Title: Fertility among young women in Mexico: New evidence about the role of abortion from a national survey

Authors: Biani Saavedra Avendaño (CIDE)**;** Raffaela Schiavon (Independent consultant)**;** Blair G. Darney (OHSU- INSP)

ABSTRACT

To test the association between history of abortion and total live births by age 24 in Mexico. We used the National Survey of Adolescent Pregnancy Factors (ENFaDEA), a nationally representative survey of women 20-24 years old. We used logistic regression to identify factors associated with having an abortion in the first pregnancy, and to test the association between abortion experience and number of live births. 19.6% of the women reported an abortion. Women living with their parents or with a partner with higher educational level had larger odds of having an abortion. Compared with women who never had an abortion, women who reported an abortion in the first pregnancy had lower odds of having one or more children by 24 years. Abortion appears to be an important mean to limit early fertility, especially when it ends a first reproductive experience among adolescents and young women.

INTRODUCTION

Adolescent pregnancy is a persistent global health problem [1]. Annually, approximately 16 million adolescent girls (15 to 19 years) and 2.5 million girls under 15 years give birth in developing regions [2, 3]. In low- and middle-income countries (LMICs), complications from pregnancy, childbirth, and unsafe abortion are the leading causes of morbidity and mortality among adolescent females [4]. It is estimated that each year, 71 unintended pregnancies occur per 1000 women of reproductive age in Mexico [5]. Furthermore, while the total fertility rate has fallen drastically, from 6.8 in the 1950s to 2.3 by 2010, adolescent birth rates have stagnated [6, 7].

The Mexican government has made significant efforts to prevent adolescent pregnancies. It recently created the National Strategy to Prevent Teen Pregnancy [8], which defines community and inter-sectorial government actions to reduce teen pregnancy. Activities such as school and community-based sex education programs and provision of youth friendly health services, among other, are being strengthened and implemented. However, the Mexican government has omitted the provision of safe abortion as a key strategy to prevent adolescent births.

Scientific research and international guidelines [9, 10] have documented that abortion, whether it is not considered a family planning method, is undoubtly a key intervention to limit fertility. In Mexico, abortion law is determined at the state level; in 2007, it was decriminalized in Mexico City, but remains highly restricted in Mexico other 31 states. Access to abortion for adolescents, even in liberalized context as Mexico City, is limited [11]. Most studies have analyzed incidence and trends of abortion public service utilizations [12, 13], abortion-induced mortality

[14], profile of unsafe abortion [15] and estimations of induced abortion in the country [16]. But very little is known about its role in regulating fertility, particularly early unintended fertility in Mexico.

The purposes of this study are to identify socio-demographic and contextual characteristics of young women who had an abortion in the first pregnancy; and to test the association between having an abortion and the number of children born alive.

METHODS

We conducted a cross-sectional study, using data from the National Survey of Adolescent Pregnancy Factors (ENFaDEA 2017). The ENFaDEA is a cross-sectional population-based household survey fielded in 2016 which asked women 20 to 24 years old about socio-demographic, reproductive health, social and contextual factors in three particular moments: a) during their adolescence (12 to 19 years), b) at the moment of their first pregnancy and c) at the moment of the survey. The ENFaDEA is nationally representative, as well as by rural/ urban stratum. We included in this analysis 1,992 (N=2,682,286) women from 20 to 24 year old who reported ever having a pregnancy (58.9% of n=3,380 total sample).

Our main outcomes were: a) having an abortion (in the first pregnancy or after the first pregnancy) ; b) number of children born alive, classified in three categories: zero, 1 or >=2 and c) age at first live birth (classified as: had no additional pregnancies, 11-13, 14-15, 16-17, 18-19 y 20-24 years). We did not distinguish between spontaneous or induced abortion in this study, because of the persistent legally restricted environment and the stigma still associated with abortion in Mexico.

We analyzed several contextual, familiar and socio-demographic characteristics of the women at first pregnancy and at the moment of the survey. At the first pregnancy, we explored the following variables: age (classified as adolescent/>20), occupation of the woman and her partner (none, student or employee), difference between the age of the woman and the age of her partner (zero, 1-3, 4-6 >=7); educational level of her partner (completed primary school or less, secondary/9th grade, high school/12th grade, and greater than high school), contraceptive use before first pregnancy, and whether the woman and her partner wanted the pregnancy. We also identified if the woman lived in her parents' household at the first pregnancy.

