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Bruno Jimènez
Universidad de Piura

Sìlvio Rendon
IZA Fellow

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IZA – Institute of Labor Economics

Schaumburg-Lippe-Straße 5–9
53113 Bonn, Germany

Phone: +49-228-3894-0
Email: publications@iza.org

www.iza.org

ABSTRACT

Sterilization Policy with Incomplete Information in Peru: Does History Repeat Itself?*

We contrast the socio-demographic profiles and degree of information received by women that were sterilized with women that used other contraceptive methods. We use data from the 2016 round of the Demographic and Health Survey (DHS) for Peru and compare these profiles with those of the 2000s, which contain the effects of the massive non-voluntary sterilizations executed in Peru in the late 1990s. From 2000 to 2016 there is a reduction from 17% to 10% in the use of sterilization as a contraceptive method. There is also an important socio-demographic change in the incidence of sterilization, from women who are indigenous, from the highlands, and without electricity toward women who are non-indigenous, literate, coastal and who have electricity at home. There is not only no improvement in the information received by users of contraceptive methods with respect to the 1990s, but there is even a worsening: the percentage of sterilized women that received complete information dropped from 35% in 2000 to 34% in 2016. Moreover, the information provided for sterilizations continues to be poorer than for other, non-terminal, methods. We also estimate that providing incomplete information about the sterilization procedure increases the probability of sterilization in 7 percent points.

JEL Classification: J13, I15, J16

Keywords: health policy, fertility, sterilization, family planning, development

Corresponding author:
Sìlvio Rendon
E-mail: rensilvio@gmail.com

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1 Introduction

Most previous research on female sterilizations in Peru revolve around studying the National Program of Reproductive Health and Family Planning conducted between 1996 and 2000, with particular attention to non-voluntary sterilizations[1] and how they are human rights violations.[2] Less attention has been given to exploring how the incidence of sterilizations on women and their socio-demographic patterns have changed since the 1990s and to whether the information standards have improved for them.

We find that between the years 2000 and 2016 the percentage of female sterilizations as part of total contraceptive methods has declined from 17% to 10%. Socio-demographic profiles of the sterilized women also changed. In the 2000 round of the DHS, sterilizations are relatively more used by indigenous and illiterate women, that do not have access to electricity, and residents of the Peruvian highlands or the jungle region. By contrast, in the 2016 round, the incidence is higher on non-indigenous, literate women, with electricity and from the Peruvian coast. There also are clear improvements in the information given about alternative methods, in particular to historically marginalized groups. However, altogether there is not only no improvement, but on the contrary, there is a slight decrease in the percentage of women that were properly informed about the sterilization procedure: from 35% in 2000 to 34% in 2016. We consider that information is complete when a woman has been informed about the impossibility of future childbearing, alternative contraceptive methods, potential side effects and how to deal with them.

The historical trend in Peru between 1980 and 2000 reflects a major increase in the use of modern contraceptive methods: from 10% in 1980 the percentage of modern contraceptives over the total rose to 50% in 2000, as we can see in Figure 1. Traditional methods oscillate above 20% in these years. Due to this rise in the use of modern contraceptive methods the share of women in a relationship that do not use

[1] See for example Tamayo (1999), Zauzich (2000), Boesten (2007), Getgen (2009), Ballón (2014), Vásquez del Aguila (2006) or Jadhav and Vala-Haynes (2018).

[2] Sterilization procedures in which patients receive incomplete information, financial incentives are provided, or in which the patient is intimidated are considered non-voluntary (Open Society Foundation 2011, Hardee, Harris, Rodriguez, Kumar, Bakamjian, Newman and Brown 2014). In particular, when an individual receives incomplete information her right to freedom and personal liberty is violated (Mantilla Falcón 2016), hence procedures performed under these conditions are deemed human rights violations (Jadhav and Vala-Haynes 2018). Peruvian justice adopts these criteria and labels as forced sterilization every sterilization conducted without the patient's free and informed consent, as it happened in the 1990s (MINJUS 2017).

any contraceptive method dropped in this couple of decades from 70% to 30%, that is 40 percentage points, which mirrors the increase in usage of modern contraceptives.

