



Risk factors for adolescent pregnancy in Bogotá, Colombia, 2010: a case-control study

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ABSTRACT

Objective. To identify risk factors for adolescent pregnancy among female students in Bogotá, Colombia.

Methods. This was a retrospective study of cases and controls matched by age, identified by means of a survey on the sexual behavior of adolescent students in Bogotá (*Encuesta sobre el Comportamiento Sexual de los Adolescentes Escolarizados en Bogotá*) conducted in the first semester of 2010. All 272 cases and 544 randomly-selected controls were taken from 39 044 total records. Variables considered were sociodemographics, household structure, and family environment; sexual relationships and pregnancy; and knowledge of sexual and reproductive health. Matching and conditional logistic regression were used to adjust for possible confounding factors.

Results. The factors associated with increased risk of adolescent pregnancy based on multivariate analyses were: attending public school (odds ratio [OR] = 2.25; 95% confidence interval [95% CI]: 1.45–3.51); history of siblings with adolescent pregnancy (OR = 1.98; 95% CI: 1.55–2.76); early first sexual intercourse (12 years of age or less) (OR = 2.34; 95% CI: 1.01–5.40); having a self-reported low- or average-level of contraceptive knowledge (OR = 3.92; 95% CI: 1.96–7.83); previous pregnancy (OR = 14.09; 95% CI: 8.74–22.70); and not living with both parents (OR 3.58; 95% CI: 2.10–6.16).

Conclusions. Factors related to individual, family, and social environments that influence the incidence of adolescent pregnancy must be considered and addressed when designing interventions. The existing sex education curriculum is an important component in preventing adolescent pregnancy, however, parent/caregiver participation is required for success.

Key words Pregnancy in adolescence; contraceptive agents; sexual violence; family; risk factors; Colombia.

Early pregnancy has been considered a social and public health problem due to its implications for the development and quality of life of adolescents and their families, and for society in general

(1, 2). An estimated 11% of childbirths worldwide occur in adolescents from 15–19 years of age, and more than 90% occur among low- and average-income groups (2). In Latin America and the Caribbean (LAC), 18% of total births are to women 15–19 years of age. Moreover, an estimated 15% of late-term and risky abortions in LAC are performed on adolescents. LAC sees 1.2 million unwanted pregnancies among adolescents annually, and approximately one-third of those not seeking pregnancy, do

not use any contraceptive method (3). Adolescents in these countries have the second highest pregnancy rate for adolescents worldwide; and on average, 38% of women in LAC become pregnant before 20 years of age (4).

According to the 2010 *Encuesta Nacional de Demografía y Salud* (the National Survey on Demography and Health; ENDS) (5), the rise in adolescent pregnancy that was experienced in Colombia from 1990–2005 has ended. Nevertheless, the figure is still high: 1 in every

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5 Colombian teenagers (15–19 years of age) has been pregnant at some time; 16% are already mothers; and 4% are expecting their first child (5). Although the data shows a downward trend in adolescent pregnancy, the current figures are still too high and continue to be of social and political concern (6, 7).

Many factors related to adolescent pregnancy have been identified (8). Studies show that risk behaviors of pregnant adolescents are interrelated with surrounding contextual and socioeconomic factors, e.g., education and poverty (9–12). The adolescent's family plays an important role in the risk of an early pregnancy: living with a single parent/guardian; having a mother with a low level of education; and having a sibling with history of adolescent pregnancy have all been reported as significant risk factors for adolescent pregnancy (13, 14). Risk behavior has also been associated with low supervision and family support (9), as well as nonfunctional families with low levels of communication (15). Other risk factors that impact adolescent sexual and reproductive health are lack of knowledge on contraceptives, early initiation of sexual intercourse (16, 17), and having suffered sexual abuse in childhood and/or adolescence (18, 19).

A review of the literature shows a substantial number of studies reporting multiple factors associated with adolescent pregnancy; however, recent studies focusing on the issue in Colombia are limited. Therefore, to properly inform and implement any interventions in Colombia, a study was needed to understand the specific circumstances and contexts in which the adolescent in Colombia, her parents, and teachers may better respond to reduce the risk of early pregnancy. The present study aimed to meet this need by identifying risk factors for adolescent pregnancy among female students in the city of Bogotá in 2010.

MATERIALS AND METHODS

Study design

A retrospective study of cases and controls (1:2) was conducted. A case was defined as any adolescent from 14–19 years of age that was pregnant at the time of the survey; controls were those who had never been pregnant. The cases and controls were matched by (stan-

dard deviation [SD] \pm 1) and type of school (public or private).

