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Prenatal screening for chromosome abnormalities in a region with no access to termination of pregnancy

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Objective To analyze the different variables that affect couples' decision-making about prenatal screening of chromosome abnormalities in a population with limited access to prenatal diagnosis and no legal termination of pregnancy (TOP).

Methods From February through August 2004, 79 couples who requested for prenatal screening at centers from Argentina and Uruguay participated in a study. A cross-sectional survey was administered to assess attitudes toward prenatal screening, the decision-making process, and knowledge and attitudes toward TOP.

Results Mean maternal age was 32.8 ± 0.4 years. Among the couples, 88.61% knew that TOP due to fetal anomalies is not legal in their countries. When asked about the possibility of TOP in case of a serious fetal anomaly, 53% would contemplate this option.

Conclusion Prenatal screening is a common practice worldwide. However, unlike most developed countries, our region has a limited access to prenatal diagnosis and no legal TOP. Those couples who stated that 'reassurance about fetal well-being' was the most important reason to perform prenatal screening had more positive attitudes toward TOP than those who considered this screening important 'to be better prepared to receive the baby'. Our findings can be used to inform and revise current health-care policies.

KEY WORDS: prenatal screening; attitude; reasons; termination of pregnancy

INTRODUCTION

First-trimester screening for Down syndrome (DS), which includes measurement of nuchal translucency (NT) by ultrasonography, has been widely used since its introduction by Nicolaides and colleagues in the early 1990s (Nicolaides *et al*., 1992; Malone and D'Alton, 2003). Prenatal screening test can identify a high-risk subgroup within a population of pregnant women. Prenatal screening for DS provides an individualized risk estimation of having a child with chromosome abnormalities. The subgroup of women with an increased risk can be offered invasive prenatal diagnosis (Nicolaides *et al*., 2002). Two of the available methods of prenatal screening for congenital defects are NT measurement and maternal serum screening test (MST). Although both screening tests result in risk estimation, it should be stressed that they have different characteristics. While NT identifies women at a higher risk for chromosome abnormalities in the first trimester of pregnancy and is performed by ultrasound scanning (Nicolaides *et al*., 2002), MST is a blood serum test performed in the second trimester of pregnancy (Benn, 2002a; Benn, 2002b). TOP for fetal condition is not legal in many developing countries. In South America, prenatal screening and, to a lesser extent, prenatal diagnosis are more accessible for a minority of pregnant women. Patients' knowledge and attitudes toward prenatal genetic screening and diagnosis have been widely reported. However, existing studies were conducted in settings where legal abortion is available and contemplated (Michie *et al*., 1999; Bekker *et al*., 2004; Kuppermann *et al*., 2004; Müller *et al*., 2006). Only three studies about attitudes toward prenatal diagnosis and TOP have been carried out in a South American country, Argentina (Wyszynski *et al*., 2003; Gadow *et al*., 2006; Quadrelli *et al*., 2007). In Argentina, as in other parts of the world, prenatal screening is a more common practice (Gadow *et al*., 2006; Müller *et al*., 2006). However, access to prenatal diagnosis is somewhat restricted. This is controversial since there is access to screening but not uniformly to prenatal diagnosis, and services are limited to a more highly educated population. Moreover, prenatal testing and related TOP have been shown to be associated with depressive symptoms, feelings of guilt, increased stress, and symptoms of post-traumatic stress syndrome (Kowalcek *et al*., 2002; Korenromp *et al*., 2005). If TOP is performed as an illegal procedure, we could assume that the

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outcome would be even more distressing. Our research into patient attitudes can be useful in understanding the expectations of those couples that decide to undergo prenatal screening for chromosome anomalies in a country with limited access to prenatal diagnosis and where TOP is not permitted. Our study is the first to consider attitudes toward prenatal screening in these countries.