[Figure 1 here.]

However, since 2000, this trend reversed and there is a stagnation in the use of modern contraceptives. In half a decade the use of modern contraceptive methods remained right above 50%, just 55% in 2016; and it even declines in the first years of the 2000s. Accordingly, the use of traditional contraceptives stops diminishing, with some increase in the first years of the 2000s. The results is that the reduction in the percentage of women that do not use any method slows down to only a 5% decrease in half a decade. Undoubtedly, the massive inadequately informed sterilizations of the second half of the 1990s were detrimental to the increase in the use of modern contraceptives.[3] This slowdown in the expansion of modern contraceptives went hand in hand with the Peruvian government of the early 2000s looking for allies in the most conservative political groups with the intention of increasing its precarious popularity level (Ewig 2006).

[Figure 2 here]

In the 2000s the composition of modern contraceptives also exhibits a change in trend. In Figure 2 we can see how sterilizations reached a peak in 2000 and then decline, while still remaining among the top three most used contraceptive methods. There is also a decline in the use of contraceptive injections and a mayor reduction in the use of IUD (intrauterine device). In the same period, two methods experienced a steady increase: the male condom and the birth control pill. In other words, the adoption of contraceptive methods shifted towards modern methods such as injections, condoms, and pills and away from more intrusive methods such as sterilizations and IUDs.

This recomposition may be a result of the change in the contraceptive policies made by both the Peruvian and the American governments (Chávez and Coe 2007, Blanchfield 2018) after the massive sterilizations of the 1990s (Tamayo 1999). The opposition to family planning by conservative political groups and the widespread

[3]There are recorded cases of distrust to the medical professionals generated by non voluntary massive sterilizations (European Roma Rights Centre 2010).

mistrust resulted in a decline not only of female sterilizations, but also of most modern contraceptives altogether. Nonetheless, some agencies such as USAID have started to openly advocate for "widely offering sterilization services" in Peru, for which they suggest "rebuilding public confidence in sterilization services."(HPP-USAID 2016)[4]

In this article we present evidence from the DHS that shows that in spite of the relative improvements in information to historically vulnerable segments of women, since the 1990s there are no substantial improvements in the information provided to sterilized women. These conditions are evidently not conductive to restoring the public's trust in sterilizations. The Peruvian experience has made it clear that sterilization procedures performed without free and informed consent by users constitute forced sterilizations (MINJUS 2017), so much that the Peruvian's Public Prosecutor reopened, in April 2018, the criminal accusation against the responsible for the National Health Program 1996-2000 (Fiscalía de la Nación 2018). Two decades after that program policy-makers in Peru should pay more attention to the persistence of sterilizations performed without adequate information and the deterioration of information standards given to users of modern contraceptives

The rest of the present article is organized as follows. The next section describes the data; Section 3 provides details on the changes in the socio-demographic profiles of sterilized women with respect to other methods. Section 4 compares the information standards received by the former two groups. Section 5 evaluates the determinants of sterilizations over other contraceptive method, and Section 6 concludes.

2 Data

Data come from the 2016 round of the Demographic and Health Surveys (DHS) or *Encuesta Demográfica y de Salud Familiar*, in Spanish (ENDES). This survey was conducted as a part of a program by the United States Agency for International Development (USAID) and is implemented in several countries by Macro International Inc. (INEI 2001).

These data contain information about the socio-demographic profiles of the users

[4] "The current contraceptive mix reflects a shift away from long-lasting methods that began as a reaction to the widespread allegations of forced sterilization of women in the late 1990s. Although it is unlikely that the government will begin to offer massive sterilization services soon, some observers note an increase in the use of long-lasting reversible contraception, especially implants".

"to better meet the needs of couples who want to limit childbearing, all FP providers must work to rebuild public confidence in sterilization services" (HPP-USAID 2016).

of contraceptive methods (age, ethnicity, education, number of children, place of residence, and household features) and about contraceptive methods such as type, year of adoption, provider, information received for its adoption: the terminal nature of the procedure (i.e. impossibility of future childbearing), side effects and how to deal with them, and about alternative methods. In addition, the survey asks whether the patient was using her preferred method during its adoption.