The required sample size was 192 cases and 385 controls, based on the 15.3% rate of adolescent pregnancy reported by the *Primera Encuesta Distrital de Demografía y Salud en Bogotá* (First District Survey of Demographics and Health in Bogotá) in 2011 (20) and an expected odds ratio of 2.4, confidence intervals of 95%, and a power of 80%. Cases and controls were selected according to data from the 2010 *Encuesta Comportamiento Sexual de Adolescentes Escolarizados en Bogotá* (Survey on the Sexual Behavior of Adolescent Students in Bogotá; ECSAE), specifically the 60 questions on sexual behavior applied to 39 040 adolescent students in Bogotá (21, 22). Survey records provided more than the required sample size: 272 cases and 544 controls, with the cases being the total number of cases in the database and the control group taken randomly.

Study instrument and variables

The 60 items on the ECSAE are grouped into five sections: (i) sociodemographic, household structure, and family environment; (ii) access to and use of school subsidies; (iii) sexual relationships, pregnancy, and knowledge of sexual and reproductive health; (iv) institutional climate and characteristics of the household environment; and (v) social stigma for pregnant adolescents. The present study used responses to questions in the first (i) and third (iii) sections. The variables considered by this study were: attending a public or private school; age at first sexual intercourse; whether first intercourse was consensual or not; living with parents; history of a sibling with adolescent pregnancy; age of respondent's mother at first childbirth; school level at which sex education was received (preschool and primary/middle/high school); parental control over access to reproductive health services; self-report on extent of contraceptive knowledge; and record of previous pregnancies.

Data analysis

Statistical data analyses comprised a bivariate analysis, odds ratios (OR) with 95% confidence intervals (95% CI), and chi square tests to establish associations between variables. For any

variable with an important statistical and contextual association, a model of conditional logistic regression was adjusted, with 0.05 as the maximum type I error permitted.

Study ethics

This study was conducted in accordance with national legislation on health research (23), based on international law and the Declaration of Helsinki revised in Brazil in 2013 (24). The study did not employ any directly mediated data collection, and its methods respected the principles of confidentiality, e.g., individual identity was protected and there were no personal interviews.

RESULTS

In total, 272 cases and 544 controls were included. The mean age of the cases was 16.28 years \pm 1.15, and of controls, 15.88 years \pm 1.10. As for the sociodemographic variables, it was found that adolescents in public schools had a greater risk (OR = 2.26; 95% CI: 1.42–3.65) of pregnancy than those in private schools. Another factor associated with adolescent pregnancy was the absence of both parents in the family nucleus (OR = 3.56; 95% CI: 2.08–6.09). No statistically significant association was observed between nonconsensual sexual intercourse and pregnancy in adolescence (OR = 1.24; 95% CI: 0.62–2.45) (Table 1).

Analysis of sexual and reproductive health variables showed that having a sibling with a history of adolescent pregnancy was associated with the number of times a respondent in the case group had been pregnant (OR = 1.87; 95% CI: 1.35–2.59). Also associated with adolescent pregnancy were first intercourse at 12 years of age or less (OR = 2.32; 95% CI: 0.94–5.72) and having an average or poor self-report of contraceptive knowledge (OR = 1.81, 95% CI: 1.31–2.49; OR = 3.02; 95% CI = 1.46–6.28). Regarding whether the respondent had been pregnant in the year prior to completing the questionnaire, 39.6% of the case group responded affirmatively, versus 4.4% of the controls (OR = 14.1; 95% CI: 8.55–23.39). As for other variables, such as having a mother with a history of adolescent pregnancy, the school level at which sex education was received, and parental control of access to reproductive health services, no association was found (Table 2).

TABLE 1. Bivariate analysis of sociocultural variables identified as risk factors for adolescent pregnancy in Bogotá, Colombia, 2010

Risk factor	Cases (n = 272) ^a		Controls (n = 544) ^a		Odds ratio	95% CI ^b (range)	P value ^c
	No.	%	No.	%			
Public school							
No	28	10.3	112	20.6	1.00		
Yes	244	89.7	432	79.4	2.26	1.42–3.61	< 0.001
Nonconsensual (forced) sexual intercourse							
No	255	32.9	521	67.1	1.00		
Yes	14	37.8	23	62.2	1.24	0.62–2.45	0.592
Parental presence/absence							
Both present	109	40.1	258	47.4	1.00		
One present	129	47.4	251	46.1	1.05	0.78–1.42	0.728
Both absent	34	12.5	35	6.4	3.56	2.08–6.09	< 0.001

^a Totals of some variables may differ due to missing values.

^b 95% confidence interval.

^c P value associated with Pearson's chi square test.

