

Relationship Between Abortion at First Pregnancy and Live Births by Young Adulthood: A Population-Based Study Among Mexican Women



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ABSTRACT

Study Objective: To identify factors associated with having an abortion (spontaneous or induced) at the time of first pregnancy, and to test the association between abortion in the first pregnancy and the number of live births among young women 20-24 years of age.

Design: Cross-sectional study.

Setting: We used a nationally representative survey of Mexican women 20-24 years of age with data at time of survey and retrospective measures of exposures in adolescence. We include 1913 women who reported ever having a pregnancy.

Main Outcomes: Our outcomes were history of abortion (spontaneous or induced) and number of live births by 20-24 years of age. We used multivariable logistic regression models to estimate the association between sociodemographic factors at the time of pregnancy and abortion history, and between abortion history and number of live births.

Results: Among women 20-24 years of age who ever had a pregnancy, 15.5% reported an abortion in the first pregnancy, and 84.4% never had an abortion. Among women who had an abortion in the first pregnancy, 62.3% did not report any live birth by age 20-24 years. Young women living with their parents (adjusted odds ratio [AOR]=1.87; confidence interval [CI]=1.16-3.02) or with a partner with a higher educational level (AOR=4.64; CI=1.05-20.44) had greater odds of having an abortion in the first pregnancy. Compared with women who never had an abortion, women who reported an abortion in the first pregnancy had lower odds (AOR=0.02; CI=0.01-0.03) of having 1 or more children by the age of 20-24 years.

Conclusion: Young women who reported abortion in the first pregnancy had fewer live births at ages 20-24 years compared to women with no history of abortion.

Key Words: Adolescent pregnancy, Abortion, Young women, Live births, Mexico

Introduction

In Mexico, it is estimated that each year 71 unintended pregnancies occur per 1000 women of reproductive age. The proportion of unintended pregnancies is as high as 50% among women 15-19 years of age.^{1,2} Furthermore, although the total fertility rate has fallen drastically in Mexico, early motherhood is common, and adolescent birth rates have stagnated. Adolescents thus account for a growing proportion of total births.^{3,4}

None of the authors have financial or other relationships that could result in a conflict of interest.

BGD was supported by the Society of Family Planning Research Fund (SFPRF11-2) and K12HS022981 (Guise, PI) from the Agency for Healthcare Research and Quality. The content is solely the responsibility of the authors and does not necessarily represent the official views of the Agency for Healthcare Research and Quality.

BSA, BGD, and RS conceived of the study; BGD secured funding; BSA conducted the data analysis and drafted the manuscript; and RS and BGD revised the manuscript for intellectual contributions.

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The Mexican government has made significant efforts focused on the reduction of adolescent pregnancies. It created the National Strategy to Prevent Teen Pregnancy,⁵ which defines community and intersectorial government actions to reduce pregnancies among adolescents. However, the Mexican government has paid less attention to providing safe abortion care as a key strategy to improve health, to enhance human rights, and to prevent births when pregnancy is unintended.

Scientific evidence and international guidelines have documented that access to safe abortion-care is crucial to improve women's health.⁶ Furthermore, abortion is an important intervention to help to women achieve their overall reproductive goals.^{7,8} In Mexico, abortion law is determined at the state level; first-trimester abortion was decriminalized in Mexico City in 2007, followed recently (2019) by the state of Oaxaca, but remains highly restricted in Mexico's other 30 states.⁹ However, access to abortion for adolescents, even in a liberalized context such as Mexico City, is limited.¹⁰ Research to date has focused on incidence and trends of use of abortion services,^{11,12} unsafe abortion,¹³⁻¹⁵ and estimates of induced abortion incidence.¹⁶ However, very little is known about its role in regulating the number

of live births in Mexico. This study aims to identify factors associated with having an abortion at the time of the first pregnancy, and to test the association between having an abortion in the first pregnancy and the number of live births among young women 20–24 years old.

