

EMERGENCY CONTRACEPTION IN MEXICO:
TRENDS IN KNOWLEDGE AND USE 2006-2014

By

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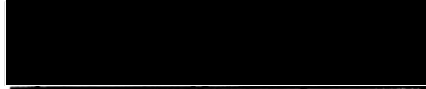
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LIST OF ABBREVIATIONS

BMI- Body Mass Index

CI- Confidence Interval

COC- Combine Oral Contraceptive

EC- Emergency Contraception

ENADID - Encuesta Nacional de la Dinámica Demográfica

ICEC – International Consortium for Emergency Contraception

LARC – Long-Acting Reversible Contraception

NGO – Non-Governmental Organization

OC- Oral Contraceptive

TFR – Total Fertility Rate

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Abstract

Objectives: A package of interventions to introduce emergency contraception (EC) to Mexico was implemented, resulting in addition of EC to the national family planning guidelines in 2004. In this report, we describe EC knowledge and use among women in Mexico over time.

Methods: We used the 2006, 2009, and 2014 waves of a nationally representative demographic survey (ENADID). We assessed EC knowledge and usage in women ages 15-29 who are not using permanent methods and tested whether EC knowledge and use is changing over time after controlling for socio-demographic characteristics using logistic regression.

Results: Our sample included 99,223 (country population N=40,234,355) women ages 15-29. Overall, knowledge of EC increased over time: 62% in 2006 to 79% in 2009 to 83% in 2014 ($p<0.001$). Among young women who have used contraception ($n=42,883$, $N=16,816,701$), the proportion that reported EC use increased from 3% to 11% to 29% ($p<0.001$). Compared to non-users, women who had ever used EC were more likely to be using no method of contraception (44% vs. 35%) or barrier method (22% vs. 17%). Demographic factors including lower wealth, lower education, indigenous status and rural living are significantly associated with less EC knowledge and use. Stratified multivariate analysis found that demographic disadvantages magnify lower EC use among rural residents compared to non-rural residents.

Conclusion: Knowledge and use of EC are growing rapidly in Mexico, but disparities persist in demographically disadvantaged women, particularly those living in rural

areas. Women who use EC appear to be at higher risk of unintended pregnancy based on current contraceptive use.

Introduction

Mexico, like many Latin American countries, has seen a dramatic fall in the total fertility rate (TFR) since the 1970s, from an average of 6.7 to 2.2 children per woman (in 2009) [1]. However, Mexico continues to experience high levels of unintended pregnancy (55%) and adolescent pregnancy; over 50% of sexually active 12-19 year old females reported a pregnancy in 2012 [2,3]. Unintended pregnancy is associated with a number of poorer outcomes for both physical and behavioral health, educational development, as well as social and economic attainment in both the mother and child[4].

Post-coital contraception or emergency contraception (EC) has been shown to reduce incidence of unplanned pregnancy[5]. Specifically, oral EC can be used up to 5 days after unprotected intercourse to reduce the risk of pregnancy. Oral emergency contraception comes in three general forms: (1) The Yuzpe method is a strategy where the user takes an increased dose of an everyday combined oral contraceptive pill. (2) Dedicated EC pills, which only have progestins in them, are also used, and this form of EC has been demonstrated to be more effective and better tolerated. (3) Ulipristal acetate has been introduced and has been shown to be more effective than progestin-based pills[5].

Despite being first described in the 1970's, availability and adoption of EC globally has been inconsistent and gradual[6]. EC was introduced strategically into Mexico in the mid 1990's largely due to the efforts of a collaboration of international reproductive health organizations known collectively as the International Consortium for Emergency Contraception (ICEC). The ICEC implemented multiple

interventions in order to promote EC use in Mexico[7]. First, a dedicated EC product was not available and so the ICEC worked to bring a registered product to Mexico by offering technical assistance to distributors. In the meantime, public efforts at education were limited to the Yuzpe method[8]. Second, the ICEC trained over 16,000 providers on EC through symposia, talks at national meetings and special audiences with the support of national health institutions and associations. The ICEC also partnered with the NGO Mexfam and its affiliate the International Planned Parenthood Federation to rapidly train all of their clinic providers. Third, the ICEC sought to increase knowledge among women through mass education campaigns including mailings, websites and a telephone hotline. Later, after overcoming initial pushback from the government, they were granted permission for radio and TV advertisements. Of note, the initial public education process was completely focused in Mexico City. After three years, with additional funding, the ICEC expanded public education to four other major urban centers: (1) Monterrey, Nuevo Leon; (2) Guadalajara, Jalisco; (3) Jalapa, Veracruz; and (4) Puebla, Puebla. Finally during 2000 to 2004, the ICEC worked with the Mexican Ministry of Health to include EC in the national family planning guidelines[7–10]. This effort was notable for significant national controversy and political resistance[11,12]. The ICEC shared their experience of bringing EC to Mexico over a series of publications in academic journals [7–10].

There are several indicators that EC is now an accepted form of contraception in Mexico. At the policy level, EC was eventually added to the official government family planning guidelines in 2004. These federal guidelines regulate

both public and private sectors and monitor usage and facilitate product availability. Furthermore, at least 13 registered EC products are currently available in Mexico, 12 of which are progestin based and available directly from a pharmacist without prescription and another one, ulipristal acetate is also available in Mexico via prescription. In 2012, sales of EC had increased to 6.8 million doses sold, as compared to less than half a million in 2004[13].

Despite these broadly observed trends, more specific information about population-level awareness and use of EC is lacking. The goal of this study is to provide a detailed analysis of EC knowledge and use in Mexico at the population level. In particular, we tested whether knowledge and use are changing over time, and identified socio-demographic factors associated with knowledge and use of EC. Because EC information was initially disseminated in urban areas, we were particularly interested in comparing rural to non-rural residents. We also hypothesized that a history of using oral contraceptives would be positively associated with EC use due to the similarities in the products.

Chapter 2: Methods and Analysis

Methods

We conducted a retrospective repeated cross-sectional study using three waves (2006, 2009, 2014) of the ENADID (Encuesta Nacional de la Dinámica Demográfica), a publically-available population-based demographic survey used to inform the Mexican government on issues pertinent to population dynamics including fertility, infant mortality, migration, growth, fertility, sexuality, contraception, marriage and pregnancy[14]. ENADID is a 2-stage stratified probability sample from all 31 Mexican states and Mexico City, DF. It is first stratified using basic geostatistical areas, stratified according to geographic density criteria. It is then further stratified by blocks of dwellings from each area. Sample weighting was done to be the inverse of the sampling probability; it makes the sample representative both at the national level and at the subnational levels of urban versus rural areas. It is administered in a standardized interview format— in person through direct household visits at which time participants give informed consent[15,16]. This study was approved by the National Institute of Public Health, Mexico ethics review committee and deemed exempt by the OHSU institutional review board.

We used the household and reproductive health modules of the three most recent waves of the ENADID (2006, 2009 and 2014). The household module includes household characteristics (housing materials and possessions) and socio-demographic information about all household members. The reproductive health module is administered to all women residing in the household between 15-54

years old and includes detailed information about knowledge and use of contraception, fertility history, and obstetric care and outcomes. 2006 is the first year EC use was included in the survey (earlier survey waves, in 1992 and 1997, did not include EC as a response option). We merged the household and individual level reproductive health modules.

Our analytic sample includes non-sterilized women 15-29 years old. We excluded women who reported current use of permanent female or male contraception (n=5,412; Figure 1). We excluded women 30 and older because preliminary analysis revealed the rate of permanent sterilization in this population to be very high (50%; data not shown), and about three quarters of EC use was among women <30. Moreover, given that EC was introduced in Mexico in 1995, it is less likely women over 30 would have had access to EC during their adolescence. The survey contains several filters (Figure 1). Women are first asked about knowledge of at least one contraceptive method (including traditional methods such as withdrawal and rhythm). First women were asked to list all the methods they could think of (spontaneous response). Second, for those methods they did not list, the names were read to the woman individually and she was asked if she had heard of those methods (with help). We classified both spontaneous and “with help” knowledge of EC as positive knowledge responses. We chose this definition because EC is often not considered to be a preventive form of contraception given its post-coital usage and therefore relying only on spontaneous recall might exclude many women who knew of EC, but did not consider it to be contraceptive method.

