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# The Role of Therapeutic Education in Diabetes and Maternity

## Why Address Motherhood in Women with Diabetes? Insights from Clinical Practice



**Lucía, 16 years old, diagnosed with type 1 diabetes since age 5. She visits the clinic with a 3-month history of amenorrhea. An 8-week pregnancy is confirmed through a laboratory test. She is on a multiple daily insulin injection regimen and uses Flash glucose monitoring. Her Time in Range (TIR) is 52%, Time Above Range (TAR) is 40%, Time Below Range**

**(TBR) is 8%, and Coefficient of Variation (CV) is 31%. Her HbA1c is 7.9%.**

**Sara, 43 years old, an 8-year history of type 2 diabetes mellitus on non-insulin therapy. She visits our consultations due to 2.5 months of amenorrhea, and a positive pregnancy test at home. Her last HbA1c, from 3 months ago, was 8.2%.**

Maternity in women with diabetes cannot be limited exclusively to the pregnancy period. The journey to motherhood encompasses a much longer and more complex timeline. Currently, half of the women with diabetes present with unplanned pregnancies. Therefore, educational efforts must focus on preventing situations like those mentioned at the start of this article, reflecting evidence-based findings:

- A 2021 study by the Asociación de Enfermería Familiar y Comunitaria de Cataluña (Catalonia, Spain) reported that the mean age of first sexual intercourse in Spain is 13.8 years<sup>1</sup>.
- The HBSC 2018 study in Spain on sexual behavior, funded and supported by the Ministry of Health, Con-

sumer Affairs, and Social Welfare, provided data on the age of initiation of sexual intercourse. Based on responses, the results were as follows: 30.9% of girls reported losing their virginity at age 15, 26.7% at age 16, and 21% at age 14<sup>2</sup>.

- Spain is the European Union country with the highest proportion of babies born to mothers aged 40 or older. In 2021, this accounted for 10.7% of all births<sup>3</sup> (Fertility Indicators: National Results. INE 2022).

### PREVIOUS INFORMATION AND PRECONCEPTION COUNSELING

Given these circumstances, it is essential to inform all women with diabetes—

regardless of their desire to become mothers—about the necessity of planning their pregnancies. This information should be provided as early as the moment of diagnosis to every woman of childbearing age (preconception counseling).

Women with T1DM and T2DM of childbearing age should participate in Therapeutic Education Programs. These programs aim to facilitate disease control and promote self-care practices.

Such programs should include specific guidance on the importance of preconception glycemic control, and general recommendations for pregnancy. These messages should be reinforced during follow-up visits to ensure an optimal pregnancy outcome. The purpose of >>

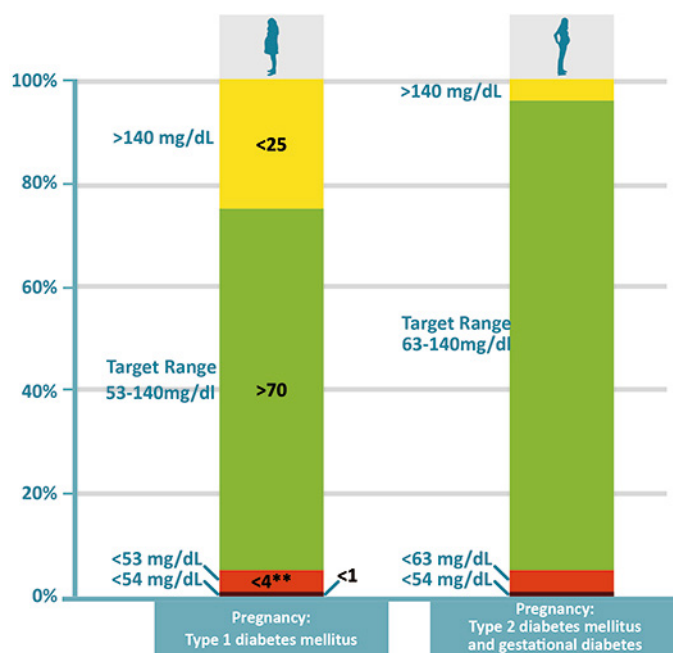


FIGURA 1 Battelino T, et al. Diabetes Care 2019 Aug;42 (8):1593-1603

» this program is to equip women with pre-gestational diabetes mellitus (DM) and their families or caregivers with the knowledge, practical skills, attitudes, and support necessary to make informed decisions and manage their condition. Every woman with DM of childbearing age should be informed, starting from the moment of their diabetes diagnosis, about the importance of planning their motherhood. The goal is to achieve an optimal glycemic state for conception and to minimize risks as much as possible, aligning them with those of the general population.