Material and Methods

We conducted a secondary analysis of the National Survey of the Determinant Factors of Adolescent Pregnancy (ENFaDEA; 2017).¹⁷ The ENFaDEA is a cross-sectional, nationally representative, population-based, randomly selected household survey fielded in 2017 by the School of Social Work (ENTS) at the National Autonomous University of Mexico (UNAM). The ENFaDEA asked women 20–24 years old about sociodemographic characteristics, sexual and reproductive events, and social and contextual factors at 3 time points: 1) during their adolescence (12–19 years old); 2) at the time of their first pregnancy; and 3) at the time of the survey (20–24 years old).

A total of 3380 individual young women 20–24 years old were surveyed. Rural (<2500 inhabitants¹⁸) locations were intentionally oversampled. In this analysis, we include 1913 women 20–24 years old who reported ever having a pregnancy (56.6% of the total sample); using the survey weights to account for the complex sampling design, these women represent a population of 2,570,549 Mexican women 20–24 years old who have experienced a pregnancy. We excluded 79 women who had an abortion after the first pregnancy because of the small sample size, which may not be sufficiently powered to detect differences between groups.

Variables

Our two main outcomes were history of abortion (spontaneous or induced analyzed together) and the number of live births at the time of the survey. First, we examined binary abortion history in 2 categories for descriptive and multivariable analyses. We did not distinguish between spontaneous or induced abortion in this study because of known underreporting of induced abortion on surveys,¹⁹ secondary to legal restrictions²⁰ and to abortion-related stigma.²¹ We classified the number of live births at time of survey (when women were 20–24 years old per inclusion criteria) as 0, 1, and 2 or more for descriptive analysis and 0 vs 1 or more for multivariable analyses (to improve power). We also analyzed the age at the first delivery, classified as very young adolescents (11–15 years old) as well as 16–17, 18–19, and 20–24 years old.

We included additional individual and household characteristics of the women at the time of first pregnancy, during adolescence, and at the time of the survey as covariates. Women's socioeconomic and contextual characteristics during adolescence and at the time of first pregnancy often overlap, as about 70% of the sample reported a first pregnancy as an adolescent. Figure A1 depicts the timing and relationship of variables used in this analysis.

At the time of the first pregnancy, we included whether the woman was an adolescent (≤ 19 years old); her student status (student vs other); the age difference in years be-

tween the woman and her partner (ie, the man with whom she became pregnant) grouped as 0, 1–5, or >5 years; educational level of respondent's partner (completed primary school or less, secondary/9th grade, high school/12th grade, and university or higher). We also identified whether the respondent lived in her parents' household at the time of the first pregnancy.

We included the following variables reported during the respondents' adolescence: level of religiosity (not religious, a little religious, very religious); an indicator to identify whether the woman dropped out of school during adolescence; and a wealth index generated using principal component analysis²² from a set of durable goods and services of the household at adolescence. We divided the index into quintiles. We also included 2 indicators of whether a woman spent most of her adolescence living in an urban vs rural area (≤ 2500 inhabitants), and in Mexico City vs elsewhere.

At the time of the survey, we included age (20–24 years), an indicator of whether a woman resided in Mexico City, and marital status (ever married vs single; Fig. A1). We had very little missing data, less than 1% except for partner education level (3.5%; see Table A1 for missingness).

Analysis

We used descriptive statistics and bivariate tests to examine differences in sociodemographic characteristics of women at the first pregnancy and during adolescence by abortion history (never had an abortion vs spontaneous or induced abortion in the first pregnancy). We used bar graphs to describe number of live births and age at the first delivery by abortion history.

We used multivariable logistic regression models to identify socioeconomic and contextual factors associated with having a spontaneous or induced abortion during the first pregnancy vs no abortion. We included the following covariates at the time of first pregnancy and during adolescence: whether the woman was an adolescent at the time of pregnancy; whether she lived in her parents' household at the time of the first pregnancy; an indicator of whether the woman dropped out of school during adolescence; the educational level of the respondent's partner; the age difference between the woman and her partner; the household at adolescence wealth index divided into quintiles; and a variable to identify whether a woman spent most of her adolescence in Mexico City.

