

# Factors influencing physicians' advice about female sterilization in USA: a national survey

R.E. Lawrence<sup>1,2,\*</sup>, K.A. Rasinski<sup>3</sup>, J.D. Yoon<sup>4,5</sup>, and F.A. Curlin<sup>3,5</sup>

<sup>1</sup>Pritzker School of Medicine, University of Chicago, 924 E 57th St, Suite 104, Chicago, IL 60637-5415, USA <sup>2</sup>Department of Psychiatry, Columbia University Medical Center, 1051 Riverside Drive, New York, NY 10032, USA <sup>3</sup>Section of General Internal Medicine, University of Chicago Medical Center, 5841 S. Maryland Ave., Chicago, IL 60637, USA <sup>4</sup>Section of Hospital Medicine, University of Chicago Medical Center, 5841 S. Maryland Ave., Chicago, IL 60637, USA <sup>5</sup>The MacLean Center for Clinical Medical Ethics, University of Chicago Medical Center, 5841 S. Maryland Ave., Chicago, IL 60637, USA

\*Correspondence address. E-mail: rlawrence@uchicago.edu

Submitted on July 20, 2010; resubmitted on September 8, 2010; accepted on September 14, 2010

**BACKGROUND:** Tubal ligation can be a controversial method of birth control, depending on the patient's circumstances and the physician's beliefs.

**METHODS:** In a national survey of 1800 US obstetrician-gynecologist (Ob/Gyn) physicians, we examined how patients' and physicians' characteristics influence Ob/Gyns' advice about, and provision of, tubal ligation. Physicians were presented with a vignette in which a patient requests tubal ligation. The patient's age, gravida/parity and her husband's agreement/disagreement were varied in a factorial experiment. Criterion variables were whether physicians would discourage tubal ligation, and whether physicians would provide the surgery.

**RESULTS:** The response rate was 66% (1154/1760). Most Ob/Gyns (98%) would help the patient to obtain tubal ligation, although 9–70% would attempt to dissuade her, depending on her characteristics. Forty-five percent of physicians would discourage a G2P1 (gravida/parity) woman, while 29% would discourage a G4P3 woman. Most physicians (59%) would discourage a 26-year-old whose husband disagreed, while 32% would discourage a 26-year-old whose husband agreed. For a 36-year-old patient, 47% would discourage her if her husband disagreed, while only 10% would discourage her if her husband agreed. Physicians' sex had no significant effect on advice about tubal ligation.

**CONCLUSIONS:** Regarding patients who seek surgical sterilization, physicians' advice varies based on patient age, parity and spousal agreement but almost all Ob/Gyns are willing to provide or help patients obtain surgical sterilization if asked. An important limitation of the study is that a brief vignette, while useful for statistical analysis, is a rough approximation of an actual clinical encounter.

**Key words:** Ethics / female sterilization / religion / tubal ligation / doctor-patient relationship

## Introduction

Female sterilization (e.g. tubal ligation) is a popular method of birth control, utilized by millions of women in the USA, and hundreds of millions worldwide (Ludermir *et al.*, 2009; United Nations, 2009). Benefits of sterilization include: not taking daily pills, not receiving hormone shots, not having foreign bodies in the uterus or vagina and not needing to negotiate contraceptive devices with sexual partners. However, sterilization is also surrounded by moral controversy. The Catholic Church has long been vocal in its opposition to sterilization (Catechism, 1994). Tubal sterilization for non-medical reasons was largely unavailable in the USA until 1972, when federal courts removed the remaining legal restrictions (Peterson, 2008).

Even as recently as 1997, elective sterilization was illegal in Brazil (Ludermir *et al.*, 2009) and France (Dorozynski, 1997). Importantly, physicians who do not oppose sterilization in general may still have reservations about its appropriateness in specific situations, such as when decisions appear to be made hastily (Flemming and Govind, 2010), when women are young and childless (Benn and Lupton, 2005), or when women are offered money to undergo sterilization (Vega, 2003).

