IJSRM
INTERNATIONAL JOURNAL OF SCIENCE AND RESEARCH METHODOLOGY
An Official Publication of Human Journals

Human Journals
Case Report
May 2020 Vol.:15, Issue:3

Dietary Therapy in the Management of Gestational Diabetes: Case Report

IJSRM
INTERNATIONAL JOURNAL OF SCIENCE AND RESEARCH METHODOLOGY
An Official Publication of Human Journals

Hamid Chamlal[1], Imane Barakat[1], Mohamed Mziwira[1,2], Mohammed El ayachi[1], Rekia Belahsen[1*]

[1]Laboratory of Biotechnology, Biochemistry & Nutrition. Training and Research Unit on Nutrition & Food Sciences. Chouaib Doukkali University. School of Sciences, El Jadida, Morocco.

[2]Higher normal school of Hassan II University, Casablanca, Morocco.

Submission: 21 April 2020
Accepted: 29 April 2020
Published: 30 May 2020

HUMAN JOURNALS
www.ijsrm.humanjournals.com

Keywords: gestational diabetes, dietary care, case report, nutritional intakes

ABSTRACT

The management of gestational diabetes requires the adherence of the partners to the pillars of medical and nutritional care, if necessary manifesting situations of serious complications that threatens the life of the mother/newborn couple during and long term. Failure to adhere to the appropriate diet is one of the situations that can affect the development of pregnancy and the quality of life of pregnant women with diabetes. In this paper, we report the case of a pregnant Moroccan woman who was diagnosed with gestational diabetes in the first trimester and who suffers of repetitive and unexplained hypoglycemias.

INTRODUCTION

Nutritional counseling is at the heart of prenatal care for all women during pregnancy (Kominiarek and Rajan, 2016). Indeed, maternal nutrition represents a major public health challenge as it affects not only the health of women, but also that of the future generations (Hanson et al, 2015). Gestational diabetes (GD) is the most common perinatal metabolic and endocrine complication. It represents a growing health problem worldwide (Dolatkhah et al, 2018). This metabolic situation causes emotional distress (Schmidt et al., 2019), with short-term and long-term consequences for both the newborn and the mother terme (Bhatia et al, 2018; Wang et al, 2013). However, individualized management based on dietary recommendations and physical activity remains the main treatment for GD (Baoet al, 2014; Dolatkhah et al, 2018). Appropriate and flexible methods of nutritional therapy successfully regulate maternal blood sugar while improving fetal growth (Dolatkhah et al, 2018).

PRESENTATION OF THE CASE

The study case is a pregnant woman aged 33 years old, of Moroccan origin, civil servant, with high education level, diagnosed with gestational diabetes in the first trimester by a simple fasting blood sugar test. She is followed simultaneously by an endocrinologist and a gynecologist, she was referred to a dietitian for dietary consultation in order to alleviate food-related problems.

On the day of the consultation, the patient was at 25 weeks of gestation, had 80.5 kg asbody weight and 1.64 m as height. Her pre-conception weight was 84kg, or a body mass index (BMI) of 31.2 kg/m2, indicating that she is with category I of obesity. The case weight decreased during the first two trimesters of pregnancy by 3.5 kg, while the weight gain during pregnancy reported in the literature ranges from 5 to 9 kg (Moore Simas et al, 2013; Sebire et al., 2001). No medical treatment was prescribed for this patient from her treating physicians.

The biological parameters that are represented fasting blood glucose levels vary between 0.77 and 0.98g/l and post-prandial glycemia levels which in turn varied between 0.87 and 1.45g/l two hours after the consumed meal (Figure 1). The patient declared that she always has repetitive morning hypoglycaemia between 10 a.m. and 11 a.m. These hypoglycemias reached levels below 0.7g/l and are generally accompanied by classic symptoms.

The other parameters are normal, namely, hemoglobin levels of 13g/l, O positive blood group, and except for rubella and toxoplasmosis that were positive all serology test were negative.