We next built a logistic regression model to test the association between abortion history (never had an abortion vs having had a spontaneous or induced abortion in the first pregnancy) and our second outcome, number of live births (0 vs ≥ 1) at the time of the survey. We included the same variables as in the model described above and also included the following covariates at the time of the survey: age in years; woman's educational level (completed primary school or less, secondary/9th grade, high school/12th grade, and university or higher), an indicator to identify whether the woman was ever married; and whether the woman lived in Mexico City.

We performed several sensitivity analyses. We varied our measure of socioeconomic status. For our first model, we included the woman's mother's educational level as a proxy of household socioeconomic status; we also tested our model including the household wealth index divided in quintiles during adolescence. Results did not change; therefore, we present only the wealth index divided in quintiles. We tested models with and without religiosity in adolescence; religiosity was strongly correlated with rural residence, but its addition did not change our results (data not shown). For simplicity, we deleted religiosity in adolescence from the final model. We also tested 2 indicators to identify whether a woman spent most of her adolescence (first model) or resided (second model) in a rural vs urban locality. Results did not change; we thus decided to keep the Mexico City residency indicator for parsimony. In our second model, which tests the association between abortion history and the number of live births at the time of the survey, we tested an interaction between abortion history and adolescent pregnancy. Our results did not change, and the interaction term was not statistically significant. For simplicity and a more straightforward interpretation, we kept the model without the interaction term.

We used STATA 14 for all analyses. We used survey weights for all analyses to account for complex sampling. This secondary analysis of publicly available data was deemed not to be human subjects research by the Institutional Review Board at Oregon Health & Science University (IRB#19507).

Results

Among our sample of women 20 to 24 years of age who reported ever having a pregnancy ($n = 1913$), 84.4% never had an abortion and 15.5% had a spontaneous or induced abortion in the first pregnancy (Table 1). Overall, 67.7% reported that the pregnancy occurred during adolescence (≤ 19 years old). The proportion of women living in their parents' household at the time of the first pregnancy was statistically significantly different between women who never had an abortion and those with an abortion experience in that first pregnancy (89.2% vs 96.0% respectively; $P < .01$) (Table 1). History of abortion varied by wealth distribution during adolescence, with a greater proportion of wealthier women reporting abortion ($P < .01$) (Table 1). Abortion history also varied by place of residency; 53.5% of women with no history of abortion and 74.4% of those with a spontaneous or induced abortion in first pregnancy resided in an urban locality during the adolescence ($P < .01$). Moreover, a larger proportion (30.4%) of women who reported a spontaneous or induced abortion in the first pregnancy lived in Mexico City in adolescence, compared with 8.9% of women who never had an abortion ($P < .01$) (Table 1).

Among women who had a spontaneous or induced abortion in the first pregnancy ($n = 190$), 62.3% did not report any live births by age 20–24 years, and 20.5% had their first birth as adolescents; the rest delivered a first child at 20–24 years of age (Fig. 1). Among those women who never had an abortion ($n = 1723$), just over half (51.9%) gave birth to a

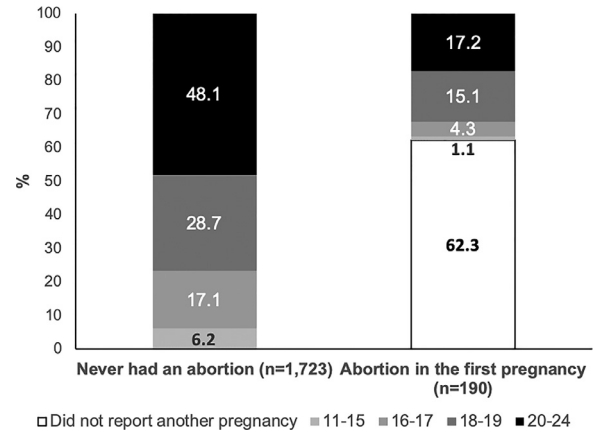


Fig. 1. Age at first birth among women who ever had a pregnancy ($n = 1913$ / $N = 2,570,549$). Note: We used survey weights, $n =$ size of the sample/ $N =$ size of the population. χ^2 Test comparing women who never had an abortion and women who had an abortion in the first pregnancy ($P < .000$). In all, 71.1% women in the group who never had an abortion were pregnant at the time of the survey; they were classified as having their first pregnancy between 20 and 24 years of age.