Of particular concern for physicians is that some patients who undergo sterilization experience regret later on (MacKenzie *et al.*, 2009). This is distressing for the patient (Kelekci *et al.*, 2005), and potentially expensive if she chooses to undergo a surgical reversal or IVF (Curtis *et al.*, 2006). Previous studies have linked regret to a

number of patient characteristics including: young age at sterilization (Hillis *et al.*, 1999; Kariminia *et al.*, 2002; Curtis *et al.*, 2006; Moseman *et al.*, 2006; Jamieson, 2007; Ludermir *et al.*, 2009), having few children at the time of sterilization (Kariminia *et al.*, 2002), losing a child after the sterilization (Ludermir *et al.*, 2009), feeling pressured by a partner (Moseman *et al.*, 2006; Ludermir *et al.*, 2009), entering a relationship with a new partner (Kariminia *et al.*, 2002; Moseman *et al.*, 2006; Ludermir *et al.*, 2009) and having the procedure post-partum (Hillis *et al.*, 1999; Kariminia *et al.*, 2002; Ludermir *et al.*, 2009). Some of these factors are unforeseeable, while others, if present at the time of the sterilization request, could raise a doctor's suspicion that a patient is not an ideal candidate for sterilization.

Many have proposed that physicians use such data to identify patients at risk for regret (Kariminia *et al.*, 2002; Department of Reproductive Health, 2009), but little is known about how well physicians identify risk factors, which patient characteristics in particular cause physicians to advise against sterilization, and how physicians proceed when they have reservations about sterilizing a specific patient. A 1986 study examined this topic (Harrison and Cooke, 1988), but it had a low participation rate (35.1%), and is not necessarily representative of physicians in 2010. Consequently we surveyed US obstetrician-gynecologist (Ob/Gyn) physicians, providing a vignette of a patient requesting tubal ligation and asking whether the physician would dissuade the patient from undergoing the procedure, and whether the physician would ultimately perform the procedure if the patient persisted in her request. We varied the patient's age, her gravida and parity and her husband's agreement to determine how these patient characteristics influenced Ob/Gyns' decisions. We also tested whether physician sex and religiosity were associated with how physicians responded to the patient's request.

## Materials and Methods

From October 2008 until January 2009, we mailed a confidential self-administered questionnaire to a stratified random sample consisting of 1800 US general Ob/Gyn physicians 65 years old or younger. The sample was generated from the American Medical Association Physician Masterfile, a database intended to include all practicing US physicians. To increase minority representation (especially minority religious perspectives), we used validated surname lists to create four strata (Sheskin, 1998; Lauderdale and Kestenbaum, 2000; Lauderdale, 2006). We randomly sampled (i) 180 physicians with typical south Asian surnames, (ii) 225 physicians with typical Arabic surnames, (iii) 180 physicians with typical Jewish surnames and (iv) 1215 other physicians (from all those whose surnames were not on one of these ethnic lists). Physicians received up to three separate mailings of the questionnaire; the first included a \$20 bill, and the third offered an additional \$30 for participating. Physicians also received an advance letter and a postcard reminder after the first questionnaire mailing. All data were double-keyed, cross-compared and corrected against the original questionnaire. The study was approved by the University of Chicago institutional review board.

The questionnaire included a vignette experiment. The core premise was that a married woman requests that an in-hospital surgical sterilization (tubal ligation) be performed after her upcoming childbirth. She has considered but declined other options for contraception. We experimentally varied three patient characteristics in a factorial between subjects design. The patient in the scenario was either 26 or 36 years old, either G2P1

(gravida/parity) or G4P3, and her husband either 'would prefer to have more children, but she is certain she does not want any more' or 'her husband and she agree that they do not want any more children'. Thus one version of the vignette was: 'A 26-year-old married woman, G2P1, requests in-hospital surgical sterilization (tubal ligation) after her upcoming childbirth. Her husband would prefer to have more children, but she is certain she does not want any more. She has considered but declined other options for contraception'. The eight possible vignettes were randomly distributed among the study sample (correlation among the vignette-patients' characteristics  $<0.02$ ;  $P > 0.5$ ).

