

**Ministry of Higher Education  
and Scientific Research  
University of Diyala  
College of Medicine**



**Case study of:**

**The incidence and clinical course of covid19 infection  
among women with gestational diabetic mellitus  
comparing to non diabetic mellitus pregnant women in  
AL- Batool teaching Hospital.**

**Submitted to the Council of the College of Medicine, Diyala  
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**Submitted by**

**DALILA ADLIL HASAN**

**Supervised by**

**Dr. Inaam Faisal Mohammed**

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**Dr. Inaam Faisal Mohammed**

MBChB, FICMS

Assistant prof. By BBCV

MBChB, DGO, FIBMS

### **Supervision Certificate**

I certify that this thesis was prepared under my supervision at Department of gynecology\_ College of Medicine / Diyala University.

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

إِنَّمَا أَمْرُهُ إِذَا أَرَادَ شَيْئًا أَنْ يَقُولَ لَهُ كُنْ فَيَكُونُ سورة يس ايه ٨٢

وَلَسَوْفَ يُعْطِيكَ رَبُّكَ فَتَرْضَىٰ سورة الضحى ايه ٥

إِنَّ مَعَ الْعُسْرِ يُسْرًا سورة الشرح ايه ٦

يُدَبِّرُ الْأَمْرَ مِنَ السَّمَاءِ إِلَى الْأَرْضِ سورة السجده ايه ٥

صدق الله العلي العظيم

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# Abstract

**Background:** The journey of pregnancy can be various for different women. Some of them, got GDM which consider one of the pregnancy complications which was defined as any degree of glucose intolerance with onset or first recognition during pregnancy. The definition has been modified to indicate that the diagnosis is done during either the 2<sup>nd</sup> or the 3<sup>rd</sup> trimester, It is usually recognized at 24 to 28 weeks of gestation on the basis of abnormal glucose tolerance testing.

Generally affects **0.6-15%** of all pregnancies ( The prevalence of GDM in the U.S. was **7.6%**).

In general, people with diabetes are more likely to have more severe symptoms and complications when infected with any virus, so they are more likely to have serious complications from COVID-19. Also an studies found increased severity of coronavirus disease 2019 (COVID-19), caused by infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), in patients with diabetes mellitus. Furthermore, COVID19 might also predispose infected individuals to hyperglycemia.

**Aim of study:** To identify the incidence and severity of covid19 infection as well it's complications among pregnant women with gestational diabetic mellitus comparing to nondiabetic pregnant women .

**Patients, Materials and Methods:** retrospective study done at Obstetric outpatient clinic of AL-Batool Teaching Hospital in Baquba-Diyala -Iraq, from September 2021 to March 2022. A total of 30 pregnant lady were studied within the age of (15 to 38) years old . Their pregnancy was confirmed by blood test for (B-HCG) and then confirmed by ultrasound during first trimester . And to get precise result, all should have a confirmed diagnosis of COVID19 infection depending on the PCR result or radiologic features of COVID-19 (chest x-rays). The cases that reported to have gestational diabetic mellitus their diagnosis was confirmed by GTT. It should be noted that a questionnaire was prepared to

achieve accurate and exact consequence of our study and that questionnaire has been printed so some of the participants whose involved in this study have the opportunity to fill it out by themselves .

The other main aspects that got focused attention in our study were the popular and common symptoms of covid\_19 plus their severity and also the possible complications of the infection .Those symptoms included:

1. **Fever**, and it's degree of severity (mild , moderate and severe) .
2. **Dyspnea**, and it's degree of severity (mild , moderate and severe).
3. **Diarrhea**, if present and it's degree of severity (mild, moderate and severe).
4. **Cough**, it's presence and whether it is productive or not.
5. **Constipation** , and if present or not .

**Result** : Patients who have gestational diabetic mellitus have higher incidence of covid19 infection and also found to develop more sever symptoms as well as more serious complications than those without gestational diabetic mellitus.

**Conclusion**: there is a significant difference in covid19 incidence and it's clinical course in gestational diabetic patients comparing to non gestational diabetic women .

**Key words**: pregnancy, covid19 in GDM women Non-GDM, SARS-CoV-2

## **Introduction**

The journey of pregnancy can be various for different women. Some of them, got GDM which consider one of the pregnancy complications which was defined as any degree of glucose intolerance with onset or first recognition during pregnancy(1).The definition has been modified to indicate that the diagnosis is done during either the 2<sup>nd</sup> or the 3<sup>ed</sup> trimester , It is usually recognized at 24 to 28 weeks of gestation on the basis of abnormal glucose tolerance testing(2).