Our sample includes women that use any contraceptive method, excluding lactational amenorrhea, rhythm, Billings ovulation method, and withdrawal. Moreover, the sample is restricted to women who adopted a contraceptive method during 2010 or after, which results in a final sample of 13,751 women. For the details regarding how the data was constructed for the 1995-2000 sample see Rendon (2018).

3 Socio-demographics of contraceptive methods

In this section we examine the evolution in the adoption of sterilizations by socio-demographic attributes of women.

[Table 1 here]

In Table 1 we can see that female sterilization is the fourth most used method in Peru with a percentage of 10%, after injections, condoms, and the pill. This represents a major drop from the 17% reported in the late 1990s by the 2000 round of the DHS. Yet, in year 2010 the adoption of female sterilization was as high as 32%, as in the late 1990s.

[Table 2 here]

In Table 2 we show the percentage of women by socio-demographic attribute and female sterilization compared to other methods. Between 1995 and 1997 the percentage of indigenous women was larger for users of sterilizations than for users of other methods. However, between 2010 and 2016 there is a smaller percentage of indigenous women among sterilized women. In addition, we also find a sizable drop in the share of illiterate women among sterilized women, from 21% to 4%, an increase in the average age, from 36 to 37 years, an increase in the average number of children, from 2.6 to 3.3, a major increase in the share of women with access to electricity, from

68% to 97%, a decrease in the percentage of government-provided sterilizations, from 91% to 81%, and a decrease in the share of sterilized women living in rural areas, from 33% to 12%. These patterns are a common phenomenon among other Latin American countries (Jadhav and Vala-Haynes 2018).

[Table 3 here]

In Table 3 we show the share of sterilized women by socio-demographic trait during each of the following periods: 1995-1997, 1998-2000, 2010-2013 and 2014-2016. The first two periods come from the 2000s round of the DHS, and the rest from the 2016 round. As we can see, in both rounds the fraction of sterilized women is larger four years prior to the survey. Besides the drop in the relative incidence of sterilizations as a contraceptive method, we observe a change in the socio-demographic profiles of sterilized women. In the 1990s sterilizations were more frequent for women that were indigenous, illiterate, residing in rural areas that did not have electricity. By contrast, in the 2010s sterilizations were more frequent for women that were non-indigenous, literate, urban and that had electricity. In the 1990s the region with the highest incidence of sterilizations was the jungle region, while the region with the lowest was Lima (Metropolitan Area). In the 2010s the highest incidence of sterilizations happened in the coast region, while the lowest happened in the highlands. There is also a clear decrease of sterilizations in the jungle and in the highland regions.

In terms of age groups, we see that in the past sterilizations were adopted in larger percentages by women between 35 and 39 years old, while in the recent decade these percentages are larger for those aged between 40-44. However, we see no major changes in the incidence of sterilizations for women without children: on the one hand, 19% during 1995-1997 and 3% between 1998 and 2000 and, on the other, 17% in 2010-2013 and 5% between 2014 and 2016. In addition, we see that the share of sterilized women was increasing in the number of children during the 1990s. By contrast, in the 2010s sterilizations were more frequent among women with only two children. Sterilizations were performed mainly by the government, mainly in hospitals and health centers belonging to the Ministry of Health's network, but between 2010 and 2013 this changed, and ESSALUD-related centers took the lead. Within the private sector, we see an increase in the incidence of sterilizations in private hospitals.

4 Has information about sterilizations improved?

After nearly two decades of the "*Programa Nacional de Salud 1996-2000*" it is sensible to inquire on the improvement of informational standards for contraceptive methods in general, and for sterilizations in particular. In Table 4 we compare these standards for two time frames, 1995-1997 and 2010-2016.

