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Is selective screening for gestational diabetes mellitus worthwhile everywhere?

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Abstract We assessed if selective screening for gestational diabetes mellitus (GDM) as recommended by the Fourth Workshop on GDM is worthwhile in our centre. Detection is performed using universal screening in three pregnancy periods using the tests recommended by the first three Workshops. We have analysed the prevalence of low-risk characteristics for GDM in the 917 women delivering in the centre in 1992 and in the whole cohort of 1635 women with GDM delivering between 1986 and 1998. The rate of women with all low risk characteristics was 7.0% among the general pregnant population and 1.3% in the cohort of women with GDM ($p<0.001$). We conclude that in our population, selective screening of GDM is reliable in identifying women at low risk of GDM, but since only a negligible subset of the pregnant population would not need to be screened, adherence to these guidelines would make the screening policy unnecessarily complicated.

Key words Gestational diabetes mellitus • Selective screening • Universal screening

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Introduction

Gestational diabetes mellitus (GDM) is defined as any degree of glucose intolerance with onset or first recognition during pregnancy. Whereas the first three workshops on GDM recommended universal screening [1–3], in 1997 the Fourth International Workshop-Conference introduced the concept of selective screening; women did not need to be tested if they fulfilled all the following criteria: member of an ethnic or racial group with a low prevalence of GDM, no family history of diabetes in first-degree relatives, age less than 25 years, normal weight before pregnancy, no personal history of abnormal glucose metabolism or poor obstetric outcome [4]. However, this does not mean that before the Fourth Workshop-Conference there was universal agreement, since before that date several studies had tested if selective screening was a reasonable option [5–8] and in 1995 the Technical Bulletin on Diabetes and Pregnancy of the American College of Obstetrics and Gynaecology stated that appropriateness of selective or universal screening depended on the setting [9]. Nevertheless, it was the Fourth Workshop-Conference that prompted studies dealing with the implications of a change in the screening policy: in the following years it was reported that 10%–20% of the pregnant population would not qualify for testing with new criteria, with 3.8%–10% of

all cases of GDM being missed [10–12]. Reports that universal screening did not improve GDM-related outcomes in the general [13] or low risk [14] populations would add support to selective screening policy, but again this would be in disagreement with authors reporting that universal screening improved both the detection rate of GDM and the outcome [15].

We aimed to assess if selective screening was worthwhile in our centre, with a retrospective study answering the question: How would a selective GDM screening strategy influence the detection of GDM?

Subjects and methods

We analysed the prevalence of low-risk characteristics in the general pregnant population and in women with GDM. The information about both groups was taken from existing databases:

1. A database of all women delivering in the centre in 1992 (n=917), including anthropometric characteristics, ethnicity, family history of DM and personal history of glucose intolerance or poor obstetric outcome.
2. A database of the cohort of women with GDM delivering in the centre between 1986 and 1998 (n=1635), including the same variables of the former database plus diabetes treatment and pregnancy outcome.

The prevalence of GDM in the general pregnant population in the first database was 12.8%, a rate similar to that formerly reported for this centre [16]. The two study populations were compared for the following demographic and anthropometric characteristics: ethnicity, age, weight, height, body mass index, prior pregnancies, history of poor obstetric outcome, prior history of glucose intolerance and diabetes mellitus in the family.

Approval of the Ethics Committee is not required for observational studies in Spain.

GDM screening policy

The strategy for GDM diagnosis in our centre uses universal screening in three pregnancy periods (after the first visit, at 24–28 weeks, and at 32–35 weeks). An oral load of 50 g glucose is administered and, if post-challenge plasma glucose is ≥7.8 mmol/l, a 3-h, 100-g oral glucose tolerance test (OGTT) is scheduled and evaluated according to the recommendations of the first three Workshops on Gestational Diabetes Mellitus [1–3].

Statistical analysis

Data were analysed using SPSS for Windows software 8.0. Characteristics of the two study populations were compared with chi-square test (qualitative variables) and Mann-Whitney U-test (quantitative data, non-normally distributed). Significance was set at a bilateral $p<0.05$.

Results

Women with gestational diabetes mellitus (GDM) had a higher rate of diabetes mellitus in the family and had a lower height and higher age, weight and body mass index than women in the general pregnant population (Table 1). Although they had a similar rate of former pregnancies, they had a significant higher rate of prior GDM and obstetric outcomes suggestive of GDM. They did not differ in ethnicity (Table 1).