The primary criterion variable was physicians' response to the question: How likely would you be to 'discourage' the patient from having the tubal ligation at this point in time? Responses were dichotomized as somewhat/very likely and not very/not at all likely. This was followed by the question: if the patient requests the surgery after your discussion, which of the following indicates how you would most likely respond? Response options were: (i) you would provide the surgery yourself, (ii) you would refer the patient to another physician you believe would provide the surgery and (iii) you would neither provide the surgery yourself nor refer the patient to someone who would.

Our first analyses examined only the effects of the experimentally manipulated scenario characteristics. Follow-up analyses included respondent's sex (male/female) and religiosity (attending religious services twice a month or more, once a month or less or never) because of an earlier finding that male and religious physicians are less likely to believe doctors must disclose information about or refer patients for medical procedures to which the physician objects on moral grounds (Curlin *et al.*, 2007).

## Statistical analysis

Case weights were incorporated to account for the oversampling strategy (the design weight), and to correct for differences in response rates among the surname categories and between the USA versus foreign medical school graduates (the post-stratification adjustment weight). Weights were the inverse probability of a person with the relevant characteristic being in the final data set. The final weight for each case/respondent was the product of the design weight and the post-stratification adjustment weight. This method of case weighting—widely used in population-based research (Groves *et al.*, 2004)—enabled us to adjust for sample stratification and variable response rates in order to generate estimates for the population of US Ob/Gyns.

To examine how each patient characteristic affected the physician's tendency to dissuade the patient, we examined a saturated model that allowed us to assess main effects, as well as two and three-way interactions. We also analyzed significant experimental effects within the context of respondent sex and religiosity. All analyses were conducted using the survey-design-adjusted feature of Stata SE statistical software (version 10.0; Stata Corp., College Station, TX, USA). Statistical significance was set at  $P < 0.05$ .

## Results

The response rate was 66% (1154/1760) after excluding 40 potential respondents who were retired or had invalid addresses. The response rate varied by sample: 68% (807/1188) of the primary sample responded, 54% (120/221) of those with Arabic surnames responded, 61% (107/175) of those with South Asian surnames responded and 68% (120/176) of those with Jewish surnames responded. Graduates of foreign medical schools were less likely to respond than graduates of US medical schools (58 versus

**Table I** Characteristics of respondents in national survey of US Ob/Gyn physicians' advice about, and provision of, tubal ligation.

	n (%)
Sex	
Female	537 (47)
Male	617 (53)
Race/Ethnicity	
White	774 (69)
Black	67 (6)
Asian	202 (18)
Hispanic/Latino	64 (6)
Other	22 (2)
Age (years)	
25–40	291 (25)
41–47	305 (26)
48–55	281 (24)
56–65	277 (24)
Region of USA	
South	373 (32)
Midwest	249 (22)
Northeast	288 (25)
West	242 (21)
Immigration History	
US born	817 (72)
Immigrated to USA	323 (28)
Education	
US medical school graduate	932 (81)
Foreign medical school graduate	222 (19)
Board certification	
Board certified	963 (83)
Not board certified	191 (17)
Religious affiliation	
No affiliation	119 (11)
Hindu	91 (8)
Jewish	160 (14)
Muslim	54 (5)
Catholic/Orthodox	262 (23)
Evangelical Protestant	91 (8)
Non-Evangelical Protestant	300 (27)
Other religion	48 (4)
Attendance at religious services	
Never	123 (11)
Once a month or less	547 (48)
Twice a month or more	466 (41)

Mean age: 47.8 years, SD 9.2, range 26–65 years.  
Results are not adjusted for survey design.

68%,  $P = 0.001$ ). Response did not differ significantly by age, gender, region or board certification. Demographic characteristics of respondents are reported in Table I.

**Table II** Physicians' responses to a patient who requests a tubal ligation after her upcoming pregnancy, by the patient's age, gravida/parity and her husband's agreement.

Age (years)	Gravida/Parity	Husband's agreement	Physician would dissuade patient (%) <sup>a</sup>	n
26	G2P1	Agree	42	61
		Disagree	70	108
36	G4P3	Agree	22	19
		Disagree	47	73
	G2P1	Agree	10	33
		Disagree	57	66
G4P3	Agree	9	16	
	Disagree	37	57	

<sup>a</sup>Percentages are adjusted for the survey design and provide an estimate for all US Ob/Gyn physicians.

