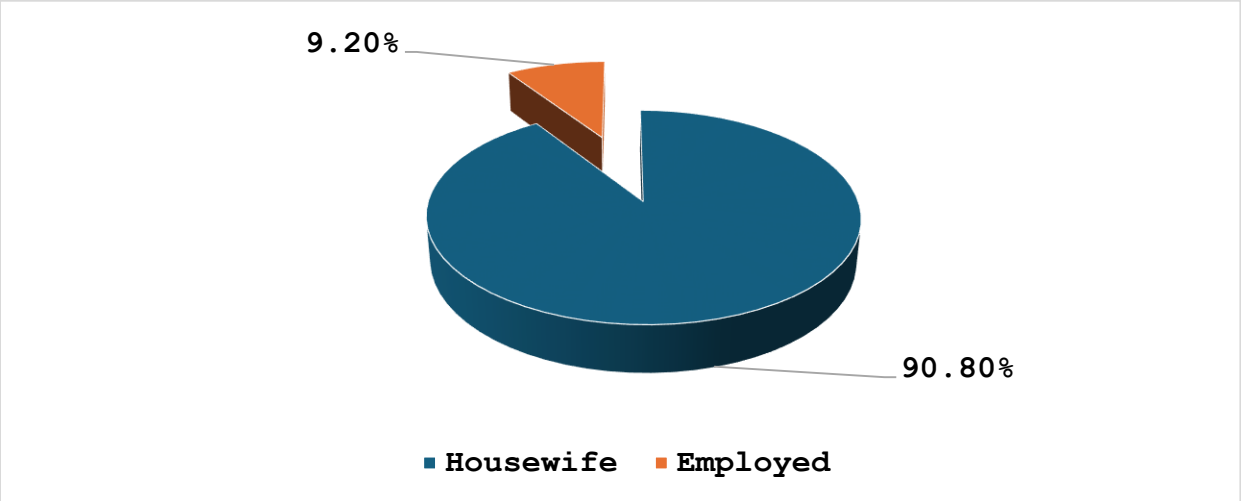

Figure 3: distribution of occupation of the participants.

Clinical risk factors and complications of the enrolled women.

From clinical risk factors of these reproductive-aged women, there were 1450 (96.4%) women who were physically inactive, 1282 (85.2%) women who were overweight or obese, 917 (61%) women who had a first-degree relative with DM, 438 (29.1%) women who had chronic diabetes mellitus, 377 (25.1%) women who had abnormal lipid disorders, 305 (20.3%) women who had chronic hypertension, 226 (15.0%) women who were make a diagnosis with a history of the syndrome of polycystic ovary, 129 (8.6%) women with GDM, and 107 (7.1%) women who had macrosomia. There were a limited number of participants who had either heart disease, 14 (0.9%), or established kidney disease, 11 (0.7%). Data are shown in Figure (3.1).