Next, all women who reported (either spontaneously or with help) that they knew about at least one method were asked if they had ever used contraception (the survey item reads “Have you or your partner ever used any method to prevent pregnancy?”). Women who answered yes were then asked which methods they had ever used at least once from a provided list.

Our primary dependent variables were self-reported knowledge of EC as a contraceptive method and history of having ever used EC, both binary measures. We examined several household and individual-level variables. At the household level, we used standard Mexican government stratifications of population density to categorize the location of a woman’s household to define rural location (<2500 inhabitants)[17]. We classified women as an ethnic minority (indigenous or not) using the preferred classification of the Mexican government (anyone in the household speaks an indigenous language)[18]. We classified household-level socioeconomic status using an asset index based on household materials and possessions. The index is generated by including all normal goods (positively associated with education) and principal components analysis[19]. We collapsed the index into quintiles (1=poorest, 5 =wealthiest).

At the individual level, we included socio-demographics as well as select reproductive health characteristics that are theoretically linked to use and knowledge of emergency contraception. We collapsed age into three groups (15-19, 20-24, 25-29). We used the metric of “education gap” to measure level of schooling. Education gap was calculated by subtracting the number of years of schooling reported from the number of years of schooling a woman would be expected to have

based on her age[20]. This allows a comparison of adolescents who are still in school to women who have finished schooling. We created a binary indicator of whether women had reported employment outside the home in the past week. We measured relationship status as either married or cohabitating, single or divorced. We included a binary indicator equal to one if the woman reported ever having been pregnant. We classified current contraceptive use into 5 categories: (1) long-acting reversible contraception or LARC (IUD, implant), (2) hormonal methods (pills, patch, injectables), (3) barrier methods (male and female condoms, sponges), (4) traditional methods (rhythm, withdrawal), and (5) no method. We created a binary indicator of knowledge of any method as well as our outcome of knowledge of EC. We also hypothesized that because the progestogens in EC are the same or similar to those used in standard oral contraceptive pills (OCPs), that a history of using hormonal pills for contraception could be an important predictor of EC usage and knowledge; therefore, we created a binary indicator for ever use of oral contraceptives.

Analysis

We used tabulations, descriptive statistics and visualizations to examine the proportion of women who had used EC or knew EC by survey year and by age group. We used chi-square tests (for categorical variables) and simple logistic regression (for continuous variables) to test for differences in proportions of EC knowledge and use across survey waves. We also examined contraceptive use by EC knowledge and use, and compared EC knowledge and use by socio-demographic

characteristics.

We then used logistic regression [21] to develop separate models for each of our outcomes (EC knowledge and EC use), controlling for household and individual level socio-economic and reproductive history (ever pregnant and ever use of oral contraceptives) covariates. To do this we used simple logistic regression to calculate unadjusted odds ratios for EC use and EC knowledge with covariates. For those that were significantly associated ($p < 0.1$) we assessed their individual contribution to the full model using backwards stepwise elimination. Our final model included significant variables ($p < 0.05$) as well as variables with a theoretical relevance to analysis in a multivariate logistic regression.

For both models, we explored several interaction terms to test for effect modification. We examined the relationship of EC knowledge and use varied by household socioeconomic quintile, educational gaps, rural habitation and ethnic minority status. Based on significant results, we ran models stratified on rural location to assess if covariate relationships with the outcome were different. Since in this data set we did not have information on sexual activity, and therefore risk of unintended pregnancy, we also stratified by history of pregnancy, under the hypothesis that those women who reported ever having experienced a pregnancy were more likely to be currently sexually active and at risk for another pregnancy.

We conducted several sensitivity analyses. We constructed models where age was considered as a continuous and then as a categorical variable. We also examined educational gap as both a continuous variable and a categorical variable (0 years missed, 1-3 4-6, 7-9, 10+). We also examined several different

categorizations of contraceptive use to see if this would change the findings of our models. Our findings were robust to variable specification.

We accounted for complex sampling design used in this multi-year national survey by using sampling weights, cluster and strata in our descriptive and multivariable analyses. We present population-level estimates of proportions, bivariate relationships, and multivariable associations. For multivariate regression models, reported odds ratios are population-level estimates with corresponding 95% confidence intervals. We considered p values $<.05$ and odds ratios that did not cross 1.0 to be significant associations. We used Stata 13.0 (StataCorp LP, College Station, TX, USA; 2013) for all analyses.

Chapter 3: Results

Our analytic sample includes 99,223 women (Population N = 40,234,355) who were between age 15-29 and not using sterilization for contraception (Figure 1). Approximately, 27%, 33% and 39% of the women in the combined sample of 3 survey waves were between ages of 15-19, 20-24 and 25-29 respectively (Table 1). Over 97% of women in all three survey years knew of at least one contraceptive method, and 62%, 79% 83% knew of EC in the 2006, 2009, and 2014 panels respectively ($p < 0.001$; Table 1). Approximately 40% of women 15-29 reported a pregnancy. Close to 5% resided in indigenous households, 22% lived in rural locations, and 35% were married or cohabitating. Over the study period 2006-14, the educational gap decreased significantly (from 1.0 years to 0.5 years; $p < 0.001$).

Among women who reported ever having used a modern contraceptive method, in each survey wave a greater proportion of the older (25-29) women reported current use of LARC and hormonal methods compared with younger women (Table 2). Overall the number of women currently not using contraception did not change significantly from 2006 to 2014 with 36% overall not using any birth control method ($p = 0.85$). However, fewer women reported current use of traditional methods from 2006 to 2014 (7.6% vs. 3.8% $p < 0.0001$), and a higher proportion were using LARC from 2006 to 2014 (24% vs. 27%, $p < 0.0001$). The number of women who reported using EC increased significantly over the three waves from 3.2% in 2006 to 11% in 2009 to 29% in 2014 ($p < 0.001$; Table 2) even though there was no significant difference in use of hormonal contraceptive pills over this time ($p = 0.03$).

We compared the current contraceptive method of women who had used EC in the past to those who had not. Figure 2 shows the population-level proportions of contraceptive usage in these two groups of women. A greater proportion of women who had used EC were not using any contraceptive method (44% vs. 35%) or using barrier methods (22% vs. 17%) and less likely to be using a LARC (17% vs. 26%) or hormonal birth control (12% vs. 16%) ($p < 0.0001$).

We also examined EC usage and knowledge and its correlation with certain demographic variables (Appendix Figures 1, 2, and 3). In particular we were interested how EC usage changed over time for women living in rural areas (Appendix Figures 4 and 5). Because EC was disseminated in Mexico starting in the urban centers, we expected to see differences in EC knowledge and usage over time when comparing rural to non-rural residents. In fact, EC usage increased for both rural and non-rural residents (Figure 3). For rural residents, there was an increase in usage from 0.3% to 14.3%. For non-rural residents, there was an increase in usage from 1.4% to 32.7%. While changes in knowledge similarly increased at a higher rate for rural residents, these changes were less dramatic particularly because knowledge of EC was already high for non-rural residents in 2006 (70%) (Appendix Figure 4). Overall, rural residents continued to substantially lag behind with usage rates less than half that of non-rural residents in the 2014 survey wave (32.7 vs. 14.3 $p < 0.0001$).

In multivariable analysis, we identified several correlates for EC use and knowledge (Table 3). Consistent with our hypothesis, a history of using birth control pills was highly associated with a history of using EC (OR 2.7, CI 2.5-2.9).

Similarly, increases in wealth were correlated with EC, especially with the knowledge outcome (Table 3, Appendix Figure 6). Other covariate relationships remained unchanged from bivariate analyses, including lower odds of knowledge and use among women who were indigenous, living rurally, married or cohabitating, and who had larger educational gaps.

Our stratified multivariate analyses of rural vs. non-rural residents and women with and without a history of pregnancy suggest that socio-economic status (wealth quintile) and demographic factors have stronger relationships with the use of EC among rural residents (Appendix Tables 7 and 9). In the subsample of women who reported a pregnancy, current use of a barrier method had a stronger relationship with use of EC than among women who had never been pregnant (OR 1.3, 95% CI 1.1-1.5 vs. 0.81, 95% CI 0.7-0.94) (Appendix Table 8).

