The London School of Economics and Political Science

Rethinking Health System Accountability to Patients:

Female Sterilization & Patient Reported Performance Measurement

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Declaration

I certify that this thesis is solely my own work, other than where I have clearly indicated that the work was shared with others, in which case the extent of any work carried out jointly with co- authors is clearly identified (see "Statement of conjoint work").

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Abstract (293 / 300 words)

Female sterilization is a widespread and viable method of fertility control, but this is only the case when done with the full consent of women undergoing the procedure. Involuntary sterilization is considered an act of violence and, when systematic, a crime against humanity. While often framed as a historical practice or limited to isolated cases, I find that routinized forms of coercive sterilization are a widespread and contemporary issue. Made up of four related papers, this dissertation examines how we think about and measure informed consent, and in turn quantify human rights abuses amongst sterilized women.

In the **first empirical chapter**, I provide the first quantification of a human rights-based framework presented in the WHO's "*Interagency Statement on Eliminating Forced, Coercive and Otherwise Involuntary Sterilization*," using patient-level data from over 180,000 sterilized women. The **second empirical chapter** re-evaluates the roll out of a large nation-wide policy; employing an instrumental variable (IV) approach to estimate the effect of increased institutional delivery on tubal ligation practice patterns. The **third** and **fourth empirical chapters** look at how people rate their care. This process involves testing conceptual equivalence and construct validity of patient ratings with 65 qualitative subjects as well as an examination of how these measures preform quantitatively. The goal of this work is to see if commonly used performance measures adequately capture instances of coercion and explore why patients who are subject to coercion might rate their care highly.

This body of work problematizes status quo approaches in patient-centeredness measurement with practical implications for quantifying rights abuses for an important population: sterilized women. The findings are relevant given current accounting practices that may mask, rather than reveal, issues of coercion in healthcare as well as the demographic effects of uninformed sterilization concentrated within specific populations.

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Statement of conjoint work

The first empirical article in this thesis (**Chapter 2**) was single authored by the Ph.D. candidate.

The second empirical article in this thesis (**Chapter 3**) was co-authored with Dr. Irene Papanicolas, PhD.

> Summary of Author Contributions: *LW conceived of the study – re-examining the impact of increased institutional delivery on outcomes specific to postpartum family planning. The study was first run with a difference-in-difference model. Given recent, and evolving, literature on two-way fixed effects, IP proposed an Instrumental Variable (IV) approach. LW designed the IV, ran all analyses and drafted the manuscript. IP provided oversight: reviewing approach and resulting drafts.*

The third empirical article in this thesis (**Chapter 4**) was single authored by the Ph.D. candidate.

The final empirical article in this thesis (**Chapter 5**) was co-authored with Dr. Mahrokh Irani, MD MPH.

> Summary of Author Contributions: *LW conceived of the study – formal pre-testing of the HCAHPS Survey Tool in an Indian inpatient setting to test conceptual equivalence and content validity. Both LW and MI were present for all focus groups and individual interviews. MI provided additional insight on the Indian inpatient clinical setting and served as a liaison with Hindi and Oriya-speaking participants. LW designed the study, ran all analyses and drafted the manuscript.*

This statement is to confirm I (the PhD candidate) contributed a minimum of 70% effort to all empirical Chapters: 2, 3, 4 and 5; as agreed to by the undersigned:

Irene Papanicolas Mahrokh Irani

Other relevant work

During my PhD studies, I co-authored peer-reviewed articles, reports, and book chapters on the Indian Health System, quality of care, patient-reported performance measurement and reproductive autonomy as well as presented on these topics at national and international conferences. These outputs (listed below in reverse order), while not contributing directly to this thesis, are relevant to the work presented throughout.

- Kalita A, Bose B, **Woskie L**, Haakenstad A, Cooper J, Yip W. Private Pharmacies as Healthcare Providers in India's Health System: Analysis and Implications for Universal Health Coverage. BMJ Global Health (Accepted, In Press).

- Yip W, Kalita A, Bose B, Cooper J, Haakenstad, Hsiao W, **Woskie L**, Reich M. Comprehensive Assessment of Health System Performance in Odisha, India. Health Systems and Reform. 2022; 8:1, 2132366.

- **Woskie L**. Chapter: How Do We Hold Health Systems Accountable to Patients? Conceptual and Practical Challenges in the Routine Measurement of Patient-Centeredness in India. Book: Health Systems Performance Assessment. Bill and Melinda Gates Foundation, 2021.

- **Woskie L**, Kailita A, Papanicolas I, Yip W (2021). Patient Satisfaction and Education: The Danger of Low Expectations and Implications for Measuring Health System Performance. AcademyHealth Annual Research Meeting.

- Kalita A, Gupta N, **Woskie L**, Yip W. Providers' Knowledge of Diagnosis and Treatment Best Practices for Acute Myocardial Infarction (AMI): Evidence from India Using Clinical Vignettes. Health Services Research (HSR), 2021. DOI: 10.1111/1475-6773.13805.

- **Woskie L** (2021). Reproductive Autonomy in Modern Family Planning: A Critical Assessment Using Data from 68 Low- and Middle-Income Countries. International Health Economics Association, iHEA.

- **Woskie L**, Tsai T, Wellenius G, Jha A. Early Impact of India's Nationwide Lockdown on Aggregate Population Mobility and COVID-19 Cases. The Lancet SSRN, 2020. DOI: 10.2139/ssrn.3631258.

- **Woskie L**, Papanicolas I (2020). How Patient-Centered Is Modern Family Planning? An International Assessment of Progress on FP2020. Panel Presentation: Maternal and Child Health, Promises and Challenges in 2020. AcademyHealth Annual Research Meeting.

- Papanicolas I, **Woskie L**. et al. Chapter: The Current State of Global Health Care Quality. Report: Crossing the Global Quality Chasm, Improving Health Care Worldwide. The National Academies Press (NAP), 2018.

- **Woskie L**, Leatherman S. Chapter: Understanding Levers to Improve Quality. Book: Delivering Quality Health Services, A Global Imperative for Universal Health Coverage. The World Health Organization (WHO), 2018.

- **Woskie L**, Rajbhandari R, Moccia A, Leatherman S. Chapter: Quality Interventions. Handbook: National Quality Policy and Strategy, A Practical Approach for Developing Policy and Strategy to Improve Quality of Care. WHO, 2018.

- Jishnu D, **Woskie L**, Rajbhandari R, Abbasi K, Jha A. Rethinking Assumptions about the Delivery of Healthcare: Implications for Universal Health Coverage. The BMJ. 2018; 361, k1716.

Extended abstract(s)

Female sterilization is a widespread and viable method of fertility control, but this is only the case when done with the full consent of women undergoing the procedure. Involuntary sterilization is considered an act of violence and, when systematic, a crime against humanity. While often framed as a historical practice or limited to isolated cases, I find that routinized forms of coercive sterilization are a widespread and contemporary issue. Made up of four related papers, this dissertation examines how we think about and measure informed consent, and in turn quantify human rights abuses amongst sterilized women:

Chapter 2: The Interagency Statement on Eliminating Forced, Coercive & Otherwise Involuntary Sterilization: Prevenance and Drivers in India
Sterilization is currently the most common form of modern family planning utilized globally. As of 2019, sterilized women made up approximately 70% of people utilizing any family planning method in India. There is widespread recognition that sterilizations are only a viable, and rights-affirming, modern family planning method when undertaken voluntarily. However, a historical focus on volume-based measures in reproductive care and lack of consensus on how to operationally define coercion have hampered quantification of this issue. In this paper, I examine pre-conditions for informed consent within the purview of the health system, such as: being told that a tubal ligation surgery is permanent, availability of alternate options or ability to decide independently. I look at the point prevalence of these variables in a nationally representative sample, where relevant comparting sterilized patients to other modern family planning users. I then apply a variance decomposition approach to estimate the relative importance of different factors that might drive uninformed consent. Amongst predictors examined, I find that over 70% of variance for unknown permanence can be attributed to supply-side or system-modifiable factors. Examining these system-modifiable factors as potential interventions, I identify potential avenues through which to address this issue.

Chapter 3: Facility-based Delivery and Immediate Postpartum Sterilization in India: An Instrumental Variable Analysis
The share of women giving birth in facilities has increased dramatically in most low- and middle-income countries over the past 30 years; in 1992 as few at 14% of women living in India gave birth in medical facilities, whereas that share was estimated at 83% in 2014, driven largely by an increase in public hospital use. This transition has been flagged as an opportunity to increase family planning communication and method adoption while women are in facilities, particularly amongst those who do not regularly interact with the healthcare system outside of the birthing experience. This paper exploits variation in the Janani Suraksha Yojana (JSY) or the "*Safe Motherhood Scheme*," at the district level as an instrument to identify the causal effect of increasing institutional delivery on immediate postpartum sterilization amongst women who would not otherwise deliver in facilities. The model finds that high rates of institutional delivery at the community level have a statistically significant effect on a woman's odds of being sterilized immediately following childbirth in Low Performing States (LPS) and Christian-majority states, but not wealthy southern states. These findings hold when controlling for a concurrent caesarian-section and key demographic characteristics, such as family wealth, caste and parity. Using the same model, there were no concurrent changes in the adoption of other forms of modern family planning (mFP). In addition, women sterilized in the immediate postpartum period were 1.3 times more likely to express regret with the procedure than non-postpartum sterilized peers. Higher rates of regret were concentrated amongst women with a historically marginalized caste or tribal designation.

Chapter 4: Satisfaction with Coercive Sterilization Care: Discordant Quality Ratings, the Role of Remuneration and Postpartum Procedure Timing
Patient-reported satisfaction is often used as a measure to assess the patient centeredness of health systems. However, due to asymmetry of information, there is concern that patients may be unable to discern low quality serves and /or express dissatisfaction when services are of poor quality. To examine this issue, I look at how women exposed to coercive or otherwise involuntary sterilization procedures, using an internationally agreed-upon framework for the provision of non-coercive or otherwise involuntary sterilization care, rate the quality of their care. With a sample of over 180,000 sterilized women, I find a statistically significant and positive relationship between being exposed to coercion variables and the odds of reporting low quality. However, I also identify high rates of discordant scoring; i.e. over 95% of women who undergo a tubal ligation procedure rate their care highly regardless of if they were provided with adequate information for informed consent; a recognized form of coercion. Further, discordance is more pronounced if a patient belongs to a historically marginalized

caste. In examining system-modifiable factors, I find that both conditional cash transfers to the patient and procedure timing (e.g. during the immediate postpartum period) negatively impact the odds that a women will report a low-quality rating after receiving a coercive sterilization procedure. For the postpartum sterilized population, labor complexity and health of the newborn, both eclipse any statistically significant relationship. This work problematizes status quo approaches in patient-centeredness measurement for a frequent, yet understudied, surgical procedure with practical implications for quantifying coercive reproductive care.

Chapter 5: Are We Measuring What We Think We're Measuring: Conceptual Equivalence & Content Validity of the Consumer Assessment of Health Providers and Systems Survey (HCHAPS) in India[1]

With increasing use of patient experience and satisfaction measures to routinely assess health system performance in India, we sought to formally pre-test the Consumer Assessment of Health Providers and Systems Survey (HCAHPS) tool. This study involves structured pre-testing with 70 patients, providers and experts in Orissa, India. We used a three-stage process to test semantic equivalence, conduct cognitive testing and assess content validity. Data was collected in 2019. Raters produced a total of 570 relevance scores. When assessing items' relevance to patients, the all-item mean was 3.50 out of 4 (SE = 0.145). When assessing relevance given the hospital environment, the all-item mean was lower: 3.36 out of 4 (SE = 0.174). During cognitive testing, concerns arose regarding the relevance of specific items e.g. the receipt of help when needing to use the restroom or the provision of an explanation for prescribed medicines. These concerns were largely driven by lack of clarity on, and prior experiences with, who holds responsibility for a given task rather than the survey item's lack of importance to the patient. When assessed based on relevance to patients, these same items performed well; with i-CVI rating of "good" or "excellent" for all items. Taken together, these findings suggest that inpatients in Odisha, India may value similar things to patients where the HCAHPS tool has been previously validated. We find that the HCAHPS tool has adequate content validity and construct validity to merit quantitative study in Indian inpatient settings. However, pre-testing raised fundamental questions regarding patient expectations and who holds responsibility for the quality of inpatient care in Odisha, India.

This body of work problematizes status quo approaches in patient-centeredness measurement with practical implications for quantifying rights abuses for an important population: sterilized women. The findings are relevant given current accounting practices that may mask, rather than reveal, issues of coercion in healthcare as well as the demographic effects of uninformed sterilization concentrated within specific populations.

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[1] General inpatient population; not sterilization-specific due to COVID-related data collection limitations.

Abbreviations

ANM	Auxiliary Nurse Midwife
API	Active Pharmaceutical Ingredient
ASHA	Accredited Social Health Activist
ATE	Average Treatment Effect
BMGF	Bill and Melinda Gates Foundation
CCT	Conditional Cash Transfer
CEDAW	Convention on the Elimination of All Forms of Discrimination Against Women
CI	Confidence Interval
COREQ	COnsolidated Criteria for REporting Qualitative research
CMC	Century Month Code
CPR	Contraceptive Prevalence Rate
CVI	Content Validity Index
DHS	Demographic and Health Survey
DPR	Democratic People's Republic
EAG	Empowered Action Group
FP2020	Family Planning 2020
FS	Female Sterilization
HCAHPS	Hospital Consumer Assessment of Healthcare Providers and Systems
HIV	Human Immunodeficiency Virus
HPS	High Performing States
HRW	Human Rights Watch
ICC	International Criminal Court
ICE	Immigration and Customs Enforcement
ICPD	International Conference on Population and Development
IPPF	International Planned Parenthood Federation
IRB	Institutional Review Board
IUD	Intrauterine Device
IV	Instrumental Variable
JSY	Janani Suraksha Yojana
LARC	Long-Acting Reversible Contraceptive
LHV	Lady Health Visitor
LPS	Low Performing States
LSE	London School of Economics
MDG	Millennium Development Goals
mFP	Modern Family Planning
MII	Method Information Index
MoHFW	Ministry of Health and Family Welfare
NFHS	National Family Health Survey

NRHM	National Rural Health Mission
OPP	Out-of-Pocket Payment
OR	Odds Ratio
PIL	Public Interest Litigation
PPFP	Postpartum Family Planning
PSM	Propensity Score Matching
RCHI	Reproductive and Child Health
RMNCH+A	Reproductive, Maternal, Newborn and Child Health and Adolescents
SDGs	Sustainable Development Goals
SE	Standard Error
SRVAW	Special Rapporteur on Violence Against Women
UHC	Universal Health Coverage
UN	United Nations
USAID	United States Agency for International Development
USD	United States Dollar
WB	World Bank
WHO	World Health Organization

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This PhD was undertaken while working, during a pandemic, the unexpected death of both a parent and cohort member and numerous travel bans that halted, or fundamentally changed, research plans. While the resulting course of study was long and indirect, it gave me the opportunity to extend beyond my initial proposed PhD topic and explore issues that have become deeply meaningful for me.

I am very grateful to the many people who provided me with guidance and support. First and foremost, I would like to thank my academic advisors Professors Irene Papanicolas and Clare Wenham for encouragement, guidance, and feedback throughout the entire process. Having two invested and fiercely intelligent scholars' mentorship has been both intimidating and inspiring. Irini has persistently challenged me to candidly interpret what data is showing in practice, as opposed to what I want it to – adding nuance and (at times begrudgingly) opening new lines of inquiry. They have also encouraged me to approach research design with a holistic eye and apply new methods, a challenge for which I am grateful and from which I have learned so much. I will miss Clare's emails – at any time of day or night – checking in and inquiring about progress, not letting me disappear when overcome with self-doubt. Having her perspective has forced me to think beyond short-form outputs and grapple with how this work is situated outside of a health services research perspective. I am deeply grateful for their time, their academic thoughtfulness and, above all, their care.