The risks associated with an unplanned pregnancy, both for the mother and the child, should be clearly communicated. Appropriate contraception should be offered to all women with diabetes. Currently, there are no contraceptives contraindicated for women with diabetes; the choice should be made based on the individual's characteristics and the woman's preferences, just as it is for the general population.

In our context, there are two groups of women with DM where educational intervention on this topic is a priority due to their heightened vulnerability in planning motherhood: adolescents and women with T2DM of childbearing age.

## PREGNANCY PLANNING (PRECONCEPTION COUNSELING)

Women with diabetes who wish to become mothers should communicate their intentions to their healthcare team to en-

sure proper planning, as the prognosis for these pregnancies improves significantly when they are planned. **Women facing pregnancy with pre-existing diabetes** are advised not only to aim for good glycemic control but to achieve excellent control—matching that of women without diabetes—while avoiding hypoglycemia. However, pregnancy involves multiple hormonal changes that complicate glycemic control. These changes lead to an **increased risk of hypoglycemia within the first half of pregnancy and a tendency toward hyperglycemia in the second half**. By the end of pregnancy, insulin requirements may increase two- to threefold compared to those at the beginning of pregnancy. Similarly, for women with T2DM who have not previously used insulin, it is essential to ensure they have completed a structured educational program on insulinization to prepare them for its potential necessity.

Preconception and pregnancy management programs should address both medical aspects, such as analyses and treatment adjustments, and educational components. These programs aim to equip women with strategies to achieve desired glycemic targets, such as an HbA1c values < 6.5%. In our country, the funded use of continuous glucose monitoring (CGM) for insulin-treated women with diabetes is currently available from the planning stage of pregnancy and throughout its course, which facilitates the management of changes and the establishment of appropriate time-in-range targets for this condition across all glucose metrics (see Figure 1).

Additionally, this period serves as an excellent opportunity to **reassess** knowledge, skills, and attitudes, as motivation and adherence are at their peak. It is also a time to **re-educate** in areas requiring improvement, such as carbohydrate management and insulin treatment strategies.

## PREGNANCY PLANNING (PRE-GESTATIONAL CONTROL)

Educational efforts should emphasize the importance of planning pregnancy and achieving optimal glycemic control to ensure a safer outcome for both mother and child.

## EDUCATIONAL FOLLOW-UP DURING PREGNANCY

During pregnancy, the maternal body undergoes physiological changes that affect glucose in various ways, necessitating adjustments to glycemic targets across the trimesters. These adjustments should be applied to all technological devices used, such as CGM systems, insulin pumps, or connected insulin pens, with corresponding modifications to glucose alert thresholds and treatment plans for hypo- or hyperglycemia.

First trimester: The primary characteristic of this period is an increased risk of hypoglycemia. Educational interventions should be agile and dynamic, addressing this tendency preventively:

- Teaching how to adjust carbohydrate-to-insulin ratios. »



- » - Teaching sensitivity factor adjustments by time of day.
- Proper management of hypoglycemia.

Throughout this period and the pregnancy, **telemedicine** can help maintain frequent and direct contact with patients to address unforeseen issues. This method provides a bidirectional communication channel between the pregnant woman and her health care team.

#### **Second trimester:**

As pregnancy progresses, the maternal

body requires a caloric adjustment to meet new energy demands. An increase of approximately 300 kcal/day<sup>3</sup> is recommended to meet these needs. This adjustment should be gradual, avoiding disproportionate maternal weight gain and its associated negative consequences. Close contact is essential for resolving concerns and supporting the additional burdens of pregnancy on women with diabetes.

#### **Third trimester:**

In addition to this “theoretical” insulin adjustment, we must ensure that the insulin is administered and

absorbed as effectively as possible. During pregnancy, the woman experiences many physical changes that may affect this. Therefore, we need to work on the corresponding strategies both with the injection sites and with the materials used:

- During the first half of pregnancy, no modifications are usually necessary. It may seem obvious, but it is important to confirm with the woman that nothing will happen to the fetus by injecting insulin into the abdomen.
- From the second half of the pregnancy, although this is very indivi-»

- dual, the abdomen becomes more distended, and the injection should be shifted to the sides, using the area where there is sufficient subcutaneous tissue.
- With weight gain and abdominal growth, general mobility may also be significantly limited, preventing the use of injection sites the woman was accustomed to. For example, she may no longer be able to use the upper part of the buttocks because she cannot rotate comfortably. In these cases, it is crucial to find alternative sites or to seek the help of another person to maintain optimal injection in those areas.
- The same applies to the insertion of cannulas for subcutaneous insulin delivery systems. We must adapt the insertion sites to the stage of pregnancy.
- Due to the mobility limitations we have mentioned and more difficult access to certain areas, it may be necessary to adjust the materials used for continuous subcutaneous insulin infusion systems. For example, changing the catheter length to a longer one can make it much easier for the woman to manage her insulin pump.