Chapter 4: Discussion

More than a decade after it was added to the national family planning guidelines, both EC knowledge and use are growing among women who have ever used contraception in Mexico. In 2006, knowledge was already high, with 62% of 15-29 year olds aware of EC as a contraceptive option. This is in sharp contrast to 1997 when prior to the public promotion campaigns, only 18% of patients at medical clinics in Mexico City knew of EC[10]. From 2006 to 2009, knowledge rapidly increased from 62% to 79%, followed by a more gradual increase to 83% in 2014. During this same period, usage demonstrated a markedly different growth trajectory. Among women who have previously used contraception, EC use increased dramatically from 3% in 2006, to 10% in 2009, and then to 29% in 2014.

The difference between knowledge and usage could be explained by several factors. It is possible that continued cultural and social reservations about EC use explains the difference. Surveys from the original consortium studies showed that while education level was positively associated with higher knowledge, it was also associated with an increased concern about EC and decreased support of EC availability [9]. This may be because many women are concerned that EC is an abortifacient [10,12,22], potentially affecting provider prescribing and patient choice. However, this “hesitancy” is not limited to Mexico. In the US, it has been well documented that patients are unsure of the mechanism of action and providers are concerned about prescribing EC to due to inexperience, moral or religious concerns, or concerns of adverse side effects[23,24]. Inadequate access to EC may represent another reason for our findings. Unfortunately, this survey did not

contain items that allow us to know if women had difficulty acquiring a contraceptive for any reason. However, previous studies showed that women had mixed feelings over whether or not EC was affordable[22]. A third possibility is that EC usage reflects a general trend towards greater contraceptive usage and increasing cultural motivations to prevent unintended childbirth in young women. During the 1980s, the Mexican government established community-based contraceptive distribution programs in order to reduce population growth rates. Subsequently, Mexico experienced a doubling of the contraceptive prevalence rate from 30% in 1976 to 60% in 2005, and more recently 73% in 2015[25,26]. Similarly the adolescent fertility rate (births per 1000 women, ages 15-19) decreased from 82 in 1995 to 73 in 2005 to 63 in 2015[27]. Finally, the induced abortion rate in Mexico has also increased 33% from 1990 to 2006, suggesting that there is an increased desire to prevent an unwanted childbirth beyond contraceptive usage alone [28].

Our study is consistent with what would be expected from a strategic introduction of EC that focused on urban areas. The ICEC began its efforts in Mexico City, and then later expanded to four other urban centers[13]. Training and service deliver programs utilized city-based NGO collaborators as well as urban-located professional training schools[7]. Many of the social marketing campaign products used electronic mediums and were directed towards students and younger populations. Our data demonstrates that rural knowledge and usage of EC continues to significantly lag behind that of non-rural areas. However, increases in knowledge and usage over the past decade have also been proportionally greater

among rural residents. We also found an amplification of educational and socioeconomic effects among rural residents. These results suggest that while the relative gap is shrinking, rural EC knowledge and usage are more sensitive to demographic disadvantage.

In this study we provide some of the first population-level data regarding the contraceptive practices of women who know of and use EC. Previous studies relied on small samples and were limited to specific subsets of the population. A study of over 10,000 Mexican adolescents in 2004 found the EC use was positively correlated with condom use[29]. Our data support these findings. However, in our study EC users were also less likely to be current users of WHO Tier I and II (LARC, hormonal) methods and more likely to be using no contraception. This suggests that EC serves as a “back-up” for women who prefer not to use Tier I or II methods. One instance where this may prove to be particularly valuable is at first episode of sexual intercourse; in the 2014 ENADID, 48% of Mexican women answered that they used no contraception method at first sex with only 2% using EC (Appendix Figure 10). First intercourse is often an unplanned event[30,31] and EC potentially can prevent the outcome of unintended pregnancy until actions can be taken to use other forms of contraception..

Also of note, was the high correlation between history of oral contraceptive pill usage and emergency contraceptive usage. We know that initial efforts were focused on Yuzpe method due to delay in availability of a dedicated product[8]. One limitation of this study is that we are not able to clarify exactly what kind of emergency contraception was being used. Perhaps, the high correlation between

these two similar products suggests that women who are open to hormonal contraception are those who are most likely to try EC. However, there are other explanations of this association including the fact that users of short acting methods are more likely to experience gaps in contraceptive coverage compared to long-acting users [32,33]. Of note, this is not the first association with these two products in Mexican women. A subgroup analysis of OC users in female factory workers also demonstrated that oral contraceptive users were more likely to recall EC information following a 5-month educational intervention[34].

This study should be interpreted with the following limitations in mind. First, knowledge and use of methods were self-reported and are subject to recall bias. Second, while our data can illustrate temporal trends at the population level, the data do not necessarily represent behaviors at the individual level. Thus, we are unable to connect contraceptive usage past or present with continuation of contraception, future contraceptive choices and prevention of unintended pregnancies. There is some concern that while use of EC may lower the risk of pregnancy for a particular episode of unprotected intercourse, EC may not lower the overall likelihood of unintended pregnancy because it does not predict future usage of effective contraception[35–37]. Third, we have almost no data regarding the circumstances of use. We do not know if EC was used multiple times or only once, and we do not know if it was used correctly. Moreover we do not know when and how EC was obtained and if the woman experienced difficulty in the process. All of these limitations could impact the “usefulness” of EC to women. Fourth, the background of contraceptive trends in Mexican women is dynamic. Like the rest of

the world, LARC usage is increasing and this means there maybe differences between women who were at risk for pregnancy in 2006 and those in 2014. One important advantage of this study is that it utilizes all existing national data regarding EC use. This is the only information that reflects population-level EC trends for all Mexican women.

Mexico was selected by the ICEC to study the dissemination of a new contraceptive product in a country with high needs for family planning. We have demonstrated that the Mexican experience is still evolving, and that two decades after its introduction there is room to grow in terms of providing all women with the knowledge and ability to use EC. Further research is needed to understand if EC is affecting unintended pregnancy rates in the Mexican population. Understanding Mexico's trajectory will continue to help us anticipate and strategize the expansion of this important, unique form of contraception in other parts of the world.

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Figures and Tables

Figure 1. Assembly of the Analytic Sample from ENADID Surveys of Mexican Women in 2006, 2009, and 2014

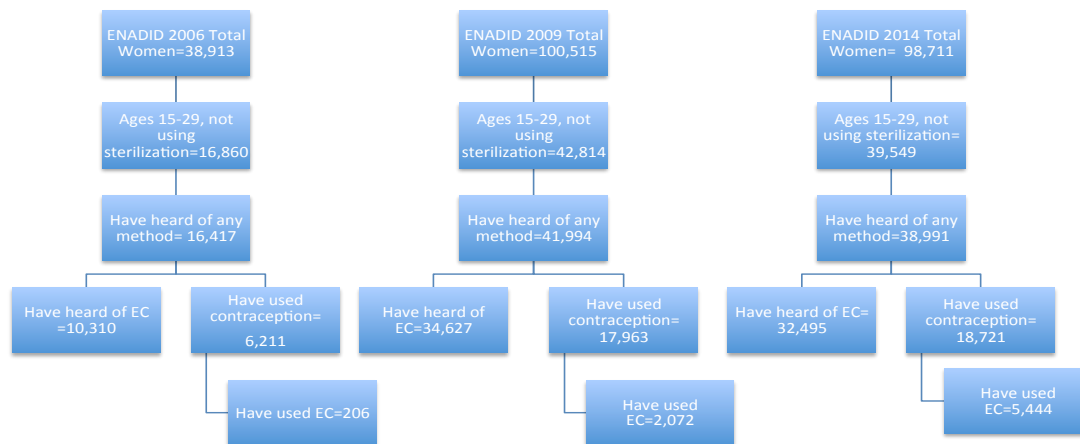


Table 1. Demographic Characteristics of Mexican Women 15-29 Years Old Not Using Sterilization for Contraception by ENADID Survey Year 2006, 2009, and 2014*