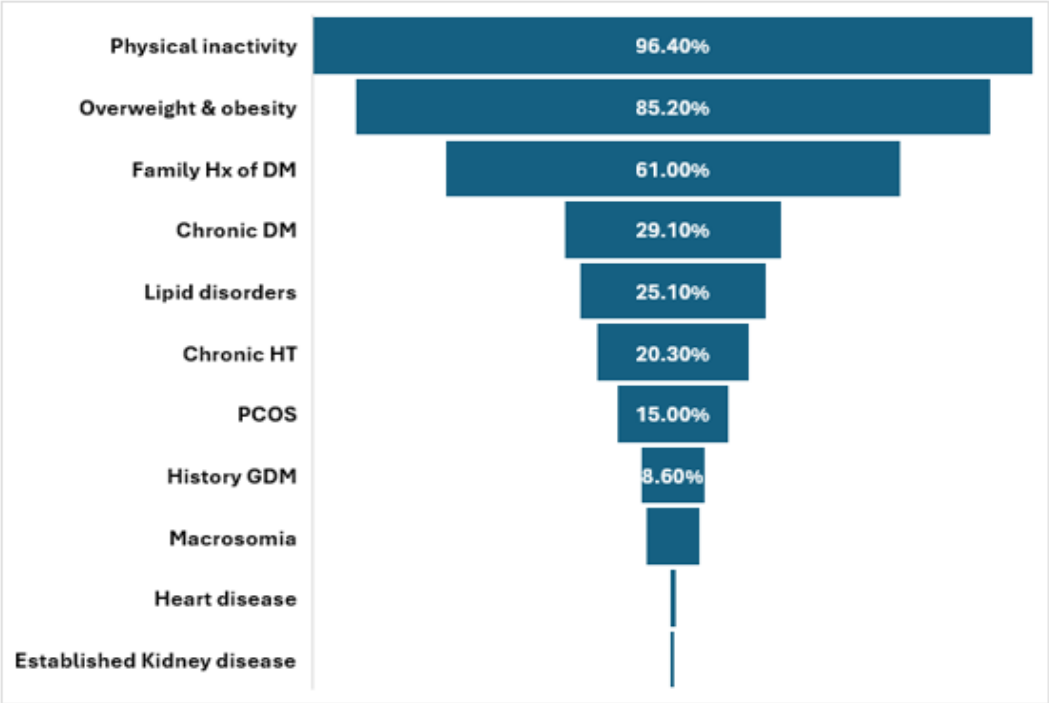

Figure 4: Clinical risk factors and complications of the enrolled women (N=1504)

History of GDM and later maternal complication

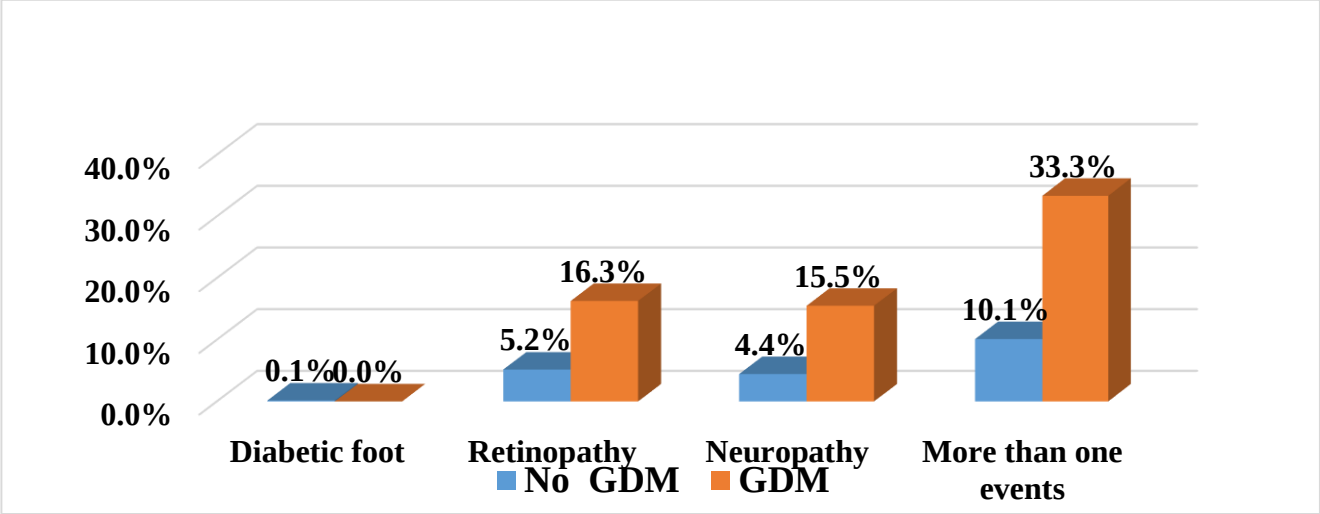

Figure 5: History of GDM and later complications (P value<0.001)

Table (3.2) shows the association between GDM and DM complications. Residency, pregnancy, lipid disorder, kidney disease, heart disease, PCOS, GDM, chronic hypertension, macrosomia, and physical activity were significantly different between the two groups the (p-value = 0.001, 0.001, 0.002, 0.001, 0.001, 0.001, 0.001, 0.001, and 0.044, respectively).