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CHAPTER 1

Introduction

1.1. Summary

Globally, access to family planning services has been shown to reduce maternal mortality and improve quality of life for women, children, families, and communities.[1] In India, contraceptive use has increased dramatically over the past 40 years. Between 1980 and 2020, the modern contraceptive prevalence rate (mCPR) increased from approximately 28% to 55% amongst married or in-union women. Simultaneously, the total fertility rate declined from 4.8 to 2.2 children per woman as of 2020.[1] In addition, the 2020-21 estimate of unmet family planning need was 18.6% of women currently married or in union, a rate lower than the mean for 68 other low and middle oncome countries (22.7%) included in the Family Planning 2020 agenda; an agenda that aimed to cover an additional 120 million women with reproductive care by 2020.

However, female sterilization[1] has been, and remains, the most common form of family planning utilized in India.[2] As of 2020 approximately 76% of married or in-union women utilizing a modern family planning method relied on female sterilization – the next most common method, condoms, made up less than 12% of methods is use, with Inter Uterine Devices (IUD) at only 3%.[3] In line with this, approximately four million women in India are estimated to undergo a surgical sterilization annually.[4] While female sterilization is a viable modern method of fertility control, this is only the case when done with the full consent of women undergoing the procedure.

Involuntary sterilization is considered an act of violence and, when systematic, a crime against humanity.[5,6] Yet, examining the extent to which tubal ligations are undertaken voluntarily is controversial. While reproductive health professionals recognize the potential for human rights violations and the term "voluntary" is widely used as a precursor to describe women who have been sterilized, this designation is often assumed in accountings of care coverage. Complicating the issue, many women undergoing tubal ligations voluntarily rely on the procedure to control fertility. Yet, the sterilization literature does not quantitatively test or account for coercion in the provision of mFP services. Objective measures of patient-centeredness, such as the provision of informed consent, are one route through which to do this. There are a number of papers on correlates and drivers of sterilization regret.[7–10] However, we lack a nationally representative quantification of more objective rights-based aspects of patient-centeredness (such as being informed of the procedure's permanence) amongst sterilized women and how objective measures of patient-centeredness relate to more subjective indicators, such as patient-reported regret and satisfaction.

The persistence of sterilization as a form of modern family planning control is predicated on the assumption that these procedures are undertaken without coercion and with the informed consent of patients. As a result, a contemporary understanding of the degree to which patients do have the factors in place required for free and informed consent would be foundational. While often framed as a historical practice or limited to isolated cases, in this thesis, I find that routinized forms of coercive sterilization care (e.g. uninformed consent, or lack of alternative options) are a widespread and contemporary issue. Made up of four related empirical papers, this dissertation examines how we think about and measure consent, and in turn quantify human rights abuses amongst sterilized women.

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[1] *Female sterilization refers largely to targeted surgical procedures that result in permanently curtailed fertility, such as: a hysterectomy or tubal ligation. The majority of female sterilizations are conducted surgically, however there are non-surgical interventions intended to permanently curtail fertility (e.g. Erythromycin) and other surgical procedures or interventions that may inadvertently result in curtailed fertility (e.g. adverse events in gynecological surgery). In this thesis, I focus on tubal ligation procedures (the most common form of female sterilization) amongst people who self-identify or are identified by survey enumerators as female.*

This work focuses specifically on care in India due to a number of factors, including: the high share of sterilization as a form of modern family planning and the high absolute number of tubal ligation procedures conducted annually (See Section 1.2.4.).

1.2. Motivation

In the context of high national prevalence, several recent cases have shed light on the contemporary persistence of harmful female sterilization care in India. These cases have been acute, striking and often garner public attention.[11] For example: in November of 2014, 83 women were sterilized over the course of a 1.5 hour period in Takhtpur block in Sakri at Nemi Chand Jain Hospital (a non-operational, abandoned, facility).[12] Two days later, the same clinical team conducted 54 sterilizations at three other nearby sites in the central Indian state of Chandigarh.[13] After being sterilized, at least 60 women began experiencing burning sensations, vomiting, abdominal pain and trouble breathing for which they were referred to two nearby hospitals.[13] In rapid succession after arriving at the hospital, 13 of the admitted women died.

While the deaths occurred in hospitals, their surgical care was administered in what is commonly referred to as a "sterilization camp" or a fixed location in which multiple laparoscopic tubal ligations are conducted in succession – often by traveling physicians from a nearby city. While not always rural, many camps are intentionally set up in areas with limited access to secondary or tertiary care. In this case, a retired surgeon traveled to a designated camp on a scheduled day. Local motivators, members of India's Accredited Social Health Activist (ASHA) or community health worker cadre, would identify women in the months leading up to a "camp day" that might be interested in receiving a sterilizing procedure.[14] The camp day and location would then be communicated within the catchment area – in an effort to maximize the number of individuals undergoing the procedure in each sitting and efficiently leverage the traveling surgeon's time. On the day of the camp temporary medical infrastructure would be set up (e.g. operating table, waiting wards, etc.) generally in a space that was not in use, sometimes school buildings on weekends, or in the case of Chandigarh, an abandoned hospital. Functionally, the camps served as "pop-up" operating theaters, providing one service: female sterilizations.

Certain aspects of the Chandigarh case were particularly striking and highlighted by multiple international news outlets: there was no running water in the abandoned hospital, 83 procedures were conducted in 1.5 hours, the clinical team used bicycle pumps to introduce air into women's abdomens during procedures (generally done with an insufflator).[15] In addition, women lay en masse on bare mattresses, on the floor, following the procedures – resulting in striking photographs that visually conveyed the sheer volume at which these procedures were taking place. The New York Times, Washington Post and other international news outlets featured pieces on the sterilization camp deaths, chastising the camp model as inherently unsafe and rights-violating.[16,17]

In line with this, four doctors were suspended immediately following the deaths and an enquiry report concluded that the national clinical practice guidelines for sterilization set by the government of India had not been followed (e.g. sterilization of surgical tools between procedures, volume of procedures and consent processes). The primary surgeon operating on the deceased women, Dr. R. K. Gupta, was found to have used the same gloves, syringe, and sutures on all the eighty-three women, potentially causing the life-threatening infections.[18] Another potential cause of death was the use of substandard Ibuprofen and Ciprofloxacin prescribed post-operatively with additional superfluous harmful active pharmaceutical ingredients (API), though lab tests of the medicines were incomplete.[19] The exact clinical cause is unclear, but it appears a confluence of unsafe conditions contributed to the 14 deaths.

Dr. Gupta, the primary surgeon, was ultimately acquitted after the prosecution argued that the investigation did not have the State government's sanction necessary to prosecute a public servant.[13] A 2016 piece entitled *Victims of the Number Game* and published in The Hindu, cited Dr. Gupta as stating: "If I am wrong, all my senior officials are also in the wrong. They gave me these targets. They knew exactly what was happening."[19] Population health experts in India have critiqued the government for absolving individual physicians of responsibility for medical negligence, but reproductive rights advocates broadly align with this sentiment – that the Chandigarh deaths, while tragic, were reflective of much broader systemic issues, not the fault of individual physicians.[13,18,20] Specifically, a government-wide focus on ensuring as many women as possible are "covered" by modern family planning (mFP) methods, with a near exclusive focus on the provision of female sterilization to meet these numerically driven quotas.[12] The single-minded focus on sterilization, in turn, has provided women with little practical alternative if they want to curtail their fertility but do not want to be sterilized. This contrasts with public statements from the central government, which since 1994, has repeatedly claimed the national program (still focusing on sterilization) is driven by patient demand rather than supply-side pressure, such as numerical targets.[21]

Raising further issue, a small number of studies conducted from 2017 – 2022 suggest a sizable minority of women who underwent sterilizing procedures were not told that the procedure was permanent.[22–24] This work has striking implications: even if women do "demand" sterilization services, or "choose" to undergo a procedure, they may not be actively choosing to forgo the ability to have children *forever*. In addition, multiple qualitative studies have found the receipt of other forms of reproductive care (e.g. abortion), may be made contingent on undergoing a sterilization procedure in certain states.[25] Lack of access to alternate mFP options, even in the case of full knowledge or the threat of withholding care, is another factor that may bias women towards sterilization care even if they do not want to permanently curtail their fertility. These studies raise concern and support assertions from activists that the prominence of sterilization care may be systems-driven rather than purely a reflection of patient demand or limited to a series of acute, but isolated, events. In this context, the Chandigarh deaths shed light on what appears to be a much broader, and more complicated, set of issues surrounding the contemporary prevalence of sterilization care in India and the extent to which these procedures are chosen by the women undergoing them.

Motivated by this discordance – between the public (exclusive) support of rights-based reproductive care and consistent reports of rights violations from Indian patients, physicians, and advocates; I aim to re-examine this issue quantitively. I attempt to better understand and disentangle issues of patient centeredness in sterilization care by focusing on pre-conditions for consent. I use a definition of reproductive autonomy proposed by Leigh Senderowicz in her 2020 piece, Contraceptive Autonomy: Conceptions and Measurement of a Novel Family Planning Indicator: "*Contraceptive autonomy is defined… as the factors that need to be in place in order for a person to decide for themselves what they want in regards to contraceptive use, and then to realize that decision*."[26] I assess factors required for someone to consent to a sterilization procedure in line with the 2014 interagency report on coercive and otherwise involuntary sterilization led by the World Health Organization

(WHO).[27] As a result, the work presented in this thesis is not a direct assessment of choice, but rather an assessment of whether healthcare providers are meeting basic pre-conditions required for a person to choose sterilization.

I take this approach because: 1.) Responsibility lies clearly within the purview of the health system (e.g. communicating to patients that a sterilizing procedure is permanent), 2.) Digression is measurable (with a series of more objective process measures collected from patients themselves) and 3.) Assessing if pre-conditions for consent are met answers a fundamental question: <u>is coercion a persistent and more fundamental issue in contemporary Indian sterilization care?</u> Given the aforementioned discordance, there is a concurrent need to critically explore how we measure this issue and hold health systems to account, which necessitates a more in-depth examination of item #2 that assesses and problematizes status quo approaches in assessing patient centerdness.

1.2.1. How Did we Get Here: A Persistent Emergency

India has a long and complicated history with sterilization care. While the more contemporary camp deaths made global headlines, India's history with coercive sterilization often centers on a period in the 1970s known as "the Emergency," a period in which men were overtly forced or otherwise pressured into undergoing vasectomy surgeries during a state of unrestricted government rule.[28]

In 1975, Prime Minister Indira Gandhi declared the "State of Emergency" which suspended the constitution, imprisoned over 100 thousand opponents, and effectively expanded the powers of the central government.[29] Initially posed as an effort to ensure national stability in a country faced with civil unrest, the justification for the period was quickly re-framed as a program to promote economic development with population control as a crucial strategy to building an economically viable, independent India.[30] In line with this, the government initiated a compulsory sterilization program in the same year.[31] While the Emergency included a series of acts that extended state power, such as the Internal Security Act, which allowed the government to detain prisoners without charge; sterilization quickly became its principal program.[30] In interviews, men who underwent vasectomies during this period are cited as remembering the Emergency as *nasbandi ka vakt* (or "the time of sterilization"), often using the terms "emergency" and "sterilization," intechangably.[32]

The implementation of the forced sterilization campaign in 1975-77 over a 21-month period was carried out at the district level by "collectors" who received targets for the number of sterilizations required by their state Chief Minister who, in turn, was acting on orders of the central government.[31] However, how to meet these targets was left to state governments and decentralized further under the purview of de-centrally operating district collectors.[31] For the first time since India's independence, the police of many districts were conscripted to roll out a social program – in this case, directly involved in "motivating" men to undergo vasectomies.[33] While there were reports of police forcing men into vasectomy booths at gunpoint, the use of less acute forms of physical force were also widespread; men forcibly removed from trains, taken from homes, removed from shops, etc. Not only the police but a range of other government officials, such as railway ticket-inspectors, schoolteachers, public-works department contractors, and show owners were given kick-backs to meet sterilization quotas by whatever means necessary.[34]

Given the blatant use of state force during this period, it is often referenced as the hallmark example of "coercive" sterilization care in India. But even before the 1970s, India had made significant investments in sterilization care and utilized quota approaches to meet volume-based goals.[35] It was the first country to develop a national family planning program (1951) amidst a much broader global agenda to control what was viewed as unmitigated population growth, particularly in poorer nations.[36] India's program both proceeded similar efforts in other countries in terms of timing and received dramatically more intentional aid. This was motivated, in part, by an emerging body of research on the topic of population control.[36] One branch of emerging economic research began to quantitively tackle the relative effectiveness of population control interventions, for example a 1960 analysis by Stephen Enke suggested that providing financial incentives to accepters of sterilization could be more than 250 times more effective than other forms of development aid.[37] Simultaneously, books oriented toward popular audiences, such as Paul Ehrlich's 1968 *The Population Bomb*, were released with stark warnings to the public of the potential impending crisis of an exponentially expanding global population and the consequent starvation of "over a hundred million" people.

In this environment, India was the recipient of a dramatic and continuous stream of international aid. The World Bank alone provided the Indian government with a loan for family planning worth $66 million dollars between 1972 and 1980.[28] However the aid was not without contingencies. For example, a large share of the World Bank loan was earmarked exclusively for sterilization. In addition to direct contingencies, in 1965, President Lyndon B. Johnson refused to provide food aid to India, which at the time was threatened by impending famine, until it agreed to incentivize sterilization or IUDs.[38] When Prime Minister Gandhi initiated the emergency in 1975, it was supported by the World Bank – whose president at the time, Robert McNamara, visited the country to demonstrate his backing of the Emergency efforts. International public officials denounced "compulsion" but supported "gentle pressure of a civilized nature."[36] The World Bank, Sweden, and the International Planned Parenthood Federation (IPPF), for example, all *increased* funding during this period and in just 12 months, the government was able to carry out more than eight million sterilizations.[36] The program was stopped in 1977 with growing backlash from the Indian public – but until its conclusion was still supported, financially if not vocally, by international donors. In the years following the Emergency period, multi-lateral agencies continued to actively laud these efforts: Prime Minister Gandhi was awarded the UN Population Award in 1983 for "Outstanding contribution to the awareness of population questions or to their solutions."[39]

Directly following the Emergency, a body of scholarship emerged critiquing coercive efforts undertaken during the period as "self-defeating" i.e. resulting in increased animosity towards the National Family Planning Program and, in turn, leading to lower rates of overall contraceptive uptake.[29,40,41] However, in the early 1980s, demographer Alaka Basu identified a contrasting trend. While the above concern seemed to apply to vasectomies, female sterilization was *rising* at a striking rate following the emergency's conclusion. In 1976-77 (the Emergency period), over 8 million sterilizing procedures were reported within the Ministry of Health and Family's annual yearbook. Of these, only 25% were tubal ligations. After the 1977 calendar year, the pattern reverses – with no year at less than 70% female sterilization following the Emergency (Figure 1.1). In 1982-3, for example, only 15% of sterilizations were vasectomies. Immediately after the Emergency, this is due in parge part to the striking decline in vasectomies – but the volume of procedures rises quickly in the years following with four million sterilizations occurring in 1982-3, of which approximately 85% were tubectomies.

Figure 1.1. Vasectomy and Tubectomy Procedures Conducted in India by Year During and Directly Following the 1976-77 Emergency Period

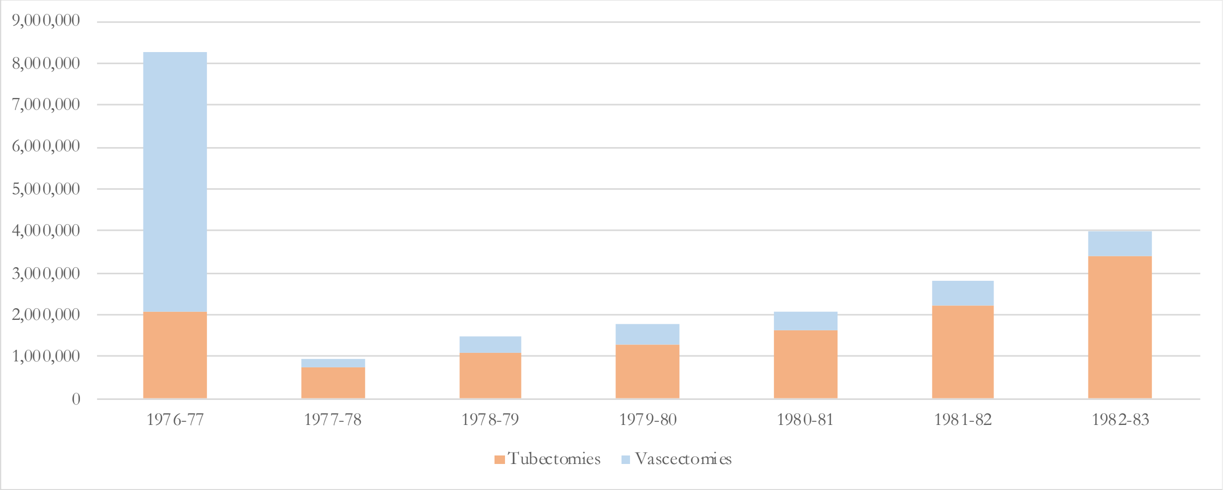


**Figure by author, data adapted from Basu, 1985 aggregated from the Ministry of Health and Family Welfare "Annual Yearbook, 1982-83," Government of India, 1984.*

Basu explored three hypotheses regarding the rise in female sterilization in the late 1970s and early 1980s:

1.) Greater post-Emergency resistance to sterilization amongst males,
2.) Marked acceptor preference for tubectomy over vasectomy, and
3.) Greater promotion of tubectomy than vasectomy by the family planning program.

