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Original Research

Short primiparous women are at an increased risk for gestational diabetes mellitus



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ABSTRACT

Objectives: Both short stature and adiposity are risk factors for gestational diabetes mellitus (GDM). The aim of this study was to simultaneously evaluate the importance of stature and degree of adiposity on development of GDM in primiparous women.

Study design: Longitudinal cohort study.

Methods: In the city of Vantaa, Finland, between 2009 and 2015, all together 7750 primiparous women without previously diagnosed diabetes mellitus gave birth. Of these, 5223 women were ≥ 18 years of age with information on height, weight, and complete data from a 75 g 2-h oral glucose tolerance test composing the study participants of this study.

Results: A 155-cm tall woman with a body mass index (BMI) of 25.5 kg/m² had a similar risk for GDM as a 175-cm tall woman with a BMI of 27.1 kg/m². Women shorter than 159 cm had the highest prevalence of GDM, 28.7%, whereas women with height between 164 and 167 cm had the lowest prevalence of GDM, 19.9% ($P < 0.001$). Height was inversely and significantly associated with both 1- and 2-h glucose values (both $P < 0.001$).

Conclusions: To avoid over diagnosis of GDM, an unbiased strategy is needed to determine and diagnose GDM in women with different stature and degree of adiposity.

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Introduction

Gestational diabetes mellitus (GDM) is a common pregnancy complication defined as glucose intolerance with onset or first recognition during pregnancy.^{1,2} Today, the prevalence of GDM is estimated to be about 6% in Europe and 9% in North America.³ GDM is associated with adverse short- and long-term health outcomes for both women and their offspring.^{4–6} Usually, the diagnosis of GDM is based upon an oral 2- or 3-h glucose tolerance test with 75- or 100-g glucose load.^{1,7,8}

It has previously been reported that women with GDM are at higher childbearing age, more obese, and have a shorter stature than women without GDM.^{1,4,9–16} Studies focusing on the influence of maternal height on fasting and postprandial glucose levels in pregnant women in relation to the risk of GDM are limited. Among Brazilian and Korean women, short stature has been shown to be associated with elevated postprandial glucose levels but not with fasting glucose concentrations.^{10,12} With regard to obesity, it is important to keep in mind that within different ethnic populations, a body mass index (BMI) may not correspond to the same degree of adiposity due, in part, to different body composition and thus different definition criteria for obesity have been suggested; e.g., for European populations BMI ≥ 30 kg/m² and for Asian populations BMI ≥ 27.5 kg/m².^{17,18}

In the year 2016, we initiated a long-term follow-up study in the city of Vantaa, Finland, to evaluate the long-term consequences of gestational glucose intolerance on women's and their offspring's health. The aim of this study was to evaluate in primiparous women the association between height,

degree of adiposity, and the development of GDM based on a standard 75 g 2-h oral glucose tolerance test (2-h OGTT).

Methods

This study is a longitudinal cohort study in the city of Vantaa, the fourth largest city in Finland. Between January 1, 2009, and December 31, 2015, in total, 7750 women without previously diagnosed diabetes mellitus delivered their first child. Of these primiparous women, 5223 women aged 18 years or more had height and weight data and complete data from a 75 g 2-h OGTT and formed the study cohort. According to the Finnish Current Care Guidelines for GDM, GDM should be screened using 2-h OGTT in all pregnant women, except those who are at low risk, e.g. primiparous women with BMI 18.5–24.9 kg/m² without first-degree family history of diabetes.¹⁹

Data on deliveries were obtained from the Finnish Medical Birth Register, kept by the National Institute for Health and Welfare, Finland, which collects the information from the delivery hospitals. The quality of the Finnish Medical Birth Register has been found to be good.²⁰ The following information was obtained from this register: participants' pregestational height, weight, previous pregnancies (miscarriages, induced abortions, or ectopic pregnancies) and deliveries, infertility treatment, GDM, and smoking during pregnancy.²¹ BMI was calculated as body weight (kg) divided by height² (m²) (kg/m²).

Educational attainment was defined according to the number of years of schooling and obtained from Statistics Finland.²²

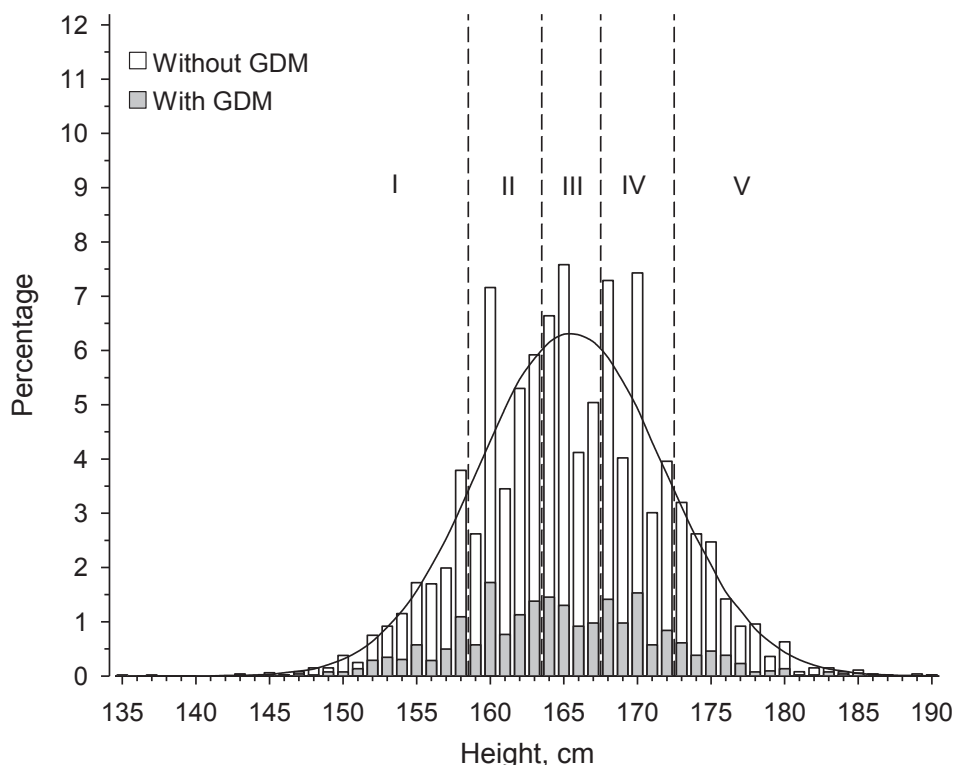


Fig. 1 – Distribution of height and percentage of primiparous women with and without GDM according to height. Cutoffs were: I < 159 cm, II = 159–163 cm, III = 164–167 cm, IV = 168–172 cm, and V > 172 cm. GDM = gestational diabetes mellitus.

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