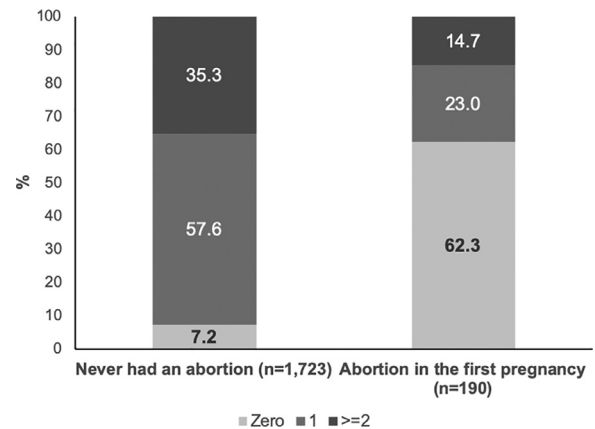


Fig. 2. Number of live births by history of abortion, among women who ever had a pregnancy ($n = 1913$ / $N = 2,570,549$). Note: We used survey weights, $n =$ size of the sample/ $N =$ size of the population. χ^2 Test comparing women who never had an abortion and women who had an abortion in the first pregnancy ($P < .000$).

child as an adolescent, including 6.2% as very young adolescents (11–15 years old), whereas 48.1% had a first birth by the age of 20–24 years (Fig. 1). Parity at age 20–24 years also differed by history of abortion. Among women with a history of spontaneous or induced abortion in the first pregnancy, 23.0% had 1 child, and 14.7% had 2 or more children. Among women aged 20–24 years with no history of abortion, 57.6% had 1 child, and 35.3% had 2 or more ($P < .05$ for difference in distribution of parity by history of abortion) (Fig. 2).

Women living with their parents at the time of the first pregnancy (adjusted odds ratio [AOR] = 1.87; confidence interval [CI] = 1.16–3.02) and women having a partner with higher educational level (AOR = 4.64; CI = 1.05–22.44) had significantly greater odds of having a spontaneous or induced abortion in the first pregnancy. Age gap with partner did not affect these odds, nor did woman's socioeconomic status (Table 2). Living in Mexico City during adolescence was not significantly associated with reporting a spontaneous or induced abortion in the first pregnancy, compared with women living elsewhere (AOR = 2.99; CI = 0.84–10.61).

Table 1
Socio-Demographic and Contextual Characteristics of the Women at the Time of the First Pregnancy and During Adolescence by Abortion History, Among Women Who Ever Had a Pregnancy

	Never Had an Abortion	Abortion in First Pregnancy	Total
N	1723	190	1913
N	216,954,336	39,843,510	2,570,549
%	84.4	15.5	100
		%	
Adolescent pregnancy (≤ 19 years old)	67.2	70.9	67.7
Living in her parents' household**	89.2	96.0	90.2
Studying at first pregnancy	25.4	34.5	26.8
School drop-out during adolescence (≤ 19 yrs old)	67.7	59.0	66.3
Partner's educational level			
None/primary	16.7	5.5	15.1
Secondary	39.4	33.7	38.5
High school	33.2	35.3	33.5
University or higher	10.8	25.5	12.9
Partner's occupation			
Other (student, domestic worker)	16.3	14.7	16.1
Employee	83.7	85.3	83.9
Age gap between the woman and her partner, yrs			
0	22.7	22.4	22.7
1-5	55.5	56.4	55.7
>5	21.8	21.2	21.7
Socioeconomic status in adolescence**			
Q-1 (poorest)	25.5	17.7	24.3
Q-2	23.4	14.5	22.0
Q-3	24.8	9.6	22.4
Q-4	15.7	33.4	18.4
Q-5 (wealthiest)	10.7	24.8	12.9
Religiosity in adolescence*			
Not religious	12.5	22.9	14.1
A little religious	49.9	61.3	51.7
Religious or very religious	37.6	15.9	34.2
Living in a urban locality at adolescence**	53.5	74.4	56.8
Residence in Mexico City at adolescence**	8.9	30.4	12.3

Note: We used survey weights, n = size of sample/N = size of population.