### Effects of experimental variables on physicians' tendency to dissuade

Physicians responded differently to a request for tubal ligation depending on the patient's age, parity, and whether her husband was in agreement with the decision. The most controversial patient was a 26-year-old, G2P1, whose husband disagreed with the request. Seventy percent of physicians were somewhat or very likely to discourage her from pursuing sterilization at this time. The least controversial patient was a 36-year-old, G4P3, whose husband agreed with the request. Only 9% of physicians would discourage her from pursuing sterilization (Table II).

We used logistic regression to fit a saturated model to the data in order to explore main effects and interactions of the three manipulated patient characteristics. We found a significant main effect for Gravida/Parity [odds ratio (OR) 1.4, 95% confidence interval (CI) 1.2–1.7]: 45% of physicians would dissuade a G2P1 woman, compared with 29% of physicians who would dissuade a G4P3 woman. The patient's age (OR 1.6, 95% CI 1.4–1.9) as well as the husband's agreement/disagreement (OR 2.3, 95% CI 1.9–2.7) were significant as main effects, yet also had a significant two-way interaction (OR 0.8, 94% CI 0.7–0.9), summarized in Table III. Most physicians (59%) would dissuade a 26-year-old woman whose husband disagreed with her request, whereas half as many physicians (32%) would dissuade the 26-year-old woman if her husband agreed. For a 36-year-old woman, 47% of physicians would dissuade her if her husband disagreed with her request, while 10% would dissuade if the husband agreed.

### Effects of physician sex and religiosity on physicians' tendency to dissuade

The physician's sex had no significant main effect, nor any significant interactions with the patient's age, gravida/parity or the husband's agreement/disagreement. This means that male physicians were not more likely than females to dissuade a patient because of her age, family size or because her husband disagrees.

**Table III** Percentage of physicians who would dissuade the patient from seeking sterilization.

	Patient age 26 years	Patient age 36 years	Main effect of husband's agreement or disagreement
Husband agrees with sterilization (%)	32	10	21
Husband disagrees with sterilization (%)	59	47	53
Main effect of patient age (%)	45	28	

Results show the main effects of age and husband agreement, along with the interaction between age and agreement.

Religiosity had a main effect, with physicians who attend religious services twice a month or more being more likely than non-attenders to dissuade patients from seeking a tubal ligation (40 versus 29%, OR 2.0, 95% CI 1.1–3.7). In a more detailed analysis, there was a significant interaction between religious attendance and the patient's age (OR 0.5, 95% CI 0.3–0.9 for doctors attending services once a month or less; OR 0.5, 95% CI 0.3–1.0 for doctors attending services twice a month or more). Specifically, attenders and non-attenders were equally likely to dissuade a 26-year-old patient (44–47% would dissuade,  $P = 0.8$ ) but for a 36-year-old patient, 9% of non-attenders would dissuade her, versus 26% of doctors attending once a month or less and 33% doctors attending twice a month or more ( $P = 0.001$ ). With attendance included in the model, the effect of husband/wife disagreement became non-significant. There were no significant interactions between attendance and gravida/parity or the husband's agreement/disagreement.

### Physicians' responses to the patient's request

If, after the discussion, the patient still requests the tubal ligation, the vast majority of respondents said they would provide the surgery themselves (91%,  $n = 1035$ ). A small minority would refer the patient to another doctor likely to perform the surgery (7%,  $n = 80$ ), while a few physicians (2%,  $n = 25$ ) would neither provide the surgery nor refer the patient to someone who would. The small number in the latter group did not allow for further testing of characteristics associated with refusal to provide or refer.

### Comment

In this national survey of US Ob/Gyn physicians we used a vignette experiment to determine how much physicians adjust their advice about sterilization, and willingness to provide it, according to the patient's age, gravida and parity and the opinion of the patient's spouse. We found that physicians are significantly more likely to discourage a patient from undergoing surgical sterilization if she is younger, has fewer children, and is not in full agreement with her husband. Nevertheless, if the patient persists in her request for tubal ligation, nearly all Ob/Gyn physicians will help her obtain the procedure.