Generally affects **0.6-15%** of all pregnancies(3) .The prevalence of GDM in the U.S. was **7.6%**(4). It is not like chronic diabetes these patients only get diabetes during pregnancy and often recover post-pregnancy . That usually

returns to its normal level soon after delivery and testing for diabetes is advised at 6-12 weeks post-partum for women with a diagnosis of gestational diabetes (GDM) during their pregnancy(5).

For GDM diagnosis, the ADA has recommended the use of either the one- or two-step approach at **24–28** weeks of gestation. The one-step approach involves performing a 75-g OGTT, with plasma glucose measurement when the patient is fasting and at 1 and 2 hours in this group of gravida at **24-28** weeks gestation(6)(7). The two-step approach is a 1-hour (non fasting) plasma glucose measurement after a 50-g oral glucose load in women at **24-48** weeks gestation who were not previously diagnosed with diabetes. The diagnosis of GDM is made if at least two of the following four plasma glucose levels (measured during OGTT) are met or exceeded :(8)

- Fasting: 95 mg/dL (**5.3** mmol/L)
- 1 hour: **180** mg/dL (**10.0** mmol/L)
- 2 hour: **155** mg/dL (**8.6** mmol/L)
- 3 hour: **140** mg/dL (**7.8** mmol/L)

In general, people with diabetes are more likely to have more severe symptoms and complications when infected with any virus, so they are more likely to have serious complications from COVID-19(9). Also an studies found increased severity of coronavirus disease 2019 (COVID-19), caused by infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), in patients with diabetes mellitus. Furthermore, COVID19 might also predispose infected individuals to hyperglycemia(10).

People with GDM are at risk of many complications that may affect the baby such as [excessive birth weight , early (preterm) birth , serious breathing difficulties , low blood sugar (hypoglycemia) , obesity and type 2 diabetes later in life and stillbirth ] .

And complications that may affect the mother which include [ high blood pressure and preeclampsia , having a surgical delivery (C-section) and future diabetes] (11).

In addition to that complications, according to the CDC, Pregnant women experience immunologic and physiologic changes which might make them more susceptible to viral respiratory infections and other diseases(12).

Especially pregnancy that associated with GDM which characterized by physiological changes making pregnant women even more vulnerable to viral

respiratory infections, such as SARS-CoV-2(13) . And by emerging covid19 infection that caused by a kind of Coronaviruses which are a large family of viruses that are known to cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). A novel coronavirus (COVID-19) was identified in 2019 in Wuhan, China(14).

All that data increased the concern between pregnant women and lead a question came to most of them especially those who have been diagnosed with gestational diabetes and that question was (dose women with GDM are experienced more sever course of covid 19 than those without? ) .

**Aim of study:** To identify the incidence and severity of covid19 infection as well it's complications among pregnant women with gestational diabetic mellitus comparing to nondiabetic pregnant women .

**Patients, Materials and Methods:** A retrospective study done at Obstetric outpatient clinic of AL-Batool Teaching Hospital in Baquba-Diyala -Iraq, from September 2021 to March 2022. A total of 30 pregnant lady were studied within the age of (15 to 38) years old . Their pregnancy was confirmed by blood test for (B-HCG) and then confirmed by ultrasound during first trimester . And to get precise result, all should have a confirmed diagnosis of COVID19 infection depending on the PCR result or radiologic features of COVID-19 (chest x-rays). The cases that reported to have gestational diabetic mellitus their diagnosis was confirmed by GTT. It should be noted that a questionnaire was prepared to achieve accurate and exact consequence of our study and that questionnaire has been printed so some of the participants whose involved in this study have the opportunity to fill it out by themselves . It included at first the full title and main goal of the study , also brief introduction about the whole survey. Furthermore, it covered all the necessary questions started by full name of the individual , then the age. After that ,it covered the whole following fundamental qualifications :All the participants must have no any underlying or hereditary serious respiratory diseases or any chronic disorders that could potentially affect the course of covid19 as well as the real course of GDM already has been started prior to the infection in order to clarify the infection severity influenced by the disease . All cases are followed after delivery and finished both the pregnancy and the course of covid19 regardless of the outcome weather it has been ended with NVD , preterm or even abortion considering this issue as on of our research Purposes. The other main aspects

that got focused attention in our study were the popular and common symptoms of covid\_19 plus their severity and also the possible complications of the infection .Those symptoms included:

6. **Fever**, and it's degree of severity (mild , moderate and severe) .
7. **Dyspnea**, and it's degree of severity (mild , moderate and severe).
8. **Diarrhea**, if present and it's degree of severity (mild, moderate and severe).
9. **Cough**, it's presence and whether it is productive or not.
10. **Constipation** , and if present or not .