The prevalences of low-risk characteristics for GDM in the general pregnant population that delivered in the centre in 1992 (n=917) and in the cohort of women with GDM who

Table 1 Demographic and anthropometric characteristics of the study populations

Characteristic	General pregnant population (n= 917)[a]		Women with GDM (n= 1635)[b]		*p*
Ethnicity, n (%)					NS
Caucasian	913	(99.6)	1619	(99.0)	
Arab	1	(0.1)	5	(0.3)	
Chinese	2	(0.2)	11	(0.7)	
Roma	1	(0.1)	0	(0)	
Age, years	30	(16–43)	32	(17–45)	<0.001
Height, m	1.60	(1.39–1.82)	1.59	(1.38–1.80)	<0.001
Weight, kg	57	(39–110)	58	(40–151)	<0.001
BMI, kg/m^2	22.1	(15.61–40.89)	23.12	(15.89–47.07)	<0.001
Prior pregnancies, n (%)	592	(64.6)	1043	(63.8)	NS
History of poor obstetric outcome, n (%)	75	(8.2)	203	(12.4)	0.05
Prior history of glucose intolerance, n (%)	41	(4.5)	193	(11.8)	0.001
History of DM in the family, n (%)	257	(28.0)	850	(52.0)	<0.001

[a] All women delivering in the centre in 1992; [b] All women with GDM delivering in the centre between 1986 and 1998
BMI, body mass index; *DM*, diabetes mellitus; *NS*, not significant; values are median (range) unless otherwise indicate

Table 2 Prevalence (%) of low-risk characteristics for GDM

	General pregnant population[a] (n=917)	Women with GDM[b] (n=1635)	*p*
Caucasian ethnicity	99.6	99.0	NS
Age <25 years	12.6	4.2	<0.001
BMI <25 kg/m^2	81.9	69.0	<0.001
No family history of DM	72.0	48.0	<0.001
No history of abnormal glucose tolerance	95.5	88.2	<0.001
No history of poor obstetric outcome	91.8	87.6	<0.001
All low-risk characteristics	7.0	1.3	0.001

[a] All women delivering in the centre in 1992; [b] All women with GDM delivering in the centre between 1986 and 1998
BMI, body mass index; *NS*, not significant

delivered between 1986 and 1998 (n=1635) are depicted in Table 2. The percentage of women with all low-risk characteristics was 7% (n=64) in the general pregnant population vs. 1.3% (n=21) in the cohort of women with GDM (p<0.001).

Discussion

In the Recommendations of Fourth Workshop-Conference on GDM, a selective screening policy (not to be performed in women with all low-risk characteristics) was advocated [4]. In our centre, this policy is reliable in identifying women with GDM since only 1.3% of those identified by universal screening would not have been diagnosed with selective screening. These results are even better than those reported in some recent studies in which 3.8%–10% of women with GDM were missed using Fourth Workshop-Conference Recommendations [10–12]. However only 7% of the pregnant women of our centre fulfilled all the low-risk characteristics so that they would "benefit" from avoiding screening, while other authors have reported rates of 10%–20% [10–12]. This can be accounted by age, since age alone would leave only 12.6% of our population in the low-risk category for GDM and similar figures can be assumed for the Spanish population given that the rate of women younger than 25 delivering in 1997 in Catalunya was 11.1% [17] and that in a recent report from a Health Area in Madrid the corresponding rate was 16% [18]. Of course, the conclusions can be different in centres where teenagers without additional risk factors are an important fraction of the pregnant population. The fact that the control population only encompasses the deliveries of one year is a weakness of the present study. Nevertheless, if we refer again to the figures of pregnant women younger than 25 in population-based data of the country [17, 18], we can accept that the segment of the general pregnant population not requiring screening is very small. This is the key point: the segment of the pregnant population requiring selective screening is so large that selective screening, if appropriately performed, would be nearly universal.

We conclude that, in our area, selective screening of GDM according to Fourth Workshop-Conference criteria is reliable in identifying women at low risk of GDM, but since only a negligible subset of the pregnant population would not need to be screened, a universal screening policy is more adequate. A corollary of this conclusion is that the adequacy of universal versus selective screening should be assessed in every setting.

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