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Diabetes in low-resourced countries

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Maternal and newborn health poses one of the greatest health challenges in the developing world. Many low-income countries are now experiencing a demographic and epidemiological transition and changing of lifestyles. Thus, apparent "Western" diseases such as diabetes and obesity have been reaching the Third World countries. There is a paucity of reliable data on diabetes in pregnancy in many low-income countries. Adequate information about maternal and perinatal mortality and morbidity as a consequence of diabetes in pregnancy is scarce. This chapter presents evidence of the magnitude and impact of diabetes in pregnancy. Additionally, we discuss interventions in screening and managing diabetes in pregnancy in these specific patient populations.

Prevalence of gestational diabetes mellitus

Gestational diabetes mellitus (GDM) is defined as carbohydrate intolerance that begins during pregnancy or is first recognized during pregnancy [1]. Pregestational diabetes is defined as type 1 diabetes or type 2 diabetes present before the onset of pregnancy [1]. Both entities pose great risks to the mother and developing fetus.

The prevalence of type 2 diabetes mellitus (DM) increased almost twofold between 1997 and 2010 in Africa [2]. More recent estimations anticipate that the number of individuals with diabetes will double by the year 2030 [3]. Reports indicate that diabetes will gain more significance around the world in the coming decades, especially in pregnancy [4]. There are vast differences in the prevalence of diabetes in different ethnic groups, with regional prevalence varying from the lowest in Africa (2.4%) to the highest in Europe and North America (7.89%) [5]. Yet, African low-prevalence figures must be

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interpreted with caution, as the lack of diagnosis resulting from health economic difficulties in many parts of rural Africa has likely caused a surveillance bias.

The current diabetes epidemic affects pregnant women on a large scale, not only in high-income countries but even more so in low-resourced countries [6]. The incidence of GDM has increased dramatically in the past decade in all racial and ethnic groups [7]. GDM influences approximately 7–14% of all pregnant women [8] and is associated with numerous obstetric and neonatal complications, including cesarean delivery [9], preeclampsia [10], preterm delivery [11], fetal macrosomia [12], and shoulder dystocia [13].

Although it is well established as a cause for pregnancy complications, studies of the racial and ethnic distribution of GDM have shown significant variation in its prevalence and its epidemiology has not been studied systematically [14]. The actual distinction of GDM, as currently defined, is problematic.

The lack of adequate data on the preexisting, however undiagnosed, diabetes results in a potential bias. The degree of clinical surveillance may have a tremendous impact on the estimated prevalence of GDM in a given population. This is especially true in high-risk populations in which the onset of type 2 DM may even occur at early ages and in low-resourced countries [14,15]. Furthermore, investigators apply different screening programs and diagnostic criteria for GDM, making comparison among reports extremely difficult.

The tremendous therapeutic progress in diabetes in general and in GDM in particular in the developed world during the last century is not shared to any extent in low-resourced countries, where resources for diabetes management are often lacking, resembling a situation reminiscent of the pre-insulin era.

Racial and ethnical distribution of GDM

The prevalence of GDM varies in direct proportion to the prevalence of type 2 DM in a given population or ethnic group [1]. The reported prevalence of GDM in the United States (US) ranges from 1% to 14%, with 2–5% being the most common reported rate [16]. In a study of the prevalence of diabetes and impaired glucose tolerance (IGT) in diverse patient populations in women between the ages 20 and 39 [17], the World Health Organization (WHO) Ad Hoc Diabetes Reporting Group noted the lowest rates of diabetes (<1%) in Bantu (Tanzania), Chinese, rural Indian, Sri Lankan, and in some Pacific populations. Low rates of diabetes (about 3–5%) were reported in Italian women and in white, black, and Hispanic women in the US. Rural Fijian Indian and Aboriginal Australian women had 7% prevalence. The highest rates were found in Pima/Papago and Nauruan Indians (14–22%). The prevalence of IGT was <3% in Chinese and Malays, and was >10% in black and Hispanic women in the US, urban Indian women in Tanzania, and Pima and Nauruan Indians and in other Pacific communities. The prevalence of the combined age-stratified rate of both diabetes and IGT ranged from 0% to 36%, with >10% prevalence in one-third of the populations and >30% prevalence in Pima and Nauruan Indians. More importantly, in several populations, the majority of cases diagnosed with diabetes were in fact undiagnosed prior to the survey. Thus, a significant proportion of patients with abnormal glucose tolerance will be missed without screening.

King et al. summarized several reports that had collected data on the prevalence of diabetes in pregnancy [14]. Together with the WHO study, their findings show that for a given population and ethnicity, the risk of GDM reflects the underlying rate of type 2 DM in the specific patient population.

Due to the remarkably varied approaches used, different methods of screenings, various oral and intravenous glucose loads, and different diagnostic criteria, it remains unclear if this marked geographic and racial diversity represents true differences in the prevalence of GDM. For instance, Dooley et al. [18] showed that when comparing the prevalence of GDM in different populations, race as well as obesity must be taken into account. They included 3744 pregnant women who underwent universal screening. The patient population included 39.1% white, 37.7% black, 19.8% Hispanic, and 3.4% Oriental and others. The adjusted relative risk (RR) was increased in black (1.81, 95% confidence interval (CI) 1.13–2.89) and in Hispanic (2.45, 95% CI 1.48–4.04) women. Regarding carbohydrate intolerance, no differences were found. However, when 92 women with GDM under dietary control were analyzed separately, mean birth weight was highest in Hispanic women and lowest in blacks and Orientals. Hence, race had a significant independent impact on neonatal birth weight with maternal percentage