## **Whereas the complications included:**

1. The **delivery** if it was ended as abortion, preterm, or normal .
2. **Vaginal bleeding**, and it's degree of severity (no bleeding, mild, moderate and severe).
3. **Get admitted**, if needed or not.
4. **O2 support**, whether it required or not.

These items were checked for all cases whose

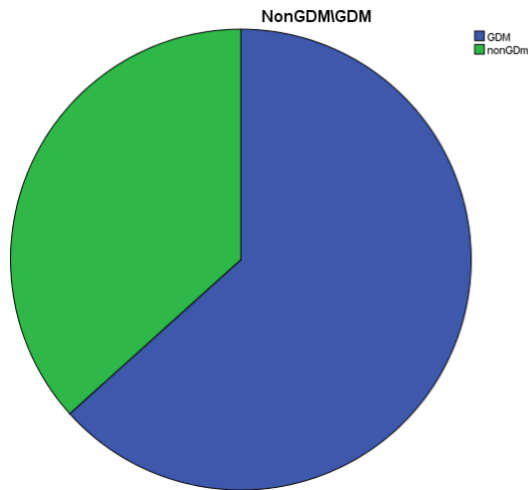
divided into two groups: The 1st group represented women who were pregnant and simultaneously got infected with covid19 while the 2nd group represented women who were pregnant and diagnosed with gestational diabetic mellitus then got infected with covid19 infection(15).

## **Statistical analysis**

This is a retrospective study. Demographic data were presented as incidence , frequency and percentage and comparison between groups were done using chi square test and pie chart.

**Results:** The results of this study shows that there was significant difference between the two study groups (G1: GDM pregnant women infected with covid19 and G2:NonGDM pregnant women infected with covid19 ) that was regarding the Incidence of covid19 infection among them, the result presented with the percentage as in G1 equal to 63.3 percent calculated for 19 case and 36.7 percent in G2 which was for 11 number of cases as it shown in pie chart (1).





Pie chart ( 1 ) that demonstrate the incidence of covid19 infection among GDM pregnant women vs Non-GDM pregnant women.

Regarding the symptoms and their severity between the two groups the result was as the following : starting by fever there was a differences in all degrees of severity ; and the result was like G1:G2 [5.3 : 18.2 >> 36.8:18.2 >> 57.9:63.6 ] % as mild > moderate > sever respectively. On the others hand there was slightly difference between the two groups related to cough result equal to G1:G2 [ 31.6 : 27.3 >> 52.6: 54.6 >> 15.2: 18.2 ]% as productive cough >> nonproductive >> no development of cough respectively . Considering the dyspnea as a so important symptom the result showed a significant difference between the two study groups as G1:G2[ 36.8: 45.5 >> 31.6 : 18.2 >> 10.5: 18.2 >> 21.1: 18.2 ] % as mild >> moderate >> severe >> no dyspnea respectively. And for the next symptom the result was like G1:G2 [ 42.1: 36.4 >> 57.9:36.6] % as constipated and non constipated respectively. The last studied symptom which is diarrhea was like G1:G2 [ 36.1: 63.6 >> 31.6: 27.3>> 5.3: 0 >> 3.16: 9.1 ] % as mild >> moderate >> sever >> and no diarrhea respectively. All that data about the symptoms and their severity degree demonstrated below in table (1) .

**Table (1) show the symptoms of covid\_19 infection  
And their severity in both GDM Patients Vs Non-GDM.**

<b>Symptoms</b>		<b>G1 (GDM ) No = 19</b>	<b>G2 ( Non- GDM ) No= 11</b>
<b>Fever :</b>	Mild Moderate Severe	(1) 5.3 % (7) 36.8% (11) 57.9%	(2) 18.2% (2) 18.2% (7) 63.6%
<b>Cough:</b>	Productive Non-productive No cough	(6) 31.6 % (10)52.6% (3) 15.2 %	(3) 27.3% (6) 54.5% (2) 18.2%
<b>Dyspnea:</b>	Mild Moderate Severe No dyspnea	(7) 36.8% (6) 31.6% (12) 10.5% (4) 21.1%	(5) 45.5% (2)18.2% (2) 18.2% (2)18.2%
<b>Constipation:</b>	Constipated Not constipated	(8) 42.1% (11) 57.9	(4) 36.4% (7)63.6%
<b>Diarrhea:</b>	Mild Moderate Severe No diarrhea	(6) 36.1% (6) 31.6% (1) 5.3% (6) 3.16%	(7) 63.6% (3) 27.3% (0) 0% (1) 9.1%