ENADID Wave Year	Sample Total	2006	2009	2014	P-values
Sample n	99,223	16,860	42,814	39,549	
Population N	40,234,355	12,839,358	13,371,286	14,023,711	
Individual Characteristics					
Ever Pregnant	0.41	0.40	0.39	0.42	< 0.0001
Ethnic Minority	0.05	0.06	0.05	0.05	0.58
Married or Cohabiting	0.35	0.34	0.35	0.37	0.0001
working	0.32	0.30	0.33	0.34	< 0.0001
Urban-Rural Classification by # of Inhabitants: >=100,000					
15,000-99,999	0.49	0.50	0.50	0.48	0.24
2,500-14,999	0.15	0.14	0.15	0.15	0.52
<2,500 (Rural)	0.14	0.14	0.14	0.15	0.53
	0.22	0.22	0.21	0.22	0.55
Mean Educational Gap in Years	0.75	1.04	0.76	0.47	< 0.0001
Socioeconomic Quintile (1=poorest)					
	0.20	0.19	0.21	0.18	0.0085
2	0.20	0.19	0.20	0.20	0.36
3	0.19	0.21	0.19	0.19	0.0001
4	0.20	0.18	0.19	0.21	0.0014
5	0.22	0.22	0.21	0.22	0.20
Know Any Contraceptive method	0.98	0.97	0.98	0.99	< 0.0001
Knows Emergency Contraception	0.75	0.62	0.79	0.83	< 0.0001

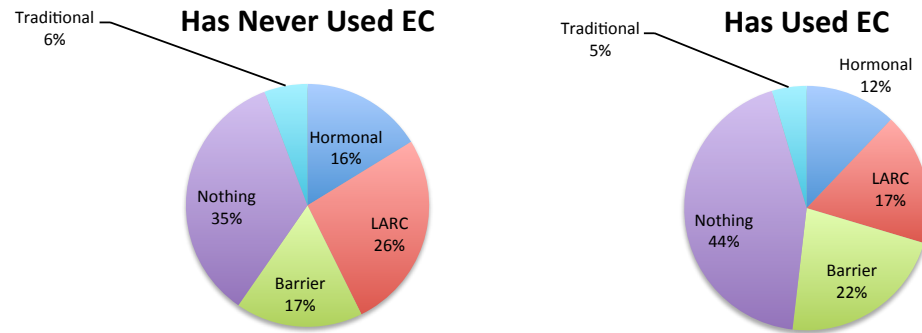
Table 2. Characteristics of Contraceptive Usage in Mexican Women 15-29 Year Old Who Have Ever Used Any Form of Contraception by ENADID Survey Year 2006, 2009, and 2014*

Enadid Wave	Total	2006				2009				2014				P-value
		15-19	20-24	25-29	15-29	15-19	20-24	25-29	15-29	15-19	20-24	25-29	15-29	
Sample n	42,883	891	2,478	2,842	6,211	2,960	7,482	7,509	17,951	3,292	7,746	7,683	18,721	
Population N	16,816,701	623,329	1,836,410	2,151,730	4,611,469	889,298	2,294,625	2,411,172	5,595,095	1,141,458	2,737,740	2,730,939	6,610,137	
Have Used Emergency Contraception	0.16	0.08	0.03	0.02	0.03	0.19	0.11	0.07	0.11	0.31	0.32	0.25	0.29	< 0.0001
Has Used Birth Control Pills in the Past	0.27	0.22	0.28	0.27	0.26	0.23	0.27	0.31	0.28	0.20	0.25	0.30	0.26	0.0328
Current Contraceptive Usage**														
Currently using a Hormonal Method	0.16	0.12	0.19	0.17	0.17	0.14	0.18	0.19	0.18	0.10	0.12	0.15	0.13	< 0.0001
Currently using LARC	0.25	0.19	0.25	0.25	0.24	0.19	0.24	0.24	0.23	0.23	0.28	0.29	0.27	< 0.0001
Currently using Barrier Methods	0.18	0.18	0.14	0.14	0.15	0.22	0.20	0.16	0.18	0.23	0.20	0.17	0.19	< 0.0001
Currently not using Contraception	0.36	0.46	0.36	0.35	0.37	0.40	0.33	0.34	0.35	0.42	0.36	0.35	0.37	0.0432
Currently using a Traditional Method (Rhythm, Withdrawal)	0.06	0.05	0.07	0.09	0.08	0.05	0.05	0.07	0.06	0.02	0.03	0.05	0.04	< 0.0001

*And who are not using Sterilization for Contraception

** Hormonal Contraception is defined by pills, patches, rings and injectables. LARC includes subdermal implants and Intrauterine devices. Barrier includes male and female condoms and diaphragms. Traditional includes rhythm method and withdrawal.

Figure 2. Pooled Population Proportions of Current Contraceptive Method In Mexican Women Ages 15 to 29 Years Who Have and Have Not Used Emergency Contraception, ENADID Surveys 2006, 2009, and 2014*



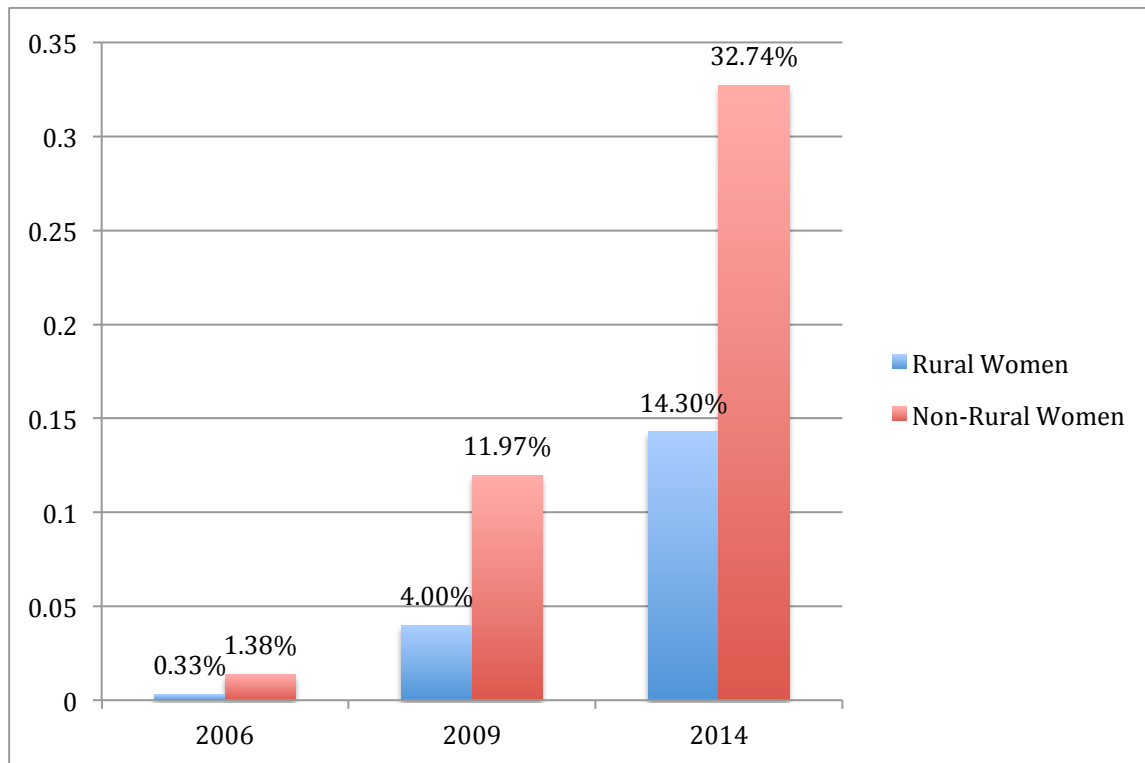
*

Total analytic sample n=42,883. Total Mexico Female

Population Ages 15-29 N=16,816,701

P value = <0.0001

Figure 3. Population Proportions of Rural and Non-Rural Women in Mexico who have ever used contraception ages 15-29 and who report having ever used EC in ENADID surveys 2006, 2009, and 2014 *



* Sample excludes Women who are using Sterilization for Contraception. Total analytic sample n=42,883. Total Country Population N=16,816,701. Rural is defined by <2,500 inhabitants.

p-value <0.0001 (rural vs. non-rural women) for all survey years.