[Table 4 here]

Overall, we find a decrease in the quality of information offered to women, more so to non-sterilized women. Recalling that the composition of other methods is different in both periods, complete information regarding side effects was provided to 68% of the users in the mid 1990s and to 63% in the early 2010s. The percentage of women that was adequately informed of the existence of alternative methods also dropped from 91% to 85%. In aggregate terms, the percentage of women informed of both, side effects, and the existence of alternative methods declined from 65% to 58%. This is definitely a sizable drop. Meanwhile, the deterioration in the quality of information is also seen among sterilized women, as the share that was adequately informed about potential side effects decreased from 44% to 42%. However, there is also an improvement, as the share of sterilized women informed about alternative methods increased from 66% to 77%. Altogether there is a slight increase in the percentage of sterilized women that was informed of both alternative methods and side effects, from 36% to 40%.

We also see that relatively more women were informed about the terminal nature of sterilizations, 92% in the 1990s and 96% in the 2010s. Nonetheless, under the definition of complete information as being told about side effects, existence of other methods and the terminal nature of the procedure, there is a reduction in complete information from 35% in the 1990s to 34% in the 2010s. In other words, we do not see a substantial increase in the percentage of women that received complete information. On the other hand, while the increase of the percentage of sterilized women that were informed about the existence of other methods is remarkable, it still underperforms when compared with the information given to users of other methods.

[Table 5 here]

Table 5 cross tabulates the socio-demographic traits of contraceptive users by the level of information provided by method. We observe that indigenous women used to receive worse information than non-indigenous, but in the 2010s there is an important improvement in the information given to indigenous women, from 34% to 54%. This newer figure is closer to the information given to indigenous women that use other methods, and just two percent points below the average of users of other methods. Another important improvement in information standards was experienced by illiterate women, as the share of properly informed women rose from 39% to 45%. This pattern is also seen for younger women, between 20 years old, but the opposite holds for childless women as the aforementioned percentage dropped from 55% to 45%.

Information also improves for sterilized women that reside in areas with electricity, from 35% to 40%, but it decreases from 40% to 35% for those without electricity. Information to sterilized women mainly increases in rural areas from 41% to 45%, while in urban areas it increases from 34% a 39%. Moreover, important improvements are observed in the highland region, from 35% to 48% and on the coast region (excluding Lima), from 31% to 37%. However, there are decreases in Lima (Metropolitan Area), from 42% to 38%, and in the high jungle region, from 53% to 43%. For users of other methods, the worsening of informational standards is the norm in all regions. In terms of providers, we see improvements in the information supplied by both non-government health institutions, from 32% to 46%; and by government institutions, from 37% to 38%. In particular, ESSALUD-affiliated hospitals improved from 27% to 40% and ESSALUD-affiliated medical centers, from 22% to 58%. In general, more information is provided where sterilizations are more common.

[Table 6 here]

Table 6 exhibits the shares of women that do not use their desired contraceptive method, by method and information level. The percentage of sterilized women that report not using their desired method notoriously increases when less information is given to them. This inverse relationship holds for both time periods. However, this percentage decreases from 5% in the mid-1990s to 3% in the early 2010s. There is also a reduction in reporting the sterilization as undesired when not informed about the impossibility of future childbearing, from 22% to 16%. We also find an important change in the reasons for undergoing the sterilization procedure. In particular, the

share of women that listed their partner's desire as the main reason for the sterilization dropped from 20% to 9%. Finally, the inverse relationship between adopting sterilization recommended by a physician and reporting using a non-desired method is persistent over time.

5 Estimated effects of incomplete information

In this section, we turn our attention to quantifying the effects of socio-demographic traits on the probability of sterilization, as well as estimating the effect of not receiving complete information.

[Table 7 here]

We estimate a Probit model to evaluate how much does receiving incomplete information affects the probability of sterilization. Receiving incomplete information increases the probability of getting sterilized by 8 percent points. This impact is lower than the 10 percentage points estimated for the 1990s (Rendon 2018), yet it is strongly statistically significant. We also find that when the government provides the contraceptive method the probability of being sterilized increases by 3 percent points, which is slightly lower than the 4.5 percent in the late 1990s (Rendon 2018). As expected, the marginal effects from being indigenous, literate or rural have changed dramatically since the 1990s, more specifically, their magnitude has increased showing that women that share any of these traits are less likely to be sterilized than their counterparts. Furthermore, the effect of having access to electricity is statistically indistinct from zero, at least for the first two specifications. Following that pattern, it appears that the number of children no longer contributes to the probability of being sterilized, neither as a variable by itself nor when interacted with other socio-demographic traits.