Women's characteristics when they were surveyed (at 20-24 ys. of age) were analyzed through the following variables: Age in years, educational level of their mother (completed primary school or less, secondary/9th grade, high school/12th grade, and greater than high school); educational gap of the woman herself (difference in years between the observed and the expected educational level), region of residence (Mexico City, north, west, center, south), living in a rural (less than 2,500 residents) or urban (> 2,500 residents) locality.

Data analysis

We used descriptive statistics and bivariate tests (X2 test) to examine differences in sociodemographic characteristics of women at the first pregnancy, disaggregated by abortion experience (never had an abortion, had an abortion in the first pregnancy or had an abortion after the first pregnancy). We used bar graphs to describe our reproductive outcomes (number of children born alive and age at the first delivery) by abortion experience.

We used multivariable logistic regression models to identify association between women socio-demographic characteristics and contextual factors (ascertained at the moment of the first pregnancy) associated with having an abortion in the first gestation.

We then built two logistic regression models to identify association between number of children born alive and abortion experience: the first model compared women with zero vs. one child, the second model compared women with zero vs. two or more children. In these two models we analyzed women's characteristics when they were surveyed. We used survey weights for all analyses. The deidentified data were made available by the School of Social Work of the National Autonomus University of Mexico (UNAM). All women gave consent at the time of survey; this secondary analysis was not human subjects research.

RESULTS

Among women 20 to 24 ys. of age who ever had a pregnancy (n=1,992/ N= 2,682,286), 14.9% reported an abortion in the first pregnancy, 4.7% had an abortion after the first pregnancy, and 80.95% never had an abortion (Table 1). In bivariate analyses, we found statistically significant differences in the proportion of women living in the nuclear household at the moment of the first pregnancy between women who never had an abortion and those with an abortion experience in the first pregnancy (89.1% vs. 96.0% respectively; p=0.005. Table 1).

Figure 1 shows the distribution of age at the first delivery by abortion experience. We found significant differences between women who never had an abortion and those who experienced an abortion in the first pregnancy: 62.1% of women who had an abortion in the first pregnancy did not report another

pregnancy afterward. Among those women who never had an abortion, a significant proportion (51.86%) gave birth to a child as an adolescent and the rest (48.09%) had their first delivery by the age of 20-24 years.

Figure 2 shows the number of children born alive at the moment of the survey, by abortion experience. Among women aged 20-24 years with no abortion experience, 55.75% had one child and 35.27% had two or more. On the contrary, 23.03% of women with a history of abortion in the first pregnancy had one child and only 14.67% had two or more children. Finally, among those women who experienced an abortion after the first pregnancy, 38.02% had one child and 61.43% had two or more children born alive. All these differences are statistically significant.

The logistic regression model in Table 2 shows that women living with their parents at the moment of the first pregnancy (AOR=19.4; CI:[1.02-3.70]) and women having a partner with higher educational level (AOR=5.92; CI:[1.75-20.06]) had significantly greater odds of having an abortion in the first pregnancy. Women living in rural localities had significantly lower odds (AOR=0.60; CI:[0.38-0.96]) of reporting an abortion in the first pregnancy compared with women living in cities.

Table 3 shows the association between the number of children born alive at the moment of the survey and women´s abortion experience. Panel A compares women with zero vs. one child, Panel B presents women with zero vs. two or more children. In both models, women who reported an abortion in the first pregnancy had significantly lower odds of having one (AOR=0.016; CI: [0.01 - 0.02]), or two or more (AOR=0.01; CI: [0.00 - 0.04]) children born alive compared with women who never had an abortion.

DISCUSSION

In Mexico, abortion appears to be an important mean to limit early fertility among young women. We found that parents seem to play a role in having an abortion in the first pregnancy; education of the partner is another factor positively associated. On the contrary, women living in rural localities are less likely to do so. According to this study, abortion plays an important role in delaying the age of the first pregnancy and the total number of children at the moment of the survey, particularly when it ends a first reproductive experience among adolescents and young women.