Table 3. Odds ratios of Use* and Knowledge** of EC among Mexican women ages 15-29***

	Use of EC			Knowledge of EC		
	Odds Ratio	* Confidence	Interval]	Odds Ratio	* Confidence	Interval]
Ever been Pregnant	0.93	0.83	1.04	0.57	0.48	0.67
Enadid (ref: 2006)						
2009	3.32	2.65	4.18	3.06	2.69	3.48
2014	12.04	9.70	14.99	3.85	3.43	4.31
Age	0.93	0.92	0.94	1.02	1.00	1.03
Ethnic Minority	0.66	0.51	0.88	0.39	0.31	0.47
Married or Cohabitating	0.52	0.47	0.57	0.57	0.49	0.65
Educational Gap	0.80	0.68	0.91	0.75	0.73	0.78
Lives Rurally	0.59	0.55	0.72	0.53	0.47	0.59
Has Tried Birth Control Pills	2.67	2.45	2.91	1.43	1.28	1.58
Work	1.11	1.02	1.21	1.30	1.17	1.46
Economic Quintile(ref: 1=poorest)						
2	1.43	1.18	1.63	1.50	1.32	1.70
3	1.63	1.34	1.88	2.23	1.93	2.57
4	1.79	1.47	2.06	2.60	2.21	3.05
5	1.84	1.51	2.15	5.14	4.12	6.42
Current Contraceptive Method Reference: Nothing						
Hormonal	0.61	0.54	0.70	0.81	0.71	0.93
LARC	0.74	0.65	0.83	0.97	0.86	1.09
Barrier	0.99	0.89	1.11	1.34	1.15	1.57
Traditional	1.31	1.07	1.59	1.05	0.84	1.32

*Use model excludes women who have never used contraception or if they are using sterilization for contraception. Total analytic n=42,883. Total Population

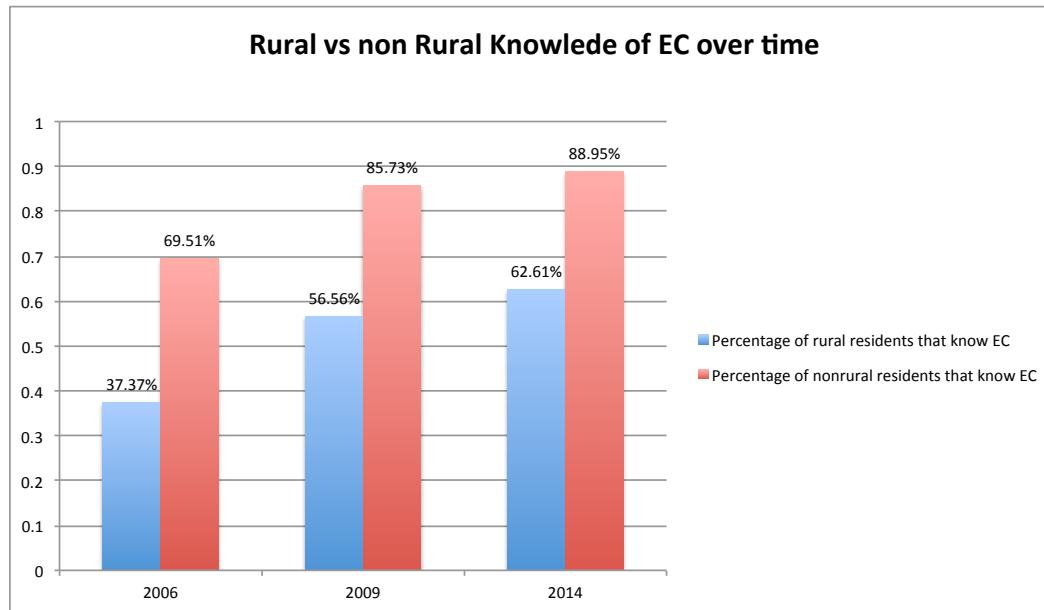
N=16,816,701

**Knowledge excludes women who are not using sterilization for contraception. Total analytic n=99,223. Total Population N=40,234,355

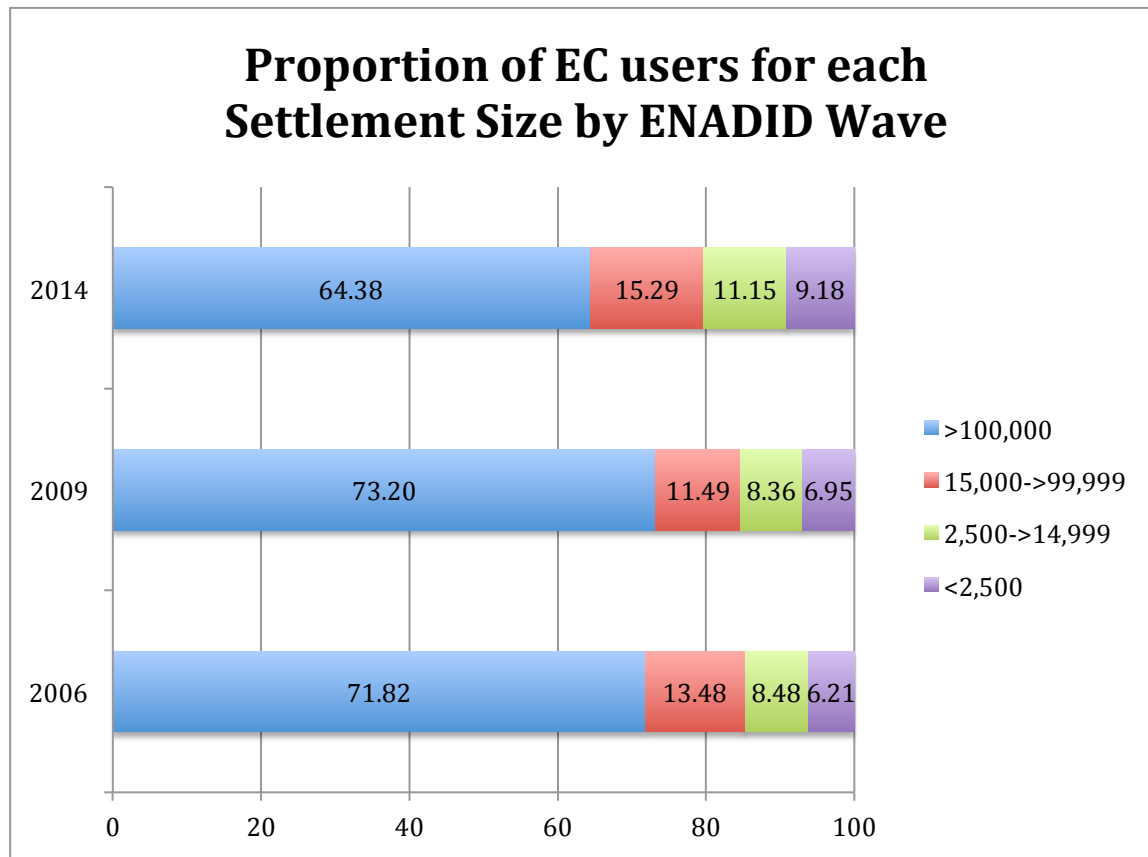
***Odds Ratio using Population Level Estimates