* $P < .05$, ** $P < 0.01$.

Table 2
Logistic Regression Model: Socio-demographic and Contextual Factors Associated With Having an Abortion in the First Pregnancy Among Women Who Ever Had a Pregnancy

N	0 = Never had an abortion 1 = Abortion in first pregnancy	
	Odds Ratio	95% CI
N	1826	2,461,897
Adolescent pregnancy (Ref: >19 years old)	1.55	[0.64-3.72]
Living in her parents' household	1.87**	[1.16-3.02]
School drop-out during adolescence	1.05	[0.50-2.22]
Partner's educational level (Ref: None/ elementary)		
Secondary	2.48	[0.73-8.46]
High school	2.75	[0.73-10.30]
University	4.64**	[1.05-20.44]
Age gap between woman and her partner, yrs (Ref: 0)		
1-5	0.79	[0.44-1.41]
>5	0.56	[0.11-2.85]
Socioeconomic status in adolescence (Ref: Q-1 (poorest))		
Q-2	0.82	[0.33-2.04]
Q-3	0.47	[0.11-2.05]
Q-4	2.42	[0.77-7.61]
Q-5 (wealthiest)	1.92	[0.70-5.22]
Living in Mexico City in adolescence	2.99*	[0.84-10.61]

Note: We used survey weights, n = size of sample/N = size of population. We analyzed 1826 observations due to missing values of some variables (see Table A1).

** $P < 0.05$, * $P < 0.1$.

By age 20–24 years, at the time of the survey, women who reported a spontaneous or induced abortion in the first pregnancy had significantly lower odds of having 1 or more children (AOR = 0.02; CI = 0.01–0.03) (Table 3) compared with women who reported no abortion. Women 22–

24 years old had greater odds of having 1 or more children than women 20 years old (AOR = 2.67; CI = 2.16–3.30). Women who reported getting pregnant as an adolescent (≤ 19 years of age) or who dropped out of school during adolescence had significantly higher odds of having 1 or

Table 3

Logistic Regression Model: Association Between Number of Live Births by Age 20-24 Years and Abortion History, Adjusted by Socio-demographic Factors at the Time of the Survey and During Adolescence, Among Women Who Ever Had a Pregnancy

N	Number of Children: 0 vs ≥1	
	Odds Ratio	95% CI
N	1,826	
	2,569,743	
Abortion history (Ref: Never had an abortion)		
Abortion in the first pregnancy	0.02***	[0.01-0.03]
Ever married	1.31	[0.46-3.67]
Age at the time of the survey (Ref: 20 years old)	2.68***	[2.11-3.39]
Educational level (Ref: None/elementary)		
Secondary	2.58	[0.72-9.22]
High school	2.11	[0.61-7.34]
University	3.41	[0.69-16.94]
School drop-out during adolescence	2.19**	[1.10-4.39]
Adolescent pregnancy (Ref: >19 years old)	22.69***	[10.24-50.29]
Living in her parents' household	0.66	[0.22-1.94]
Partner's educational level (Ref: None/ elementary)		
Secondary	0.50	[0.15-1.70]
High school	0.44	[0.14-1.40]
University	0.13**	[0.03-0.60]
Age gap between the woman and her partner, yrs (Ref: 0)		
1-5	0.68	[0.18-2.60]
>5	0.97	[0.20-4.61]
Socioeconomic status in adolescence (Ref: Q-1 poorest)		
Q-2	0.48	[0.15-1.55]
Q-3	0.47	[0.16-1.36]
Q-4	0.79	[0.15-4.03]
Q-5 (wealthiest)	0.68	[0.26-1.78]
Living in Mexico City	0.69	[0.26-1.78]

Note: We used survey weights, n = size of sample/N = size of population. We analyzed 1826 observations due to missing values of some variables (see Table A1).