TABLE 2. Bivariate analysis of sexual and reproductive health variables as risk factors for adolescent pregnancy in Bogotá, Colombia, 2010

Risk factor	Cases (n = 272) ^a		Controls (n = 544) ^a		Odds ratio	95% CI ^b (range)	P value ^c
	No.	%	No.	%			
Sibling with history of adolescent pregnancy							
No	145	27.0	392	59.1	1.00		
Yes	105	40.9	152	73	1.87	1.35–2.59	< 0.001
Mother (of adolescent) with history of pregnancy ≤ 19 years of age							
No	76	40.4	254	46.7	1.00		
Yes	112	59.6	290	53.3	1.29	0.92–1.80	0.149
School level at which sex education received							
Preschool and primary school	36	19.1	82	21.5	1.00		
Middle school	20	11	38	9.9	1.12	0.61–2.06	0.687
High school	125	69.1	262	68.6	1.02	0.69–1.53	0.909
Age at first sexual intercourse							
≥ 16 years	46	19.1	93	18.7	1.00		
13–15 years	183	75.9	393	79.1	0.83	0.57–1.22	0.333
≤ 12 years	12	5.0	11	2.2	2.32	0.94–5.72	0.042
Parental control over access to reproductive health services							
Yes	214	86.6	436	88.3	1.00		
No	33	13.4	58	11.7	0.86	0.53–1.40	0.526
Self-report on extent of contraceptive knowledge							
Good	131	50	367	68.6	1.00		
Fair	110	42	153	28.6	1.81	1.31–2.49	< 0.001
Poor	21	8	15	2.8	3.02	1.46–6.28	< 0.001
History of prior pregnancy(ies)							
No	162	60.4	517	95.6	1.00		
Yes	106	39.6	24	4.4	14.10	8.55–23.39	< 0.001

^a The totals of some variables may vary due to missing values.

^b 95% confidence interval.

^c P value associated with Pearson's chi square test.

Multivariate conditional analysis (Table 3) showed that the six risk factors (public school; early first intercourse; sibling with adolescent pregnancy; parental

absence; poor contraceptive knowledge; and previous pregnancy) identified as being associated in the bivariate analysis remained significant; however, the

variables “previous pregnancy” and “inadequate knowledge of contraceptive methods” were the factors most associated adolescent pregnancy.

TABLE 3. Multivariate analyses of the risk factors associated with adolescent pregnancy in Bogotá, Colombia, 2010

Risk factor	Odds ratio ^a	95% CI ^b (range)	P value ^c
Public school			
No	1.00		
Yes	2.25	1.45–3.51	< 0.001
Parental presence/absence			
Both present	1.00		
One present	1.03	0.77–1.51	0.823
Both absent	3.58	2.10–6.16	< 0.001
Sibling with history of adolescent pregnancy			
No	1.00		
Yes	1.98	1.55–2.76	< 0.001
Age at first sexual intercourse			
≥ 16 years	1.00		
13 – 15 years	2.20	0.90–5.37	0.082
≤ 12 years	2.34	1.01–5.40	0.046
Self-report on extent of contraceptive knowledge			
Good	1.00		
Fair	1.94	0.96–3.94	0.064
Poor	3.92	1.96–7.83	< 0.001
History of pregnancy(ies)			
No	1.00		
Yes	14.09	8.74–22.70	< 0.001

^a Odds ratio adjusted for all variables in the table.

^b 95% confidence interval.

^c P value associated with Pearson's chi square test.

DISCUSSION

Obviously there are both contextual and socioeconomic factors that constitute risks for adolescent pregnancy. The associations found in this work between previous pregnancy and family history of adolescent pregnancy and the respondent's pregnancies, as well as some risk behaviors for health, concur with those of other research (9–19).

This study found that attending public school represents a greater risk for adolescent pregnancy, noting that school type is generally related to socioeconomics. Again, these findings are quite similar to those reported by other studies (9–19).

This study's findings regarding the risk of pregnancy in adolescents who experienced the absence of both parents from the nuclear family—not for those with a single parent—agree with what was reported by Goicolea and colleagues (19); however, a study by Lee (25) reported that adolescents from single-parent families were also at risk of pregnancy (adjusted OR = 4.8; 95% CI: 1.4–16.1).

On the other hand, this study did not find a significant association between adolescent pregnancy and nonconsensual sexual intercourse. This finding contradicts that of another study, which reported that adolescent victims of sexual or physical abuse had a significantly greater risk of pregnancy than those without a history of abuse (18). This result should be interpreted cautiously given that the question of forced sexual intercourse can be emotionally complex; therefore, it was possibly underreported. This factor should be further explored using other methods, such as in-depth interviews, where answers may be given more candidly.