PPG: postprandial glycemia; BF: breakfast; L: lunch; D: dinner

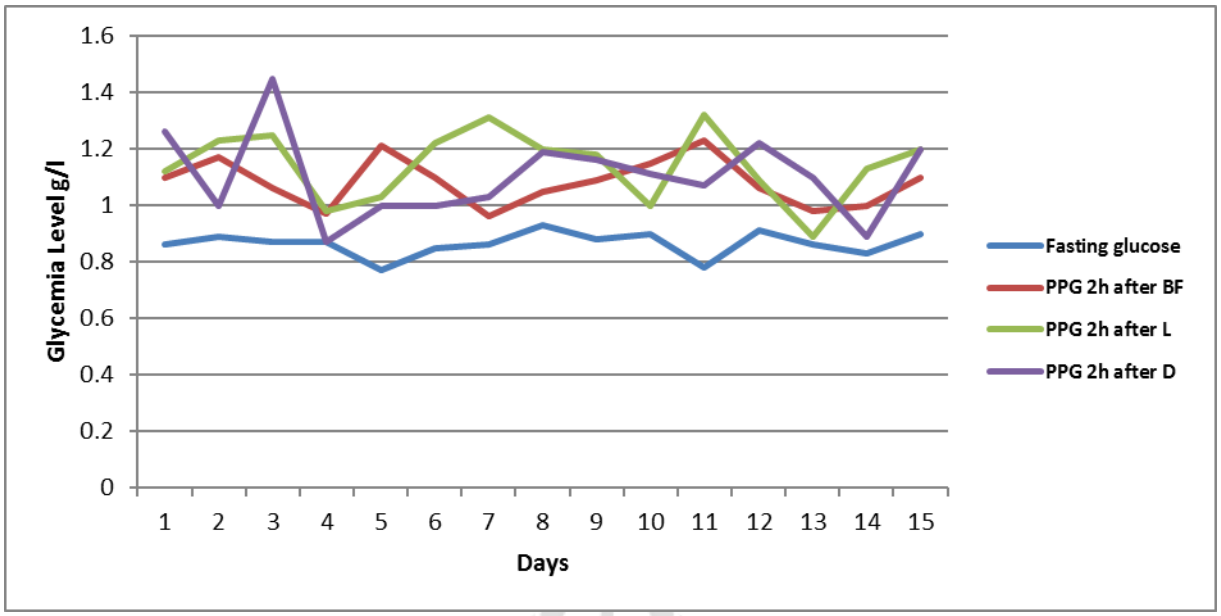

Figure No. 1: The distribution of fasting and postprandial blood sugar levels in for 15 days.

The first degree patient relatives, namely the father and the mother, have type II diabetes, but the patient has never mentioned having type II diabetes or gestational diabetes before. The case is multiparous with a single female child, born with a congenital malformation. She has experienced two miscarriages, a caesarean, a history of polycystic ovary syndrome and a history of complications during delivery of PRM type (premature rupture of membranes). On the other hand, the patient suffers from persistent constipation. However no history of blood pressure problems or a macrosomia were declared.

The patient was very cooperative during the consultation and very interested in dietary monitoring. She was sedentary before pregnancy but her physical activity reached a duration of 30 min per day in the first trimester. This physical activity was stopped on medical orders.

The data on food consumption were collected by a dietitian-nutritionist who carried out a dietary interview using the 24h recall repeated three times.

The first two dietary recalls were undertaken on two different weekdays while the third one was carried out ona weekend day. The composition of food intake was determined using **BILNUT** Version **2.01** Software, the data collected are presented in Tables 1 and 2.

Table No. 1: The average dietary energy and nutrients intakes in the patient.

Nutrients	Intakes
DEI* (Kcal)	2359
P (%)	17.4
L (%)	36.2
G (%)	46.5
Ca (mg)	997
Fe (mg)	32.45
Folates (ug)	448
Zinc (mg)	13.5
Mg (mg)	477
Fibres (g)	25
Vitamine B (mg)	1.45
Vitamine C (mg)	125
Eau (ml)	1424

DEI *: daily energy intake

Table No. 2: The percentage of meals consumed in the daily energy intake.

Meals	Percentage in DEI* %
Breakfast at 8 a.m	22
snack at 11 a.m	30
Lunch at 1 p.m	28
snack at 6 p.m	7.8
Dinner at 10 p.m	12.2

DEI *: daily energy intake

In relation to the recommended daily allowance (RDA), the energy needs for pregnant women are in general similar to those of the non-pregnant women in the first trimester with an intake of 2000kcal that increases by only 10% during the pregnancy distributed between the 2nd and the 3rd trimesters. Nevertheless, this increase of energy should not exceed 500kcal (EFSA, 2010b; Koletzko et al., 2013). Indeed, energy intake should be personalized according to the age, BMI and physical activity level of the pregnant woman (Kominiarek and Rajan, 2016). The other daily requirements concern; 10-15% of RDA for proteins, 15-30% of RDA for lipids, 45-60% of RDA for carbohydrates, 30g of dietary fiber, 2.3 l of water, 1000-1300 mg of calcium, 27-30 mg of iron, 400-600 ug of folate, 300 mg of magnesium, 15 mg of zinc, 1.1-1.5 mg of vitamins B1 and 110 mg of vitamin C (EFSA, 2010a, 2010b; Koletzko et al., 2013).