A high ratio of female to male sterilization is not, in its own right, normatively problematic as Basu explores in her second hypothesis – a higher client preference for tubectomy might drive differential ratios. However, she ultimately lands on the final hypothesis: "*The changes in the pattern of sterilization acceptance revealed in [Figure 1.1] reflect not so much the vagaries of consumer demand as the changing preferences of the official family planning program itself.*"[42] In brief, she posits the government "over-corrected" for their focus on vasectomy care following the Emergency period. She cites an immediate post-Emergency need to de-emphasize vasectomy as the country's primary method of birth control, which was rationalized both politically and also strategically, allowing the central government to re-orient capacity amassed during the Emergency, reemploying that capacity with a similar procedure, but different patient population.[42] Basu also hypothesizes that in the 1970s women, unlike men, were more likely to lack the group capability to protest – which is what ultimately led to the conclusion to the Emergency period. This was further complicated by women's demand for *some* form of birth control even if tubectomy was not the preferred method.[42] Her hypothesis – that the shift from male to female sterilization was government driven - was reaffirmed at the conclusion of the 1983 Conference on Vasectomy – which concluded with a statement that the greatest hindrance to increased acceptance of vasectomy appeared to be the lack of services made available [by the government] in appropriate settings.[43]

Supporting this line of thought is a broader characterization of India's history with sterilization care prior to the Emergency. Since the early 1980s and even in its immediate aftermath, a smaller subset of scholars have argued that the Emergency – while stark and bounded - was not unique.[33] According to Gwatkin, for example, the Emergency was different not because of the novelty of methods employed, but simply because they were implemented more vigorously and with a larger number of patients than prior events with comparable intent.[29] A similar view was expressed by D. Banerji at the onset of the Emergency, though he extended this argument to as early as the mid-1960s, where he notes a clear escalation of coercion and violence in the implementation of the government's reproductive programming.[44] Clinics that focused exclusively on providing sterilization services were established in the 1960s and quotas for sterilizations were declared in 1966 in line with pressure from foreign donors.[35] Family planning was further politicized in 1971, and a high population growth rate was framed as an incipient economic disaster by the government. These scholars highlight that the primary form of contraception promoted by the government of India was sterilization prior to the Emergency and in the early years of the program, it was still target-driven (i.e. local governments might be rewarded based on the volume of individuals sterilized, asked to meet monthly or annual quota).[31]

The recognition of pre-Emergency trends towards coercive or, at minimum, target-driven sterilization care, aligns with Basu's work following the Emergency – highlighting a clear and longstanding focus on sterilization even outside any acute example or bounded period of unrestricted government rule. The marked demographic shift towards women (albeit in someone less striking absolute numbers) is not cause for concern in isolation, but appears to mirror a longer history of intentionally centering sterilization care within national programming.

1.2.2. Evolving Methods of Sterilization

One factor that may have been central to facilitating the growing volume of female sterilizations conducted in India in the wake of the more concerted Emergency efforts was the introduction of laparoscopic surgical methods in the 1980s and higher capacity for clinical acuity more broadly.[45,46] Laparoscopic tubectomy, for example, involves a small incision in the abdomen (often through the umbilicus) and allows the surgery to take place quickly and in an outpatient setting, also known as an interval tubal ligation (Table 1.1).[42] While it had previously been markedly easier to conduct a vasectomy in an outpatient setting, it became relatively straightforward to do so for a tubectomy as well. In India, the shift towards laparoscopic methods of sterilization began in the 1980s with differential rates of uptake at the state level; with Rajasthan and Uttar Pradesh at almost 100% laparoscopic by 1983.[42] States with higher uptake of laparoscopic surgery also had higher female to male sterilization ratios.[42]

In Organization for Economic Cooperation and Development (OECD) countries, and certain Indian states, laparoscopy and hysteroscopic sterilizations are the most common surgical methods used for female sterilization, but in a number of states, mini-laparotomy and caesarean tubal ligation remain common.[47] Both the addition of laparoscopic methods and an increase in basic surgical capacity allowed for the more widespread practice of both interval tubal ligation (in the first case), and postpartum tubal ligation (in the latter). For example, following a vaginal delivery, a tubal ligation can be performed at any point within the 24-hour period directly following a birth. In cases of caesarean section, the same incision can be used to both birth the baby and conduct a tubal ligation surgery.

Table 1.1. Tubal Ligation Procedure Types (by Incision Type) and Corresponding Considerations

Procedure Type^		Description	Common Timing	Materials
Laparotomy	General	Performed with a larger incision in the abdomen	• Interval • Concurrent with caesarean	Requires less sophisticated clinical equipment, and less technical skill to perform
	Mini-Lap	Common in India; involves an abdominal incision larger than laparoscopic surgery, though smaller than general laparotomy	• Immediate postpartum • Post abortion	

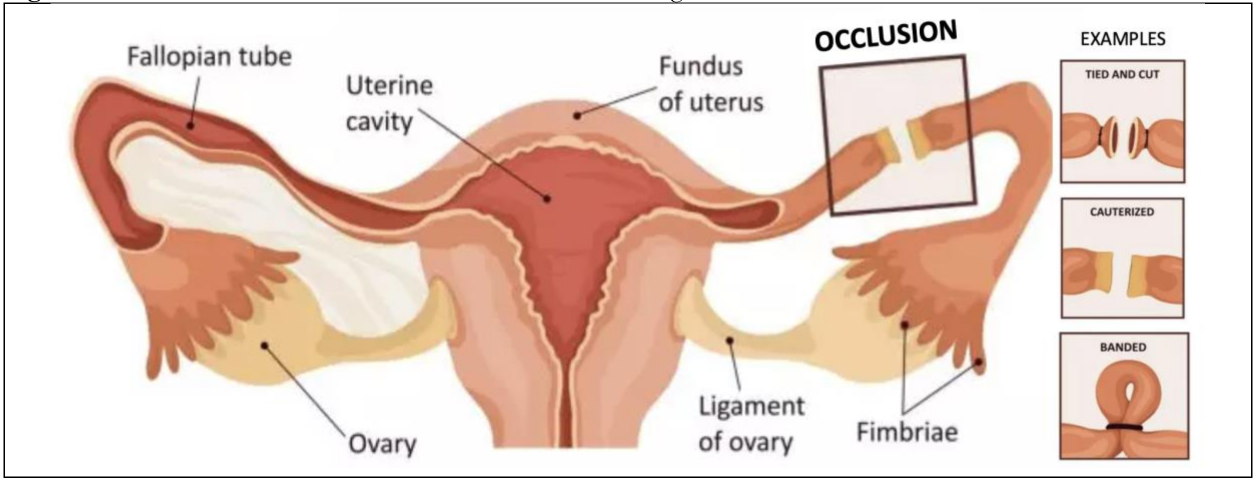
		and is often performed at the time of, or just after, childbirth		
Laparoscopy		Most common in OECD nations; fiber-optic device inserted through the abdominal wall with a "keyhole" incision, generally at the bellybutton.	• Interval • Post abortion (first trimester)	Fiber-optic device and more advanced surgical skill (i.e. trained clinical personnel)

^Procedure type is organized by method of incision, an additional point of entry is vaginal.

Uptake of laparoscopic methods also coincided with a rise in facility-based childbirth in the late 1970s and early 1980s. According to a national survey by the Registrar General in 1979 (Registrar General of India, 1981), in Kerala and Tamil Nadu, approximately half of all births occurred in medical institutions as early as 1979. This aligned with a similar, though slower trend throughout the rest of the country.[42] The increase in facility-based delivery and advances in surgical methods, though separate phenomena, did make it convenient to combine a delivery with a sterilization procedure. In 1982, as many as 334 thousand postpartum tubectomies, or approximately 10% of all sterilizations, were performed under the family planning program (Ministry of Health and Family Welfare, 1984).[42]

High rates of concurrent procedures were possible, in part, due to advancement in laparotomy techniques, such as the MiniLap – requiring a smaller incision and often employing small, easy to insert "clips" to close tubes (Table 1.2; Figure 1.2). Whereas the clinically straightforward process of conducting laparoscopic tubectomies also made outpatient procedures more straightforward. While technically challenging, the laparoscopic procedure could be conducted quickly and, in an outpatient, setting or with minimal elongation of stay in the case of childbirth. The entire procedure, while technically complex, could take as little as five minutes for a skilled surgeon or other health professional with technical training. Once an insertion was made, a number of different methods could be used to block fallopian tubes (Figure 1.3).

Figure 1.2. Visual Overview of Occlusion Methods for Tubal Ligation



Base image in figure adapted from 2003-22 Shutterstock, Inc with full permissions for re-use and adaptation.

The most commonly reported method in India, with the highest assumed contemporary prevalence, are: Hulka clips, The Falope ring and cauterization via electrocoagulation. To conduct the procedure with Hulka clips, women are placed in a lithotomy position, the bladder is emptied and a speculum is placed in the vagina. The cervix is then washed, in India this is generally done with a povidone-iodine solution.[48] A uterine manipulator (e.g. Hulka clip) is inserted in the vagina and attached to the anterior part of the cervix. A pneumoperitoneum is created by inserting a needle into the peritoneal cavity, and insufflation with gas is begun. The tocar and surrounding sheath are then inserted through a small subumbilical incision.

These techniques, developed in the 1980s, remain the dominant methods of tubal ligation in India today. However, the evidence regarding both laparotomy and laparoscopic sterilization and safety in India is limited to single-site studies, many of which are also from that time period. International estimates suggest the failure rate, i.e. the chance of becoming pregnant after the operation, is approximately one in 200 and the rate of complication approximately one in 100 with the risk of death at three in 100,000 procedures.[49] The studies that do exist in India suggest very low complication rates. For example, a survey from India covering 240,036 tubal ligation procedures found a complication rate of less than 2%, with a 1% wound infection rate.[45] In another survey covering 10,100 patients, 78.1% reported no pain at all, while less than 4% had pain after 7 days.[45(p100)] A survey completed by The Indian Council of Medical Research (1982) found a mortality rate of 62 of 100,000 one month following the procedure.[50] These numbers are strikingly low given consistent reports by human rights advocates of re-used surgical equipment and other safety breaches.[20,51] The low reported rates may be driven in part, by conflicts of interest in academic medical publishing of these studies. Both studies cited above, for example, were conducted by the same physician researcher and over 250 thousand of the surgeries examined in the studies were conducted by that same surgeon.[46] Qualitative reports suggest that in some clinical settings, there is no (or minimal) follow up outside of the immediate post-surgical period[50,52] – this, paired with barriers to accessing care and attendant opportunity costs for patients who do want to follow up but are not able, suggest the estimates of physical harm are likely an undercount of the true prevalence of adverse surgical events following sterilizing procedures.

1.2.3. A Conflicting Modern History

With minimal published evidence that patients undergoing sterilization care were subject to physical risk and increasing programmatic focus from the central government, sterilization remained the dominant form of mFP in the 1990s. This period, however, has been marked by inconsistencies: discursive support for rights-affirming reproductive care (e.g. declarations of support for international efforts centering women's rights), but consistent and acute examples of rights abuses. Human rights reports and legal cases in the 1990s and more recently point to the continued persistence of care that values government priorities over those of the patient.

For India, and other national participants, there was a marked shift in language surrounding reproductive programming in the mid 1990s. The 1994 International Conference on Population and Development (ICPD), for example, signaled a decisive shift away from target-setting to an emphasis on women's rights and ultimately empowerment. In line with other country-level commitments following the ICPD, in 1996 the government of India announced a new national population policy that eliminated numerical targets for new contraceptive acceptors.[53] Five factors have been identified as playing a role in the evolution from target setting to a target-free policy:[53]

1) The research of India's academics;
2) The work of women's health advocates;
3) The support of officials in the state bureaucracy who approved the target-free approach;

4) The influence of the donors to India's family planning program, especially the World Bank; and
5) The International Conference on Population and Development.

In line with this, in October of 1997, India announced a near re-launch of the national family planning program that radically deviated from prior programming - more broadly addressing health and family limitation needs as opposed to the number of women utilizing a mFP option.[54] The new approach prioritized making a more comprehensive set of reproductive and child health services available and a focus on client choice, service quality, gender issues and underserved groups.[54] This was followed by the 1999 release of India's first national guidelines for sterilization care, which codified clear criteria for safe and patient-centered sterilizations.

However, after the new program was announced and implemented, there have been a number of reports and legal cases filed indicating both unsafe conditions and the presence of coercive pressure placed on patients undergoing sterilizations. For example, in 2002, a case was filed by Ramakant Rai v. the Union of India. The case cited data from the States of Uttar Pradesh, Bihar, and Maharashtra, regarding government practices regarding female sterilization.[55] The case stated that procedures often lacked counseling or informed consent, lacked appropriate pre- and post-operative care, and included unhygienic and un-anesthetized operating conditions, sterilization of minors, coercion and cruelty.[55] Public interest litigation (PIL) requested that the Court direct state governments to comply with the Ministry of Health and Family Welfare's Guidelines on Standards of Female Sterilization, enacted in October 1999.[55] The case asserted that the current sterilization conditions violated not only the national guidelines, but patients' reproductive rights, women's rights, and health rights as articulated in international instruments ratified by India, including the Alma Alta Declaration, the Convention on the Elimination of All Forms of Discrimination (CEDAW) and the Beijing Platform for Action.[55] The case also concluded that the reported conditions violated patients' constitutional right to health, part of the "right to life" enshrined in Articles 14, 15, 21, and 47 of the Indian Constitution.[55]

While the Rai case resulted in updated guidelines and a compensation scheme for women who had undergone failed or unsafe sterilizations, nearly ten years later, in 2012, a Human Rights Watch (HRW) report mirrored many of the same findings.[20,56] The report also focused on the government's role in setting and placing continued pressure at the clinical level on meeting numerical mFP coverage targets, citing this as a key driver of rights violations.[20] For example, the report stated that in much of the country, authorities were still "aggressively" pursuing targets, especially for female sterilization. This included reprisal in addition to more positive incentives, for example withholding pay or threat of dismissal.[20] "Health workers who miss sterilization targets because they give proper counseling and accurate information about contraception risk losing their jobs in many parts of the country," Aruna Kashyap, a women's rights researcher at HRW, is cited.[20] In all, more than 50 health workers were interviewed for the report and consistently communicated to HRW that district and sub-district authorities assigned individual yearly targets for contraceptives; paying more, or in some cases exclusively, for sterilization. While vasectomies were also incentivized, they hypothesized that India's history of forced male sterilization and ASHA workers serving as "motivators" (an exclusively female cadre), drove concern regarding female sterilization as the primary target of centralized programs promoting sterilization care and compromising reproductive rights.

Throughout the report, HRW highlighted issues with the quality and nature of information that health workers provided women and their families to convince them to be sterilized, raising concern regarding informed consent. The report quoted one “motivator” stating: “*I tell these women you can get yourself operated. They put rings inside and tie the birth tubes and you can go back to the doctor and take the rings out if you want to have children again*.”[20] This information, and other similar quotes, were inaccurate and contradictory to the guidance provided in the national Standards for Female and Male Sterilization care, which highlighted the importance of communicating permanence – stressing that tubal ligation was both difficult and expensive to reverse.[48] Multiple health workers reported that women came back to them asking to reverse the sterilizing procedure – indicating clear gaps in information provision.[20] In addition, several other interviewees reported that female sterilization procedures had failed; resulting in subsequent pregnancy (failure rates are estimated at less than 3%, but communicating this risk is required in national protocols).[20] Of the 50 health workers interviewed, none had discussed these possibilities with women before referring them to clinics for sterilization.