This study must be interpreted with a number of limitations in mind. First, we are not able to distinguishing between spontaneous and induced abortions in our analysis. However, it is unlikely that all the reported abortion events were spontaneous, suggesting that a proportion were indeed induced terminations of an unintended pregnancy. Second, we don´t know whether the women received any care in a health facility, and therefore post-abortion counselling and contraception, that could explain in part the overall impact on subsequent fertility. A third limitation, common to surveys in general, is that abortion is underreported. It is highly possible that in the ENFaDEA too we face abortion underreporting. However, it is interesting to observe that we found a greater proportion of reported abortions compared with other national surveys [14]. This may be due to highly trained peer data collectors or to possible decreases in stigma talking about abortion among these young women as a result of legal changes and a more open public discourse around abortion. Fourth, the ENFaDEA surveys young, 20-24 ys

old women, with the aim of exploring adolescents´ sexual and reproductive behaviors. It therefore uses retrospective information, as socio-demographic, contextual and individual variables in two particular moments in the past: during their adolescence years (12 to 19) and at the moment of the first pregnancy. It is therefore possible that ENFaDEA faces recall bias, which is a common systematic error in observational studies. However, the error usually decreases with decreasing time interval between the event and the recall –which is the case for ENFaDEA. At the same time, retrospective measurement to capture socio-demographic information during adolescence is also a strength of the survey.

The National Strategy to Prevent Teen Pregnancy [8] implemented by the Mexican government, focuses on preventing pregnancies, which is an extremely relevant goal. However, there is an unrecognized role for safe abortion to reduce early fertility. This study provides novel and significant evidence to this need. Improving the widest access to modern contraception and additionally ensuring legal and safe abortions when a contraceptive failed, was not available or whenever a pregnancy was forced or unintended, would generate the most important impact for the sexual and reproductive health of women in general and girls and adolescents in particular.

REFERENCES

1. Chandra-Mouli, V., Camacho, A. V., & Michaud, P. A. (2013). WHO guidelines on preventing early pregnancy and poor reproductive outcomes among adolescents in developing countries. *Journal of Adolescent Health, 52*(5), 517–522. doi: 10.1016/j.jadohealth.2013.03.002.

2. Darroch J, Woog V, Bankole A, Ashford LS. Adding it up: Costs and benefits of meeting the contraceptive needs of adolescents. New York: Guttmacher Institute; 2016.

3. UNFPA. Girlhood, not motherhood: Preventing adolescent pregnancy. New York: UNFPA; 2015.

4. World Health Organization. (2011). *WHO guidelines on preventing early pregnancy and poor reproductive health outcomes among adolescents in developing countries*. In W. H. Organization (Series Ed.) Vol. 2012. Retrieved from http://whqlibdoc.who.int/publications/2011/9789241502214_eng.pdf.

5. Juarez, F. (2013). *Unintended pregnancy in Mexico: Causes and consequences*. New York: Guttmacher Institute.

6. Consejo Nacional de Poblacion. (2015). Proyecciones de la Población 2010-2030. Datos de Proyecciones. Retrieved February 18, 2015, from http://www.conapo.gob.mx/es/CONAPO/Proyecciones_Datos.

7. Tuiran, R., Partida, V., Mojarro, O., & Zúñiga, E. (2004). Fertility in Mexico: Trends and Forecast In United Nations Development Group (Ed.), *Compeling the Fertility Transition.* New York, NY.

8. Consejo Nacional de Poblacion. (2014). *Estrategia nacional para la prevencion del embarazo en adolescentes*. Mexico City: Consejo Nacional de Poblacion. Retrieved from http://www.conapo.gob.mx/work/models/CONAPO/Resource/2441/1/images/ENAPEA_V10.pdf.

