OBSERVATIONS

Gestational Diabetes Mellitus in HIV-Infected and -Uninfected Pregnant Women in Cameroon

Gestational diabetes mellitus (GDM) in both HIV-infected and -uninfected women has been poorly studied in Africa. We enrolled pregnant women ages 15–50 years at a large semiurban clinic in Cameroon. A 75-g oral glucose tolerance test (OGTT) was performed at 24–28 weeks' gestational age or at the earliest prenatal visit for those presenting after 28 weeks. Women were diagnosed with GDM according to American Diabetes Association criteria (1). Data on height, blood pressure, sociodemographics, obstetrical history, prepregnancy weight, HIV clinical status, combination antiretroviral therapy (cART) history, and pregnancy outcomes were collected. Exact logistic regression models were used to identify predictors of GDM.

Of 316 participants, 20 (63%) had GDM, and 3 had overt diabetes (DM). Women with GDM presented for OGTT later than those without (29 vs. 27 weeks, $P = 0.04$) (Table 1). After adjustment for age, gestational age at the time of OGTT, family history of DM, HIV, and prepregnancy BMI, only age ≥30 years remained a significant predictor of GDM. Among HIV-infected women, 6.6% (11 of 166) exhibited GDM. In this subgroup, median age (30.5 vs. 28 years), systolic (118 vs. 105 mmHg) and diastolic (76 vs. 64 mmHg) blood pressure, and rates of cART use during pregnancy (90.9 vs. 54.2%) differed significantly between those with vs. without GDM ($P = 0.04$, 0.02, 0.01, and 0.02, respectively) (Table 1).

Our overall rate of GDM (6.3%) is comparable with those reported in developed settings (U.S. 3.2–7.6% and Europe 2–11.6%) (2) as well as scarce African data (Nigeria 4.5–13.4% ([3], Ethiopia 3.7% [4], and South Africa 3.8–8.8% [5]). These rates vary depending on the method and criteria used. Had we used World Health Organization 1999 criteria, 3.2% would have had GDM. In multivariate analysis, older age, but not prepregnancy BMI, remained a significant predictor of GDM. Waist circumference has been shown to be a better predictor of cardiovascular/metabolic disease in nonobese subjects, which may account for this finding. HIV infection was not associated with GDM. The use of cART, particularly, protease inhibitors, has been associated with insulin resistance in pregnant and nonpregnant women. The low rates of cART (33 of 166) and protease inhibitor (1 of 166) use in the HIV-infected subgroup may explain why an association between HIV and GDM was not found in our study. Among HIV-infected women, GDM was associated with higher blood pressure. Almost all (91%) of the HIV-infected women with GDM were on cART. Our cohort had insufficient numbers of HIV-infected women not on cART with GDM to create an adequately powered multivariate model. Nonetheless, the significant association between cART and GDM in univariate analysis is consistent with reports in developed countries.

Our study is limited by its small sample size. The low rates of cART use limited our ability to assess effects of HIV/cART on GDM. Lastly, we could not properly evaluate effects of GDM on birth weight, since subjects delivered at different facilities.

Our study revealed a GDM rate within the range of that in advanced economies, evidence for the growing prevalence of diabetes in Africa, which is projected to

Table 1—*Baseline characteristics and birth outcomes of pregnant women*

	Overall sample ($n = 316$)		
	GDM ($n = 20$)	Without GDM ($n = 296$)	*P*
Age (years)	30.5 (27.5–34.5)	28 (25–32)	NS
Gestational age at OGTT (weeks)	29 (27–30)	27 (25–30)	0.04
Gravidity	3 (1–3)	1 (0–2)	NS
Family history of DM	5 (25)	41 (13.9)	NS
Family history of hypertension	4 (20)	92 (31.2)	NS
Prepregnancy BMI (kg/m^2)	25 (23.3–29)	25.4 (23–28.4)	NS
Systolic BP at OGTT (mmHg)	112 (104–118)	105 (96–111)	NS
Diastolic BP at OGTT (mmHg)	72 (63–79)	64 (61–70)	NS
Preeclampsia during pregnancy	0 (0)	4 (1.36	NS
HIV infection	11 (55)	155 (52)	NS
C-section delivery	3 (15)	24 (8.1)	NS
Stillbirth/IUFD	0 (0)	6 (2.5)	NS
Birth weight (grams)	3,214 (3,000–3,500)*	3,400 (3,000–3,600)*	NS
	HIV-infected women ($n = 166$)		
	GDM ($n = 11$)	Without GDM ($n = 155$)	*P*
Age (years)	30.5 (27.5–34.5)	28 (25–32)	0.04
Gestational age at OGTT (weeks)	29 (27–30)	27 (25–30)	NS
Gravidity	1 (1–3)	1 (0–2)	NS
Family history of DM	2 (18.2)	19 (12.3)	NS
Family history of hypertension	3 (27.3)	43 (27.7)	NS
Prepregnancy BMI (kg/m^2)	25.2 (24–29)	25.4 (23.5–28.2)	NS
Systolic BP at OGTT (mmHg)	118 (115–120)	105 (98–111)	0.02
Diastolic BP at OGTT (mmHg)	76 (72–80)	64 (63–69)	0.01
Preeclampsia during pregnancy	0 (0)	2 (1.3)	NS
CD4 cell count at OGTT (cells/mm^3)			NS
<50	0 (0)	13 (8.4)	
50–199	4 (36.4)	20 (12.9)	
200–350	2 (18.2)	42 (27.1)	
>350	5 (45.5)	80 (51.6)	
On cART at OGTT	10 (90.9)	84 (54.2)	0.02
C-section delivery	1 (9.1)	14 (9)	NS
Stillbirth/IUFD	0 (0)	3 (2.2)	NS
Birth weight (grams)	3,228 (3,000–3,500)	3,300 (3,000–3,500)	NS

Data are reported as median (interquartile range) for continuous variables and *n* (%) for categorical variables. *P* values from Wilcoxon test for continuous variables and χ^2 or Fisher exact test for categorical variables. BP, blood pressure; IUFD, intrauterine fetal demise; NS, not significant. *$n = 263$.

double by 2030 as obesity, westernization of diets, and urbanization increase. Moreover, continued high rates of HIV with expanding access to cART may further impact this phenomenon. As GDM is a largely ignored disease in Africa, future studies to determine the scope and identify individuals at risk will inform health policy in resource-limited settings.

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