## EDUCATIONAL PROCESS DURING POSTPARTUM

The use of technology facilitates the management of diabetes and communication with the health care team, not only during pregnancy but also afterward. As previously mentioned, "motherhood" is a much broader concept than just pregnancy. Specifically, the postpartum period is particularly challenging for any woman and can be even more difficult for a woman with diabetes. Our support must be continuous and should not cease once the pregnancy ends.

Learning about diabetes management for this period should begin at the start of the third trimester of pregnancy or earlier if requested by the woman. Properly anticipating this information can ease the anticipatory anxiety many wo-

men with diabetes experience regarding the postpartum period. We must discuss possible scenarios, appropriate strategies, and address their concerns without judging their decisions.

Before the end of pregnancy, all these topics should be thoroughly reviewed with the health care team:

- How and when the delivery will occur (if possible): The medical team should inform the woman as early as possible about the potential methods (natural delivery, scheduled cesarean, induction, etc.).
- Insulin administration during delivery and who will manage it: Different hospitals have various protocols. In centers where ambulatory treatment with subcutaneous insulin infusion systems/CGM is maintained, the woman should be properly trained to handle it.
- Immediate postpartum adjustments: This includes the new insulin regimen and necessary changes to devices.
- Breastfeeding advice and specific recommendations for maternal lactation.

Postpartum support: This includes scheduling follow-up appointments, online consultations, and communication channels for addressing concerns.

### -General Prepartum Information

Women need to be informed and have all her doubts clarified about the points discussed earlier. We must explain how, in the postpartum period, insulin needs decrease significantly and that, therefore, the clear objective of this period is to take all necessary measures to avoid hypoglycemia, always prioritizing safety. To address this in an individualized way and provide specific recommendations, we must understand her particular situation and what she wants to do regarding choices she can make.

- Postpartum treatment: Some wo-

men with T2DM or other types of diabetes will return to their previous treatment. We must ensure that they have no doubts about this.

- For insulin injection or cannula insertion, the same injection sites used at the end of the pregnancy should be maintained, waiting for complete abdominal recovery before using it again. There is no evidence of how long to wait, but most women wait more than 6 months before resuming injection in that area.
- Boluses should not be advanced. For safety, during this period of irregularity, insulin should be administered only when there is complete certainty that ingestion will follow.
- If hypoglycemia occurs, we must remember that its treatment should be prioritized. Remember that having hypoglycemia alarms activated and properly programmed in continuous glucose monitoring systems can significantly help reduce risk situations.
- Counseling on breastfeeding options: There is still much misinformation regarding breastfeeding in women with diabetes. Therefore, it is crucial to approach this topic appropriately, allowing the woman to choose the option she prefers.

### - Counseling and promoting Breastfeeding

In many cases, there is a deeply ingrained rejection of this option. Fears based on misinformation or previous bad experiences can influence this rejection if not properly addressed. Clear information and proper support can be key to encouraging this option:

- Breastfeeding has the same benefits for the woman with diabetes and her child as it does for the general population.
- The results regarding the association between breastfeeding and



» hypoglycemia are very variable, although it has been shown that good educational support is essential to reduce this risk.

➤ Nutritional recommendations are similar to those for the general population, but they should be reinforced here with the aim of avoiding hypoglycemia.

➤ Insulin requirements are lower during breastfeeding than before pregnancy, so the previously mentioned recommendations should be reinforced even more.

➤ For safety, we should recommend that the woman with diabetes monitor her glucose before each feeding. A common recommendation is to take a 10g carbohydrate supplement (usually a glass of milk) when glucose is < 100 mg/dL at that time. Specific recommendations for breastfeeding comfortably while sitting.

**- Adjustment of the different devices to the new targets:**

Although this will have been discussed before delivery, most systems (both infusion and CGM) cannot be adjusted to the new parameters until the immediate postpartum period. This is a time when, due to the inherent circumstances of this period, it is common for forgetfulness or errors in programming to occur. To minimize these, we should always provide everything in writing in the simplest and clearest way possible, as well as review with the patient (either by phone or through the appropriate platforms) to make sure that these changes have been made correctly.

#### **- Postpartum support:**

Despite all the prior information and instructions to continue adjusting treatment when hypoglycemia occurs, it is not uncommon for women to face very challenging moments in managing their diabetes without the healthcare teams being aware. Remember that, at this point, their priorities are elsewhere, and therefore, we must be much more proactive in our support, especially for those women we know are at higher risk. **D**

## CONCLUSIONS

Preconception control ensures half the work is completed even before pregnancy begins.

Technology use (particularly CGM) can lead to improved outcomes.

Therapeutic and emotional support is essential to help women cope with the significant demands of motherhood, from pregnancy planning through the postpartum period.

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