At the same time, public discourse since the 1990s has centered women’s rights. For example, on July 11, 2012 the same year that the HRW report was released, at the London Summit for Family Planning, the Indian government announced that it had successfully brought about “a paradigm shift” in its approach – away from targets and coercion and towards rights-affirming care.[20] The Indian government announced that its new strategy focused on “making contraceptives available at the doorstep through 860,000 community health workers,” providing services for inserting intrauterine devices (IUDs) on fixed days in public health facilities, and improving post-natal services, especially in those public health facilities that have large numbers of women coming to give birth. But an ongoing focus by the Indian central, and in turn state governments, on achieving numerical targets for use of contraception, especially female sterilization, appears to persist even after the 2012 summit. Another public interest litigation was filed with the Indian Supreme Court in 2012, reiterating many of the complaints filed in 2002. The case, Devika Biswas v. Union of India,[51] was filed by a health rights activist alleging lack of informed consent and poor quality services when 53 women were sterilized in Bihar state within two hours. The filing included clear first-hand evidence collected from random site visits to sterilization camps and other facilities. These filings align with, but proceeded, the 14 deaths in Chhattisgarh outlined above.

1.2.4. Contemporary Prevalence

The more contemporary reports of rights-abuses are particularly concerning as female sterilization (FS) continues to dominate the field of contraceptive use in India today – of the 40.6% of women aged 15-49 who were utilizing any modern method of family planning in 2020, over three quarters (76.2%) were sterilized. While female sterilization is popular across countries, India is unique in the high share of tubal ligation procedures amongst women using a modern family planning method. In contrast, the mean share of mFP users who are sterilized across Family Planning 2020 (FP2020) countries excluding India was only 7.3% as of 2020, nearly ten times lower than India (Figure 1.3). Again, a concentrated mFP method mix or high share of one method is not normatively “bad” in its own right, but it does raise questions regarding whether this concentration reflects the preferences of patients. A stark example is the Democratic People’s Republic (DPR) of Korea, which has the highest modern contraceptive prevalence rate of any FP2020 focus country (54%) yet, by far, the most concentrated family planning “market” with a HHI of 9,040 (highly concentrated) where over 95% of modern family planning users are utilizing an inter-uterine device (IUD). Looking at concentration alone provides a limited window into the family planning landscape, for example: women in DPR Korea *may* have a higher baseline preference for IUDs than individuals in other countries. Similarly, women in India may have a higher baseline preference for tubal ligation. And the relationship may not be straightforward: if a single method is normalized for decades, this may self-perpetuate its permeance over time.[57] However, a high method concentration does raise concern regarding choices available to women at the point of purchase and knowledge of alternate options, both factors that can be improved by efforts within the purview of the health system.

Figure 1.3. Method Mix Amongst All Modern Family Planning Users in FP2020 Countries, 2020 or Closest Year

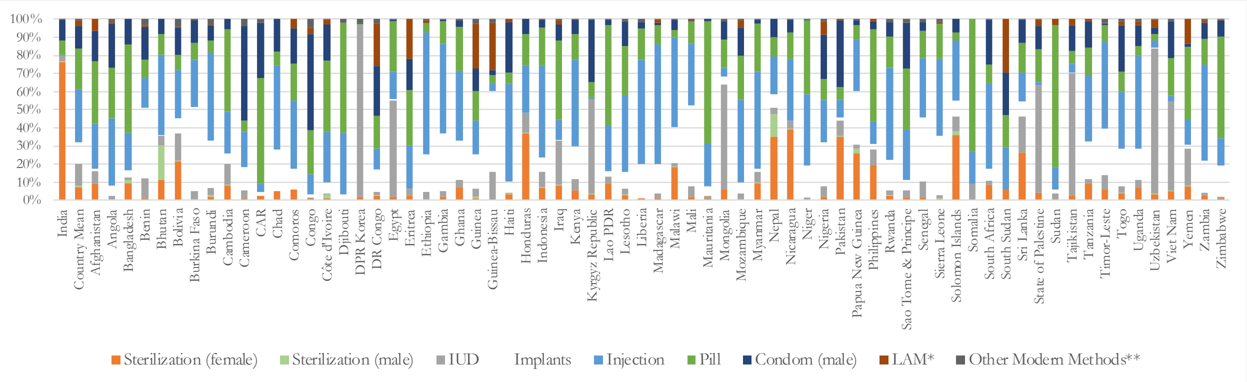
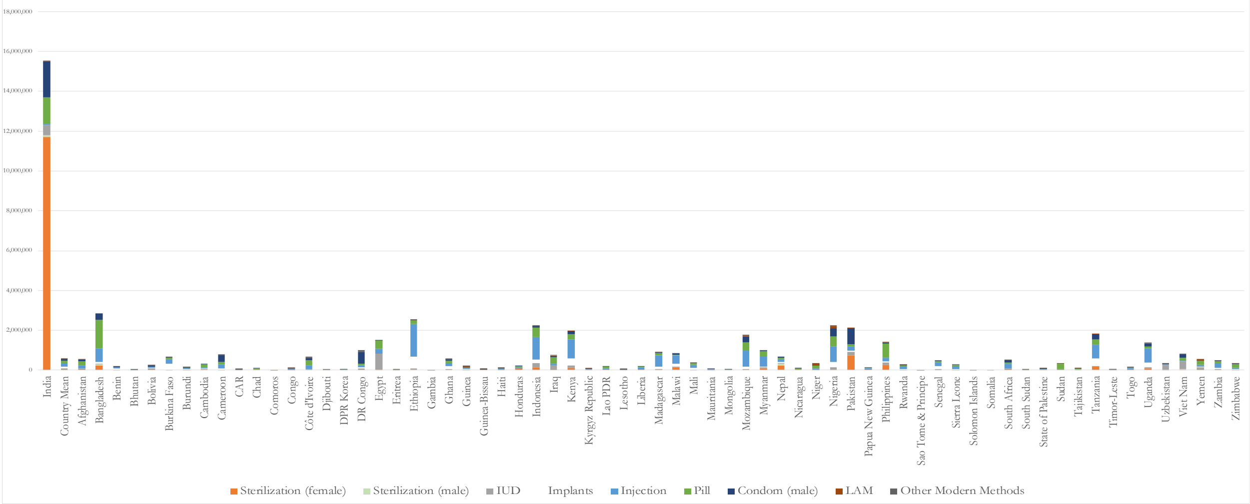


Figure by author, data: Family Planning 2020 Core Indicator Estimates 2019-2020 Progress Report - Indicator 9: Percentage of Women Using Each Modern Method of Contraception, 2020 or Latest Year.
**Lactational Amenorrhea Method (LAM) was excluded from MCP in Chad, CAR, Cameroon, and Somalia due to high levels reported in MICS surveys.*
***Other Modern Methods includes female condoms, diaphragm, foam, jelly, Standard Days Method, and emergency contraception.*

Beyond having a uniquely high share of sterilizations, India is also unique in terms of the current number of women who identify as having undergone a sterilizing procedure overall – or volume of sterilizing procedures. Looking at the total population of women 15-49 reporting use of a modern contraceptive method, India has by far the highest absolute number who are sterilized (Figure 1.4). Currently, approximately 4 million sterilizations are performed in India annually.

Figure 1.4. Absolute Number of Currently Sterilized Women Amongst All Modern Family Planning Users Aged 15 - 49 in FP2020 Countries, 2020 or Closest Year



While these number are striking, tubal ligation may be a woman's first mFP choice. As noted previously, the procedure has been viewed as a relatively safe one-time surgery that mitigates the need for routine management.[58] In addition, unlike the pill and other pharmacological options, it is not subject to supply chain failures on the side of the health system or routine access barriers on the side of the patient.[59]

Further supporting this patient-driven hypothesis, a 2015 study by Pallikadavath and colleagues found that, similar to other forms of birth control, sterilization is associated with mothers' improved autonomy in household decision-making and freedom of mobility in India.[60] Indeed, given that many women lack viable forms of family planning, human rights are often invoked in the call to expand access to family planning, which includes access to tubal ligation.[61] A small anthropological literature has examined the experiences of women undergoing sterilizing procedures from a qualitative perspective, shedding light on contexts in which these procedures can be rights-affirming. Based on 18 months of fieldwork in rural Rajasthan, for example, Luksaite et al found that many women described and interacted with sterilization as an act of "care" – finding immense relief in managing chronic reproductive suffering, which was previously borne out through repeated unwanted pregnancies, resulting household tasks, caregiving, etc.[62] Through interviews and ethnographic shadowing, this work also revealed concern regarding the ability of the health system (e.g. local health facilities) to consistently meet women's needs or lack of transportation and other forms of infrastructure to seek care. Sterilization, in this context, was viewed as an act of radical self-determination: an act of care particularly relevant given the attendant challenges in accessing the health system and other relevant social factors.

Recognizing that sterilization may be wanted, the previously discussed sterilization camp deaths and other transparently transgressive events provide some substantiation that coercion persists as a contemporary challenge. What these cases do not shed light on is the extent to which coercion is more routinely present in the general population receiving these services. Internationally comparative data on three measures of informed choice sheds some light on this issue. In a 2018 seven country comparison study, Jadhav and Vala-Haynes found that sterilized women in India received less information about side-effects or other methods of family planning than any of the other six study countries examined in the study (all in south Asia or Latin America).[63] These findings were reaffirmed in FP2020 data reports, which provided comparable estimates of the method information index, or MII (a composite indicator of three piece of information: told about side effects, offered other options & told what to do if side effects did occur) across focus countries. India's aggregated data suggested that information provided to sterilized women was below average on multiple fronts. India's MII, for example was lower for sterilized women than other FP2020 countries, but also *within* India – sterilized women had a lower (worse) MII when compared to women utilizing any other form of family planning.[64(p20)]

Taken together, the contemporary prevalence of female sterilization, paired with consistent human rights reports and civil litigations as well as aggregated data on the lack of information provision all raise concern. However, there has been limited empirical work diving into these issues on a national scale and with person-level data. One major factor inhibiting this work has been the lack of a consistent or "quantifiable" definition of coercion in sterilization care provision.

1.3. Uninformed Consent as Coercion

1.3.1. Defining Coercion

While sterilization is a modern form of fertility control – like other methods – this is *only the case* when done with the full, free and informed consent of the woman being sterilized. Involuntary sterilization is considered an act of violence against women or gender-based violence.[65] At the individual level, the designation of violence is relevant given the procedure's invasive nature and the attendant physical, mental and psychological consequences.[66,67] When committed as a part of a widespread or systematic attack against a civilian population, it can have profound societal implications beyond the individual and is considered a crime against humanity, as recognized by the Rome Statute of the International Criminal

Court (ICC).[68] This is particularly relevant given the potential for long-term demographic harm caused by targeting sterilizations amongst specific groups or types of people; an act that has been referred to as reproductive genocide.[69,70]

However, a lack of consensus on what actually constitutes "coercion" has plagued the reproductive care space. While the central government of India only supports voluntary sterilization, the concept "voluntary" is not routinely assessed or accounted for in regional, national or international measures of reproductive care coverage in the country. This rhetorical discordance aligns with broader trends across the reproductive care field. The 1994 International Conference on Population and Development in Cairo, for example, represented a historical turning point and reckoning, where people from around the world demanded an end to family planning programs geared toward population control. The resulting Cairo Programme of Action called for a broader understanding of sexual and reproductive health that emphasize three pillars: rights, access, and quality within family planning programs.[71] Yet, as Senderowicz writes, both rights and quality, are absent from most measurement strategies:

> *"In many ways… the post-Cairo shift toward these pillars has been more successful rhetorically than substantively. While the language used to describe family planning has shifted dramatically in the 25 years since ICPD, changes to how we conceptualize, implement, and evaluate family planning programs have been far less complete.*[26]*"*

For sterilization, the juxtaposition is particularly stark. Despite a commitment to rights-based language, currently all sterilized women (regardless of whether they were coerced), fall into aggregate categories of "modern family planning users." This designation, in turn, contributes to a large share of key development indicators' numerators (e.g. met need for family planning). These indicators center on issues of access to, or use of, reproductive care services as opposed to patients' ability to freely choose those services or their satisfaction with services once received.

However, in 2014 the World Health Organization and six UN Agencies co-produced a report: "*Eliminating forced, coercive and otherwise involuntary sterilization*."[27] The report provided guiding principles for the prevention and elimination of coercive sterilization – but also an actionable definition of what constitutes coercion. Using this framework, coerced sterilization occurs when financial or other incentives, misinformation, or intimidation tactics are used to compel an individual to undergo the procedure.[27] The framework also makes clear that coerced sterilization can occur in the absence of informed consent. Unlike yelling, or physical abuse, coercion in this case may include behavior that is normalized or potentially unknown as a rights-violation to the patient, such as financial incentivization or the provision of partial information.[27,72] Information that is required for informed consent is clearly outlined in the framework and includes factors such as: knowledge that a tubal ligation procedure is permanent, knowledge of alternate family planning option, freedom from misinformation etc. Individuals and societies may have different ideas of how to weigh aspects of the framework, but as a human rights-based document with broad multi-lateral support the intent was to provide a context agnostic rights-based reference i.e. any woman in any country should be told that a tubal ligation procedure is permanent prior to undergoing the procedure, regardless of what they choose to do with that information. As such, the document provides the minimum information required, in any context, to make an informed, full and free decision.

The framework also aligns with work from Radhika Coomaraswamy, Special Rapporteur on Violence Against Women (SRVAW), to outline the attributes and role of state violence, which may be more pervasive and less overt than other forms of violence.[65,71] In identifying actions that should be taken by actors within the health system – the Interagency

Framework similarly situates responsibility at a structural level. This aligns with a longer-standing body of scholarship on structural violence. Structural violence, a term coined by Johan Galtung during the 1960s, describes the role of social structures that stop individuals, groups, and societies from reaching their full potential.[73] In its general usage, the word "violence" often refers to physical acts; however, according to Galtung, violence also extends to the "avoidable impairment of fundamental human needs or…the impairment of human life, which lowers the actual degree to which someone is able to meet their needs below that which would otherwise be possible."[74] In turn, structural violence in healthcare is often embedded in longstanding social structures, normalized by institutions and regular experience.[73,74] Because violations are ordinary, they may appear almost invisible. Disparate access to mFP options, restrictions on political power, and legal standing are a few examples. The idea of structural violence is linked closely to social injustice and the social machinery of oppression.[75]

Objective measures of patient-centeredness, such as the provision of informed consent, are one route through which to assess this issue. There are a number of papers on correlates and drivers of sterilization regret.[7–10] There is a smaller, related, literature on patient-reported satisfaction with sterilization care that finds high rates of overall service satisfaction.[76,77] Bansal and Dwivedi's 2020 work connects these two concepts, suggesting patients with low care ratings at the time of procedure are more likely to later express regret.[78] There is one paper that calculates a Method Information Index (MII) amongst young women in India.[7] However, we lack a nationally representative quantification of more objective rights-based aspects of patient-centeredness (such as being informed of the procedure's permanence) amongst sterilized women and how objective measures of patient-centeredness relate to more subjective indicators, such as patient-reported regret and satisfaction. The increasing prevalence of sterilization as a form of modern family planning control is predicated on the assumption that these procedures are undertaken without coercion and with the informed consent of patients. As a result, a contemporary understanding of the degree to which patients do have the factors in place required for free and informed consent would be foundational.