In sum, although some socio-demographic patterns have changed over time, we find that the provision of incomplete information continues to be an important determinant of the adoption of sterilizations as a contraceptive method.

6 Conclusion

We have found that in a context of stagnation of modern contraceptive adoption, the use of female sterilizations is still relatively high, the fourth most used modern

method. The socio-demographic profiles of sterilized females have changed: unlike those performed in the 1990s, sterilizations today are more common among non-indigenous, literate, urban and women with access to electricity. These changes were accompanied by changes in the amount of information received by women of different socio-demographic segments. In general, more information is provided to groups in which sterilizations are more frequent. In the 2010s more information was provided to women who were indigenous, illiterate, rural and from the highlands. We also have found an increase in the percentage of women that were informed about the existence of alternative methods: from 66% in 2000 to 77% in 2016.

However, we have also found that the information standards have not changed substantially since the massive non-voluntary sterilizations of the *Programa Nacional de Salud 1996-2000*. While there has been an increase in the quality of information about the existence of other methods, the share of women that did not receive complete information is similar in the 2010s as in the late 1990s. Moreover, less information was provided to users of non-terminal methods.

Given the minimal improvements of informational standards, it is unlikely that sterilizations as a contraceptive method will regain public trust, as some institutions advocate for (HPP-USAID 2016). It is clear that public policies to increase the use of contraceptive methods need to guarantee the proper provision of information about the consequences of adopting these methods and the availability of alternatives. In that perspective, the design and implementation of family planning policies in Peru has to pay closer attention to the fact that in twenty years there has been no progress in guaranteeing that the adoption contraceptive methods, in particular sterilizations, is adequately informed.

Finally, we have shown that it is possible to determine whether a woman was sterilized non-voluntarily, based on the information that she received prior to adopting the procedure, as complete information is a necessary condition for a free and informed decision. This identification could be useful for future research that tries to measure the effect of non-voluntary sterilizations on education, health or female labor supply (Gribble et al. 2007, Byker and Gutierrez 2012, 2016, Battaglia and Pallarés 2018).

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Table 1. Contraceptive method by year of adoption. In percent

Method	Year of method adoption							Total	1995-
	2010	2011	2012	2013	2014	2015	2016		2000
Female sterilization	31.72	20.57	16.17	12.50	10.68	6.37	2.99	9.64	16.88
Male sterilization	1.23	1.54	0.01	0.05	0.22	0.17	0.21	0.33	0.89
Pill	7.20	14.41	15.22	14.82	12.10	16.63	19.31	15.89	14.87
IUD	9.55	7.17	4.35	5.13	3.87	3.08	1.91	3.78	16.24
Injection	26.16	25.65	27.67	34.42	37.51	39.34	39.27	35.94	34.59
Condom	23.03	29.57	34.70	29.07	29.97	28.51	29.57	29.42	13.00
Others	1.11	1.09	1.87	4.00	5.65	5.90	6.75	5.01	3.53

Table 2. Demographic attributes of women users of contraceptive methods, by method and time frame: 1995-1997 and 2010-2016

Demographic attributes	1995-1997		2010-2016	
	Sterilization	Other	Sterilization	Other
Indigenous (%)	6.37	5.71	2.29	4.39
Illiterate (%)	21.37	11.41	3.70	4.91
Age when interviewed	36.29	32.64	37.06	30.33
Number of children	2.64	1.79	3.34	1.91
Has access to electricity (%)	68.03	78.53	97.15	93.95
Rural (%)	33.15	24.70	12.13	20.96
Government-provided method (%)	91.32	76.30	81.30	46.82

Table 3. Percentage of sterilized women by demographic attribute and time frame: 1995-1997, 1998-2000, 2010-2013 and 2014-2016