Table 3.2: The association between different risk factors and DM complications

Variables		No DM Complications	DM Complications	Total	P value
Pregnant	No	699 (60.9%)	341 (95.5%)	1040 (69.1%)	**0.001**
	Yes	448 (39.1%)	16 (4.5%)	464 (30.9%)	
Physical activity	No	1112 (96.9%)	338 (94.7%)	1450 (96.4%)	**0.044**
	Yes	35 (3.1%)	19 (5.3%)	54 (3.6%)	
Lipid disorder	No	1023 (89.2%)	104 (29.1%)	1127 (74.9%)	**0.001**
	Yes	124 (10.8%)	253 (70.9%)	377 (25.1%)	
Chronic hypertension	No	1048 (91.4%)	151 (42.3%)	1199 (79.7%)	**0.001**
	Yes	99 (8.6%)	206 (57.7%)	305 (20.3%)	
PCOS	No	1002 (87.4%)	276 (77.3%)	1278 (85.0%)	**0.001**
	Yes	145 (12.6%)	81 (22.7%)	226 (15.0%)	
GDM	No	1102 (96.1%)	273 (76.5%)	1375 (91.4%)	**0.001**
	Yes	45 (3.9%)	84 (23.5%)	129 (8.6%)	
Macrosomia	No	1119 (97.6%)	278 (77.9%)	1397 (92.9%)	**0.001**
	Yes	28 (2.4%)	79 (22.1%)	107 (7.1%)	
Heart disease	No	1143 (99.7%)	347 (97.2%)	1490 (99.1%)	**0.001**
	Yes	4 (0.3%)	10 (2.8%)	14 (0.9%)	
Kidney disease	No	1143 (99.7%)	350 (98.0%)	1493 (99.3%)	**0.002**
	Yes	4 (0.3%)	7 (2.0%)	11 (0.7%)	

The effect of GDM on the history of abortion among women.

This figure shows the effect of GDM on the history of abortion among women be present significantly higher among women with GDM than others without (p-value < 0.001)

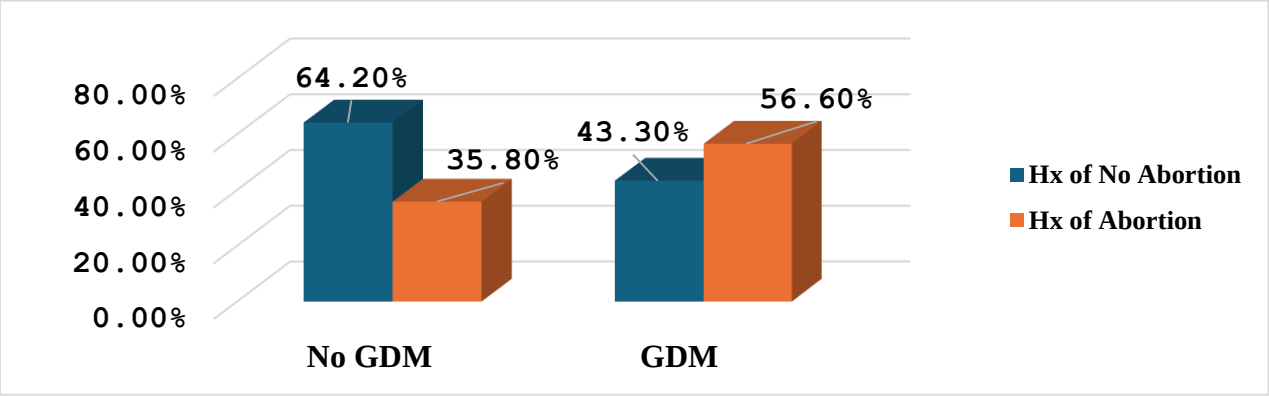

Figure 6: The effect of GDM on the history of abortion among women. (P value<0.001)

The effect of GDM on the evidence of congenital anomalies

The effect of GDM on the evidence of congenital anomalies was fourfold higher, but numerically not significantly higher among women with GDM than women without it (p-value 0.058).