But regarding the complications ; according to table (2)the results were significantly different among the two groups. Firstly ; the pregnancy outcome which was classified as abortion , preterm labor , and normal term labor their consequences respectively were (21 \_ 31.6\_ 74.4) % for the first group ( GDM) and for the second group (non GDM) the consequences were (9.1\_ 18.2 \_ 72.7) % which consider a worthy result especially for the percentage of abortion and preterm section. One more complication was vaginal bleeding that likewise the labor outcome it also showed a considerable result that were as G1:G2 [ 31.6:36.4 >> 21.1: 9.1 >> 10.5: 0 >> 36.8:54.5 ] % as mild bleeding >> moderate >> severe >> and no developing of bleeding , respectively . hospitalization requirement was also included in the complication that it's result was like following G1:G2 (47.4: 18.2) % admitted result and (52.6:

81.8) % not admitted result that reflect critical differences between them. The latter complication that was part of this study is needing O2 support there was somewhat difference that's clear in this next numbers G1:G2 ( 21.1 \_ 18.2 ) % related to those whom needed a O2 supply and for those that didn't need O2 support their result for both G1&G2 were 78.9 %and 81.8 % respectively.

**Table (2) shows the complications of covid19 infection among GDM pregnant women vs Non-GDM pregnant women.**

<b>Complications in %</b>	<b>G1 (GDM ) No = 19</b>	<b>G2 ( Non- GDM ) No= 11</b>
<b>Pregnancy outcome :</b> Abortion Preterm Normal term	(4) 21 % (6) 31.6% (9) 47.4	(1) 9.1% (2) 18.2% (8) 72.7
<b>Vaginal bleeding:</b> Mild Moderate Severe No bleeding	(6) 31.6 % (4) 21.5% (2) 10.5 (7) 36.8	(4) 36.4% (1) 9.1% (0) 0% (6) 54.5
<b>Admission:</b> admitted Not admitted	(9) 47.4% (10) 52.6%	(2) 18.2% (9) 18.2%
<b>O2 support:</b> needed Not needed	(4) 21.1% (15) 78.9%	(2) 18.2% (9) 81.8%

**Discussion:** GDM is the result of a complex and variable interaction of genetic, environmental, maternal, and fetoplacental factors in an integrated manner with onset or first recognition during the second half of pregnancy(16). The newly onset of covid19 which was within the last 2 years make the study concentration directed toward the main concern issues that could lead

to world extermination , so regarding the prevalence of covid19 infection in pregnant women and more specifically in GDM pregnant women was some how far from or may located at the bottom of the main concern topics list . Thus it should be noted that there is lack in such precise information. The world health organization ( **WHO**) at the beginning of the outbreak warn about major expected predictions that has ben confirmed later on , one of these predictions that documented was Older people, and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness(14).also the (**CDC**) stated that :- People who have COVID-19 during pregnancy are also at increased risk for complications that can affect their pregnancy and developing baby. For example, COVID-19 during pregnancy increases the risk of delivering a preterm (earlier than 37 weeks) and or stillborn infant(17).

A meta-analysis done by Allotey et al showed the prevalence of COVID-19 in pregnant women varies with the series, with an overall rate of 10% (7–14%)(18). This percentage notably shows the impact of covid on pregnancy in the community.

According to our study the percentage of the infection that was equal to 63.3 % while those who are Non-GDM The infection incidence was 36.7%. So it is a noticeable that GDMs are prone to have COVID-19 symptoms. Another case-control study by anda et al studied the Gestational diabetes association with SARS-CoV-2 infection during pregnancy concluded that:- The significantly higher rate of GDM among women with SARS-CoV-2 infection during pregnancy, as compared to corresponding controls, suggests that GDM increases the risk of infection. Meanwhile, SARS-CoV-2 during pregnancy might increase the risk of developing GDM(19). Which agree with this study.

As regards the symptoms. Study that done by Khalil et al(20). Has been agreed In some way with our study and give The almost same result Which detect that symptomatic pregnant women were screened, the symptoms were cough (71.4%), fever (63.4%), shortness of breath (34.4%) . another study by overton et al have nearly same result regarding cough and shortness of breath, while fever, overton stated less likely to be complained of(21).

Another multiple studies done by : 1: Liu W, (22). 2 : Gidlöf S et al (23) 3: Kleinwechter H et al (24).

Showed the almost same findings of this study and showed that cough was the most prevalent initial symptom among GDM women affected by covid19

infection. also it revealed that , the majority were preterm deliveries that also agree with our study as we conclude the preterm and abortion was more common in women with GDM comparing to Non-GDM and the normal term pregnancy was the majority in both groups but with significant difference in percentage.

**Conclusion:** there is a significant difference in the clinical course of covid19 including it's symptoms and their severity as well as it's complications in gestational diabetic patients comparing to non gestational diabetic women .

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