Demographic attributes	1995-1997	1998-2000	2010-2013	2014-2016
Aggregate percentage	37.50	7.88	18.34	5.83
Non-indigenous	37.33	7.73	18.65	5.97
Indigenous	40.10	9.66	11.01	2.84
Literate	34.75	7.65	18.81	5.85
Illiterate	52.92	9.60	10.72	5.52
Age when interviewed				
20-24	3.73	1.03	0.37	0.72
25-29	19.77	4.29	3.48	3.08
30-34	37.97	10.85	14.67	8.64
35-39	48.64	18.35	26.65	13.07
40-44	54.34	16.63	32.03	13.02
45-49	36.40	12.88	29.20	2.89
Number of children				
0	19.26	3.26	17.35	4.71
1	32.58	8.21	18.20	7.77
2	44.49	8.87	28.77	6.27
3	45.47	14.79	13.45	12.18
4 or more	53.20	12.88	21.81	13.39
No access to electricity	47.20	7.44	9.04	3.24
Access to electricity	34.20	8.05	18.83	6.00
Urban	34.76	7.86	20.06	6.38
Rural	44.60	7.93	10.99	3.74
Lima (Metropolitan Area)	29.03	6.49	19.46	5.95
Rest of the Coast	43.32	8.77	23.65	8.09
Highlands	37.84	8.91	11.85	3.74
High jungle	45.05	7.58	16.34	4.77
Low jungle	43.22	7.00		
Government provided	41.80	8.66	29.98	9.54
MINSA hospital	67.53	24.93	57.36	24.97
MINSA health centre	36.61	4.73	0.85	0.29
ESSALUD hospital	57.01	22.73	64.36	40.81
ESSALUD post	28.13	4.47	18.86	1.49
Campaign/ fair	63.17	2.47		
Military/ police hospital			66.75	49.73
Non-government provision	18.03	4.61	6.79	2.31
Private clinic	51.56	22.88	64.03	21.73
Private doctor's office	5.24	0.54		
Church			61.42	36.09
NGO: Clinic/ post	10.47	8.60		
Other	38.43	22.31	0.52	1.40

Table 4. Percentage of women who were informed about their method of choice* by time frame

	1995-1997		2010-2016	
Was informed about	Sterilization	Other	Sterilization	Other
(1) Side effects	44.32	68.46	42.36	62.92
(2) Existence of other methods	66.04	91.11	77.12	85.29
(1) and (2)	36.27	64.79	39.63	58.33
(3) Impossibility of future childbearing	92.20		96.22	
Complete information (1),(2) and (3)	35.12		33.90	

* The variables related to information existed only for users of female sterilization, pill, IUD, injections and implants (Norplant and vaginal).

Table 5. Percentage of women who received information about side effects and about the existence of other methods; by attribute, method and time frame: 1995-1997 and 2010-2016

Demographic attributes	1995-1997		2010-2016	
	Sterilization	Other	Sterilization	Other
Non-indigenous	36.69	65.21	39.37	58.46
Indigenous	34.41	67.12	54.34	55.90
Literate	35.80	66.76	39.46	58.53
Illiterate	39.30	54.53	44.65	55.19
Age when interviewed				
15-19		59.77		54.43
20-24	30.94	58.68	41.58	56.51
25-29	32.73	67.33	37.86	61.18
30-34	42.08	65.29	45.60	56.88
35-39	32.30	67.07	37.91	59.33
40-44	38.82	66.90	38.46	57.68
45-49	26.19	59.12	30.13	65.27
Number of children				
0	55.05	71.55	44.72	60.03
1	32.24	63.23	32.64	55.14
2	35.90	66.09	34.48	58.16
3	35.45	54.36	43.54	59.26
4 or more	35.17	65.95	41.03	58.12
No access to electricity	40.07	65.30	35.42	53.33
Access to electricity	34.89	65.32	39.76	58.70
Urban	34.40	65.18	38.78	58.53
Rural	40.89	65.69	45.39	57.74
Lima (Metropolitan Area)	41.67	63.38	37.85	54.37
Rest of the coast	30.53	62.08	37.05	57.69
Highlands	34.76	68.21	47.93	60.39
High jungle	52.91	66.79	42.75	63.29
Low jungle	40.20	75.32		
Government provided	36.99	63.56	38.28	61.45
MINSA hospital	38.19	62.45	37.25	63.53
MINSA health centre	43.13	64.66	33.87	63.37
ESSALUD hospital	26.45	71.26	39.58	59.02
ESSALUD post	21.80	66.18	57.86	61.70
Campaign/ fair	28.14	94.32		
Military/ police hospital			30.74	66.44
Non government provision	31.98	74.33	45.56	50.09
Private clinic	34.89	74.38	45.24	66.18
Church			0.00	49.01
NGO: Clinic/ post		86.11		
Other			67.98	60.96