9. The, Lancet. (2018). Abortion: access and safety worldwide. *Lancet, 391*(10126), 1121. doi:10.1016/S0140-6736(18)30624-X

10. Sedgh, G., Finer, L. B., Bankole, A., Eilers, M. A., & Singh, S. (2015). Adolescent Pregnancy, Birth, and Abortion Rates Across Countries: Levels and Recent Trends. *The Journal of Adolescent Health : Official Publication of the Society for Adolescent Medicine*, *56*(2), 223–230. http://doi.org/10.1016/j.jadohealth.2014.09.007

11. Saavedra-Avendano, B., Schiavon, R., Sanhueza, P., Rios-Polanco, R., Garcia-Martinez, L., & Darney, B. G. (2018). Who presents past the gestational age limit for first trimester abortion in the public sector in Mexico City? *PLoS ONE*, *13*(2), e0192547. http://doi.org/10.1371/journal.pone.0192547

12. Alexander,L, Fuentes, E., Maldonado, N., Schiavon, R. & Darney, B. G. (2018) Second trimester abortion in Mexico City: A descriptive study. *Master Degree Thesis.*

13. Schiavon, R., Alexander,L, Fuentes, E., Maldonado, N., & Darney, B. G. (2018). State and health system level variation in utilization of in-facility abortion services, Mexico 2000- 2006. Paper presented at the International Federation of Professional Abortion and Contraception Associates (FIAPAC), France.

14. Schiavon, R., Troncoso, E., & Polo, G. (2012). Analysis of maternal and abortion-related mortality in Mexico over the last two decades, 1990–2008. *International*

Journal of Gynecology and Obstetrics, 118, S78-S86. doi:10.1016/S0020-7292(12)60004-6

15. Sousa, A., Lozano, R., & Gakidou, E. (2009). Exploring the determinants of unsafe abortion: Improving the evidence base in Mexico. *Health Policy Plan*, 1-11.

16. Juarez, F., & Singh, S. (2012). Incidence of induced abortion by age and state, Mexico, 2009: New estiamtes using a modified methodology. *International Perspectives on Sexual and Reproductive Health, 38*(2), 58-67. doi:10.1363/3805812

Table 1. Socio-demographic and contextual characteristics of the women at the first pregnancy disaggregated by abortion experience, among women who ever had a pregnancy (n=1,992/ N= 2,682,286)

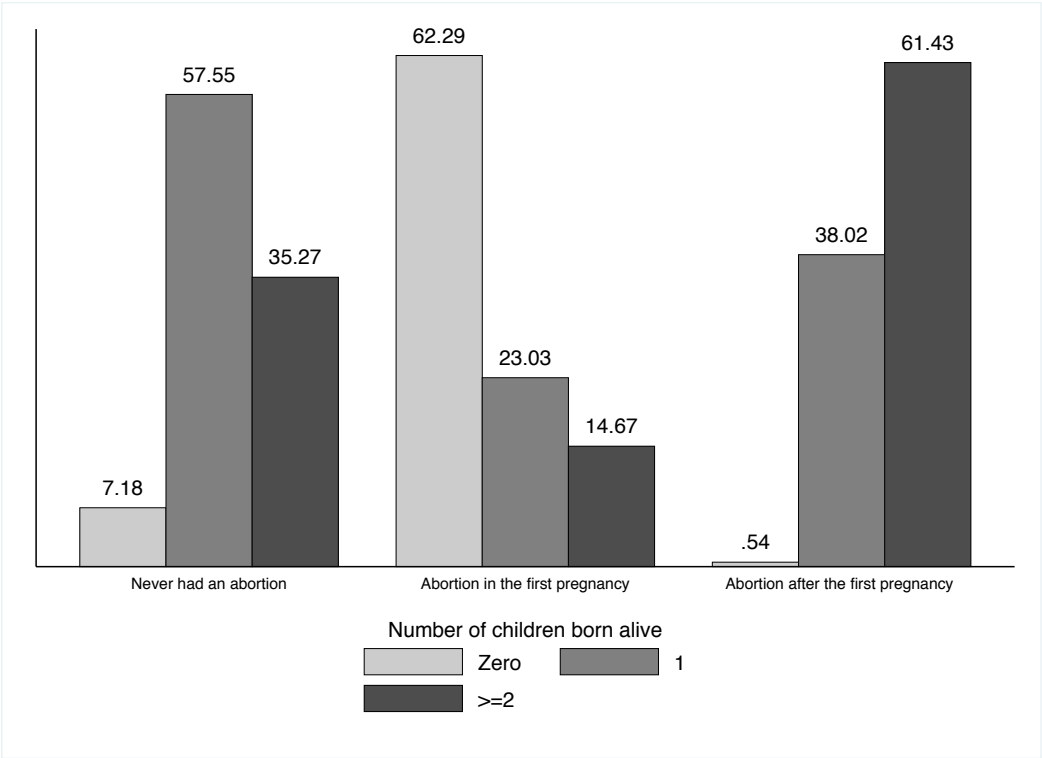|	(a) Never had an abortion	(b) Abortion in the first pregnancy	(c) Abortion after he first pregnancy	Total	p value Chi2 (a vs. b)	p value Chi2 (a vs. c)
n	1,723	190	79	1992		
N	2,171,301	399,249	111,736	2,682,286		
%	80.95	14.88	4.17	100		
		%				
Teen pregnancy (<=19 year old)	67.61	70.90	76.41	68.10	0.659	0.353
Living in the nuclear household at the moment of the first pregnancy	89.10	96.03	87.49	90.14	**0.005**	0.823
Employment of the women at the moment of the first pregnancy					0.452	0.141
None	46.75	40.99	40.09	40.99		
Student	26.34	34.53	41.51	34.53		
Employee	26.91	24.47	18.40	24.47		
Educational level of the partner at the moment of the first pregnancy					0.285	0.213
None	16.85	5.52	19.04	15.28		
Secondary	40.09	33.68	54.54	39.20		
High school	32.76	35.28	25.19	33.11		
University or more	10.30	25.53	1.22	12.41		
Employment of the partner at the moment of the first pregnancy					0.493	0.203
None	3.66	5.66	0.00	3.95		
Student	12.90	9.01	21.20	12.32		
Employee	83.45	85.33	78.80	83.73		
Difference in years between womens' age and their partners'					0.877	0.403
zero	23.10	22.38	30.63	23.00		
1-3	40.57	38.26	39.23	40.23		
4-6	21.03	20.95	13.27	21.02		
>=7	15.30	18.41	16.88	15.76		
Contraceptive use before the first pregnancy	23.29	22.14	11.59	23.12	0.800	0.127
Wanted to be pregnant - women	35.50	28.95	40.03	34.52	0.186	0.826
Wanted to be pregnant – partner	44.46	31.17	41.71	42.55	0.636	0.655