The patient's daily energy intake was 2400kcal which guarantees the recommended daily allowance (RDA). However, this energy supply is unbalanced in terms of the macronutrients contribution. In fact, proteins provide 17.4%; fat 36.2% and carbohydrates provide 46.4% of energy. In addition, the minerals and trace elements intakes were generally adequate compared to RDAs, in particular for calcium (997mg); iron 32.4mg; folates (448 µg); zinc (13.5mg) and magnesium (477mg). Dietary fiber intake (25g) and fluid intake (1423ml) are generally reduced compared to the RDA.

The daily energy intake (DEI) is based on 3 essential meals (breakfast, lunch and dinner) and 2 snacks (morning and afternoon). The distribution is not well respected following a high caloric percentage of the snacks compared to that of the main meals. In addition, the daily dietary intake is characterized by a considerable consumption of dairy products, moderate consumption of fruits and vegetables, an insufficient intake of cereals and starchy foods, in addition to a considerable consumption of fries, sfenj (Moroccan donut), jam and fruit with a glycemic index higher than 70%.

DISCUSSION

The various elements of medical and dietetic diagnosis undertaken on the present study case have allowed the confirmation of a case of unbalanced gestational diabetes with both repetitive hypoglycaemia and postprandial hyperglycaemia in addition to an unbalanced dietary intake. In the absence of medical treatment (Satirapoj et al, 2020), the existence of hypoglycaemia is generally justified either by food phobia towards all kinds of carbohydrates

for fear of having hyperglycaemia or by significant physical activity accompanied by a diet low in slowly absorbed carbohydrates. Constipation is a consequence of a diet low in dietary fiber and water (Sharma and Rao, 2017). Indeed, the analysis of the composition of the patient dietary intake showed insufficient consumption of foods, source of fiber such as cereals.

In front of the case diet and medical diagnosis, a diet of up to 2500kcal/d, balanced on the macro nutritional level, rich in dietary fiber and containing sufficient amounts of vitamins, mineral salts and water was considered.

The following changes to correct the dietary intake were recommended to the patient. Among them the consumption of foods that align with the principles of the Mediterranean diet (Hezaveh et al, 2019), characterized by a variety of foods, rich in fruits and vegetables main sources of dietary fiber and water-soluble vitamins and certain minerals (Rees et al., 2019), the international recommendations being for the consumption of three to five fruits and vegetables per day. In addition, the consumption of cereals and starches should be moderate in reasonable quantity adjusted to the glycemic balance (IOM, 1992).

The consumption of fat is very important during pregnancy and it is desirable to select foods sources of lipids rich in mono or polyunsaturated fatty acids such as fatty fish and vegetable oils. However it recommended to avoid trans fatty acids and saturated fatty acids contained in frying and animal fat, respectively (Hanson et al, 2015; Mijatovic-Vukas et al, 2018). In addition, the consumption of dairy products that constitute a source of calcium is to be maintained. In addition, the consumption of animal protein should be from various sources namely, red meats, poultry, fish and eggs.

Consumption of food products with a high glycemic index is strongly discouraged because of their role in the onset of glycemic peaks (Sacks et al, 2014). Also, the patient was advised to maintain a rigorous rhythm of follow-up through the food diary and the daily glucose monitoring notebook to better control the disease.

CONCLUSION

After adequate nutrition education and care, diet therapy has led to the considerable disappearance of glycemic fluctuations (Figure 2).

ACKNOWLEDGMENT

We thank the patient for their collaboration and integration into the dietary approach and also thank the health delegation of the Safi province for their support.

Consent: Informed consent was given to the patient beforehand.

Conflict of Interest: The authors state that there is no conflict of interest.

