Determinants of Female Sterilization in Brazil, 2001–2007

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Objective

- This study aims to investigate the determinants of female sterilization in Brazil between January 2001 and July 2007.
- The analysis is innovative because it adds time of exposure to the risk of sterilization into survival models.
- We seek to comprehend the effects of different birth intervals (postpartum duration) on the possibility of a woman getting sterilized.
- Our main hypothesis is that when taking into account a person’s months of exposure to sterilization, the effects of color/race and years of schooling will lose significance.
Fertility and contraception in Brazil

– An increase in the prevalence of modern contraceptive methods is a major factor associated with the decline of the country’s total fertility rate (IBGE, 2012):

  – 5.8 children per woman in 1970
  – 1.9 children per woman in 2010

– Contraceptive methods are largely focused on the use of pills and female sterilization.

– The government did not intervene in order to reduce fertility, change female reproductive behavior, or increase the use of contraception.
Type of contraception

– There has been an expansion of modern methods.

– Change in the distribution of married and cohabiting women between 15–44 years of age by type of contraceptive use:

<table>
<thead>
<tr>
<th>Type of contraception</th>
<th>1996</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not use</td>
<td>22.1</td>
<td>18.4</td>
</tr>
<tr>
<td>Female sterilization</td>
<td>38.5</td>
<td>25.9</td>
</tr>
<tr>
<td>Male sterilization</td>
<td>2.8</td>
<td>5.1</td>
</tr>
<tr>
<td>Pills</td>
<td>23.1</td>
<td>27.4</td>
</tr>
<tr>
<td>Condom</td>
<td>4.6</td>
<td>13.0</td>
</tr>
<tr>
<td>Withdrawal</td>
<td>3.0</td>
<td>2.1</td>
</tr>
<tr>
<td>Periodic abstinence</td>
<td>2.9</td>
<td>1.0</td>
</tr>
<tr>
<td>Others (IUD, diaphragm, injections...)</td>
<td>3.0</td>
<td>7.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6,613</strong></td>
<td><strong>8,707</strong></td>
</tr>
</tbody>
</table>

Family planning law

– In 1997, the federal government implemented the family planning law.

– One of the goals of the law was to enable sterilization in public hospitals, but with restrictions on surgeries during cesarean deliveries, childbirth, and abortion.

– Female and male sterilizations are permitted only for those 25+ years of age or with at least two children born alive.

– However, municipalities have insufficient resources to supply female sterilization.

– Despite legal impediments, female sterilization is still performed in conjunction with cesarean sections.
Data

– Data is from the 2006 Brazilian National Survey on Demography and Health of Women and Children (PNDS).


– The database was disaggregated into postpartum duration as the unit of analysis, which includes 17,376 observations, related to 3,398 live births, and 2,762 women.

– Women were exposed to the risk of sterilization for a total of 88,228 months, resulting in 855 women being sterilized.
Methods

– Piece-wise constant exponential regression models: based on starting and ending times of exposure to the risk of sterilization (survival analysis).

– **Dependent variable:** risk of a woman getting sterilized, considering the month and year of procedure.

– **Independent variables:**
  
  – Postpartum duration in months: 0, 1, 2, 3–6, 7–12, 13–18, 19+
  
  – Age in years at time of delivery: 15–24, 25–29, 30–34, 35–49
  
  – Parity at delivery (2, 3, 4+), calculated with information about number of children ever born and birth order

  – Place of delivery: public hospital (SUS), health insurance ("convênio"), private hospital
Other variables

- Independent variables:
  - Region of residence: North, Northeast, Southeast, South, Central-West
  - Color/race: white ("branca"), black ("preta"), brown ("parda"), yellow/Asian ("amarela"), indigenous ("indígena")
  - Years of schooling: 0–3, 4–7, 8–10, 11+
  - The database only addresses the region of residence and years of schooling at the time of the interview.
## Categories with higher prevalence of births and sterilizations, 2001–2006

<table>
<thead>
<tr>
<th>Variables</th>
<th>Births</th>
<th>Sterilizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>15–24 (42%)</td>
<td>30+</td>
</tr>
<tr>
<td>Parity at delivery</td>
<td>2 children (50%)</td>
<td>3+ children</td>
</tr>
<tr>
<td>Place of delivery</td>
<td>Public hospital (84%)</td>
<td>Private hospital</td>
</tr>
<tr>
<td></td>
<td>Health insurance (8%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Private hospital (8%)</td>
<td></td>
</tr>
<tr>
<td>Region</td>
<td>North (22%)</td>
<td>North</td>
</tr>
<tr>
<td>Color/race</td>
<td>Brown (52%)</td>
<td>Brown</td>
</tr>
<tr>
<td>Years of schooling</td>
<td>4–7 (39%)</td>
<td>11+</td>
</tr>
</tbody>
</table>

Source: 2006 PNDS.
Regression results

- Models indicate that sterilization is greater:
  - Following childbirth.
  - Among older women.
  - For those with two children at time of delivery.
  - In areas of elevated fertility rates (North and Northeast).

- Women who gave birth at **private hospitals** experience the greatest chances of getting sterilized following a birth.

- **Color/race** and **years of schooling** are not good predictors of the risk of female sterilization.
Cumulative predicted hazard of female sterilization

Note: Hazards are for women with 25–29 years of age, parity of two children, living in the Southeast, and represent the mean across the different color/race and years of schooling categories.
Source: 2006 PNDS.
Cumulative predicted hazard of female sterilization

- New models were estimated for each subgroup of women:

  Cesarean section  Vaginal delivery

Note: Hazards are for women with 25–29 years of age, parity of two children, living in the Southeast, and represent the mean across the different color/race and years of schooling categories.
Source: 2006 PNDS.
Final considerations

- There is an indication that women may not have been able to get sterilized at public hospitals, due to regulations.

- This evidence of **frustrated demand** for sterilization may be forcing women to search for this irreversible contraceptive method at private institutions.

- Women may be utilizing the private sector in order to get sterilized, following an **unnecessary cesarean delivery**.

- The high prevalence of sterilization in private institutions should be a concern for the government.

- Policies need to take into account the health service demands of women.