PATIENTS AND METHODS

Design

After obtaining the Institutional Review Board (IRB) approval, a descriptive cross-sectional survey was administered at the Genetic Units of the Center for Medical Education and Clinical Research CEMIC University Hospital (Buenos Aires, Argentina), and Hospital Italiano (Montevideo, Uruguay). An 18-item questionnaire assessed various dimensions of decision-making about prenatal screening. The first section of the questionnaire included sociodemographic and descriptive questions, including age, ethnicity, education, and reproductive history. Close-ended questions were used to assess the importance given to prenatal screening, source of referral, difficulty in making the decision to undergo screening, and knowledge and attitudes toward TOP in case of chromosomal anomalies. In this case, the study subjects could choose not to answer.

After prenatal genetic counseling, those couples who decided to undergo prenatal screening were invited to participate in this study. They were asked to take the survey home and fill it out anonymously. In the counseling session, couples were informed about the risks for Down syndrome and other chromosomal anomalies based on maternal age at delivery. They were also informed about the different available screening strategies. Prenatal invasive diagnostic testing through CVS and amniocentesis were also addressed in the counseling session. Regarding screening, they were informed about the detection rate of 85% using NT and free Bhcg and PAPPA of the 5% false-positive rate. In the screening for second trimester markers, the detection rate quoted was 66% using the serum markers, alphafetoprotein, estriol, and total HCG with a 5% false-positive rate. Patients older than 35 years were also informed about the higher rate of false-positive results. When informing couples about prenatal invasive studies, they were told of the accuracy of the diagnostic test for chromosomal anomalies was 99.5% for CVS and 99.7% for amniocentesis. The miscarriage rate was quoted as 0.5%. The counseling was performed in a nondirective manner in order to let the patients decide which test was more suitable for their interests and worries.

Study aims

The aims of the study were to analyze attitudes, knowledge, source of referral, sociodemographic variables, and decision-making about prenatal screening, and toward TOP.

Study population

From February to August 2004, a sample of pregnant women between 10 and 16 weeks of gestation, and their partners, who requested prenatal genetic counseling and underwent prenatal screening, either NT and/or MST, were invited to participate in the study in two different settings, one in Buenos Aires, Argentina, and the other in Montevideo, Uruguay.

Medical services in our region are provided by the state by insurance or provided by the enterprises arranged by the patient employers. Our patient population is covered mostly by private insurance or self-pay. Seventy-nine couples participated in the study. Mean maternal age was 32.8 ± 0.4 years. The rate of previous miscarriage was 25%. Thirty-nine percent had children, only one of whom had a birth defect. (Table 1)

Statistical analysis

A descriptive statistical analysis was performed. Categorical variables were expressed as percentages. For continuous variables mean and standard deviations were estimated, while for non-normally distributed variables medians and percentiles were considered. For analyses, the STATA 8.0 statistical software package was used (Statistics/Data Analysis 8.0, Stata Corporation 4905 Lakeway Drive College Station, Texas 77845 USA. http://www.stata.com).

RESULTS

Source of referral

Genetic counseling was most frequently sought following 'medical referral', 57% (CI 95% 45.3–68.1). The second more common source was 'self referral'. Thirty-one couples (39%) decided to seek genetic counseling

Table 1—Sociodemographic features in patients undergoing a prenatal screening test ($n = 158$)

Maternal age (mean ± SD)	32.8 ± 4.0
Paternal age (mean ± SD)	35.3 ± 6.0
Gestational age (median, min–max)	13.6 (8.0–20.6)
Other children (%)	39.24
Previous anomaly (%)	1.26
Previous miscarriage (%)	25.31
Maternal education (%)	
Less than high school	0.0
Completed high school	40.51
Completed university	59.49
Paternal education (%)	
Less than high school	5.2
Completed high school	37.7
Completed university	57.1
Maternal Latin-European ancestry (%)	59.49
Paternal Latin-European ancestry (%)	60.76
Genetic study in previous pregnancy (%)	11.39

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Table 2—Background and type of procedure according to the disposition to TOP