PPG: postprandial glycemia; BF: breakfast; L: lunch; D: dinner

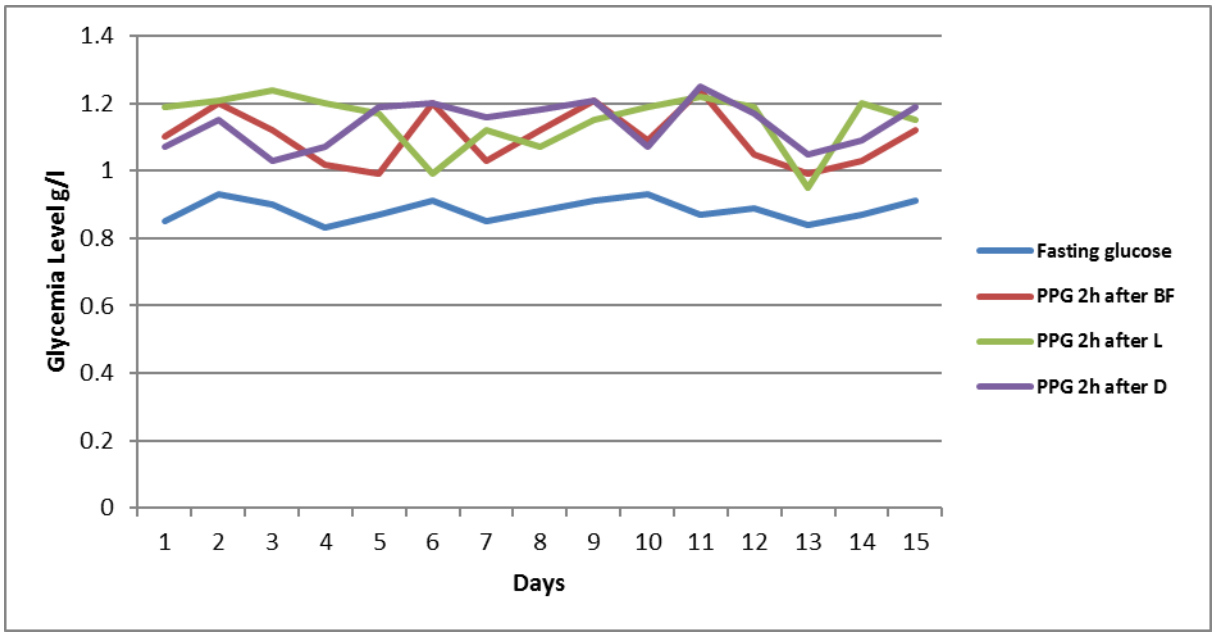

Figure No. 2: The distribution of fasting and postprandial blood sugar levels in for 15 days.

REFERENCES

1. Kominiarek MA, Rajan P. Nutrition Recommendations in Pregnancy and Lactation. Med Clin North Am. nov 2016;100(6):1199‑215, doi: 10.1016/j.mcna.2016.06.004.
2. Hanson MA, Bardsley A, De-Regil LM, Moore SE, Oken E, Poston L, et al. The International Federation of Gynecology and Obstetrics (FIGO) recommendations on adolescent, preconception, and maternal nutrition: "Think Nutrition First"#. International Journal of Gynecology & Obstetrics. 2015;131(S4):S213‑53, doi: 10.1016/S0020-7292(15)30034-5.
3. Dolatkhah N, Hajifaraji M, Shakouri SK. Nutrition Therapy in Managing Pregnant Women With Gestational Diabetes Mellitus: A Literature Review. J Family Reprod Health. juin 2018;12(2):57‑72.
4. Schmidt CB, Voorhorst I, van de Gaar VHW, Keukens A, Potter van Loon BJ, Snoek FJ, et al. Diabetes distress is associated with adverse pregnancy outcomes in women with gestational diabetes: a prospective cohort study. BMC Pregnancy Childbirth. 3 juill 2019;19(1):223, doi: 10.1186/s12884-019-2376-6.