1.3.2. Re-Conceptualizing Measurement

Measures that focus on care coverage, such as "met need for contraception" are the standard for assessing national progress on family planning. However, a growing body of literature suggests these measures – which focus on the volume of women utilizing mFP methods – pay inadequate attention to women's' autonomy or satisfaction with their contraceptive method.[26,79,80] For example, in 2019 Sarah Rominski and Rob Stephenson advocated for the revision of how unmet family planning need is conceived and calculated, calling for the active incorporation of women's satisfaction with their current method (essentially counting unsatisfied users as un-covered).[81] Rothschild built on this work by estimating how a re-configuration of the measure would impact coverage estimates in Kenya – finding that estimates of unmet need would increase by a minimum of 25%.[79] Uninformed consent, while recognized as a form of coercion, is not routinely factored into these measures. In a review of quality measures in family planning, Harris et al concluded that a "*Lack of measurement tools that capture negative experiences has resulted in limited data on how many women have these experiences, how coercion happens in different contexts, or how these experiences affect program outcomes*."[82] Uninformed consent is, however, clearly situated within an adjacent literature on disrespect and abuse, which examines mistreatment of women seeking healthcare services more broadly.[72] Yet, this literature focuses primarily on instances of obstetric violence and is rarely used to examine quality of reproductive or sterilization care specifcially.[72,83–85]

With regard to autonomous choice in mFP, in a 2020 piece Senderowicz argued for a broader conceptualization, and in turn measurement strategy, of reproductive coercion in which coercion can manifest through structural forces (even in the absence of intent or ill will). In her piece "Conceptions of a Novel Contraceptive Autonomy Indicator," she proposes removing all family planning users who lack information, access or freedom of choice from the Contraceptive Prevalence Rate.[26] This work problematizes current measurement strategies, but also aims to expand the conversation on reproductive autonomy beyond existing quantitative research that attempts to examine contemporary reproductive coercion focuses on interpersonal relationships, such as the intimate partnership dyad or other familial relations, rather than coercion originating from the health system or state.[86] This aligns with quantitative work by Metheny et al, which identified structural and community-drivers of unmet need across 44 countries; challenging the conceit that unmet need for family planning was an issue of individual preference or sentiment rather than the confluence of more complex structural factors that inform both accessibility and use.[87]

1.4. Research Questions & Structure

The above-discussed gaps in the literature give rise to the central research question of this thesis. If we believe uninformed consent is a form of involuntary female sterilization:

> *To what extent is coercive or otherwise involuntary female sterilization a problem in the routine delivery of healthcare in contemporary India and how can we better assess this issue?*

This thesis aims to answer this question by focusing on contemporary surgical practice patterns. The four primary questions posed in each paper are as follows:

1. Looking at a general population, what is the prevalence of uninformed tubal ligation care in India and what drives it?
2. To what extent did the movement to increase facility-based birth / delivery impact sterilization practice patterns?
3. Are we identifying these rights violations i.e. do standard performance measures used to assess patient-centeredness "pick-up" on issues of uninformed consent?
4. Why might people be satisfied with the receipt of poor-quality care?

This section outlines the four sub-questions that form the empirical work of this thesis, including how they fit together, main methods, findings and contributions. The structure of the thesis is then described.

The first empirical chapter – Chapter 2 – provides the first quantification of a human rights-based framework presented in the WHO's "*Interagency Statement on Eliminating Forced, Coercive and Otherwise Involuntary Sterilization*." This process allows us to better understand who was, and who was not, given the information required to freely consent. The goal of this paper is threefold: to provide the first country-level quantification of contemporary uninformed sterilizations within a nationally representative sample, to understand factors associated with uninformed consent and to identify system-modifiable factors that might improve this issue. I therefore sought to answer the following three research questions, first: what share of women who have undergone a tubal ligation in India did so without the factors in place required for that individual to decide for themselves what they want with regard to contraceptive use, and realize that decision? Second, what patient and facility-level factors are related to the odds of a woman undergoing a sterilization without informed consent? And, finally, to what extent might system-modifiable factors inform the odds of receiving informed consent?

To answer these questions, I use detailed patient-level data from over 188,000 tubal ligation patients. These data were collected through the most recent round of the National Family Health Survey of India, or NFHS-5. As discussed above, this is a large-scale, multi-round survey conducted in a representative sample of households throughout India. I find high rates of uninformed sterilization care, a form of coercion, as defined by the *Interagency Statement on Eliminating Forced, Coercive and Otherwise Involuntary Sterilization.*[88] For example, only 22% of the sterilized population met all preconditions for consent. Examining sub-components of the framework, I find that while nearly 80% *were* informed that the procedure was permanent, this left approximately 20% of women who underwent a sterilizing procedure without understanding they would never be able to have children again. Utilizing a variance decomposition approach I find that, at least for this variable, a large share of variance can be explained by system-modifiable factors. For example, seeing a community health worker (ANC or LHV) explained the most variation in being told that a tubal ligation procedure was permanent. These results are encouraging and may inform policies and care practices that increase the odds of receiving an informed procedure, which is particularly relevant if tubal ligation remains the dominant form of mFP utilized in India.

The second empirical chapter utilizes an earlier round of the same survey tool (NFHS-4) and an instrumental variable approach to better understand and isolate the effect of increasing institutional delivery rates on immediate postpartum sterilization. This study aims to address the following endogeneity issue: prior to India's investment in increasing institutional delivery, states in India with a higher share of facility-based births also had a higher share of sterilizations occurring in the postpartum period. These data raise concern: the push to increase institutional delivery in 2005+ may have also led to more women getting sterilized when they entered facilities to give birth. However, people giving birth in institutions at baseline may also be more likely to receive a postpartum sterilization for other reasons (e.g. access to clinical facilities with surgical capacity, preference for clinical intensity, etc.). This complicates causal estimates: individuals who give birth in facilities likely differ from women birthing in other locations along several important dimensions, such as wealth (observable) or sociocultural preferences for home birth or permanent fertility control (with available data, un-observable). These factors may also align with the odds that a sterilization is consented i.e. affluent women in wealthier states may be able to proactively schedule a postpartum tubal ligation (if this is their preferred mechanism for sterilization) when they give birth if they already decided they wanted this procedure. These issues of unmeasured confounding make it difficult to understand the relationship between increases in facility-based delivery and sterilization. To address this issue, I exploit variation in the policy that drove this shift - the Janani Suraksha Yojana (JSY) program, which provided financial incentives to women if they gave birth in a recognized health facility.

The IV model finds that high rates of institutional delivery at the community level have a statistically significant effect on a woman's odds of being sterilized immediately following childbirth in State Group I (Low Performing States, LPS) and State Group II (Christian-majority states), but not State Group III (wealthier southern states). These findings hold when controlling for receipt of a caesarian-section and key demographic characteristics, such as family wealth, caste, and parity. Using the same model, I find no corresponding uptake in the adoption of other forms of modern family planning (mFP), such as: the pill, IUD or other forms of birth control. In addition, women sterilized in the immediate postpartum period were more likely to express regret with the procedure than their non-postpartum sterilized peers. Taken together, these results suggest that the postpartum period has been leveraged to increase sterilization adoption amongst those who would otherwise not give birth in a facility.

The third empirical chapter – Chapter 4 – focuses on how women rate the quality of their care following the receipt of coercive or otherwise involuntary sterilization. This paper is an attempt to understand if "status quo" measures of person-centeredness (e.g. subjective "satisfaction" ratings) pick up on issues of coercion amongst sterilization patients. I find that women who received coercive care, as defined by an internationally recognized human rights framework, were more likely to report low quality ratings than their peers for three out of four measures of coercion. However, in all cases over 95% of women subject to uninformed sterilization care reported high quality ratings. In other words, 95% of women said they had good care despite being sterilized with uninformed consent (a clear human rights violation). Belonging to a historically marginalized caste made this form of scoring discordance statistically significantly more likely to occur with factors such as time since procedure also playing a role in reporting discordance. Receiving financial compensation, or a conditional cash transfer, for the sterilization (60% of the sample) also decreased the odds of reporting concordance. These findings suggest that while patient quality ratings do provide some signal that uninformed care is occurring, subjective satisfaction ratings may be insufficient to reveal the scale of the problem. In addition, system-modifiable factors such as payment, may mask routinized human rights abuses (via patient report) in the delivery of reproductive care.

The final empirical chapter – Chapter 5 – provides a deeper dive into subjective patient satisfaction ratings. This paper utilizes a multi-pronged assessment of how patients think about, interpret, and in turn rate issues of patient experience and satisfaction. This process adapted standard approaches to survey validation, such as content validity indexing, and involved in-depth interviews as well as focus groups with over 60 patients and providers in public hospitals in Odisha, India. The conclusion of this study was that the HCAHPS tool (Hospital Consumer Assessment of Healthcare Providers and Systems) appeared to preform well when assessed for validity. However, when asked about the relevance of questions posed within the tool for an Indian inpatient setting, interviewees consistently raised concern – expressing doubt that the assessed actions (e.g. provision of information about medications prescribed) would occur in practice. This was at odds with how patients rated the relevance of each item i.e. people thought assessed actions were very important, but did not think they were realistic to expect given current clinical norms.

As a Ph.D. thesis by papers, each of the empirical chapters or articles should be read as a stand-alone piece. However, the thesis presents an overarching narrative, outlined here:

Table 1.2. Overview of the Key Contributions of Empirical Chapters

	Primary Research Question	**What is Known on the Topic**	**What This Chapter Adds**
Chapter 2: Point Prevalence	- What is the prevalence of uninformed tubal ligation in India?	Sterilization is common in India, with human rights reports suggesting isolated instances of coercion; Aggregated data used to assess performance within the context of FP2020 suggests The Method Information Index (MII) is low in India	*Methodological*: Application of WHO framework with quantitative nationally-representative data; Use of a variance decomposition approach and propensity score matching to identify modifiable drivers *Substantive*: Uninformed consent is widespread in routine care delivery; Structural drivers are system-modifiable

Chapter 3: Institutional Delivery	- To what extent did increases in facility-based delivery impact sterilization practice patterns?	India's national conditional cash transfer program was associated with higher facility-based delivery and family planning utilization; even when matching on basic regional characteristics	*Methodological*: Use of an instrumental variable (IV) approach to estimate the effect of increased facility-based births on sterilization practice patterns *Substantive*: Increases in facility-based delivery drives higher rates of sterilization in the immediate postpartum period; Particularly pronounced in non-Hindu regions and accompanied by higher rates of post-sterilization regret
Chapter 4: Reporting Discordance	- Do standard performance measures pick up on uninformed consent?	Non-tubal ligation patients (e.g. during the birthing period) are often unable, or inconsistently able, to pick up on instances of poor technical quality when asked to judge the quality of clinical services they receive	*Methodological*: Use of scoring discordance as an outcome measure to assess relevance of status quo performance measurement (patient satisfaction) *Substantive*: Women who received coercive tubal ligation care were slightly more likely to rate their care poorly, but subjective measures of quality may mask the scale of this issue and receipt of payment for the sterilization was associated with a higher odds of scoring discordance
Chapter 5: Satisfaction^	- Why are people satisfied with bad care?	Satisfaction surveys have been used in high income and a handful of lower income contexts to assess performance – but ratings are often high (over 95%) and provide minimal variation useful for assessing performance	*Methodological*: Mixed-methods approach to assessing content validity and clinical relevance of patient experience and satisfaction measures in an Indian inpatient setting *Substantive*: Patients value many aspects of "patient-centeredness" assessed in high income settings, but do not expect those things to occur in practice; this may bias results that utilize quantitative approaches to assess survey tool relevance in new settings

^This mixed methods study was conducted with the General Inpatient Population, not sterilization patients specifically due to halted in-person data collection during COVID-19.

Each of the empirical chapters is structured similarly, and in line with typical formatting for a medical or social science and medicine journal: the topic and primary questions of interest are presented in the introduction. Additional background information (e.g. on a specific policy or issue of endogeneity) may be provided, after which the data used and the methods are then outlined. Third, the results from the statistical analyses are detailed. And fourth, the main findings are discussed considering the existing literature, the strengths and limitations of the analyses after which a summary of the conclusions are provided.

Finally, Chapter 6 brings together the findings of the empirical chapters, providing more detail and discussion in line with the above table ("What This Chapter Adds"). After a summary of the key findings, how they fit together and discussion of the overarching limitations of the work conducted as part of this thesis, I outline the contributions of the thesis as well as policy implications and potential avenues for future research.

1.5. Data Sources

1.5.1. National Family Health Survey

This section provides an overview of the data sources used in the four empirical chapters of this thesis. Chapters 2 – 4 of this Thesis use different rounds of the National Family Health Survey (NFHS), a Demographic and Health Survey (DHS) derivative survey. NFHS data have enabled assessing trends in and determinants of fertility, infant and child mortality, and gender equity, as well as the utilization of contraception, immunization, and other health services.[89] Four Survey modules (Household, Woman's, Man's, and Biomarker) are fielded in local languages using a Computer Assisted Personal Interviewing (CAPI) approach. The Woman's module includes data on the woman's characteristics, marriage, fertility (including date-specific information on pregnancy and births), contraception, children's immunizations and healthcare, nutrition, reproductive health, sexual behavior, HIV/AIDS, women's empowerment, and domestic violence.

The NFHS program in India has been a critical source of population-level data on contraceptive use in India for nearly three decades. The first round, NFHS-1 was collected in 1992 and 1993, followed by NFHS-2 (2002-03), NFHS-3 (2005–06), NFHS-4 (2015–16) and, most recently, NFHS-5 (2019-21).[89] The Indian central government uses NFHS data to evaluate the government's global commitments, for example: in 2018 Bora and Saikia used the survey to gauge district-level trends toward meeting UN Sustainable Development Goals (SDGs) for newborn and under-five child mortality.[90] For contraceptive access, New et al. examined multiple data sources (NFHS, the Annual Health Surveys, and district-level surveys) in 2017 to identify state-level gaps in reaching the SDG target of having 75% of eligible women with their satisfied demand for modern contraceptives.[91] Similarly, NFHS data have been used to estimate progress toward meeting the global Family Planning 2020 agenda goals of covering an additional 120 million women with reproductive services by 2020.[92] Policymakers have come to expect each NFHS round to provide accurate, and representative, estimates of demographic and social indicators. In NFHS-3, estimates of key population indicators were designed to be representative at the state or national level. In NFHS-4, the survey was expanded dramatically so that representative estimates could also be generated at the district level. In doing so, the overall sample size was increased dramatically (from 124,385 to 699,686). Like NFHS-4, NFHS-5 also provided an adequate sample to generate district-level estimates for a large share of the tool's collected indicators.

Beyond generating estimates of overall reproductive care coverage, the NFHS has also been used to assess sterilization use specifically, including: prevalence, trends, and factors that may influence procedure uptake as well as regret. This includes work demonstrating and affirming the contemporary prominence of sterilization in India (as discussed above), for example a 2014 by Oliveira et al documenting the persistent dominance of female sterilization and a recent 2022 piece by Bansal et al employing an age-cohort approach to assess trends in sterilization by age over time.[93,94] Examining regret: the NFHS has been used to identify demographic factors, such as: age at time of sterilization, death of a child and re-marriage as factors informing the odds a women will say she regrets a sterilizing procedure.[9,10,95] Building on methodology utilized in these papers, this thesis extends on existing work by utilizing a number of variables collected across the NFHS to assess both the technical quality of sterilization services utilizing a human rights framework (as assessed through the provision of information required for consent, discussed below), satisfaction with that care (as assessed through subjective patient quality ratings) and how broader trends in care delivery, that can also be assessed through the NFHS (e.g. facility-based delivery), might impact sterilization care (Table 1.3).

Table 1.3. Overview of National Family Health Survey (NFHS) Rounds Utilized in this Thesis and Corresponding Populations of Interest

Round	Chapters	Overall Sample	Population of Interest
NFHS-4 *Collected: 2015-16*	Chapter 3	699,686 women aged 15-49	- 165,000 women who identify as utilizing sterilization to control fertility
NFHS-5 *Collected: 2019-20*	Chapter 2 Chapter 4	724,115 women aged 15-49	- 181,000 women who identify as utilizing sterilization to control fertility

Throughout this thesis, the term "sterilization" and the populations examined are patients who indicate they are using a family planning method and have been sterilized. As such, the designation is entirely patient-determined and limited to women who identify as sterilized. While the NFHS has been used to identify sterilized women and study demographic trends in prior research, this distinction is important to highlight for several reasons. First: In the latest round of the NFHS over 188 thousand women indicated they were sterilized and just under 21 thousand women indicated they had their uterus removed (i.e. a hysterectomy). However, these categories did not fully overlap - only 10.7 thousand women who indicated removal of uterus (approximately half) also indicated that they were using sterilization as a modern family planning method. As a result the category "sterilized" may be an undercount of women with surgically curtailed fertility. Second: This by definition excludes all women who are sterilized without their knowledge. Third: a positive implication is that in using patient-reported data I can examine the issue at a national level – we lack comparable clinical data across the country of India. Finally, this form of data may be less subject to reporting bias (in contrast to physician populated medical records), but more subject to issue of recall bias.