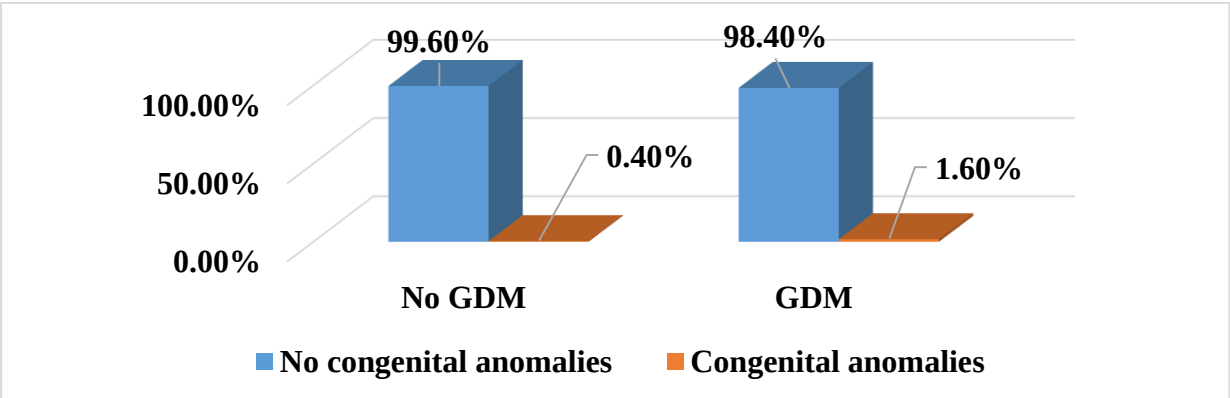

Figure 7: The effect of GDM on the evidence of congenital anomalies. (P-value 0.058)

Correlation between GDM and different risk factors

Table (3.3) shows the correlation between GDM and different risk factors. Residency, age, number of abortions, number of stillbirths, and number of live children, weight, BMI, waist circumference, e.GFR, and RBS were significantly higher among women with GDM. At the same time, FBS, HbA1c, cholesterol, LDL, HDL, and creatinine were not having any significant association with the history of GDM.

Table 3.3: Correlation between GDM and different risk factors

Variables	No GDM Mean ±SD	GDM Mean ±SD	Confidence interval	P value
Age(years)	32.98±8.2	36.99±6.8	(-5.4 – (-2.5)	**< 0.001**
Number abortion	0.65 ±1.1	1.02 ±1.1	(-0.5 – (-0.1)	**0.001**
Number dead birth	0.09 ±0.4	0.29 ±0.6	(-0.2 – (-0.1)	**< 0.001**
Number live child	3.20 ±2.1	3.74 ±1.8	(-0.9 – (-0.1)	**0.007**
Weight	75.5±15.1	82.1±13.2	(-9.3 – (-3.9)	**< 0.001**
BMI	30.6 ±5.7	32.7 ±5.3	(-3.1 – (-1.0)	**< 0.001**
Waist circumference	93.8 ±12.4	101.1±11.2	(-9.4 – (-5.0)	**< 0.001**

4. DISCUSSION

Several risk factors have been linked to an increased risk of impaired glucose tolerance or T2D in women with a history of GDM. GDM can have major consequences for both mother and child during and after pregnancy, both short and long-term. In this cohort, the findings verify the valuable burden of GDM on women's abortion histories compared to those without GDM (p-value < 0.001), confirming earlier wide world observations while highlighting local epidemiological nuances. This study was supported by a case-control study done in same locality at 2024 when 38.4% of the pregnant women with history of GDM had abortion that found women with GDM were having a high rate of abortion than others (15). Also some studies found higher risk of developing GDM at the central hospitals of the Amhara region in Ethiopia (16) and another cross-sectional study conducted in the Mekong Delta (17) that found pregnant women with an abortion history were 4.4 times more likely to develop GDM than those without. Multiple abortions may be linked to different factors such as education, family income, and pre- and post-pregnancy healthcare. Also, the history of GDM may increase the risk of any form of poor obstetrical events including miscarriages, recurrent abortions, stillbirths and preterm delivery as observed (18).

In the current investigation, there was a statistically significant correlation between the number of live births and the prevalence of GDM (p-value = 0.007). This is consistent with an Egyptian study that revealed the prevalence of GDM was statistically associated with parity larger than or equal to 3 (19), but in contrast to Pakistani study which showed the number of parities had no effect on the risk for GDM (20). Additionally, we observed that the number of dead babies and the onset of GDM are statistically significantly correlated (p-value = 0.001) in positive manner. This was similar to two studies done in Iraq and Iran where the history of stillbirth is the risk factor that exhibited a significant correlation in univariate analysis (21), but it was in contrasts with a study done in Turkey (22).

Surprisingly, the incidence of congenital malformations looked higher among women with GDM, the correlation did not adhere statistical significance (p-value = 0.058). This was consistent with a study done in Riyadh 2023 (23), but Canday et al. showed congenital abnormalities were higher among other risk variables, including GDM in Turkey, demonstrating a statistically significant difference between people with and without GDM who had previously given birth to a child with congenital defects (22). These conflicting data suggest a possible plan that needs further work-up in larger prospective research.