Appendix Figures and Tables

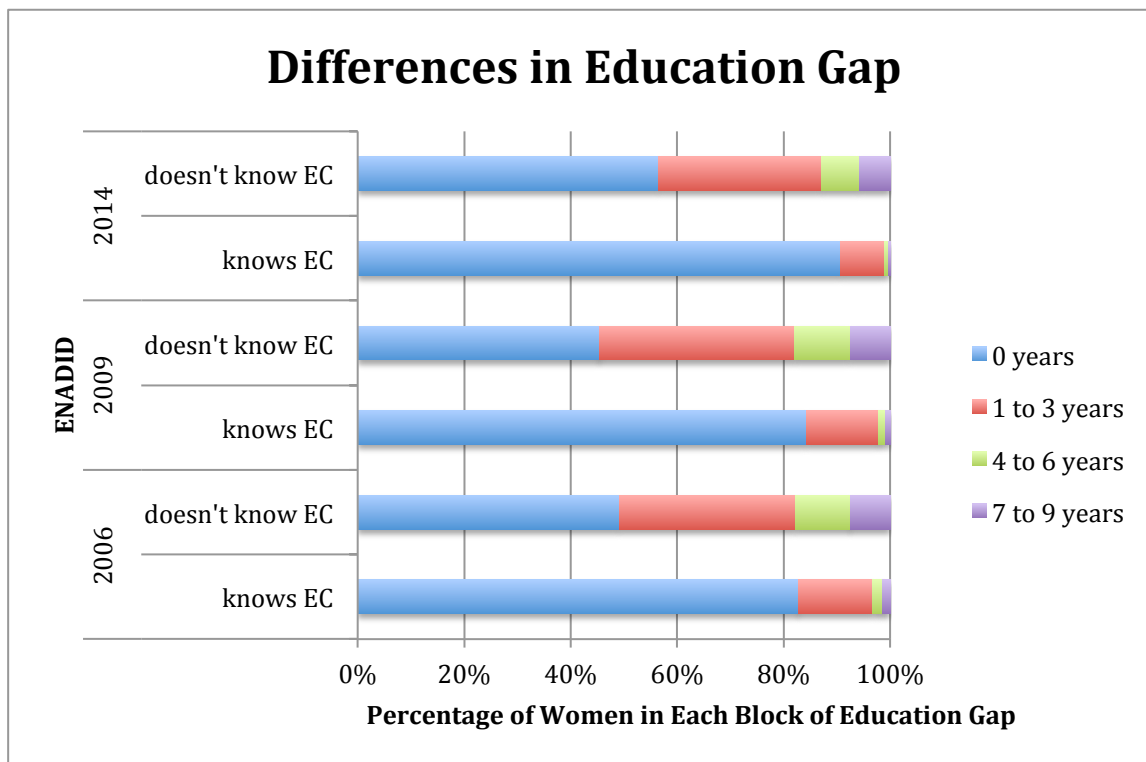
1. Proportions of Rural and Non-Rural Women who report knowledge of EC¹



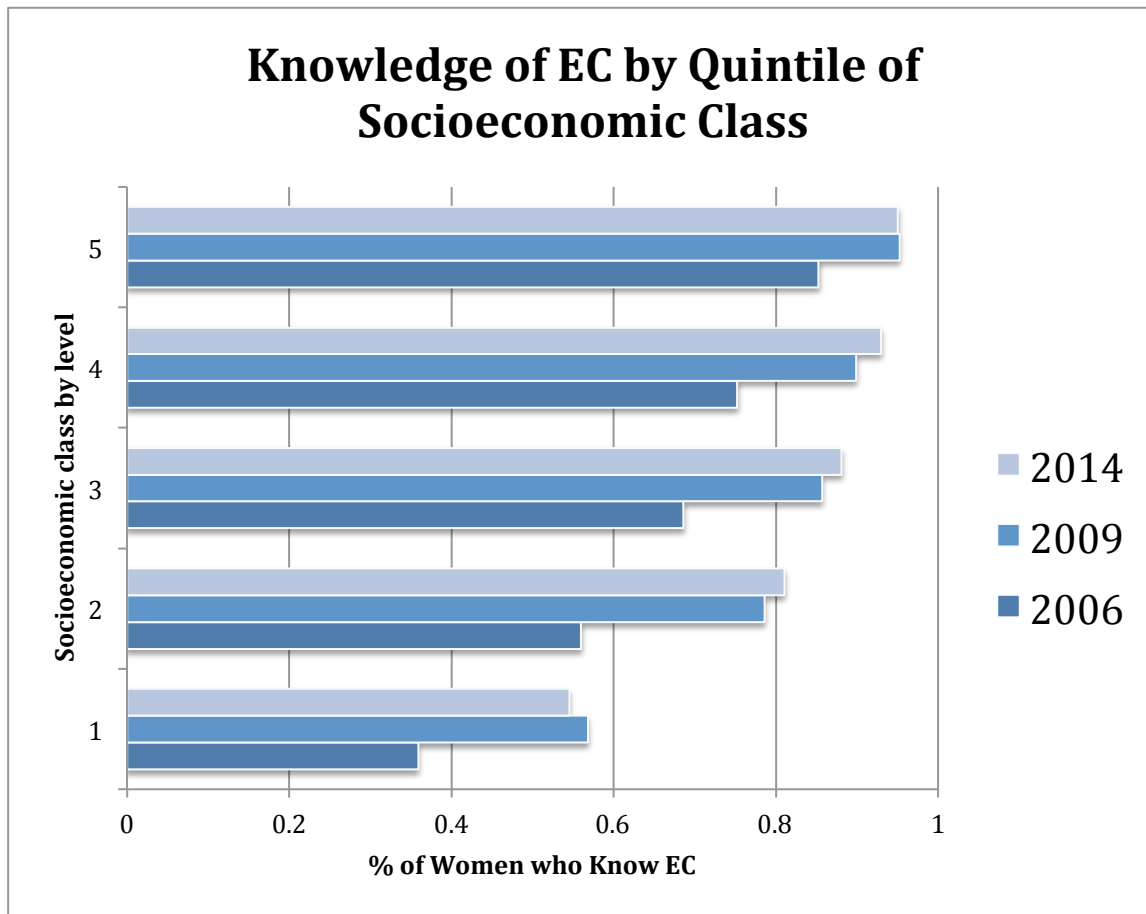
2. Proportions of EC users for each Settlement Size Category by Survey Wave Year²



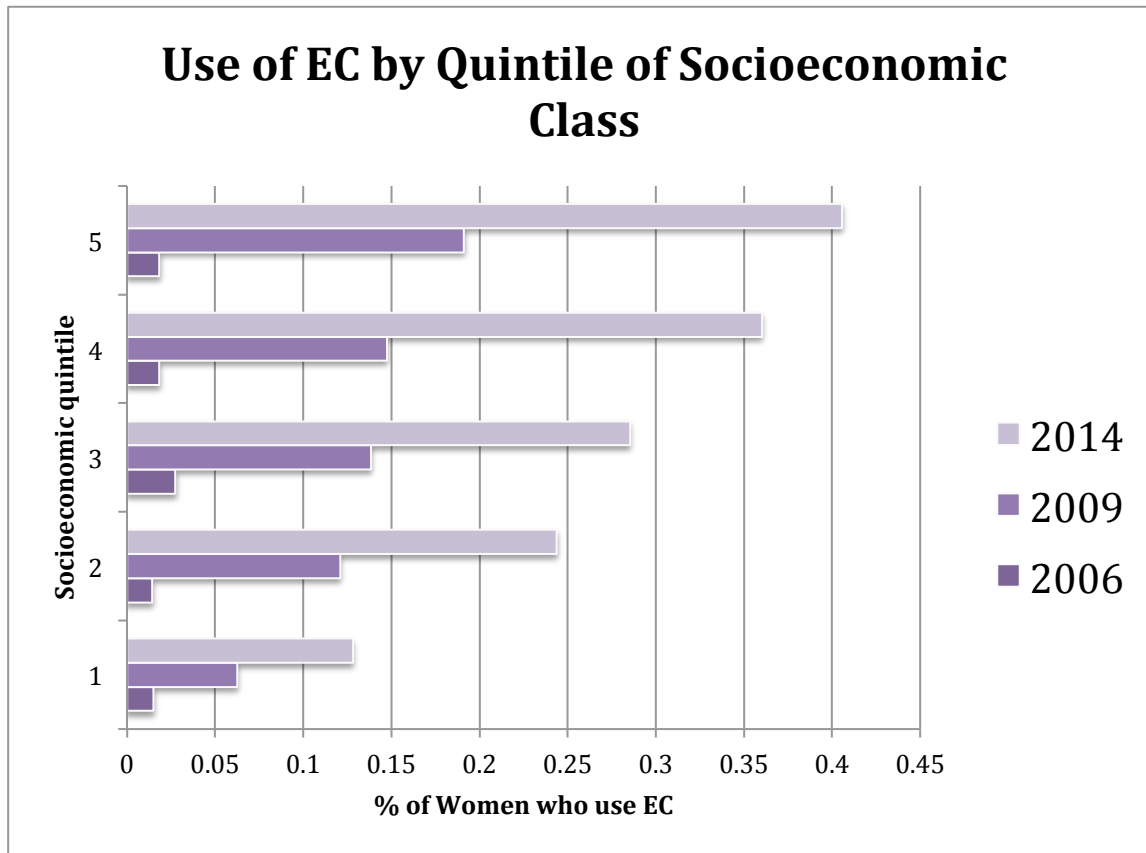
3. Proportions of the educational gap in women who know and don't know EC by Survey Year¹