There are addition limitations, and consideration, when using the NFHS to assess sterilization care. For example: the tool is only fielded to women who are between the ages of 15-49. The median age of sterilization amongst women sampled in NFHS-4 was 25.7 years. This young median age, despite the sampling floor of 15, suggests a high volume of sterilizations occurring amongst younger women and the potential for procedures conducted in un-sampled youth (under 15). In addition, the survey is limited to women who are currently in, or have previously been in, "union" or long-term partnerships including or akin to marriage. A number of populations that have been flagged as at a heightened risk of coercive sterilization (e.g. those living with a disability) may be categorically less likely to be in union, and in turn represented in this sample. While NFHS-5, for the first time, does include a "disability" designation, this variable is collected at the household level and it is not possible to determine whether the woman being interviewed has a disability, or someone else in the household (e.g. a dependent or partner). More broadly, while the NFHS provides a wealth of demographic data there are many "at risk" populations that it is not possible to identify: for example, gender is in effect measured as a woman's sex – a binary designation that is pre-determined (often assumed) by the enumerator. Only "women" are asked to complete the women's questionnaire, but it is unclear how transgender, intersex or other individuals for whom sex and gender may not align are captured, if at all, by the NFHS. Another key population of concern is individuals who have an HIV+ diagnosis. While biological samples are collected from a sub-set of respondents through

NFHS, this sample is small and not representative at the district level. In addition, as a household survey, the NFHS does not collect data amongst another at risk group: individuals who are detained, in prison or otherwise living in congregate settings. These considerations, and others, are key limitations to the use of NFHS data in assessing sterilization care. Throughout the thesis, while I examine available demographic information, the focus is the general sterilized population. This may lead to an undercount of the true prevalence of coercion or otherwise involuntary sterilization care.

1.5.2. Mixed-Methods Validation Data

The final empirical chapter, Chapter 5, uses data collected through the Bill and Melinda Gates Foundation grant "Towards Evidence-Based Health System Reform in India." The inpatient experience survey component and pre-testing activities (the main focus on Chapter 5) were one of eight instruments or survey tools tested and administered through the broader health systems assessment project. This component involved a formal pre-testing process in response to interest, from the Odisha state government, in more robustly assessing patient centeredness in inpatient clinical settings utilizing survey tools previously validated in other countries. Specifically, the U.S. Hospital Consumer Assessment of Healthcare Providers and Systems, or HCAHPS tool. The 2018 tool was the subject of evaluation in Chapter 5 because it had informed the development of the Mera Aspataal platform (an abbreviated patient satisfaction survey tool currently utilized to evaluate patient centeredness in Indian hospital). It is structurally distinct in that questions regarding patients' experiences are posed as stand-alone survey items as opposed to reasons for dissatisfaction. It is also more comprehensive than the abbreviated instrument utilized within Mera Aspataal. The HCAHPS tool includes an overall rating related to satisfaction with the hospital: "Using any number from 0 to 10, where 0 is the worst hospital possible and 10 is the best hospital possible, what number would you use to rate this hospital during your stay?" and 28 additional questions. 19 of those questions assess patients' experiences with specific aspects of care across six domains: interpersonal care from nurses, interpersonal care from doctors, the hospital environment, general experience, after hospital care and understandings of care. The core questions employ a 4-point Likert-scale. An overview of the mixed-methods data collection processes used to assess the HCAHPS tool in Chapter 5 can be found in Table 1.4.

Table 1.4. Overview of Methods Employed in Chapter 5 - Qualitative Pre-Testing of the HCAHPS Tool in Odisha, India

	Purpose	Process	Participants
Step 1 *Translation*	Ensure semantic equivalence: transfer and assess if individual data elements in one dictionary (English) create an equivalent meaning in a second system (Oriya)	**Translation and back translation:** - Translation by 2 bi-lingual forward-translators, - Back-translation by 2 bi-lingual back-translators, - Identification of points of divergence with review by research team & 5th (PhD-level) bi-lingual translator	**N = 5+**
Step 2 *Cognitive Testing*	Identify how individuals interpret each survey item and how their cognitive processing relates to the construct intended by the researcher / original survey instrument	**Focus groups:** - Group run-through of all survey items paired with structured probing to elicit cognitive processes and assess participants' understanding and interpretation of each survey item, if framing is logical and answerable, if response options are adequate, etc.	**N = 50^**
Step 3 *Content Validity Indexing*	Assess the extent to which tool items represent facets of the construct "Patient Experience" i.e. do the survey item included within HCAHPS represent what	**Individual interviews:** - Each interviewee rates each item's relevance to 1.) patient-centeredness and 2.) the Odisha inpatient setting on a 4 point Likert-scale - Interviewees provide information on why they rated each item as they did	**N = 15**

	is important to patient-centeredness in Odisha, India		

^Cognitive testing participants included 27 women and 23 men, demographics aligned with the Gates Foundation's Assessment on Health System Performance in Odisha, India survey's demographic data on individuals who have received hospital care in the 2019 calendar year.

The parent project for all in-person survey and non-survey based qualitative data collection, was filed under an "umbrella" project for the grant and entitled the "Survey of Households and Health Providers in Odisha, India," (Protocol IRB18-1675, Primary PI Winnie Chi-Man Yip). The project was approved by the Harvard T.H. Chan School of Public Health Office of Human Research Administration on March 13th 2019. Based on the submitted protocol, the IRB made the following determination: "Research Information Security Level: The research is classified, using Harvard's Data Security Policy, as Level 1 Data." Approval for research in India, by Indian governing boards, was granted through to two separate boards: 1.) the State Ethics Board Approval (Administrative Approval), and 2.) the Independent Review Board (Ethics Approval, Sigma i.e. National Ethics Board).

CHAPTER 1, REFERENCES

1. Fertility rate, total (births per woman) | Data. Accessed November 5, 2022. https://data.worldbank.org/indicator/SP.DYN.TFRT.IN?end=2020&start=1960&view=chart

2. United Nations. *Contraceptive Use by Method 2019 Data Booklet.*; 2019.

3. United Nations. *Contraceptive Use by Method 2019 Data Booklet.*; 2019.

4. Singh P, Singh KK, Singh P. Factors explaining the dominion status of female sterilization in India over the past two decades (1992-2016): A multilevel study. *PLOS ONE*. 2021;16(3):e0246530. doi:10.1371/JOURNAL.PONE.0246530

5. Coercive Sterilization: An On-Going Crime Against Humanity. Accessed January 30, 2021. https://www.frc.org/op-eds/coercive-sterilization-an-on-going-crime-against-humanity

6. Cole WM. Convention on the Elimination of All Forms of Discrimination against Women (CEDAW). In: *The Wiley Blackwell Encyclopedia of Gender and Sexuality Studies*. John Wiley & Sons, Ltd; 2016:1-3. doi:10.1002/9781118663219.wbegss274

7. Pradhan MR, Patel SK, Saraf AA. Informed choice in modern contraceptive method use: Pattern and predictors among young women in India. *J Biosoc Sci*. 2019;52(6). doi:10.1017/S0021932019000828

8. Hillis SD, Marcheanks PA, Tylor LR, Peterson HB. Poststerilization regret: Findings from the United States Collaborative Review of Sterilization. *Obstet Gynecol*. 1999;93(6):889-895. doi:10.1016/S0029-7844(98)00539-0

9. Pal G, Chaurasia H. Revisiting Post-Sterilization Regret in India. *J Obstet Gynecol India*. 70(4):295-303. doi:10.1007/s13224-020-01309-5

10. Singh A. Sterilization Regret Among Married Women in India: Trends, Patterns and Correlates. *Source Int Perspect Sex Reprod Health*. 2018;44(4):167-176. doi:10.1363/44e7218

11. Senderowicz LG. Conceptions and Measurement of Contraceptive Autonomy. Published online April 19, 2019. Accessed October 1, 2019. https://dash.harvard.edu/handle/1/40976626

12. Das A, Contractor S. India's latest sterilisation camp massacre. *BMJ*. 2014;349:g7282. doi:10.1136/bmj.g7282

13. Arathi PM. Unaccountable Deaths and Damages: An Analysis of Socio-Legal Implications of Sterilisation Camp Deaths in Bilaspur, Chhattisgarh. In: *Universallising Healthcare in India*. Springer Singapore; 2021:141-154.

14. Nimavat JH, Jasani PK, Joshi JB, Jadeja YM, Sochaliya KM, Kartha GP. Effectiveness of "ASHA INCENTIVE SCHEME of 2013" on enhancing the functioning of ASHA in motivating couples having two or less children to undergo permanent sterilization in Surendranagar district. *Int J Med Sci Public Health Online*. Published online 2016. doi:10.5455/ijmsph.2016.02022016395

15. *Mistreatment and Coercion: Unethical Sterilization in India*. Human Rights Law Network Accessed December 5, 2021. www.hrln.org

16. 12 Women Die After Botched Government Sterilizations in India - The New York Times. Accessed October 12, 2022. https://www.nytimes.com/2014/11/12/world/asia/botched-government-sterilizations-india.html

17. Deaths shine light on 'horrible' conditions in India's mass sterilization camps - The Washington Post. Accessed October 12, 2022. https://www.washingtonpost.com/world/asia_pacific/deaths-shine-light-on-horrible-conditions-in-indias-mass-sterilization-camps/2014/11/12/8c409a9d-fc2b-49d2-842d-419de320236b_story.html

18. Jha MK, Majumder BC, Gorea A. Responsibility for deaths of mothers in sterilization camps. *Int J ETHICS TRAUMA Vict*. 2015;1(01):45-48. doi:10.18099/ijetv.v1i1.32

19. Krishnan V. Victims of the numbers game. *The Hindu*. https://www.thehindu.com/opinion/op-ed/victims-of-the-numbers-game/article8393771.ece. Published March 24, 2016. Accessed November 9, 2022.

20. HRW. India: Target-Driven Sterilization Harming Women. Human Rights Watch. Published 2014. Accessed November 11, 2020. https://www.hrw.org/news/2012/07/12/india-target-driven-sterilization-harming-women

21. AIIMS Helps Frame Sterilization Norms in Chhattisgarh. Accessed November 9, 2022. https://www.ndtv.com/india-news/aiims-helps-frame-sterilization-norms-in-chhattisgarh-697170

22. Jain AK. Information about methods received by contraceptive users in India. *J Biosoc Sci*. 2017;49(6):798-810. doi:10.1017/s0021932016000602

23. Rana MJ, Jain AK. Do Indian women receive adequate information about contraception? *J Biosoc Sci*. 2020;52(3):338-352. doi:10.1017/S0021932019000488

24. Chang KT, Mukanu M, Bellows B, et al. Evaluating Quality of Contraceptive Counseling: An Analysis of the Method Information Index. *Stud Fam Plann*. 2019;50(1):25-42. doi:10.1111/SIFP.12081

25. Abortion Practice in India, A Review of the Literature. Accessed November 9, 2022. http://www.cehat.org/go/uploads/AapIndia/work1.pdf

26. Senderowicz L. Contraceptive Autonomy: Conceptions and Measurement of a Novel Family Planning Indicator. *Stud Fam Plann*. 2020;51(2):161-176. doi:10.1111/sifp.12114

27. the WHO. Eliminating forced, coercive and otherwise involuntary sterilization. *The WHO*. Published online 2014.

28. Gupte PR. India:"The Emergency"and the Politics of Mass Sterilization. *Soc Policy*. 2017;22(3):5.

29. Gwatkin DR. Political Will and Family Planning: The Implications of India's Emergency Experience. *Popul Dev Rev*. 1979;5(1):29-59. doi:10.2307/1972317

30. Williams RJ. Storming the Citadels of Poverty: Family Planning under the Emergency in India, 1975–1977. *J Asian Stud*. 2014;73(2):471-492. doi:10.1017/S0021911813002350

31. Impact of Forced Sterilization on Female Labor Market Outcomes: Evidence from India. Accessed November 5, 2022. https://dial.uclouvain.be/pr/boreal/object/boreal%3A265922/datastream/PDF_01/view

32. Tarlo E, Das V, Kleinman A, Reynolds P, Ramphele M. Body and Space in a Time of Crisis: Sterilization and Resettlement durring the Emergency in Delhi. In: *Violence and Subjectivity*. University of California Press; 2000.

33. Vicziany M. Coercion in a Soft State: The Family-Planning Program of India: Part I: The Myth of Voluntarism. *Pac Aff*. 1982;55(3):373-402. doi:10.2307/2757117

34. Johnson H. Questions of Ethics: How Family Planning changed under Indira Gandhi's Emergency. *Waterloo Hist Rev*. 2016;8. doi:10.15353/whr.v8.69

35. Connelly M. Population Control in India: Prologue to the Emergency Period. *Popul Dev Rev*. 2006;32(4):629-667.

36. Connelly MJames. *Fatal Misconception : The Struggle to Control World Population*. Belknap Press of Harvard University Press; 2008.

37. Enke S. The Gains to India From Population Control: Some Money Measures and Incentive Schemes. *Rev Econ Stat*. 1960;42(2):175-181. doi:10.2307/1926536

38. Controlling Passions | Wilson Quarterly. Accessed November 9, 2022. http://archive.wilsonquarterly.com/essays/controlling-passions

39. United Nations Population Award to Indira Gandhi and Qian Xinzhong. *Popul Dev Rev*. 1983;9(4):747-753. doi:10.2307/1973563

40. Anukriti S, Joshi S. The Emergency Lives on ? How a political event affected sterilization rates in India over three decades. Published online 2016.

41. Sterilizations. India: "The Emergency" and the Politics of Mass Sterilization. Published online 1961. Accessed February 27, 2022. https://tinyurl.com/yd4pzvrh.

42. Basu AM. Family Planning and the Emergency: An Unanticipated Consequence. *Econ Polit Wkly*. 1985;20(10):422-425.

43. Atkins BS, Jezowski TW. Report on the First International Conference on Vasectomy. *Stud Fam Plann*. 1983;14(3):89-95. doi:10.2307/1966252

44. Banerji D. Will Forcible Sterilisation Be Effective? *Econ Polit Wkly*. 1976;11(18):665-668.

45. Mehta PV. Laparoscopic sterilization with the Falope ring: experience with 10,100 women in rural camps. *Obstet Gynecol*. 1981;57(3):345-350.

46. Mehta PV. A total of 250,136 laparoscopic sterilizations by a single operator. *Br J Obstet Gynaecol*. 1989;96(9):1024-1034. doi:10.1111/j.1471-0528.1989.tb03376.x

47. Mahadevappa K, Prasanna N, Channabasappa RA. Trends of Various Techniques of Tubectomy: A Five Year Study in a Tertiary Institute. *J Clin Diagn Res JCDR*. 2016;10(1):QC04-QC07. doi:10.7860/JCDR/2016/16863.7104

48. Standards for Female and Male Sterilization Services. Published online 2006.

49. Chapron C, Querleu D, Bruhat MA, et al. Surgical complications of diagnostic and operative gynaecological laparoscopy: a series of 29,966 cases. *Hum Reprod*. 1998;13(4):867-872. doi:10.1093/humrep/13.4.867

50. Townsend JW. *Quality of Care in Sterilization Camps, Uttar Pradesh*. Population Council; 1995.

51. Devika Biswas v. Union of India & Others, Petition No. 95 of 2012 | ESCR-Net. Accessed November 3, 2021. https://www.escr-net.org/caselaw/2017/devika-biswas-v-union-india-others-petition-no-95-2012

52. Svensk M, Wikborg P. *The Quality and Effect of an Observed Sterilization Camp at The Methodist Public Health Centre, Mursan, India*. University of Osla; 2007.