Note: We used survey weights

Figure 1. Age of the women at the first delivery, among women who ever had a pregnancy (n=1,992/ N= 2,682,286)
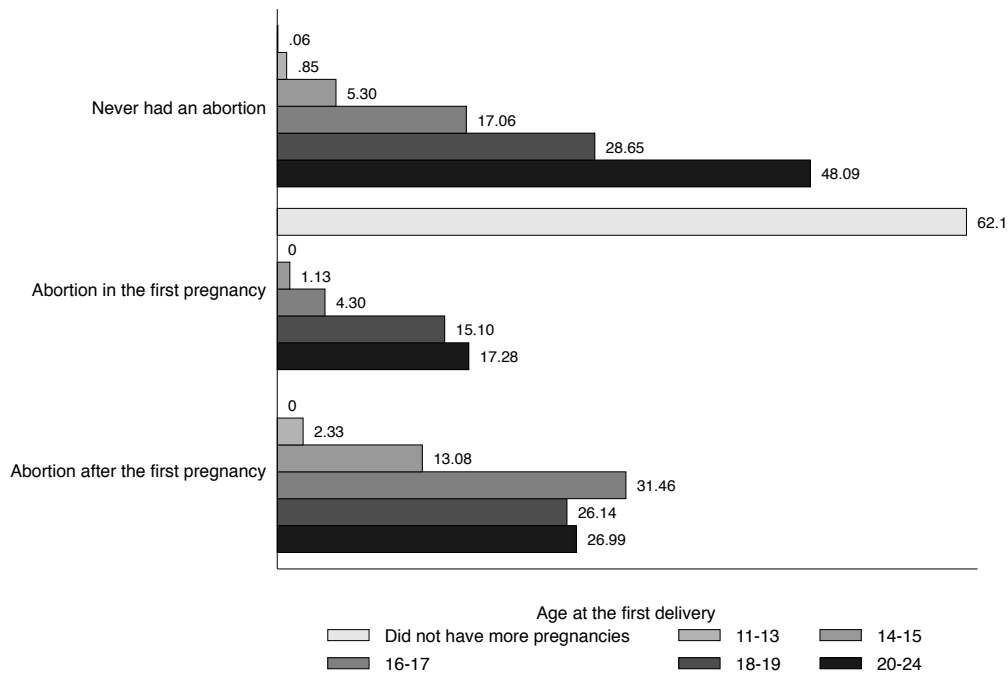
Note: We used survey weights. Chi square test comparing women who never had an abortion and women who had an abortion in the first pregnancy (p<0.000). Chi square test comparing women who never had an abortion and women who had an abortion after the first pregnancy (p=0.086).