Strengths of this study include a nationally representative sampling strategy, incorporation of immigrant and religious minority groups, an excellent response rate and a large number of respondents.

This study also has limitations. A brief vignette is not equivalent to a clinical encounter, where extended conversations can occur, and doctors can learn far more about the patient before offering advice. The three patient characteristics we studied may not be the most important factors influencing clinical decisions. The patient was married, yet pregnancies occur in many different relationships, raising different sets of issues. Self-reports may differ from actual clinical practices. Responders may differ from non-responders in ways that bias the results.

Patients' individual characteristics profoundly affect the advice that physicians offer. In our study the number of physicians who would discourage a patient from undergoing surgical sterilization ranged from 9 to 70%, related to changes in three patient characteristics. A related pattern was reported by Harrison and Cooke in 1988, where the patient's age, parity, race and marital status significantly affected the likelihood that a physician would sterilize the patient (Harrison and Cooke, 1988). To some extent, it is uncontroversial for physicians to tailor their advice to the patient's unique circumstances. However, it does raise questions about how far the physician's role should extend beyond simply presenting medical information and leaving patients to decide for themselves.

Physicians were more likely to dissuade younger patients from undergoing sterilization. A number of prior studies have identified young age at sterilization as a major risk factor for later regret. For example, the 1999 US Collaborative Review of Sterilization ( $n = 11\,232$  women followed over 14 years) reported that 12.7% of sterilized women ( $n = 744$ ) experienced regret, but this was higher (20.3%) among those who were 30 years or younger when sterilized (Hillis *et al.*, 1999). Ob/Gyn physicians appear to be practicing in a way that is consistent with World Health Organization guidelines, which advise caution when considering sterilization of younger patients (Department of Reproductive Health, 2009).

The literature shows only a weak link between family size and regret after sterilization. One report from Australia found that sterilized women with three or more children were less likely to request IVF than childless women (Kariminia *et al.*, 2002). However, a study in Iran comparing 150 sterilized and 150 un-sterilized women found no association between parity and regret after sterilization (Rogayeh *et al.*, 2007). As recently as 1965 The American College of Obstetricians and Gynecologists recommended that physicians perform voluntary sterilization only on a 25-year-old woman with five children, a 30-year-old with four children or a 35-year-old with three children (Harrison and Cooke, 1988). Brazilian law still requires that women have at least two children to qualify for voluntary sterilization (Ludermir *et al.*, 2009). Our results suggest family size is something that physicians consider relevant; allowing it to shape the advice they offer patients. In this physicians are likely influenced by personal experiences, individual beliefs and social norms.

Sterilization policies in the USA are rarely explicitly concerned with whether the husband agrees with the woman's desire not to have more children. The Medicaid Consent for Sterilization form, for instance, has no section pertaining to the woman's partner (Department of Health and Human Services, 2010). However in other countries (namely Brazil) the husband is required to sign a consent

form before the woman can be sterilized (De Bessa, 2006). Arguments can be made for both sides: women have authority to make decisions related to their bodies, yet fertility decisions profoundly affect both partners. A 1991 study interviewed husbands and wives before sterilization and 2 years after, and identified four pre-sterilization predictors of regret: respondent motivation for additional children and against sterilization, poor husband–wife communication, conflict during decision-making and dominance of the decision by one spouse (Miller et al., 1991). The authors advised physicians to consider equally the attitudes of both spouses (Miller et al., 1991). Physicians might also note that many women (64/81 in one study) (Kariminia et al., 2002) who seek reversal of sterilization or IVF explain that their previous relationship ended and they now want a baby with their new partner (Moseman et al., 2006). While physicians are not in the business of predicting which relationships will fail, it is understandable that some physicians are more cautious about sterilizing a woman whose partner might want more children.

