

Does a nutritional intervention aiming at improving diet quality initiated in early pregnancy improve glucose homeostasis in pregnant individuals at risk for gestational diabetes? A protocol for a randomized controlled trial

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Introduction

- A healthy diet during pregnancy has favorable effects on glycemic control and is associated with a lower risk of gestational diabetes mellitus (GDM) and other maternal and fetal complications.^{1,2,3}
- The primary treatment for GDM is nutritional therapy, which often begins late in pregnancy.^{3,4}
- According to Diabetes Canada, **there is a need for an effective and acceptable intervention that could improve glucose homeostasis and support pregnant individuals at risk for GDM.**⁴

Objective

To evaluate the effects of a nutritional intervention initiated early in pregnancy, based on the Canada's Food Guide (CFG), on glucose homeostasis in 150 pregnant individuals at risk for GDM, compared to usual care.

Methods

Table 1. Study characteristics

Participants	150 pregnant individuals <ul style="list-style-type: none">≥ 18 years old≤ 14 weeks of pregnancy≥ 1 GDM risk factor according to Diabetes Canada⁴
	A nutritional intervention initiated in the 1st trimester based on the health behavior change theory⁵ and on the CFG including: <ul style="list-style-type: none">4 counseling sessions with a registered dietitian using motivational interviewing4 phone follow-ups10 video clips about healthy eating in pregnancy:<ol style="list-style-type: none">The importance of healthy eating during pregnancyShould you eat differently during pregnancy?General recommendations for healthy eatingFood precautions during pregnancyHabits to adopt when it comes to eatingWhy and how can we promote processed foods?The influence of the food environmentDiscomforts during pregnancy: what role does diet play?Nutrients for a healthy dietUnderstanding nutrition labellinga virtual community on Facebook with weekly publications on healthy eating during pregnancy relating to the 4 dimensions of social support⁶
Intervention	Usual prenatal care
Control	Usual prenatal care
Outcomes	<ul style="list-style-type: none">Change in fasting plasma glucose from V1 to V3Change in 2-h plasma glucose measurements following the ingestion of 75 g of glucose from the V1 to V3<ul style="list-style-type: none">Glycemic response (iAUC)Hepatic and peripheral insulin resistance^{7,8}Beta-cell function⁹
Study desing	Single-center randomized controlled trial with 2 parallel arms and prospective follow-up

CFG, Canada's Food Guide; GDM, gestational diabetes mellitus; iAUC, incremental area under the curve; V1, V2, and V3, research visits at 1st, 2nd, and 3rd trimesters.

Methods (continued)