Figure 2. Number of children born alive disaggregated by abortion experience, among women who ever had a pregnancy (n=1,992/ N= 2,682,286)

Note: We used survey weights. Chi square test comparing women who never had an abortion and women who had an abortion in the first pregnancy (p<0.000). Chi square test comparing women who never had an abortion and women who had an abortion after the first pregnancy (p=0.006).

Table 2. Logistic regression model. Socio-demographic and contextual factors associated with had had an abortion in the first pregnancy, among women who ever had a pregnancy

	Never had an abortion (0) vs. Abortion in the first pregnancy (1) n= 1,838 N= 2,467,907	
	OR	CI (95%)
Teen pregnancy (<=19 year old)	1.60	[0.63 - 4.07]
Living in the nuclear household at the moment of the first pregnancy	1.94*	[1.02 - 3.70]
Women's mother educational level (Ref: None/ elementary)		
Secondary	0.72	[0.26 - 1.94]
High school or more	0.73	[0.19 - 2.77]
Employment of the women at the moment of the first pregnancy (Ref: None)		
Student	0.83	[0.38 - 1.83]
Employee	0.73	[0.30 - 1.75]
Educational level of the partner at the moment of the first pregnancy (Ref: None/ elementary)		
Secondary	2.27	[0.61 - 8.44]
High school	2.79	[0.66 - 11.80]
University or more	5.92**	[1.75 - 20.06]
Residence in rural locality	0.60*	[0.38 - 0.96]
Region (Ref: CDMX)		
North	0.38	[0.13 - 1.11]
West	0.34	[0.10 - 1.16]
Center	0.45	[0.13 - 1.51]
South, South-east	0.17	[0.03 - 1.03]

Note: We used survey weights. ** $p<0.01$, * $p<0.05$

Table 3. Logistic regression model. Number of children born alive and abortion experience, among women who ever had a pregnancy

	PANEL A Número de hijos (cero vs. 1) n= 1,245 N= 1,789,148		PANEL B Número de hijos (cero vs. >=2) n= 938 N= 1,298,263	
	OR	IC (95%)	OR	IC (95%)
Abortion experience (Ref: Never had an abortion)				
Abortion in the first pregnancy	0.016**	[0.01 - 0.02]	0.01**	[0.00 - 0.04]
Abortion after the first pregnancy	4.20	[0.27 - 63.66]	6.50	[0.43 - 97.78]
Teen pregnancy (<=19 year old)	16.02**	[5.52 - 46.47]	179.4**	[74.22 - 433.4]
Age at the moment of the survey (years)	2.41**	[2.09 - 2.77]	3.27**	[2.03 - 5.26]
Educational gap (Ref: zero years)				
1-2	1.91	[0.97 - 3.76]	4.89	[0.93 - 25.54]
>=3	1.17	[0.29 - 4.65]	6.95*	[1.73 - 27.93]
Marital status (Ref: single)				
Married	1.79	[0.69 - 4.68]	2.30	[0.75 - 7.02]
Divorced	0.84	[0.02 - 35.14]	1.14	[0.05 - 22.77]
Women's mother educational level (Ref: None/ elementary)				
Secondary	0.64	[0.24 - 1.68]	0.43	[0.18 - 1.00]
High school or more	0.57	[0.22 - 1.44]	0.50	[0.12 - 2.09]
Residence in rural locality	1.31	[0.80 - 2.12]	1.35	[0.46 - 3.98]
Region (Ref: CDMX)				
North	0.98	[0.12 - 7.53]	4.57**	[1.82 - 11.46]
West	1.13	[0.16 - 7.84]	1.35	[0.05 - 31.12]
Center	0.92	[0.14 - 5.90]	1.14	[0.56 - 2.32]
South, South-east	0.70	[0.10 - 4.92]	2.33	[0.85 - 6.38]

Note: We used survey weights. p<0.01, * p<0.05