

## Diabetes &amp; its Complications

## The Impact of COVID-19 Pandemia during the First Lockdown Period on Gestational Diabetes Mellitus: A Retrospective Single Centre Evaluation

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**ABSTRACT**

*Data on the impact of COVID-19 on diagnosis, management and outcomes of women with GDM are few. Our aim was to evaluate the possible impact of lockdown on GDM diagnosis and follow-up. We retrospectively analyzed the GDM diagnostic modalities, the clinical-metabolic characteristics and the maternal and fetal outcomes in 48 GDM women followed during the lockdown (March-May 2020) and to compare the results with the 61 GDM women followed in the same period in 2019. We found no significant differences between the two groups in terms of diagnosis, clinical-metabolic characteristics and maternal and fetal outcomes. Therefore, we found that lockdown did not affect negatively maternal and fetal outcomes of GDM patients followed in this period.*

**Keywords**

Pregnancy COVID-19 pandemia, Maternal outcomes, Fetal outcomes, Gestational diabetes.

**Introduction**

Gestational diabetes mellitus (GDM) is a glucose intolerance first recognized during pregnancy that if not properly diagnosed and treated causes short and long term maternal and fetal complications [1,2].

On March 2020 the OMS declared the state of pandemic due to the spread of the new coronavirus (SARS-COV-2) and in Italy a Prime Ministry Decree (DPCM) established the first lockdown. As for diabetes in pregnancy, the DPCM has kept the "visits during pregnancy" among the services to be provided and have also guaranteed diagnostic services that cannot be postponed as they are related to a specific gestational age, as long as all safety provisions are adopted [3].

In Italy, screening of GDM follows the guidelines published in 2011 by the Istituto Superiore di Sanità (ISS). A 75 g OGTT at 16-18 gestational weeks (g.w.) is performed in high-risk patients, while in medium risk patients it is performed at 24-28 g. week [4]. For GDM diagnosis, the IADPSG criteria are utilized [5]. Data on the impact of COVID-19 on GDM are few [6-10], but it is to remember that

hyperglycemia impairs the immune response to infections, and that the consequently associated inflammatory state could worsen insulin resistance, a key feature of this pathology [11-13]. So also in the occurrence of a pandemic, the attention for the diagnosis and treatment of GDM has not to be reduced and for this proposal the International and National Society have licensed many recommendations on the screening and diagnosis of GDM focused on diabetes and pregnancy [14-17]. In Italy a document, approved by the Ministry of Health, recommended that, when the usual screening procedure cannot be safely performed, because of unfavorable risk/benefits, the diagnosis of GDM is acceptable even without performing the 75 g OGTT but considering only one value of fasting plasma glucose (FPG)  $\geq 92$  mg/dL in the diagnostic period [17]. Therefore, aim of this study was to evaluate the possible impact of lockdown on GDM diagnosis and follow-up. We retrospectively analysed GDM diagnostic modalities, clinical-metabolic characteristics and maternal and fetal outcomes in 48 GDM women followed during the lockdown (March-May 2020) at Diabetology Unit of ULSS6 Padova and compared the results with the 61 GDM women followed in the same period in 2019.

GDM women diagnosed according to ISS guidelines [4,5] or by COVID-19 pandemic Italian guidelines [17] were followed up at the Diabetology Unit by a multidisciplinary team. They were trained to self-monitor glucose levels at home recording fasting and 1-hour postprandial blood glucose levels. They were given

a personalized diet considering the nutritional needs of mother and fetus. Insulin therapy was started if women did not meet the established glycemic goals (fasting plasma glucose <90 mg/dl and 1h postprandial plasma glucose <130 mg/dl) after two weeks of dietary treatment [18]. After delivery data of maternal and fetal outcomes were recorded. The newborn were classified as LGA if their birth weight was >90th percentile, or SGA if it was <10th percentile. When there was no possibility to perform the visit face to face, phone consultation and email contact for reporting of blood glucose measurements were also utilized during pandemia.

The study was conducted in accordance with the Declaration of Helsinki and informed consent was obtained from all women. Data were processed with the IBM SPSS 25 and R (version 4.0.3 "Bunny-Wunnies Freak Out") statistical programs. Continuous quantitative variables are expressed as means ± standard deviations, and were compared with Student's t-test. Qualitative variables are expressed as frequencies and compared using the  $\chi^2$  test.

During the lockdown period, thanks to high safety provisions adopted by the Reference Analysis Laboratory and to the high collaboration of it with our Unit, only in 4.2% of pregnant women GDM diagnosis was made with FPG  $\geq$  92 mg/dL, differently from what reported in literature [6-8]. Furthermore, the diagnostic procedures were performed in line with the National and International recommendations, in fact in women at high risk to develop GDM the diagnosis was made at  $17.5 \pm 1.1$  g.w. and in women at medium risk at  $26.1 \pm 1.9$  g.w. Except for age, no significative differences have been found in the clinical parameters in the pregnant women followed during this period compared with those attended in the same period in 2019. It is to notice that, despite the persistent restrictions after the lockdown period, 50% of women performed

postpartum follow up (Table 1).