It is worth mentioning that some degree of regret is unavoidable among patients choosing permanent sterilization; circumstances change and people change their minds. Moreover some patients might regret not seeking sterilization. How far physicians are responsible for (or capable of) helping patients to avoid either regret is debatable. However, the time, energy and resources needed to undo surgical sterilization suggest that physicians should make reasonable efforts to be sure that patients have considered the implications of sterilization and are willing to accept the possibility that they may someday regret their decision.

That physicians' sex had no significant effect is a notable finding. This updates 1984 survey data that found subtle differences between male and female Ob/Gyn physicians: female Ob/Gyns were more supportive of patient choice in the matter of sterilization, but males provided disproportionately more sterilization procedures (Weisman et al., 1987). It also adds nuance to our own studies of physicians from all specialties, where male physicians were less likely to present all options to patients—especially morally controversial options like elective abortion (Curlin et al., 2007). The present data suggest that male and female Ob/Gyn physicians do not differ in their concern for identifying and dissuading patients for whom permanent sterilization is not the best option.

Physicians who never attend religious services seemed more comfortable providing sterilization; being less likely to discourage women in general, and particularly less likely to discourage older women who desire sterilization. A possible explanation is that when morally or ethically controversial decisions must be made, non-religious physicians tend to place more emphasis on patient autonomy than do religious physicians (Lawrence and Curlin, 2009). Provided the patient is informed of her options and is choosing without any obvious coercion, physicians who place a particular emphasis on encouraging patient autonomy might be especially reluctant to discourage the patient from undergoing sterilization.

Even in the least controversial scenario (a 36-year-old G4P3 woman whose husband agrees with the sterilization) nearly 1 in 10 Ob/Gyn physicians would discourage the patient from undergoing sterilization. A combination of factors is likely at work. Some Ob/Gyns may generally object to using tubal ligation for birth control. Others could be responding to unmeasured details of the case. For instance, the patient is making the decision while pregnant (an unpleasant

experience for some women), the outcome of the pregnancy is indeterminate (she may not have a healthy child), and she is scheduling the procedure immediately post-partum (a risk factor for regret) (Hillis et al., 1999; Kariminia et al., 2002).

In conclusion, in this national survey of practicing US Ob/Gyn physicians, we found that physicians are more likely to discourage a patient from undergoing surgical sterilization if she is 26 (versus 36) years old, has few children (G2P1 versus G4P3), and if her husband says he might desire more children in the future. Religious physicians (those who ever attend religious services) were more likely to dissuade patients from undergoing sterilization. This suggests that, when discussing sterilization with patients, considerable effort is put into identifying and counseling that minority of patients who will later regret sterilization. Ob/Gyn physicians pay careful attention to the patient's individual characteristics and adjust their advice accordingly—all the while remaining committed to helping the patient obtain surgical sterilization if she chooses.

## Authors' roles

The survey was designed by K.A.R., F.A.C. and J.D.Y. K.A.R. supervised the execution of the survey. Data were analyzed by K.A.R. and R.E.L. All authors participated in critical discussion of the results, and R.E.L. drafted the manuscript.

## Funding

This study was supported by grants from the Greenwall Foundation, the John Templeton Foundation and the National Center for Complementary and Alternative Medicine (1 K23 AT002749, to Farr Curlin). Funding agencies did not participate in the study design, data acquisition, analysis, interpretation, writing or submission.

**Conflict of interest:** none declared.

## References

- Benn P, Lupton M. Sterilisation of young, competent, and childless adults. *Br Med J* 2005;**330**:1323–1325.
- Catechism of the Catholic Church*. New York: Doubleday, 1994.
- Curlin FA, Lawrence RE, Chin MH, Lantos JD. Religion, conscience, and controversial clinical practices. *N Engl J Med* 2007;**356**:593–600.
- Curtis KM, Mohllajee AP, Peterson HB. Regret following female sterilization at a young age: a systematic review. *Contraception* 2006;**73**:205–210.
- De Bessa GH. Medicalization, reproductive agency, and the desire for surgical sterilization among low-income women in urban Brazil. *Med Anthropol* 2006;**25**:221–263.
- Department of Reproductive Health, World Health Organization. *Medical Eligibility Criteria for Contraceptive Use*, 4th edn. [http://whqlibdoc.who.int/publications/2010/9789241563888\\_eng.pdf](http://whqlibdoc.who.int/publications/2010/9789241563888_eng.pdf) (7 October 2010, date last accessed). 2009.
- Department of Health and Human Services Consent for Sterilization, <http://www.hhs.gov/forms/HHS-687.pdf> (24 February 2010, date last accessed).
- Dorozynski A. France to investigate illegal sterilisation of mentally ill patients. *Br Med J* 1997;**315**:697.
- Flemming R, Govind A. Beware of add on procedures: a cautionary tale of regret following sterilisation. *J Obstet Gynaecol* 2010;**30**:80.