Characteristics of first sexual intercourse also influenced the risk of adolescent pregnancy. Starting sex early (< 12 years of age) was significant in our study, similar to the findings of other authors (9, 16, 17). Lack of contraceptive use during first sex was also found to be a risk for adolescent pregnancy (OR = 4.19; 95% CI: 3.04–5.77). Similar results were reported by Goicolea and colleagues (OR = 4.30; 95% CI: 1.33–13.90) and Lee and colleagues (adjusted OR = 3.1; 95% CI: 1.3–7.2)

(19, 25). Nonuse of contraceptive at first sex could be due to a lack of knowledge, specifically a false sense of security based on a perceived low or nonexistent risk of pregnancy.

According to self-reported degree of knowledge regarding contraceptive methods, the study findings showed that when knowledge is deficient, the risk of adolescent pregnancy is greater. Moni and colleagues (26) also reported a strong association between lack of sexual and reproductive health knowledge and adolescent pregnancy (OR = 4.95; *P* = 0.0003). In addition, we found that adolescents reporting a history of pregnancy had a risk 14.1 times greater of becoming pregnant again than those who reported never having been pregnant.

These study results also showed that having a sibling who had given birth in adolescence was a risk factor for adolescent pregnancy. We also looked for a possible association between adolescent pregnancy and having a mother with a history of childbirth at 19 years of age or less. This study showed no significant association and neither did the study by Goicolea and colleagues (19). Neverthe-

less, other studies, such as Amorin and colleagues (OR = 2.6; 95% CI = 1.7–3.4) and Lee (adjusted OR = 4.9; 95% CI: 2.2–11.0) found that having a history of a mother with adolescent pregnancy represents a risk (25, 27).

Study limitations

A limitation of this study was that the data came from self-reports of minors, and was therefore, subject to recall bias, and this bias that may not have been equally distributed between cases and controls. Nevertheless, the bias may have been minimal since the questionnaire was administered individually and

anonymously in a controlled environment with identical questions for both groups.

Also, other variables, such as educational status, might have been included as possible confounders. However, we did not consider educational status since the sample came from public and private schools in the same neighborhoods of Bogotá with same sociodemographic context and very similar poverty conditions. It could be assumed that the quality of the education was similar. Note that in Colombia, poor parents often pay for private school because their neighborhood public schools are over capacity.

Conclusion

In Bogotá, Colombia, attending a public school, early sexual initiation, not living with both parents, and ignorance of contraceptive methods are all associated with pregnancy in adolescents. These factors, all related to complex individual, family, and social environments, must be considered and addressed when designing interventions. Implementing sex education, including contraceptive methods, as part of the school curriculum is an important step, but parent/guardian involvement is indispensable as well.

Conflict of interest: None.

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RESUMEN

Factores de riesgo de embarazo adolescente en Bogotá, Colombia, 2010: estudio de casos y testigos

Objetivo. Identificar los factores de riesgo de embarazo adolescente entre las estudiantes de Bogotá, Colombia.

Métodos. Estudio retrospectivo de casos y testigos pareados por edad e identificados por medio de una encuesta sobre el comportamiento sexual de los adolescentes escolarizados en Bogotá (Encuesta sobre el Comportamiento Sexual de los Adolescentes Escolarizados en Bogotá) realizada el primer trimestre del 2010. Los 272 casos y 544 testigos seleccionados aleatoriamente se tomaron de un total de 39 044 registros. Se consideraron variables sociodemográficas, estructura de los hogares y entorno familiar; relaciones sexuales y embarazo, y conocimientos sobre salud sexual y reproductiva. Los métodos utilizados para el ajuste por posibles factores de confusión fueron pareamiento y regresión logística condicional.

Resultados. Sobre la base de los análisis multifactoriales, los factores asociados con mayor riesgo de embarazo adolescente fueron: asistencia a una escuela pública (razón de posibilidades [OR] = 2,25; intervalo de confianza [IC] 95%: 1,45–3,51); antecedentes de embarazo adolescente de una hermana (OR = 1,98; IC 95%: 1,55–2,76); primera relación sexual a edad temprana (a los 12 años o antes) (OR = 2,34; IC 95%: 1,01–5,40); nivel bajo o medio de conocimiento autoinformado sobre anticonceptivos (OR = 3,92; IC 95%: 1,96–7,83); embarazo anterior (OR = 14,09; IC 95%: 8,74–22,70), y hogar monoparental (OR= 3,58; IC 95%: 2,10–6,16).

Conclusiones. Los factores relacionados con el entorno individual, familiar y social que influyen en la incidencia del embarazo adolescente se deben tomar en consideración y abordar cuando se diseñen intervenciones. La inclusión de la educación sexual en el programa de estudios es un componente importante para prevenir el embarazo adolescente; sin embargo, para lograr el éxito es necesaria la participación de los padres o cuidadores.

Palabras clave

Embarazo en adolescencia; anticonceptivos; violencia sexual; familia; factores de riesgo; Colombia.