5. Bhatia M, Mackillop LH, Bartlett K, Loerup L, Kenworthy Y, Levy JC, et al. Clinical Implications of the NICE 2015 Criteria for Gestational Diabetes Mellitus. J Clin Med. 22 oct 2018;7(10), doi: 10.3390/jcm7100376.
6. Wang Z, Kanguru L, Hussein J, Fitzmaurice A, Ritchie K. Incidence of adverse outcomes associated with gestational diabetes mellitus in low- and middle-income countries. Int J Gynaecol Obstet. avr 2013;121(1):14‑9, doi: 10.1016/j.ijgo.2012.10.032.
7. Bao W, Tobias DK, Bowers K, Chavarro J, Vaag A, Grunnet LG, et al. Physical activity and sedentary behaviors associated with risk of progression from gestational diabetes mellitus to type 2 diabetes mellitus: a prospective cohort study. JAMA Intern Med. Jul 2014;174(7):1047‑55, doi: 10.1001/jamainternmed.2014.1795.
8. Sebire NJ, Jolly M, Harris JP, Wadsworth J, Joffe M, Beard RW, et al. Maternal obesity and pregnancy outcome: a study of 287,213 pregnancies in London. Int J Obes Relat Metab Disord. août 2001;25(8):1175‑82 ,doi: 10.1038/sj.ijo.0801670.
9. Moore Simas TA, Waring ME, Sullivan GMT, Liao X, Rosal MC, Hardy JR, et al. Institute of Medicine 2009 Gestational Weight Gain Guideline Knowledge: Survey of Obstetrics/Gynecology and Family Medicine Residents of the United States. Birth. déc 2013;40(4):237‑46, doi: 10.1111/birt.12061.
10. Koletzko B, Bauer CP, Bung P, Cremer M, Flothkötter M, Hellmers C, et al. German national consensus recommendations on nutrition and lifestyle in pregnancy by the « Healthy Start - Young Family Network ». Ann Nutr Metab. 2013;63(4):311‑22, doi: 10.1159/000358398.
11. L'EFSA établit des valeurs nutritionnelles de référence européennes pour les apports en nutriments. European Food Safety Authority, 2010 (https://www.efsa.europa.eu/fr/press/news/nda100326, consulté le 16 février 2020).
12. Scientific Opinion on Dietary Reference Values for water. EFSA Panel on Dietetic Products, Nutrition, and Allergies (NDA). European Food Safety Authority Journal, 2010 (http://doi.wiley.com/10.2903/j.efsa.2010.1459, consulté le 16 février 2020), doi: 10.2903/j.efsa.2010.1459.
13. Satirapoj B, Pratipanawatr T, Ongphiphadhanakul B, Suwanwalaikorn S, Benjasuratwong Y, Nitiyanant W. Real-world Evaluation of glycemic control and hypoglycemic Events among type 2 Diabetes mellitus study (REEDS): a multicentre, cross-sectional study in Thailand. BMJ Open. 12 févr 2020;10(2):e031612. doi: 10.1136/bmjopen-2019-031612.
14. Sharma A, Rao S. Constipation: Pathophysiology and Current Therapeutic Approaches. HandbExpPharmacol. 2017;239:59‑74, doi: 10.1007/164_2016_111.
15. Hezaveh ZS, Feizy Z, Dehghani F, Sarbakhsh P, Moini A, Vafa M. The Association between Maternal Dietary Protein Intake and Risk of Gestational Diabetes Mellitus. Int J Prev Med. 2019;10:197, doi: 10.4103/ijpvm.IJPVM_86_19.
16. Rees K, Takeda A, Martin N, Ellis L, Wijesekara D, Vepa A, et al. Mediterranean-style diet for the primary and secondary prevention of cardiovascular disease. Cochrane Database Syst Rev. 13 2019;3:CD009825, doi: 10.1002/14651858.CD009825.pub3.
17. Institute of Medicine. Nutrition During Pregnancy and Lactation: An Implementation Guide. Washington, DC. The National Academies Press; 1992.
18. Mijatovic-Vukas J, Capling L, Cheng S, Stamatakis E, Louie J, Cheung NW, et al. Associations of Diet and Physical Activity with Risk for Gestational Diabetes Mellitus: A Systematic Review and Meta-Analysis. Nutrients. 30 2018;10(6) , doi: 10.3390/nu10060698.
19. Sacks FM, Carey VJ, Anderson CAM, Miller ER, Copeland T, Charleston J, et al. Effects of high vs low glycemic index of dietary carbohydrate on cardiovascular disease risk factors and insulin sensitivity: the OmniCarb randomized clinical trial. JAMA. 17 déc 2014;312(23):2531‑41, doi: 10.1001/jama.2014.16658.

	***Chamlal Hamid*** Higher Institute of Nursing Professions and Health Techniques of Safi - Morocco. Laboratory of Biotechnology, Biochemistry and Nutrition, Training and Research Unit on Nutrition & Food Sciences, School of Sciences - Chouaib Doukkali University – El Jadida – 24000 – Morocco.
	***Barakat Imane*** Higher Institute of Nursing Professions and Health Techniques of Rabat - Morocco. Laboratory of Biotechnology, Biochemistry and Nutrition, Training and Research Unit on Nutrition & Food Sciences, School of Sciences - Chouaib Doukkali University – El Jadida – 24000 – Morocco
	Mziwira Mohamed - Higher normal school of Hassan II University, Casablanca, Morocco. - Laboratory of Biotechnology, Biochemistry and Nutrition, Training and Research Unit on Nutrition & Food Sciences, School of Sciences - Chouaib Doukkali University – El Jadida – 24000 – Morocco
	Elayachi Mohammed Laboratory of Biotechnology, Biochemistry and Nutrition, Training and Research Unit on Nutrition & Food Sciences, School of Sciences - Chouaib Doukkali University – El Jadida – 24000 – Morocco
	***Belahsen Rekia*** Laboratory of Biotechnology, Biochemistry and Nutrition, Training and Research Unit on Nutrition & Food Sciences, School of Sciences - Chouaib Doukkali University – El Jadida – 24000 – Morocco