Table 6. Percentage of women that use an undesired method
by information, method and time frame: 1995-1997 and 2010-2016

Percentage using an undesired method and Reason for using the current method	1995-1997				2010-2016			
	Other me thod	Sterilized			Other me thod	Sterilized		
		All	Incom-plete info	No info no more children		All	Incom-plete info	No info no more children
Percentage	2.89	5.39	6.96	21.93	3.57	3.20	4.70	16.26
Reason								
Physician's recommendation	73.26	62.29	58.59	25.14	71.77	65.82	60.80	27.00
Other methods not available	13.12	1.00	0.63	0.00	18.43	0.00	0.00	0.00
Method wanted by partner	4.87	13.52	14.48	20.29	0.84	4.11	4.72	9.07
Free food/ health care	0.00	5.36	5.99	0.00				
Program benefits	1.64	0.00	0.00	0.00	0.65	0.00	0.00	0.00
Other	6.67	16.97	20.31	52.22	8.31	30.07	34.48	63.93

Table 7. Determinants of the probability of sterilization.
Probit estimation of the average marginal effects in percent points.

Model:	(1)		(2)		(3)		(4)	
Variable	Est.	S.E.	Est.	S.E.	Est.	S.E.	Est.	S.E.
Indigenous	-4.29**	1.35	-4.62**	1.70	-3.07*	1.41	-2.83	1.79
Literate	-4.51***	1.11	-5.50***	1.41	-5.46***	1.13	-6.86***	1.43
Access to electricity	1.89	1.19	2.54	1.50	5.88***	1.12	7.46***	1.41
Rural	-6.36***	0.66	-7.66***	0.84	-7.17***	0.73	-8.61***	0.94
Age	1.08***	0.03	1.45***	0.05	0.73***	0.04	1.01***	0.05
2010-2013	5.99***	0.50	8.54***	0.65	6.37***	0.48	8.88***	0.62
3 children	-0.09	1.46	-0.33	1.89	-2.63	1.38	-3.36	1.78
4 or more children	1.29	1.63	0.93	2.08	-0.36	1.54	-1.07	1.97
Government provided	13.60***	0.58	4.97***	0.86	11.50***	0.57	3.00***	0.84
Indigenous and max. 2 children					-3.57	3.56	-5.15	4.43
Literate and max. 2 children					1.72	3.06	2.58	3.90
Electricity and max. 2 children					-11.00***	0.55	-13.70***	0.71
Rural and max. 2 children					1.28	1.31	1.70	1.68
Incomplete information			7.68***	0.62			7.25***	0.60
Nobs	13,487		9,987		13,487		9,987	
LR	2078.09		1843.28		2495.33		2229.22	
Pseudo R2	0.22		0.22		0.27		0.27	