- Groves RM, Fowler FJ, Couper MP, Lepkowski JM, Singer E, Tourangeau R. *Survey Methodology*. Hoboken, NJ: John Wiley & Sons, Inc., 2004.
- Harrison DD, Cooke CW. An elucidation of factors influencing physicians' willingness to perform elective female sterilization. *Obstet Gynecol* 1988; **72**:565–570.
- Hillis SD, Marchbanks PA, Tylor LR, Peterson HB. Poststerilization regret: findings from the United States Collaborative Review of Sterilization. *Obstet Gynecol* 1999; **93**:889–895.
- Jamieson DJ. Poststerilization regret: findings from India and the United States. *Indian J Med Sci* 2007; **61**:359–360.
- Kariminia A, Saunders DM, Chamberlain M. Risk factors for strong regret and subsequent IVF request after having tubal ligation. *Aust N Z J Obstet Gynaecol* 2002; **42**:526–529.
- Kelekci S, Erdemoglu E, Kutluk S, Ylmaz B, Savan K. Risk factors for tubal ligation: regret and psychological effects impact of Beck depression inventory. *Contraception* 2005; **71**:417–420.
- Lauderdale DS. Birth outcomes for Arabic-named women in California before and after September 11. *Demography* 2006; **43**:185–201.
- Lauderdale DS, Kestenbaum B. Asian American ethnic identification by surname. *Popul Res Policy Rev* 2000; **19**:283–300.
- Lawrence RE, Curlin FA. Autonomy, religion and clinical decisions: findings from a national physician survey. *J Med Ethics* 2009; **35**:214–218.
- Ludermir AB, Machado KM, Costa AM, Alves SV, Araujo TV. Tubal ligation regret and related risk factors: findings from a case-control study in Pernambuco State, Brazil. *Cad Saude Publica* 2009; **25**:1361–1368.
- MacKenzie IZ, Thompson W, Roseman F, Turner E, Guillebaud J. Failure and regret after laparoscopic Filshie Clip sterilization under local anesthetic. *Obstet Gynecol* 2009; **113**:270–275.
- Miller WB, Shain RN, Pasta DJ. The pre- and poststerilization predictors of poststerilization regret in husbands and wives. *J Nerv Ment Dis* 1991; **179**:602–608.
- Moseman CP, Robinson RD, Battes GW, Propst AM. Identifying women who will request sterilization reversal in a military population. *Contraception* 2006; **73**:512–515.
- Peterson HB. Sterilization. *Obstet Gynecol* 2008; **111**:189–203.
- Rogayah N, Reyhaneh I, Fatemeh RK, Zakaria PM, Fateme BA. Depression and anxiety in sterilised women in Iran. *J Fam Plann Reprod Health Care* 2007; **33**:287.
- Sheskin IM. A methodology for examining the changing size and spatial distribution of a Jewish population: a Miami case study. *Shofar* 1998; **17**:97–114.
- Weisman CS, Nathanson CA, Teitelbaum MA, Chase GA, King TM. Delivery of fertility control services by male and female obstetrician-gynecologists. *Am J Obstet Gynecol* 1987; **156**:464–469.
- United Nations. Department of Economic and Social Affairs and Population Division World Contraceptive Use 2009 (POP/DB/CP/Rev2009). 2009.
- Vega CM. *Sterilization Offer to Addicts Reopens Ethics Issue*. New York: New York Times, 2003.