	Disposition to TOP				
	No ($n = 16$)	Yes ($n = 42$)	NK/NA ($n = 21$)	Test (df)[a]	P
Maternal age (mean ± SD)	33.9 ± 2.7	32.3 ± 4.4	32.8 ± 3.4	1.02 (2)	0.365
Gestational age (median)	16.2	13.6	13.6	1.91 (2)	0.433
Previous miscarriage (%)	1 (6.7)	13 (31.0)	6 (28.6)	3.54 (2)	0.170
Primiparity (%)	5 (31.3)	30 (71.4)	13 (61.9)	7.86 (2)	0.020
Maternal education (%)					
Less than high school	0 (0.0)	0 (0.0)	0 (0.0)		
Completed high school	6 (37.5)	19 (45.2)	7 (33.3)		
Completed university	10 (62.5)	23 (54.8)	14 (66.7)	0.90 (2)	0.638
Paternal education (%)					
Less than high school	0 (0.0)	4 (10.0)	0 (0.0)		
Completed high school	5 (31.3)	16 (40.0)	8 (38.1)		
Completed university	11 (68.7)	20 (50.0)	13 (61.9)	4.75 (4)	0.314
Previous genetic study (%)	2 (12.5)	4 (10.0)	3 (14.3)	0.26 (2)	0.879

NK: did not know; NA: Did not answer.
[a] Test: Chi-Square (χ^2) for categorical variables; ANOVA (F) for continuous variables; nonparametric K-sample test on the equality of medians for gestational age.

on their own initiative. Of them, 22/31 couples (56.4%) stated that 'self referral' was the only way they were able to obtain services. The remaining 9/31 couples (23%) stated that 'self referral' along with 'referral by others', such as partner, relative, or friend occurred.

Referral and maternal age

When analyzed by maternal age, in women younger than 35 years 'self referral' was more frequent than 'medical referral' or 'referral by others' (OR:2.7; CI:0.79–10.4).

Reason for performing prenatal screening

The most important reason stated for performing prenatal screening was because 'the test does not pose any risk to pregnancy.' Fifty-three patients chose this option (67%). The second most important reason was 'medical suggestion' (21.5%).

Information provided by the study

In 48% of the cases, the most relevant aspect of the information provided by the screening was 'reassurance of fetal well-being'. Another group (30%) stated that the information 'would make them feel better prepared to receive the baby'.

Attitudes toward TOP

When patient characteristics were analyzed among patients with attitudes toward TOP, primiparity was significantly associated with more favorable attitudes toward TOP. Out of 48 primiparous pregnant women, 30 (71.4%) indicated that they would terminate the pregnancy in case of fetal abnormality (Table 2).

Most couples (88.6%) knew that TOP due to fetal anomalies is not legal in their countries. When asked about the possibility of TOP in the case of a serious fetal anomaly, 53% would contemplate this option. Eighteen patients (23%) answered that they did not know what their choice would eventually be. Fifteen (19%) would not consider TOP, and four patients chose not to answer this question. When the most relevant aspect of the information provided by the screening was reassurance of fetal well-being, there was a significant correlation with more positive attitudes toward TOP. (OR:18 : 7; CI:1.54–225.9). In contrast, when the most relevant aspect of the information provided by the screening was to be better prepared to receive the baby, there was a significant correlation with less positive attitudes towards TOP. (OR:0.19; CI:0.06–1.35) (Table 3).

DISCUSSION

It has been recently stated that little research focuses on the process of decision-making and attitudes in the context of prenatal screening and testing (Etchegary *et al*., 2008). Prenatal diagnostic procedures cannot be offered to the whole population of pregnant women, so screening allows a subgroup at increased risk to be identified who then can be offered definitive testing (Gardner and Sutherland, 2004). Over the last 30 years, prenatal diagnosis techniques became available in Argentina and Uruguay (Gadow *et al*., 1973; Gadow *et al*., 1976). However, the number of experienced genetic units is small (Liascovich *et al*., 2006). Screening either by ultrasound or biochemical markers has recently become available in Argentina and Uruguay (Otaño *et al*., 2002). Prenatal screening is widely accepted among this subset of the population because it does not pose any risk to the pregnancy. Thus, a significant increase in the number of patients eventually requesting prenatal diagnosis

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Table 3—Maternal references and attitude toward prenatal screening