*** $P < .01$, ** $P < .05$.

more children (AOR = 22.69; CI = 10.24–50.29; AOR = 2.19; CI = 1.10–4.39, respectively). Marital status did not affect the odds of early motherhood.

Discussion

Among Mexican women 20-24 of age with a history of pregnancy, 67.7% reported getting pregnant as adolescent; and 15.5% experienced a spontaneous or induced abortion during their first pregnancy. Among women who reported an abortion in the first pregnancy, 62.3% did not report any live birth by the age of 20-24 years.

Living with parents and education of the partner (ie, man with whom she became pregnant) are positively associated with having an abortion in the first pregnancy. Spontaneous or induced abortion in the first pregnancy presents a significant negative association with the total number of live births at age 20-24 years. Dropping out of school as an adolescent is strongly and positively associated with 1 or more live births at age 20-24 years.

Our overall results suggest that spontaneous or induced abortion in the first pregnancy may play an important role in delaying early motherhood among young women in Mexico and limiting the number of live births by 20-24 years of age. These findings are consistent with literature from the United States and United Kingdom,²³⁻²⁵ which found strong evidence that young women's birth rates dropped because of increased access to abortion. However, public policies as well as policy and political discourse in Mexico, and in most low-income and low-

middle-income countries, focus on primary prevention of adolescent pregnancy but do not consider the role of abortion as secondary prevention of live births. Adolescents and young women in Mexico need access to contraception as well as to abortion in order to prevent early motherhood.

Other studies have also identified a relationship between parental resources, reproductive outcomes, and older ages at first birth.²⁶ ENFaDEA does not allow us to explain the causal paths between living with parents and having an abortion in the first pregnancy. However, Stewart²⁶ discusses some hypotheses. First, parental resources may be a proxy variable for access to healthcare services, contraception, sex education, and other relevant factors. Second, parental resources may reflect adolescents' aspirations and the perception of their chance to fulfill them. However, research should also rule out other factors such as potential parental or partner coercion on the young woman's decision-making process to terminate a pregnancy.²⁷

According to the Interrupción Legal del Embarazo (ILE), the Mexico City public abortion program data,²⁸ the largest proportion of legal first-trimester abortions (46.6%) were in individuals 18-24 years old. Thus, women in our sample, interviewed at ages 20-24, correspond to the most important age group seeking legal abortion care in Mexico. In addition, 41.0% of the women who received abortion care in the public abortion program do so to prevent a first birth.²⁹ Women seeking an abortion to prevent a first birth were younger and had better socioeconomic status (ie, were more educated and more likely to be in school) than women seeking an abortion to space or limit subsequent

births.²⁹ Although living in Mexico City, the only state where first-trimester abortion was legal on request at the time of this survey, as an adolescent and spontaneous or induced abortion in the first pregnancy did not reach significance (AOR=2.99; CI=0.84–10.61), the confidence interval suggests that we are likely underpowered for this association.

This study must be interpreted with several limitations in mind. First, because of the nature of the survey and the analytical sample, we cannot present the women's full reproductive history. Second, we are not able to distinguish between spontaneous and induced abortions in our analysis. However, the proportion of pregnancies reportedly terminated in abortion in this survey is higher than the expected miscarriage prevalence,³⁰ suggesting that a proportion were indeed induced terminations of unintended pregnancy. Third, because the ENFaDEA explores retrospective information, it is possible that it faces recall bias, which is a common systematic error in observational studies. However, the error usually decreases with decreasing the time interval between the event and the recall, which is the case for ENFaDEA. Finally, the results presented in this study must be read as associations, not causal relationships.

This study provides novel evidence highlighting the role of abortion in reducing the number of live births by young adulthood. Expanding access to highly effective modern contraception to prevent unwanted pregnancies in tandem with expanding access to safe and legal abortion will help young women to reach their reproductive and life goals as well improving sexual and reproductive health.

Acknowledgments

We would like to thank the team of researchers and staff at the Escuela Nacional de Trabajo Social (ENTS)/National School of Social Work that designed and implemented ENFaDEA.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.jpag.2021.01.007](https://doi.org/10.1016/j.jpag.2021.01.007).

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