* p<0.05, ** p<0.01 & *** p<0.001

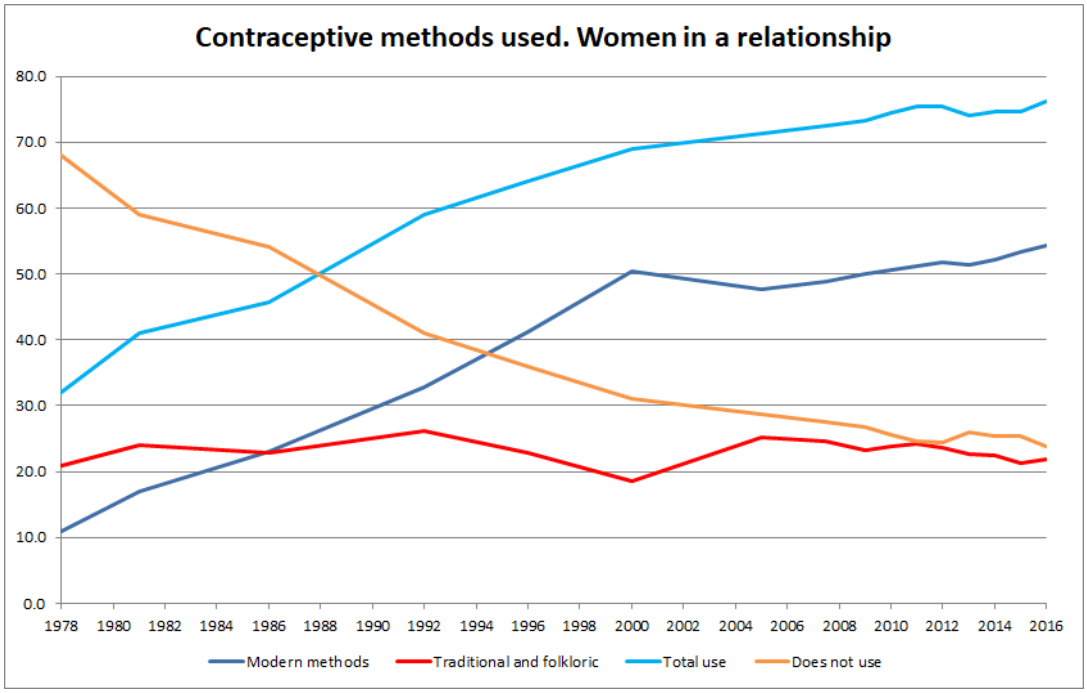

Figure 1: Methods used by women in relationships

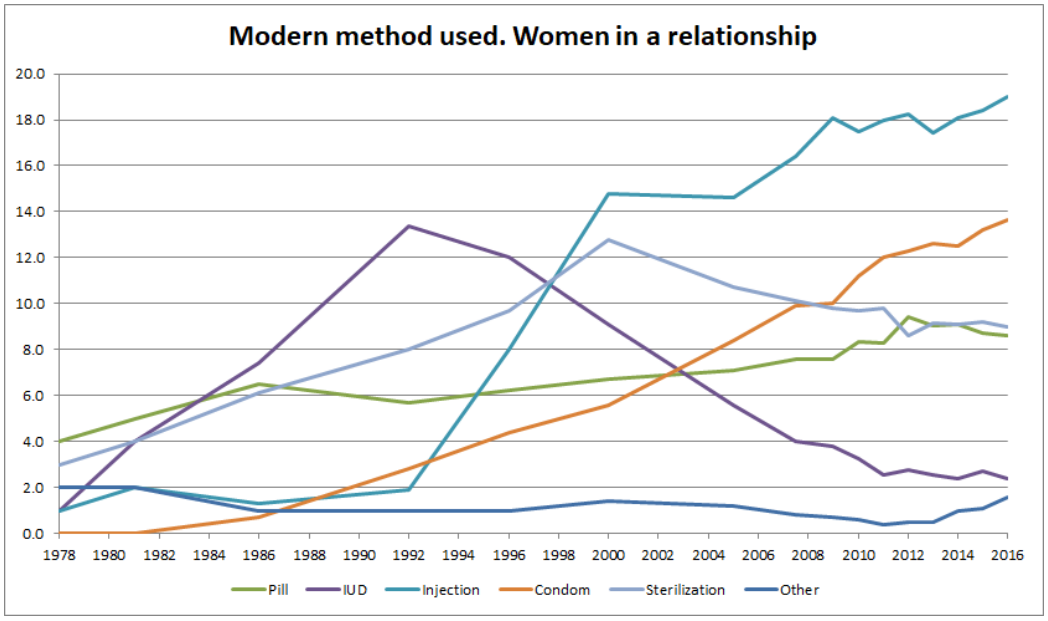

Figure 2: Modern methods used by women in relationships