As for maternal and fetal outcomes, in GDM women followed during lockdown delivery occurred earlier than GDM ones followed in 2019 and this can be due to a higher frequency, even if not significant, of preterm birth. It is to underline, that no case of SARS-COV2 infection were described in the patients under study and in particular in those experiencing preterm delivery. This data can be in part explained by the low number of patients evaluated (Table 1).

Our data agree with those of Molina-Vega et al. [6]. They retrospectively analyzed data on GDM women diagnosed from 1 September to 30 November 2019 and from the same period in 2020 and showed a similar prevalence of GDM in the two group and no differences in the maternal and fetal outcomes. However, the authors utilized different diagnostic criteria for GDM diagnosis in the two periods, i.e. a twostep strategy following the National Diabetes Data Group in the first period and measurements of fasting plasma glucose and HbA1c in the second group. On the contrary, Wilk et al. [8] compared data on GDM diagnosed according to IADPSG criteria of two periods (October-February 2020 and March-June 2020) and found a higher frequency of prolonged labour in GDM women followed during COVID-19 pandemia. Furthermore, these women reported difficulties in measuring blood glucose and in receiving diabetes education with respect to those followed in pre-pandemia. Also Ghesquiere et al. [7] analyzed the metabolic control of patients affected by GDM in the COVID-19 pandemia (first period) compared with those of the pre-pandemia period (second period) and showed that women of the first period have a higher frequency of poor control as well as the need for insulin therapy with respect to the second period.

Parameters	Lockdown n.48	Pre-COVID n.61	p
Age (yrs )	31.7 ± 4.5	33.3 ± 4.8	0.102
BMI (kg/m <sup>2</sup> )	25.6 ± 6.1	25.6 ± 6.2	0.992
Immigrate status (%)	43.7	47.6	0.835
Weight gain (kg)	10.5 ± 5.5	10.3 ±	0.805
Early screening for GDM (g.w.)	17.5 ± 1.1	16.6 ± 3.8	0.275
Late screening for GDM (g.w.)	26.1 ± 1.9	25.1 ± 1.5	0.012
A1C at diagnosis (%)	5.2 ± 0.3	5.2 ± 0.4	0.625
A1c at 3rd trim (%)	5.3 ± 0.4	5.3 ± 0.3	0.943
Insulin therapy (%)	14.6	21.3	0.517
Delivery (g.w.)	38.5 ± 2.3	39.2 ± 1.3	0.041
Preterm birth (<37g.w.) (%(n.))	10.0 (4)	1.8 (1)	0.188
Birth weight (g)	3216 ± 697	3300 ± 493	0.493
Macrosomia (%(n.))	2.6(1)	7.0(4)	0.639
LGA (%(n.))	10.2(4)	16,0(9)	0.550
SGA (%(n.))	7.7(3)	14.2(8)	0.448
Followup post partum (%)	50	63.3	0.231
AGT post partum (%)	20.8	7.9	0.277

**Table 1:** Clinical characteristics, maternal and fetal outcomes in the women under study.

Similarly, in a case control study, comparing pandemic and pre-pandemic outcomes of GDM women, a higher rate of recurrence to the insulin and metformin therapy has been found in the first group with respect to the second ones [9]. Differently from what above reported, it is to underline that in our study, no differences in glycemic control and in the need of insulin therapy to maintain a good metabolic control have been found in the two groups.

Finally LaVerde et al. showed higher pregnancy weight gain and BMI at delivery in GDM women followed during lockdown with respect to those of pre-lockdown period [10]. In our study no differences in weight gain during pregnancy have been recorded, probably staying at home, as indicated during the lockdown period, women paid more attention to the composition of meals and meal times. So, differently by what reported by the most of the studies in literature, our study shows that lock down did not affect negatively maternal and fetal outcomes of GDM patients. Furthermore, despite the persistent restrictions after the lockdown period, 50% of women performed postpartum follow up. These data emphasize the importance of communication focusing not only to the importance to obtain a good glycaemic control to reduce the maternal and fetal complications but also to support women on the worries about diabetes and COVID19 pandemic. Even if we have no data on the quality of life during the lockdown period [19], the utilization of telemedicine during pandemic by our GDM patients may have contribute to the results obtained in this study suggesting the necessity for a care taking into consideration also the psychological and social aspects of the disease. Clinical approaches utilizing telemedicine in GDM patients during pregnancy resulted beneficial in improving glucose control and reducing maternal and fetal complications [20]. However, clinical trials need to be conducted to be confident on the application of telemedicine in pandemic.

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