	Disposition to TOP					
	No ($n = 16$)	Yes ($n = 42$)	NK/NA ($n = 21$)	Total ($n = 79$)	Test (df)[a]	*P*
Source of referral						
Medical referral	9 (56.2)	24 (57.1)	12 (57.1)	45 (56.9)		
Self referral	7 (43.7)	17 (40.4)	7 (33.3)	31 (39.2)		
Others (family member or mass communication)	0 (0.0)	1 (2.4)	2 (9.5)	3 (3.8)	2.93 (4)	0.569
Is there any relevant reason to perform the study?						
Do not know	0 (0.0)	2 (4.8)	0 (0.0)	2.5 (2)		
No	6 (37.5)	20 (47.6)	13 (61.9)	39 (49.4)		
Yes	10 (62.5)	20 (47.6)	8 (38.1)	38 (48.1)	4.04 (4)	0.400
How important is genetic testing for you?						
Not important	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)		
Important	9 (56.2)	7 (17.0)	19 (90.5)	35 (44.9)		
Very important	5 (31.2)	22 (53.7)	1 (4.8)	28 (35.9)		
Extremely important	2 (12.5)	12 (29.3)	1 (4.8)	15 (19.2)	31.43 (4)	0.000
The most important reason for the decision-making process?						
There is no risk for the baby	10 (62.5)	25 (62.5)	15 (71.4)	50 (64.9)		
Our doctor's suggestion	4 (25.0)	9 (22.5)	3 (14.3)	16 (20.8)		
The result would be available on the third month of pregnancy	0 (0.00)	3 (7.5)	1 (4.8)	4 (5.1)		
Others	2 (12.5)	3 (7.5)	2 (9.5)	7 (9.0)	2.38 (6)	0.882
Benefits of the information provided by the study						
Reassurance about fetal well-being	1 (6.2)	28 (66.7)	9 (42.9)	38 (48.1)		
Better parental disposition to receive a malformed baby	7 (43.8)	2 (4.8)	3 (14.3)	12 (15.2)		
Others	8 (50.0)	12 (28.6)	9 (42.9)	29 (36.7)	22.30 (4)	0.000

NK: did not know; NA: did not answer.
[a] Test: Chi-Square (χ^2) for categorical variables.

due to a positive screening test or a congenital malformation detected prenatally will occur (Benn *et al*., 2002). Whenever a screening study is offered, a diagnostic study should be available for the positive screening tests (Godard *et al*., 2003; Malone *et al*., 2005). There is only one survey on genetic centers that provide prenatal cytogenetic diagnosis suggesting limited availability of prenatal testing in the region (Liascovich *et al*., 2006). Invasive testing is currently only offered to women over 35 years of age. Younger women are not routinely informed by their health providers of the possibility of screening (Müller *et al*., 2006). These practices are reflected in our study results indicating that women under 35 years of age mainly decide to undergo the screening test on their own initiative, while women over 35 years are referred, generally by their physicians.

An association between uptake of screening and attitudes toward abortion has been reported in developed countries (Bennett *et al*., 1980; Berne-Fromell and Kjessler, 1984). This was seen in our study, which showed a greater inclination toward TOP. However, not every woman undergoing a screening test would consider TOP in case of an affected pregnancy. As previously reported (Weinans *et al*., 2000), in our study we found that reassurance of fetal well-being was one of the most important reasons for accepting screening. In South America, no studies have been reported on attitudes toward prenatal screening.

Controversy exists regarding the widespread use of prenatal screening practice, because prenatal diagnosis is not a standard practice of care or is restricted to high-income and more highly educated populations. Moreover, TOP for congenital malformations or a chromosome abnormality is not legal in these countries.

The analysis of the answers given by the different groups when asked about their attitudes toward TOP shows that the group answering 'do not know' to the abortion question behaves in a way similar to the group answering 'yes'. We can therefore infer that if abortion were legal in this region, patients answering 'do not know' may have a greater inclination to abortion. Patients indicated that they understood that TOP is not legal in Argentina and Uruguay. Those couples who stated that reassurance about fetal well-being was the most important reason to perform prenatal screening had more inclination toward to TOP than those who considered this screening test important 'to be better prepared to receive the baby'. Our findings should be considered in terms of current healthcare and legal policies.

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