Figure 1. Study flow diagram

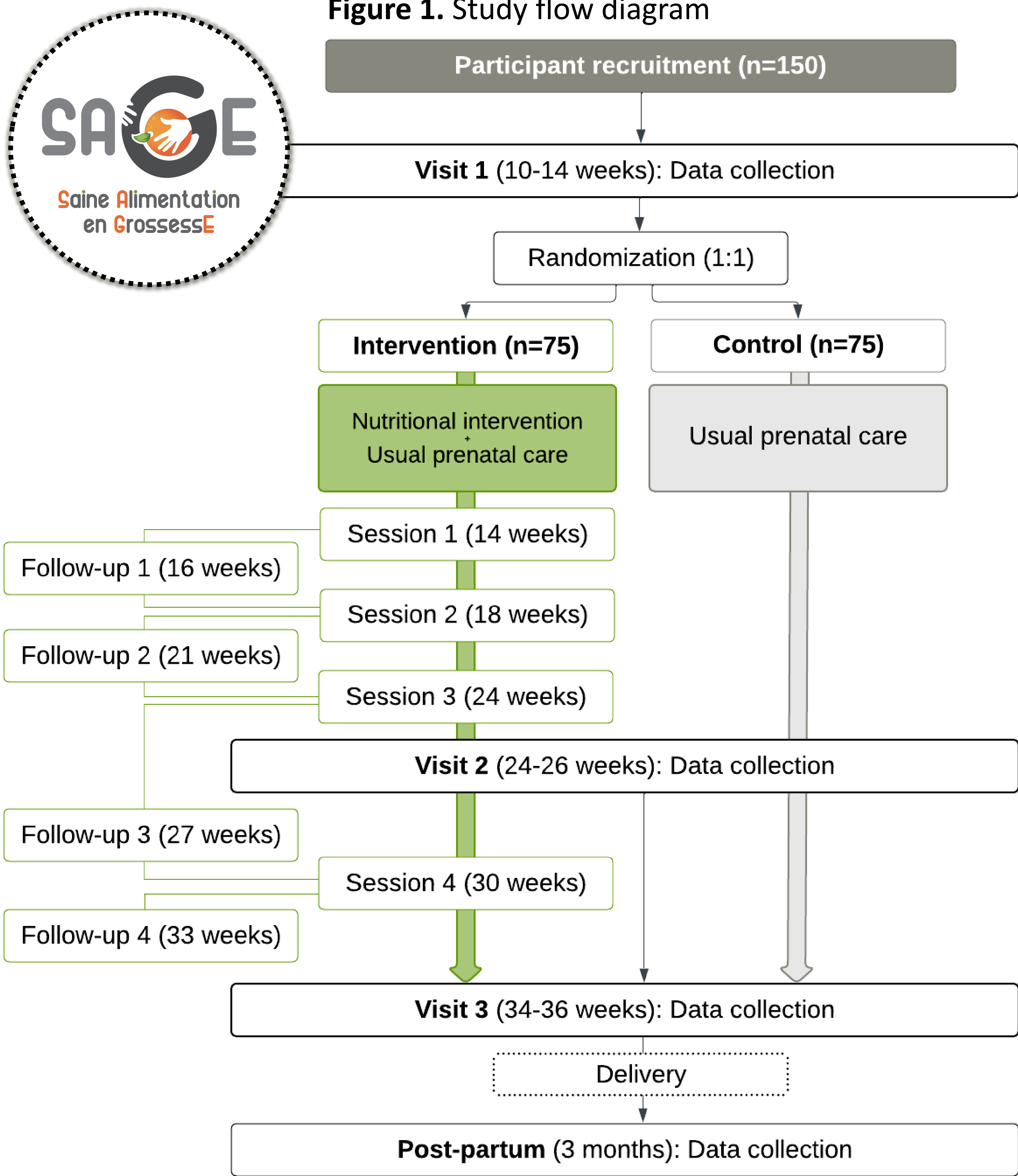


Table 2. Data collection

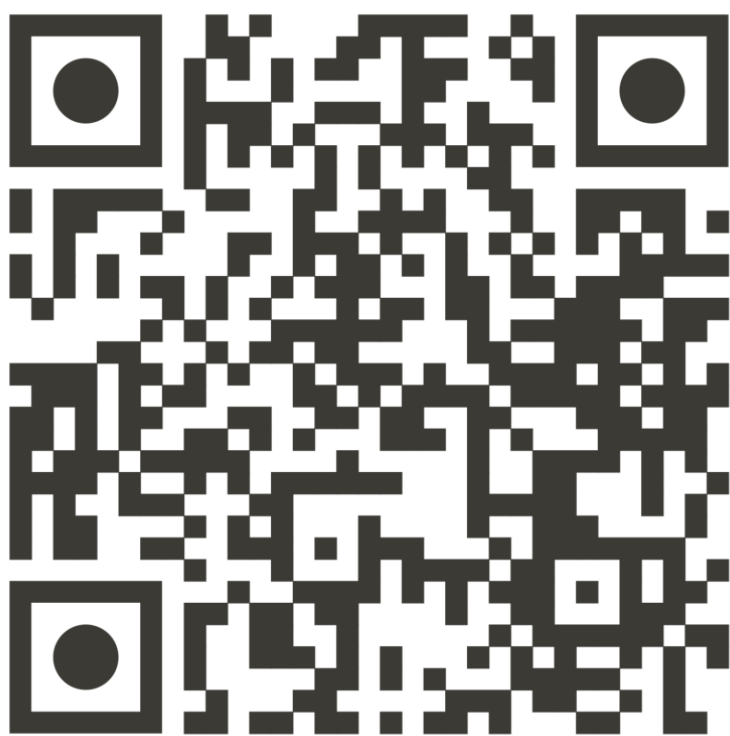
Variables	V1	V2	V3	PP
Sociodemographic status and medical history	●			
Weight and height	●	●	●	
Glucose, insulin, C-peptide, HbA1c*	●	●	●	
Dietary intakes (24h recalls), diet quality (HEFI-2019), dietary supplements use, eating behaviours (DEBQ), intuitive eating (IES-2)	●	●	●	●
Physical activity (PPAQ/IPAQ)	●	●	●	●
Perceived stress (PSS)	●	●	●	●
Quality of life (SF-36), motivation (REBS)	●		●	
Social support			●	

*Collected after a 12-h fast, as well as 15, 30, 60, and 90, 120 min after the ingestion of 75 g of glucose. DEBQ, Dutch Eating Behaviors Questionnaire; HbA1c, Glycated hemoglobin; HEFI-2019, Healthy Eating Food Index 2019; IES-2, Intuitive Eating Scale; IPAQ, International Physical Activity Questionnaire; PP, postpartum virtual data collection; PSS, Perceived Stress Scale; PPAQ, Pregnancy Physical Activity Questionnaire; REBS, Regulation of Eating Behavior Scale; SF-36, 36-Item Short Form Survey; V1, V2, and V3, research visits at 1st, 2nd, and 3rd trimesters.

Anticipated results

- Recruitment of participants has been underway since April 2022.
- More than 50 % of the sample have been randomized.**
- This project will determine if a nutritional intervention initiated early in pregnancy can improve glucose homeostasis of individuals at risk for GDM, compared to usual care, demonstrating the importance of nutritional management early in pregnancy.

Publication



References and funding

¹Mijatovic-Vukas et al., Nutrients 2018; ²Metzger et al., N Engl J Med 2008; ³Johns et al., Trends Endocrinol Metab 2018; ⁴Diabète Canada, Can J Diabetes 2018; ⁵Hill et al., Midwifery 2013; ⁶House, Work stress and social support 1981; ⁷Matthews et al., Diabetologica. 1985; ⁸Matsuda & DeFronzo, Diabetes Care 1999; ⁹Singh & Saxena, World J Diabetes, 2010.

Please note that the references for the tools used for data collection, presented in Table 2, are available in the publication (open-access), available by scanning the QR code on the left.

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