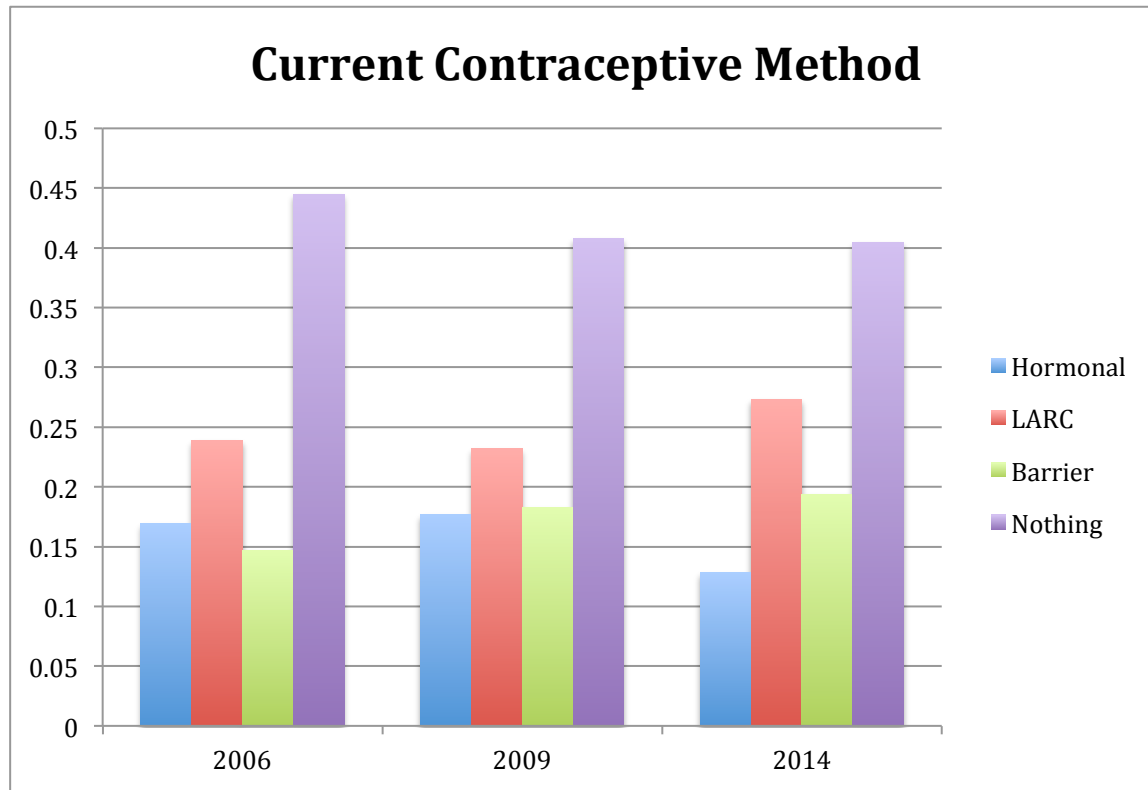
4. Proportions of the Women who report knowledge of EC by Socioeconomic Quintile and Survey Year¹



5. Proportions of Women who have used EC by Socioeconomic Quintile and Survey Year²



6. Proportion of the Current Contraceptive Method by Survey Wave Year²



7. Odds ratios of Use² and Knowledge¹ of EC stratified by Rural and Non Rural Habitation²

rural						not rural					
ECUSE	Odds Ratio	P>t	[95% Conf. Interval]			ECUSE	Odds Ratio	P>t	[95% Conf. Interval]		
Ever been Pr	0.94	0.72	0.68	1.30	Ever been Pr	0.92	0.16	0.82	1.03		
Enadid (ref: 2006)					Enadid (ref: 2006)						
2009	2.86	0.00	1.45	5.62	2009	3.35	0.00	2.64	4.26		
2014	10.44	0.00	5.61	19.43	2014	12.15	0.00	9.66	15.27		
Age	0.92	0.00	0.89	0.94	Age	0.94	0.00	0.92	0.95		
Ethnic Minor	0.77	0.29	0.47	1.26	Ethnic Minor	0.65	0.01	0.46	0.92		
Married or C	0.35	0.00	0.27	0.46	Married or C	0.54	0.00	0.49	0.60		
Educational (	0.68	0.00	0.59	0.78	Educational (	0.83	0.00	0.78	0.88
Has Tried Bir	3.15	0.00	2.48	4.01	Has Tried Bir	2.61	0.00	2.38	2.86		
Economic Quintile(ref: 1=poorest)					Economic Quintile(ref: 1=poorest)						
2	1.31	0.07	0.98	1.76	2	1.39	0.00	1.15	1.69		
3	1.70	0.01	1.15	2.53	3	1.56	0.00	1.30	1.88		
4	1.82	0.00	1.24	2.67	4	1.73	0.00	1.44	2.09		
5	3.26	0.00	2.02	5.27	5	1.79	0.00	1.47	2.16		
Current Contraceptive Method Reference: Nothing					Current Contraceptive Method Reference: Nothing						
Hormonal	0.54	0.00	0.38	0.78	Hormonal	0.63	0.00	0.55	0.72		
LARC	0.67	0.02	0.48	0.92	LARC	0.75	0.00	0.66	0.85		
Barrier	1.14	0.48	0.80	1.62	Barrier	0.99	0.85	0.88	1.11		
Traditional	0.83	0.54	0.46	1.50	Traditional	1.36	0.00	1.11	1.68		
Work	1.40	0.01	1.09	1.81	Work	1.08	0.10	0.99	1.18		
_cons	0.19	0.00	0.07	0.53	_cons	0.15	0.00	0.10	0.22		
Rural						Not rural					
ECKNOWLED	Odds Ratio	P>t	[95% Conf. Interval]			ECKNOWLED	Odds Ratio	P>t	[95% Conf. Interval]		
Ever been Pr	0.53	0.00	0.40	0.71	Ever been Pr	0.59	0.00	0.49	0.71		
Enadid (ref: 2006)					Enadid (ref: 2006)						
2009	2.39	0.00	1.89	3.01	2009	3.28	0.00	2.82	3.81		
2014	2.75	0.00	2.22	3.41	2014	4.40	0.00	3.85	5.03		
Age	1.02	0.09	1.00	1.04	Age	1.02	0.07	1.00	1.03		
Ethnic Minor	0.41	0.00	0.32	0.53	Ethnic Minor	0.36	0.00	0.26	0.50		
Married or C	0.73	0.01	0.58	0.92	Married or C	0.52	0.00	0.44	0.62		
Educational (	0.79	0.00	0.75	0.82	Educational (	0.74	0.00	0.71	0.77
Has Tried Bir	1.28	0.00	1.09	1.50	Has Tried Bir	1.47	0.00	1.29	1.68		
Work	1.33	0.00	1.10	1.61	Work	1.30	0.00	1.14	1.48		
Economic Quintile(ref: 1=poorest)					Economic Quintile(ref: 1=poorest)						
2	1.69	0.00	1.42	2.00	2	1.42	0.00	1.18	1.70		
3	1.98	0.00	1.55	2.52	3	2.25	0.00	1.88	2.69		
4	2.52	0.00	1.91	3.33	4	2.53	0.00	2.08	3.09		
5	5.74	0.00	2.92	11.27	5	4.94	0.00	3.85	6.33		
Current Contraceptive Method Reference: Nothing					Current Contraceptive Method Reference: Nothing						
Hormonal	0.69	0.00	0.57	0.84	Hormonal	0.88	0.15	0.74	1.05		
LARC	0.96	0.64	0.80	1.14	LARC	0.98	0.76	0.84	1.13		
Barrier	1.48	0.00	1.17	1.89	Barrier	1.30	0.01	1.08	1.56		
Traditional	0.85	0.42	0.58	1.26	Traditional	1.14	0.35	0.87	1.51		