53. Donaldson PJ. The elimination of contraceptive acceptor targets and the evolution of population policy in India. *Popul Stud*. 2002;56(1):97-110. doi:10.1080/00324720213793

54. Visaria L, Jejeebhoy S, Merrick T. From Family Planning to Reproductive Health: Challenges Facing India. *Int Fam Plan Perspect*. 1999;25:S44-S49. doi:10.2307/2991871

55. Ramakant Rai v. Union of India, W.P (C) No 209 of 2003. ESCR-Net. Accessed October 20, 2022. https://www.escr-net.org/caselaw/2013/ramakant-rai-v-union-india-wp-c-no-209-2003

56. *Manual for Family Planning Indemnity Scheme*.; 2013.

57. Sivaram S, Singh S, Penn-Kekana L. Understanding the role of female sterilisation in Indian family planning through qualitative analysis: perspectives from above and below. *Sex Reprod Health Matters*. 2022;29(2):2080166. doi:10.1080/26410397.2022.2080166

58. Gormley R, Vickers B, Cheng B, Norman W V. Comparing options for females seeking permanent contraception in high resource countries: a systematic review. *Reprod Health 2021 181*. 2021;18(1):1-18. doi:10.1186/S12978-021-01201-Z

59. Mukasa B, Ali M, Farron M, Weerdt R Van de. Contraception supply chain challenges: a review of evidence from low- and middle-income countries. *https://doi.org/101080/1362518720171394453*. 2017;22(5):384-390. doi:10.1080/13625187.2017.1394453

60. Pallikadavath S, RAJAN I, SINGH A, OGOLLAH R, PAGE S. POST-STERILIZATION AUTONOMY AMONG YOUNG MOTHERS IN SOUTH INDIA. *J Biosoc Sci*. 2015;47(1):75-89. doi:10.1017/S002193201300059X

61. Cottingham J, Germain A, Hunt P. Use of human rights to meet the unmet need for family planning. *The Lancet*. 2012;380(9837):172-180. doi:10.1016/S0140-6736(12)60732-6

62. Lukšaitė E. “I Do Not Have to Hurt My Body Anymore”: Reproductive Chronicity and Sterilization as Ambivalent Care in Rural North India. *Med Anthropol Q*. 2022;36(3):312-328. doi:10.1111/maq.12709

63. Jadhav A, Vala-Haynes E. Informed Choice and Female Sterilization in South Asia and Latin America. *J Biosoc Sci*. 2018;50(6):823-839. doi:10.1017/S0021932017000621

64. Track20. Accessed September 7, 2022. http://www.track20.org/pages/data_analysis/publications/methodological/additional_users.php

65. Jewell SE. Conceptualising Violence Against Women in the Work of the United Nations Special Rapporteur on Violence Against Women. *SSRN Electron J*. Published online July 6, 2012. doi:10.2139/ssrn.2038113

66. OHCHR | Sterilization a form of “systemic violence” against girls with disabilities. Accessed January 29, 2021. https://www.ohchr.org/EN/NewsEvents/Pages/SterilizationAgainstGirlsWithDisabilities.aspx

67. Fried ST. Violence against Women. *Health Hum Rights*. 2003;6(2):88. doi:10.2307/4065431

68. *Rome Statute of the International Criminal Court.*; 1998.

69. Carranza Ko ÑP. Making the Case for Genocide, the Forced Sterilization of Indigenous Peoples of Peru. *Genocide Stud Prev*. 2020;14(2):90-103. doi:10.5038/1911-9933.14.2.1740

70. Lockwood A. Report: China’s forced reproductive policies for Uighur women may constitute genocide. JURSIT. Published June 30, 2020. Accessed January 30, 2021. https://www.jurist.org/news/2020/06/report-chinas-forced-reproductive-policies-for-uighur-women-may-constitute-genocide/

71. Coomaraswamy R. *THE VARIED CONTOURS OF VIOLENCE AGAINST WOMEN IN SOUTH ASIA Jointly Organised by Government of Pakistan and UNIFEM South Asia Regional Office*.

72. Freedman LP, Ramsey K, Abuya T, et al. Defining disrespect and abuse of women in childbirth: a research, policy and rights agenda. *Bull World Health Organ*. 2014;92(12):915-917. doi:10.2471/BLT.14.137869

73. Galtung J. Violence, Peace, and Peace Research. *J Peace Res*. 1969;6(3):167-191.

74. Farmer PE, Nizeye B, Stulac S, Keshavjee S. Structural Violence and Clinical Medicine. *PLoS Med*. 2006;3(10):e449. doi:10.1371/journal.pmed.0030449

75. Farmer PE, Nizeye B, Stulac S, Keshavjee S. Structural Violence and Clinical Medicine. *PLoS Med*. 2006;3(10):e449. doi:10.1371/journal.pmed.0030449

76. Mathur M, Goyal RC, Mudey A. Client’s Level of Satisfaction Regarding Quality of Family Planning Sterilization Services Through Exit Interviews. *Innov J Med Health Sci*. 2013;3:263-265.

77. Kanabar BR, Oza JR, Thakrar D V, et al. Perception and satisfactory level of beneficiaries regarding female sterilization services through client exit interview at various facilities of Rajkot district. *Artic Int J Med Sci Public Health*. 2017;(6). doi:10.5455/ijmsph.2017.1164620032017

78. Bansal A, Dwivedi LK. Sterilization regret in India: Is quality of care a matter of concern? *Contracept Reprod Med*. 2020;5(1):1-12. doi:10.1186/s40834-020-00115-8

79. Rothschild CW, Brown W, Drake AL. Incorporating Method Dissatisfaction into Unmet Need for Contraception: Implications for Measurement and Impact. *Stud Fam Plann*. 2021;52(1):95-102. doi:10.1111/SIFP.12146

80. Brown S. 'They think it's all up to the girls': gender, risk and responsibility for contraception. *Cult Health Sex*. 2015;17(3):312-325. doi:10.1080/13691058.2014.950983

81. Rominski SD, Stephenson R. Toward a New Definition of Unmet Need for Contraception. *Stud Fam Plann*. 2019;50(2):195-198. doi:10.1111/SIFP.12084

82. Harris S, Reichenbach L, Hardee K. Measuring and monitoring quality of care in family planning: are we ignoring negative experiences? *Open Access J Contracept*. 2016;7:97. doi:10.2147/OAJC.S101281

83. Bowser D, Hill MPHK. *Exploring Evidence for Disrespect and Abuse in Facility-Based Childbirth Report of a Landscape Analysis*.; 2010.

84. Kruk ME, Kujawski S, Mbaruku G, Ramsey K, Moyo W, Freedman LP. Disrespectful and abusive treatment during facility delivery in Tanzania: a facility and community survey. *Health Policy Plan*. 2018;33:26-33. doi:10.1093/heapol/czu079

85. Sando D, Ratcliffe H, McDonald K, et al. The prevalence of disrespect and abuse during facility-based childbirth in urban Tanzania. *BMC Pregnancy Childbirth*. 2016;16(1). doi:10.1186/s12884-016-1019-4

86. Senderowicz LG. Conceptions and Measurement of Contraceptive Autonomy. Published online April 19, 2019.

87. Metheny N, Stephenson R. How the Community Shapes Unmet Need for Modern Contraception: An Analysis of 44 Demographic and Health Surveys. *Stud Fam Plann*. 2017;48(3):235-251. doi:10.1111/SIFP.12028

88. the WHO. Eliminating forced, coercive and otherwise involuntary sterilization. *The WHO*. Published online 2014. Accessed October 1, 2019. https://www.who.int/reproductivehealth/publications/gender_rights/eliminating-forced-sterilization/en/

89. Kumar K, Singh A, Tsui A. Measuring contraceptive use in India: Implications of recent fieldwork design and implementation of the National Family Health Survey. *Demogr Res*. 2022;47:73-110. doi:10.4054/DemRes.2022.47.4

90. Bora JK, Saikia N. Neonatal and under-five mortality rate in Indian districts with reference to Sustainable Development Goal 3: An analysis of the National Family Health Survey of India (NFHS), 2015–2016. *PLOS ONE*. 2018;13(7):e0201125. doi:10.1371/journal.pone.0201125

91. New JR, Cahill N, Stover J, Gupta YP, Alkema L. Levels and trends in contraceptive prevalence, unmet need, and demand for family planning for 29 states and union territories in India: a modelling study using the Family Planning Estimation Tool. *Lancet Glob Health*. 2017;5(3):e350-e358. doi:10.1016/S2214-109X(17)30033-5

92. Stover J, Sonneveldt E. Progress toward the Goals of FP2020. *Stud Fam Plann*. 2017;48(1):83-88. doi:10.1111/sifp.12014

93. Oliveira IT de, Dias JG, Padmadas SS. Dominance of Sterilization and Alternative Choices of Contraception in India: An Appraisal of the Socioeconomic Impact. *PLOS ONE*. 2014;9(1):e86654. doi:10.1371/journal.pone.0086654

94. Bansal A, Dwivedi LK, Ali B. The trends of female sterilization in India: an age period cohort analysis approach. *BMC Womens Health*. 2022;22(1):272. doi:10.1186/s12905-022-01857-0

95. Curtis KM, Mohllajee AP, Peterson HB. Regret following female sterilization at a young age: A systematic review. *Contraception*. 2006;73(2):205-210. doi:10.1016/J.CONTRACEPTION.2005.08.006

CHAPTER 2

The Interagency Statement on Eliminating Forced, Coercive & Otherwise Involuntary Sterilization: Prevenance and Drivers in India

Sterilization is currently the most common form of modern family planning utilized globally. As of 2019, sterilized women made up approximately 70% of people utilizing any family planning method in India. There is widespread recognition that sterilizations are only a viable, and rights-affirming, modern family planning method when undertaken voluntarily. However, a historical focus on volume-based measures in reproductive care and lack of consensus on how to operationally define coercion have hampered quantification of this issue. In this paper, I examine pre-conditions for informed consent within the purview of the health system, such as: being told that a tubal ligation surgery is permanent, availability of alternate options or ability to decide independently. I look at the point prevalence of these variables in a nationally representative sample, where relevant comparting sterilized patients to other modern family planning users. I then apply a variance decomposition approach to estimate the relative importance of different factors that might drive uninformed consent. Amongst predictors examined, I find the majority of variance for not told permanence can be attributed to supply-side factors. Examining these system-modifiable factors as interventions, I identify potential avenues through which to address this issue.

Keywords: Sterilization, Informed Consent, Patient-Centeredness, Structural Violence, Reproduction, India

2.1. Introduction

Sterilization is currently the most common form of birth control utilized in the world. As of 2019 approximately 24% of married or in-union women using some form of family planning relied on female sterilization globally – the next most popular method, the condom made up 20% and the Inter-Uterine Device (IUD), made up less than 17%.[1] As a result, approximately 219 million living women are estimated to have undergone surgical sterilization.[1] In India, tubal ligation is a frequent outpatient procedure utilized for female sterilization and, in turn, long term fertility control.[2,3] While popular across most countries, India is unique both in terms of the absolute volume of tubal ligation procedures conducted annually as well as the relative share of women who are sterilized amongst all family planning users.[4] Between four and five million tubal ligations are currently performed annually in India and approximately 67% of women between the ages 15 and 49 who are counted as "currently utilizing a modern family planning method" are sterilized.[5] Not only is female sterilization the most popular method of family planning in the country, its contribution to contraceptive prevalence appears to be increasing over time.[5] Despite the widespread contemporary use of sterilization as a modern family planning (mFP) method, there is a lack of research quantifying the extent to which women undergoing these procedures have the information required to provide informed consent.[6]

Examining the extent to which tubal ligations are undertaken voluntarily is controversial. Reproductive health professionals recognize the potential for human rights violation and the term "voluntary" is widely used as a precursor to describe women who have been sterilized.[7,8] In addition, many women undergoing tubal ligations do rely on the procedure to control fertility. Tubal ligation can be a relatively safe one-time procedure that mitigates the need for routine management[9,10] and, unlike the pill and other pharmacological options, is not subject to supply chain failures on the side of the health system or routine access barriers on the side of the patient.[11] Pallikadavath and colleagues found that, similar to other forms of birth control, sterilization is associated with mothers' improved autonomy in household decision-making and freedom of mobility in India.[6] Given that many women lack viable options to control fertility, human rights are often invoked in the call to expand access to modern family planning options, of which tubal ligation is one.[12] However, in this literature, the concept "voluntary" is often assumed, with coercive sterilization framed as a historical issue or one limited to specific high-risk groups.[13–15] Contemporary research in India has examined the Method Information Index (MII), a composite measure of informed choice,[1] amongst young women using any modern contraceptive method.[16] While this research revealed concerningly low levels of informed consent, it focused on young women only and suggested women who are sterilized were more informed than their peers utilizing short acting methods.[16] We lack a nationally representative quantification of informed consent amongst the general sterilized population, including aspects of informed consent specific to sterilization (such as being informed of the procedure's permanence) that are not included within the MII. The prevalence of sterilization as a viable form of modern family planning is predicated on the assumption that sterilizing procedures are undertaken without coercion and with the full and informed consent of patients. As a result, understanding the degree to which patients meet the criteria for free and informed consent would be foundational.

If uninformed consent is an issue in the general sterilized population, we would benefit from an understanding of what might drive, or inform, this issue. A 2017 paper by Anrudh Jain identified a number of patient characteristics that were

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[1] *The MII is calculated as the percentage of users who responded 'yes' to the following three questions: Were you told about other methods? Were you told about side-effects of the method selected? Were you told what to do if you experience these side-effects?*

associated with the MII, or receipt of information.[17] Sociodemographic characteristics, such as a woman's education, rurality and age were all statistically significantly related to the MII. Household wealth, interestingly, had no significant relationship. Jain also examined one supply-side factor: the public v. private status of the facility in which a woman received reproductive care.[17] In doing so, he found going to a private facility decreased the odds a woman received the three pieces of information outlined in the MII. These data, collected between 2005 and 2006, suggest both a woman's individual characteristics (fixed and time-variant e.g. parity) and situational context may inform the odds of receiving information required for informed consent. A more recent piece by Rana and Jain explored drivers over time, reaffirming many of the findings in the 2017 publication and identifying a more pronounced relationship between where a woman received care and the odds of being provided with information required for consent.[18] Taken together, these findings suggest both individual characteristics and factors related to the care context may impact the odds that a woman is able to provide informed consent.[17,18] Regardless, the World Health Organization (WHO) places responsibility for ensuring the prevision of informed consent within the purview of the health system, irrespective of a patient's characterisitcs.[19] Despite this, a 2011 review found the majority of interventions in family planning are focused primarily on influencing demand, or patient-related factors, as opposed to the supply size or context in which care is provided.[20] As a result, examining additional supply-modifiable factors may provide practical insight into clinical practice patterns or policy interventions that may improve, or inadvertently worsen, the provision of information to sterilized women.

In this paper, I examine detailed patient-level data from over 180,000 sterilized women across 29 States and 7 Union Territories in India to provide a contemporary picture of who is, and who is not, given the information required to freely consent. To do so, I use a set of criteria published by the World Health Organization (WHO) and co-signed by seven other multi-lateral agencies, including the Office of the United Nations High Commissioner for Human Rights (OHCHR).[19] The framework provides baseline criteria for informed sterilization consent, intended to be relevant across countries and clinical contexts. As such, the goal of this paper is threefold: to use these criteria to build on the work of Jain et al and provide the first country-level quantification of contemporary uninformed sterilizations within a nationally representative sample, understand what might drive the receipt of uninformed sterilization care and identify system-modifiable factors that might improve the issue. I therefore sought to answer the following three research questions, first: what share of women who have undergone a tubal ligation in India did so without the criteria in place required for that individual to decide what they want regarding contraceptive use and realize that decision? Second, what patient and supply-side factors are related to the odds of a woman undergoing a sterilization without informed consent? And, finally, viewing supply-side factors as potential interventions, to what extent might these system-modifiable factors inform the odds of receiving informed consent?