According to this study, women with GDM were significantly older in the age than those without GDM (P value 0.001) and it was consistent with different studies indicating that the prevalence of GDM rises with increasing maternal age (24), (25). Getting older in maternal age is a dominant risk factor for GDM because aging causes fat to redistribute and increase dysfunctional pre-adipocytes, which can release pro-inflammatory cytokines and chemokines that disrupt insulin pathogenesis (26).

Women with GDM had a considerably higher prevalence of central obesity than those without (p-value = 0.001) and it was consistent with other study (27), which indicated that general obesity, central obesity, and visceral adiposity were all related to an elevated risk of GDM. The risk of GDM is comparable across general and central obesity. Furthermore, visceral adiposity was a more significant risk factor for GDM than general or central obesity. In contrast, Basraon et al. found that WHR could not replace BMI as a prenatal risk factor for GDM (28).

Despite these women being young, we found more than 85% of them were either overweight or obese, which was consistent with what was documented by a local study in 2022 (29). This may be related to excessive ingestion of a high-carbohydrate diet with sedentary life behavior, and it was significantly associated with the occurrence of GDM among those women, which was similar to a studies done in PHCs in Najaf City (26) and in Saudi Arabia in PHCs in Riyadh (24). Furthermore, more than one-fifth of the women were in class II or III obesity, which may give a clue for the negative metabolic balance of these women between putting on and burning off calories. The high class of obesity may increase the burden of many obesity-related complications like metabolic syndrome, DM, hypertension, dyslipidemia, obstructive sleep apnea, and atherosclerotic cardiovascular disease (CVD). It was surprising for this data that only 14% of the women were having a normal BMI despite their young age and reproductive period, making us expect unpleasant contours for those women in the future when they become older.

In addition, most of those women were physically inactive, which may predispose them to their high BMI and co-exist as an additive danger feature for the occurrence of GDM in those populations (30). Obesity is also a well-known risk factor for GDM, since it is related to insulin resistance, ectopic fat deposition, chronic inflammation, and the release of pro-inflammatory cytokines and chemokines. Obese women were also shown to have greater amounts of adipokines such as chemerin and leptin, both of which increase inflammation and insulin resistance (26).

From maternal perspective, the study found a significantly higher incidence of micro-complications like retinopathy, nephropathy, and diabetic foot among women with GDM. Mana et al found microvascular dysfunction was (15.9%) of the women (100 out of 122 women with previous GDM), retinopathy (12.7%, P/0.001), clinical neuropathy (15.9%, P <0.001), and clinically insignificant for nephropathy (12.8% P <0.206). This could be explained by GDM is a prior background to the development of T2D, with its long-term complications often developing later after an initial GDM diagnosis (31). These observations predict the requirement for continuous monitoring and management even after pregnancy.

Most of the women with GDM lived in urban areas compared to those in rural areas, and one-third of this cohort were at the primary level of education. These results are in agreement with studies conducted in Iraq and Iran (10), (32). Due to the environment of the rural lifestyle, which necessitates a high level of physical activity for work, those living in rural areas are generally less prone to developing GDM. Additionally, sedentary lives and an excess of fast food are examples of modernizing practices among the urban population. A family history of DM was observed in less than two-thirds of the women (61%), and it was clearer among women with GDM (86%) as compared with those without GDM (59%). A family history of diabetes may be a substantial risk factor for getting GDM, and this was also perceived in a study done in Iran (21). Our results regarding family history of GDM were supported by another study done in different parts of Iran; in Shoushtar, a seven-fold risk of GDM was reported in women with a history of T2DM in the family (33). Family history of type 2 DM was much more prevalent among women with GDM (58.1%) than among those without GDM (36%). Moreover, this might be regarded as an additional risk factor for causing new occurrences of GDM within this cohort, as indicated by Monod (34).