8. Odds ratios of Use² and Knowledge¹ of EC stratified by ever having a pregnancy

Ever pregnant					Never pregnant				
ECUSE	Odds Ratio	P>t	[95% Conf. Interval]		ECUSE	Odds Ratio	P>t	[95% Conf. Interval]	
Enadid (ref: 2006)					Enadid (ref: 2006)				
2009	3.73	0.00	2.81	4.94	2009	2.72	0.00	1.96	3.79
2014	15.85	0.00	12.17	20.65	2014	8.04	0.00	5.84	11.06
Age	0.93	0.00	0.92	0.94	Age	0.95	0.00	0.93	0.96
Ethnic Minor	0.63	0.01	0.45	0.89	Ethnic Minor	0.75	0.23	0.47	1.20
Married or C	0.52	0.00	0.46	0.59	Married or C	0.48	0.00	0.40	0.57
Educational (	0.80	0.00	0.76	0.86	Educational (	0.84	0.01	0.74	0.95
rural	0.56	0.00	0.49	0.65	rural	0.70	0.00	0.55	0.88
Has Tried Bir	3.00	0.00	2.68	3.35	Has Tried Bir	2.13	0.00	1.84	2.46
Economic Quintile(ref: 1=poorest)					Economic Quintile(ref: 1=poorest)				
2	1.44	0.00	1.21	1.72	2	1.18	0.37	0.82	1.70
3	1.82	0.00	1.52	2.18	3	1.02	0.89	0.72	1.47
4	1.94	0.00	1.62	2.33	4	1.18	0.35	0.83	1.68
5	2.44	0.00	2.01	2.97	5	1.06	0.74	0.75	1.51
Current Contraceptive Method Reference: Nothing					Current Contraceptive Method Reference: Nothing				
Hormonal	0.68	0.00	0.58	0.80	Hormonal	0.58	0.00	0.47	0.72
LARC	0.75	0.00	0.66	0.85	LARC	1.45	0.10	0.94	2.24
Barrier	1.28	0.00	1.09	1.51	Barrier	0.81	0.01	0.70	0.94
Traditional	1.38	0.02	1.07	1.79	Traditional	1.24	0.18	0.91	1.68
Work	1.21	0.00	1.08	1.35	Work	0.96	0.52	0.84	1.09
Ever Pregnant					Never pregnant				
Knowledge of	Odds Ratio	P>t	[95% Conf. Interval]		Knowledge o	Odds Ratio	P>t	[95% Conf. Interval]	
Enadid (ref: 2006)					Enadid (ref: 2006)				
2009	2.90	0.00	2.53	3.33	2009	4.61	0.00	3.32	6.40
2014	3.75	0.00	3.33	4.23	2014	4.59	0.00	3.32	6.34
Age	1.01	0.10	1.00	1.03	Age	1.05	0.02	1.01	1.09
Ethnic Minor	0.39	0.00	0.32	0.49	Ethnic Minor	0.31	0.00	0.18	0.53
Married or C	0.63	0.00	0.55	0.74	Married or C	0.36	0.00	0.27	0.47
Educational (	0.76	0.00	0.74	0.78	Educational (	0.66	0.00	0.59	0.73
Work	1.38	0.00	1.22	1.55	Work	0.99	0.92	0.74	1.32
rural	0.53	0.00	0.47	0.60	rural	0.53	0.00	0.38	0.74
Has Tried Bir	1.39	0.00	1.24	1.55	Has Tried Bir	1.79	0.00	1.32	2.44
Economic Quintile(ref: 1=poorest)					Economic Quintile(ref: 1=poorest)				
2	1.49	0.00	1.30	1.70	2	1.48	0.09	0.94	2.33
3	2.26	0.00	1.95	2.62	3	1.85	0.01	1.16	2.95
4	2.57	0.00	2.17	3.05	4	2.31	0.00	1.44	3.71
5	5.04	0.00	3.93	6.48	5	4.30	0.00	2.53	7.32
Current Contraceptive Method Reference: Nothing					Current Contraceptive Method Reference: Nothing				
Hormonal	0.80	0.00	0.69	0.92	Hormonal	1.04	0.87	0.67	1.59
LARC	0.98	0.76	0.87	1.11	LARC	0.66	0.24	0.33	1.31
Barrier	1.44	0.00	1.21	1.71	Barrier	1.02	0.88	0.75	1.40
Traditional	1.09	0.47	0.86	1.40	Traditional	0.84	0.56	0.47	1.50

9. Odds ratios of Knowledge¹ of EC stratified by amount of educational gap.

Knowledge by Educational Gap	none				1-3 years				4-6 years				7-9 years				
	Odds Ratio	P>t	[95% Conf. Interval]		Odds Ratio	P>t	[95% Conf. Interval]		Odds Ratio	P>t	[95% Conf. Interval]		Odds Ratio	P>t	[95% Conf. Interval]		
Ever been Pregnant	0.57	0.00	0.47	0.70	0.70	0.03	0.50	0.97	1.06	0.90	0.43	2.62	0.90	0.84	0.33	2.48	
Enadid (ref: 2006)																	
	2009	3.20	0.00	2.74	3.72	2.95	0.00	2.34	3.73	1.76	0.02	1.10	2.82	2.00	1.00	1.03	3.87
	2014	4.36	0.00	3.78	5.03	3.38	0.00	2.77	4.13	1.86	0.01	1.19	2.91	1.97	0.05	1.01	3.82
Age		1.01	0.54	0.99	1.02	1.00	0.76	0.98	1.03	1.00	0.97	0.95	1.05	1.12	0.00	1.04	1.20
Ethnic Minority		0.37	0.00	0.29	0.48	0.39	0.00	0.27	0.58	0.34	0.00	0.19	0.59	0.37	0.01	0.17	0.80
Married or Cohabitating		0.58	0.00	0.49	0.68	0.56	0.00	0.43	0.72	0.58	0.06	0.33	1.03	0.55	0.12	0.26	1.17
rural		0.49	0.00	0.42	0.56	0.54	0.00	0.45	0.66	0.82	0.33	0.55	1.22	0.62	0.10	0.35	1.10
Has Tried Birth Control Pills		1.46	0.00	1.28	1.67	1.35	0.00	1.11	1.64	1.41	0.09	0.94	2.10	1.09	0.77	0.59	2.02
Work		1.32	0.00	1.15	1.52	1.22	0.05	1.00	1.50	1.33	0.23	0.83	2.14	1.19	0.60	0.62	2.28
Economic Quintile(ref: 1=poorest)																	
	2	1.84	0.00	1.56	2.17	1.11	0.34	0.89	1.39	1.04	0.88	0.67	1.61	2.35	0.01	1.19	4.61
	3	2.55	0.00	2.14	3.05	1.76	0.00	1.36	2.26	2.03	0.01	1.18	3.47	2.01	0.14	0.80	5.05
	4	2.91	0.00	2.39	3.55	1.98	0.00	1.45	2.70	2.14	0.06	0.96	4.77	1.91	0.29	0.57	6.36
	5	5.83	0.00	4.53	7.49	2.60	0.00	1.56	4.33	7.78	0.00	1.89	32.02	2.28	0.29	0.49	10.51
Current Contraceptive Method Reference: Nothing																	
Hormonal		0.79	0.01	0.66	0.93	0.85	0.20	0.65	1.09	0.89	0.65	0.55	1.45	0.72	0.37	0.34	1.50
LARC		0.93	0.36	0.80	1.08	0.97	0.76	0.79	1.19	1.44	0.15	0.88	2.34	0.82	0.56	0.43	1.58
Barrier		1.21	0.04	1.01	1.46	1.48	0.01	1.13	1.93	1.94	0.06	0.97	3.88	1.69	0.22	0.74	3.87
Traditional		0.97	0.85	0.74	1.29	1.10	0.65	0.74	1.63	1.38	0.42	0.63	3.02	1.69	0.44	0.45	6.32

10. Proportion of the contraceptive method used at first lifetime intercourse from the 2014 survey wave²