Both of established heart and kidney diseases were not significantly documented in this cohort which could be logic due to most of these women are at reproductive age period who well-estrogenized and considered at low risk for both atherosclerotic cardio-vascular diseases and kidney dysfunctions. This agreed with the study done in Jeddah, Saudi Arabia in 2023 by (35), (36) and (37). But some studies found that GDM may be a risk for either atherosclerotic CVD due to lipid disruption such as higher triglyceride levels and lower HDL- cholesterol (38) or early kidney dysfunction exhibit higher glomerular filtration rate, one of the early indicators of renal impairment (39).

One study tracked 72 women for five to eight years after the last GDM occurrence and found that women with a history of GDM had a higher risk for microalbuminuria than control group (40). The results from the Kidney Early Evaluation Program (KEEP) used self-report data and involved a large cohort (571 women with GDM vs. 25, 045 women without GDM). The development of microalbuminuria in the future was revealed to be at risk from GDM alone (without eventual T2DM). The authors noted that patients with a This discrepancy may be due to racial differences, community distribution of gender, history of GDM had a higher chance of later developing CKD in addition to microalbuminuria (41).

The current study's results demonstrated a significant correlation (p-value=0.001) between heart disease and DM complications. This finding is consistent with the findings of (42) and (43), which indicate that people with DM complications are more likely to have a stroke and die from one stroke than people without the disease (43).

Kidney dysfunction and DM complications were correlated significantly between each other vice versa (p-value=0.002), this result is in agreement with (44) and (45), which found that one-third of newly diagnosed T2DM patients had CKD, 4.5% had eGFR <60 mL/min/1.73 m², and approximately 30% had UACR ≥30 mg/g. Early T2DM diagnosis may lead to renal impairment. Furthermore, there is a risk of being undetected with T2DM for an extended length of time, as well as the presence of other comorbidities such as hypertension and dyslipidemia.

Others microvascular complications of reproductive aged women with GDM were comparable between either retinopathy or neuropathy which making one-third of the women had at least one of them. the history of GDM and later complications were significantly higher among women with GDM than those without (P value < 0.001). This result was in agreement with a study (46) that found Retinopathy (rho = -0.248; p = 0.001), nephropathy (rho = -0.154; p = 0.006), and neuropathy (rho = -0.132; p = 0.017) were all substantially linked to sequelae from GDM without insulin therapy. Another study was conducted in the North of England by (47) while diabetic foot was the seldom events in this cohort (48).

Chronic T2DM was found among less than one-third of this cohort, and it was three times higher among women with GDM as compared to those without GDM. This agreed with a study done by Bangash (49) and another study done by Sweeting (50). Women with a history of GDM are ten times more likely to develop T2DM, primarily in the first five years after GDM, according to a recent major meta-analysis and systematic review (6). Those women with chronic DM were distributed as T2DM (39%), slightly higher than T1DM (36%), and to a lesser degree GDM (17%). This distribution allows us to revise and highlight the pathophysiological pattern of DM among reproductive-aged women. It could be related to genetics, autoimmunity, environmental factors, socioeconomics, or familial background (51) and it may explain the vicious relationship between both chronic DM and family history of DM and GDM (52), (29).

5. CONCLUSION

GDM is considered an additive risk factor for the prediction of chronic DM and later complications. Most of the risk factors, like lipid disorder, kidney disease, heart disease, GDM, PCOS, hypertension, macrosomia, physical activity, abortion, number of live births, and number of dead births, are considered dependent risk factors for the prediction of DM complications.

6. RECOMMENDATION

1. We advised educating expectant mothers on healthy lifestyle choices and the complications that can arise during pregnancy as a result of non-modifiable risk factors like a family history of diabetes and modifiable variables like obesity and a sedentary lifestyle.

2. Asymptomatic pregnant women are risk factors for GDM and chronic DM (such as those with family history of DM or had maternal history with GDM) should be check blood glucose on regular basis and apply healthy life style.

3. Women with history GDM should follow a healthy eating pattern and exercise regime, as well as periodically check their blood sugar in order to prevent progression to T2DM

4. Use instructive and informative posters about the complications of gestational diabetes, how to identify it early, and the significance of visiting primary care facilities for the safety of both the mother and the unborn child.

5. We recommended that any woman with DM to be checked eye every six months to prevent retinopathy.

6. Encourage every woman with DM to screen her blood glucose level, kidney function, and total cholesterol every three months to avoid any complications.

7. Follow-up studies are needed to investigate which of the approaches is more accurate in predicting GDM.

Funding: None.

Conflict of interest statement: No conflict of interest is declared.

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