2.2. Background[2]

Unlike temporary methods, such as the pill or condoms (which can be discontinued at any time), female sterilization is, by definition, intended to be permanent. While sterilization is considered a viable form of modern family planning (mFP) – this is *only the case* when done with the full, free and informed consent of the woman being sterilized.[21] Involuntary sterilization is considered an act of violence against women or gender-based violence.[22] At the individual level, the designation of violence is relevant given the procedure's invasive nature and the attendant physical, mental and

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[2] *This thesis is a collection of papers, with the intent that each empirical chapter can stand alone; as a result, there is some repetition between content provided in this section (Background, Chapter 2) and the overarching introduction to the thesis (Chapter 1).*

psychological consequences.[23] When committed as a part of a widespread or systematic attack against a civilian population, it can have profound societal implications beyond the individual and is considered a crime against humanity, as recognized by the Rome Statute of the International Criminal Court.[24] This is particularly relevant given the potential for long-term demographic harm caused by targeting sterilizations amongst specific groups or types of people; an act that has been referred to as reproductive genocide.[25,26]

However, a lack of consensus on what actually constitutes coercion has plagued the reproductive care space.[27] While the central government of India only supports "voluntary" sterilization, as noted above, the concept voluntary is not routinely assessed or accounted for in regional, national or international measures of reproductive care coverage in the country.[7] This rhetorical discordance aligns with broader trends across the reproductive care field.[27] The 1994 International Conference on Population and Development in Cairo, for example, represented a historical turning point and reckoning, where professionals working in the reproductive care space demanded an end to family planning programs geared toward population control.[28,29] The resulting Cairo Programme of Action called for a broader understanding of sexual and reproductive health that emphasize three pillars: rights, access, and quality within family planning programs.[1],[28] Yet, as Senderowicz raises, both rights and quality, are largely absent from quantitative strategies to measure progress on family planning or reproductive health programming in practice:

> *"In many ways… the post-Cairo shift toward these pillars has been more successful rhetorically than substantively. While the language used to describe family planning has shifted dramatically in the 25 years since ICPD, changes to how we conceptualize, implement, and evaluate family planning programs have been far less complete."*

For sterilization, the juxtaposition is particularly stark. Despite a commitment to rights-based language, currently all sterilized women (regardless of whether they were coerced), fall into aggregate categories of modern family planning coverage.[27] This designation, in turn, contributes to a large share of key development indicators' numerators (e.g. met need for family planning). As a result, access to, or use of, reproductive care services are centered by default as opposed to patients' ability to freely choose services or their satisfaction with services once received.

However, in 2014 the World Health Organization and six UN Agencies co-produced a report: "*Eliminating forced, coercive and otherwise involuntary sterilization*."[19] The report provided guiding principles for the prevention and elimination of coercive sterilization – but also an actionable definition of what constitutes coercion. Using this framework, coerced sterilization occurs when financial or other incentives, misinformation, or intimidation tactics are used to compel an individual to undergo the procedure.[19] The framework also makes clear that coerced sterilization can occur in the absence of informed consent. Unlike yelling, or physical abuse, coercion in this case may include behavior that is normalized or potentially unknown as a rights-violation to the patient, such as financial incentivization or the provision of partial information.[19,30] The document also outlines criteria required for informed consent, including factors such as: being told that a tubal ligation procedure is permanent, being told alternate family planning options, freedom from misinformation etc.(see Table 1, Methods).

In addition to outlining pre-conditions required for informed consent, as noted above, the framework situates responsibility for these actions within the purview of the health system. The absence of this information, in turn, is also the responsibility of the health system. This aligns with a growing body of work in critical feminist demography.[31] For example, there has been a recent call to more broadly conceptualize, and in turn measure, reproductive coercion; specifically focusing on the ways coercion can manifest through structural forces (even in the absence of intent or ill will).[27]

In "Conceptions of a Novel Contraceptive Autonomy Indicator," Senderowicz proposes removing all family planning users who lack freedom of choice from the Contraceptive Prevalence Rate.[27] This emerging body of work aims to highlight, but also bridge the discordance between discursive support for voluntary family planning and active assessment of autonomy within historically volume-based measurement strategies.[32,33] In doing so, it also extends beyond a more prominent existing literature on coercion originating interpersonal relationships, the home or non-health system amenable social norms.[34,35] This aligns with quantitative work by Metheny et al, which identified community-drivers of unmet need across 44 countries; challenging the conceit that unmet need for family planning was an issue of individual preference or sentiment rather than the confluence of more complex structural factors that inform both accessibility and use.[36] This effort also builds closely on a history of reproductive justice scholarship in the United States, in which Black American women aimed to shift the focus from a narrow view of individual choice to a broader analysis of racial, economic, and structural constraints on power which, in turn, inform method choice and uptake.[37,38]

2.3. Methods

Data Source & Population

To look at women who have undergone tubal ligations in India, I use the National Family Health Survey of India (NFHS). This is a large-scale, multi-round survey conducted in a representative sample of households throughout India. The survey is conducted under the stewardship of the Ministry of Health and Family Welfare (MoHFW), Government of India. The ever-married women's questionnaire, a section of the tool, covers information on different components of maternal and child health including: pregnancy, childbirth, reproductive morbidities, immunization of mothers and children and access and availability of maternal and child health care. I use only the most recent round of the NFHS (2019-21), due to variation in survey structure and sampling strategy from year to year. This round was fielded in all 29 States and 7 Union Territories of India using the same survey instrument translated into 18 languages. In all, 28,586 Primary Sampling Units (PSUs) were selected across the country, of which fieldwork was completed in 28,522 clusters. In this dataset, state and union territory designations align with regional boundaries outlined by the central government of India in 2015, for example: Ladakh is included within Jammu and Kashmir, Mao-Maram, Paomata and Purul are included within Manipur, and Aksai Chin and Shaksgam are excluded. The study population within this dataset is adult women (15-49) who, at the time the survey was fielded, were using any modern method of family planning (N = 337,954). This includes women using the pill, sterilization, IUD, injectables, implants, male or female condoms and diaphragm. The sub-group of interest within this population is women using sterilization (presumed tubal ligation) as a family planning method. Women were asked a separate question regarding removal of the uterus; women who reported they had their uterus removed were categorized as having a hysterectomy and were excluded from this study due to the multiple clinical indications for a hysterectomy procedure other than fertility control and lack of comparable questions regarding the care experience during a hysterectomy procedure.

Variables Used to Assess Criteria for Consent

Each item within the interagency framework is treated as an outcome. I use the definition of contraceptive autonomy proposed by Senderowicz, 2020: *"The factors that need to be in place in order for a person to decide for themselves what they want in regards to contraceptive use, and then to realize that decision."*[27] The novel measure developed by Senderowicz et al was for family planning broadly. The variables used for this paper, which focuses specifically on tubal ligation using NFHS-5 data, are outlined in Table 2.1. Each variable represents a different aspect of the above-mentioned *Interagency Statement on Eliminating*

Forced, Coercive and Otherwise Involuntary Sterilization.[19] These indicators assess objective aspects of the care interaction that are required for informed consent to take place and can therefore be viewed as patient-reported process measures. Each component of this framework was, in theory, deemed necessary for people undergoing tubal ligation to provide informed consent, regardless of clinical complexity or an individual's background.

Table 2.1. Interagency Statement Domains, Components and Corresponding Variables Used in Study

Domain	Sub-Domain	Interagency Description	NFHS-4 Survey Framing	Variable Used^
Informed Choice	**Told Side Effects**	*There are potential side-effects of the sterilization procedure, and follow-up care will be required (details should be provided)*	• Were you ever told by a health worker about side effects or problems you might have with the method?	N: Not informed^
	Told Permanence	*The procedure is permanent, people who may want to have a child in the future should choose a different method of contraception*	• Before your sterilization operation, were you told by a healthcare provider that you would not be able to have any (more) children because of the operation?	N: Not informed
	Freedom from Misinformation	*Sterilization does not protect a person from HIV, other sexually transmitted infections, or abuse*	*No available survey item*	N/A
Access / Full Choice	**Alternate Options**	*There are alternative temporary methods of contraception, including long- and short-term methods (details of available methods should be provided)*	• Now I would like to talk about family planning - the various ways or methods that a couple can use to delay or avoid a pregnancy. Have you ever heard of (METHOD)?*	N: Does not know 3 options
			• Ability to get a condom if needed.	N: Cannot get Condom
Free Choice	**Independent Choice**	*The decision to undergo contraceptive sterilization is a decision to be made by the individual only*	• Who was the decisionmaker for using this contraception?	N: Non-decisionmaker
		The person can change his or her mind and withdraw consent at any time	*No available survey item*	N/A
	Freedom from Incentivization	*An individual must not be induced by incentives*	• Did you receive compensation for the sterilization? • Total paid for the sterilization, including any consultation? • How much compensation did you receive?	N: Paid for sterilization N: Paid more than net neutral

^ Each item is coded as a binary dummy variable with the negative option as one and all other options as zero; N indicates "Numerator" with denominator for the sterilized population, all sterilized women (excluding hysterectomy patients) and the denominator for mFP Other as anyone else utilizing a modern family planning method that is not sterilization.

Being told about side effects and being told permanency are framed as binary questions to respondents. For the access / full choice domain, two variables are used to assess alternate options – one reflecting a respondent's knowledge of at least three family planning options and one reflecting actual availability of an alternate option (not conceptually comprehensive due to limited variables within the NFHS).

This is the first practical application of these criteria within a nationally representative dataset. In formally assessing the validity of a scale, I find the Cronhach's Alpha for each item falls well below 0.80, suggesting they do not assess the same construct (Appendix 1) and should not be treated as a single scale. As a result, the primary approach is to first descriptively show the baseline rates of each Interagency Statement item separately as stand-alone outcomes. I also compare items, where relevant, to the same question posed to other mFP users. In doing so, I generate a measure of difference using a t-test to assess the equality of means.

Drivers; Receipt of Uninformed Consent

To identify factors associated with the receipt of uninformed sterilization I employ a Shorrocks-Shapley decomposition to quantify the extent to which different groupings of variables explain variation in the coercion outcomes. Developed by Lindeman, Merenda and Gold (1980, page 119) and implemented in R by Groemping.[39,40] This method partitions the R-squared by: 1) running a regression for every combination of covariates, 2) computing the R-squared for each combination, and 3) calculating the contribution of each covariate to the R-squared by computing the average difference in the R squared for regressions with and without each covariate. One thousand bootstrap draws from the underlying data are run through the Shapley decomposition to quantify the uncertainty from both the data and the model in the variation explained by each covariate. In this model, the decomposition attributes variation in the odds of two outcomes: 1.) not being told permanence of the sterilization, and 2.) not being the decisionmaker to undergo the sterilizing procedure, first for the immediate postpartum population (for whom we have a broader set of variables describing the care interaction) and second for the interval sterilized population (for whom data is more limited). For both populations, the model is run only amongst those who have already been sterilized. For each group, the model is run as a linear probability with Shapley as a post-estimation command to, non-directionally, assess the relative importance of each variable included within the model, run separately for the two outcomes of interest.

For both the postpartum and interval sterilized populations, potential determinants are broken down into two broad categories: supply-side and demand-side factors. Designation is based whether they are directly addressable within or by the health system or fall outside the control of the healthcare system but may affect access to, or use of, reproductive care. The first group includes policy or care-related variables, i.e. those within the control of the health system, such as: the type of facility in which the sterilization took place, whether an auxiliary nurse midwife (ANM) or lady health visitor (LHV) interacted with the patient prior to a birth. For the postpartum population, this also includes a category entitled "other care" which includes a concurrent caesarian section, an abortion or seeing an ANC worker prior to childbirth. For providers conducting a cesarian section, having an available incision may reduce clinical burden required for a tubal ligation procedure. However, increased clinical ease might also increase the odds of the decision to conduct a tubal ligation made at the time of childbirth – increasing the risk that key information is not communicated or decision-making is centered with the patient. These supply-side factors were chosen based on: prior research suggesting they drive information provision, presence and availability within the NFHS-5, and amenability at the systems level. They are not meant to be comprehensive, but to better understand practice patterns and provide insight into a handful of potentially modifiable factors.

On the demand side, factors are partitioned into three sub-groups: clinical complexity, individual characteristics and individual time-variant characteristics. The first group, 2a, includes three variables that assess clinical complexity during the birthing period: breeched labor, prolonged labor and excessive bleeding. These variables are included because clinical complexity could, in theory, inform the caregiving process more broadly – for example if a provider is dealing with a complex breeched birth, interpersonal aspects of the interaction could be de-valued and the provision of information on permanence less likely communicated. The second group, 2b, includes individual characteristics that are more fixed, such as: the patient's household's wealth quintile, whether the patient belongs to a scheduled caste or tribe, highest educational attainment of the patient (often fixed in adulthood), and the patient's reported religion. The final sub-group is made up of individual characteristics that are time-variant, such as parity at sterilization, age at sterilization and marital duration at sterilization. Parity could also be considered a supply-side variable due to India's Two-Child Norm, which debars individuals with more than two children from holding local political office and impacts public sector program eligibility in certain contexts.[41]

Potential Solutions; Health System Modifiable Factors

Finally, building on the results of the variance decomposition, I examine each[3] of the supply-side or system-modifiable factors (e.g. facility type, interaction with a lay health worker, etc.) as potential "treatments" using a propensity score matching approach.[42,43] This approach is relevant given that nonrandom treatment assignment (i.e. patient's odds of being exposed to each system-modifiable factor) is likely.[44] Wealth, for example, is likely both related to the odds of giving birth in a private hospital as well as the odds of being exposed to coercive care. To compare patients who are similar to one another - I match covariates between individuals who did and did not receive a given treatment, making it easier to isolate association that receipt of the "treatment" has with the outcome of interest: not meeting criteria for informed consent. Functionally, this method compresses the relevant factors into a single score; in this case the time and non-time variant demographic characteristics explored in the decomposition model (caste designation, wealth, education, age a time of sterilization, parity, etc.). Individuals with similar propensity scores are then compared across the treatment and comparison groups. In line with the variance decomposition, the models are applied to two separate outcomes: 1.) Not being told about a sterilization procedure's permanence, and 2.) Not making an independent or joint decision to undergo sterilization. Using this method, I am able to generate an average treatment effect (ATE) for each system-modifiable factor and generate a standardized difference.).

2.4. Results

Patient Characteristics

In total, 724,115 ever-married women between the ages of 15-49 were interviewed for the NFHS-5 survey; of these women 337,954 were employing a modern family planning method (mFP). After applying survey weights, 151,281 women were utilizing a recognized form of modern family planning (mFP) that was not sterilization and 188,569 (approximately 55% of mFP users) identified as having undergone a sterilization (S), presumed tubal ligation. Women who had undergone a sterilization as their primary form of mFP had different characteristics than the general (G) adult female population in India and counterparts using an alternative form of mFP (Table 2.2). For example, women who had undergone a tubal ligation were more likely to have no formal education than other mFP users and the general population (S: 35.75% v. mFP: 20.42% and G: 22.40% respectively) and less likely to have completed any higher education (S: 6.33% v. mFP: 18.01% and G15.70%). Sterilized women were relatively similar in terms of distribution across wealth quintiles the other two groups, but were less likely to fall within the richest wealth quintile compared to both other mFP users and the general population (S: 17.29% v. mFP: 25.02% and G: 21.00%).

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[3] *Concurrent abortion excluded due to inadequate sample size and sterilization payment excluded as a "potential intervention" due to its inclusion within the interagency framework.*

Table 2.2. Characteristics of Ever-Married Women Aged 15 – 49; General Population, Other mFP Users and Sterilization Patients General and by Facility Type*

		General Population^ (G)	Other Users (mFP)	Sterilized					
				General Sterilized (S)	Facility Type				
					Government Hospital	CHC / Rural Hosp / PHC	Private Hospital	PHC	Camp
		N/A	*N/A*	*100%*	*41%*	*26%*	*14%*	*8%*	*4%*
		N = 724,115	*N = 151,281*	*N = 188,569*	*N = 77,766*	*N = 49,699*	*N = 26,569*	*N = 15,761*	*N = 7,684*
Education	No Edu	22.40%	20.42	35.75	33.56	48.12	20.04	38.74	47.51
	Primary	11.70%	12.09	17.04	18.19	18.85	10.81	18.81	19.88
	Secondary	50.20%	49.48	40.89	43.57	30.96	50.52	39.36	30.68
	Higher	15.70%	18.01	6.33	4.68	2.08	18.64	3.09	1.93
Wealth Index by Quintile	Poorest	17.70%	18.07	17.02	13.29	29.87	6.96	16.83	23.01
	Poorer	19.60%	19.2	20.37	19.55	26.21	11.28	24.1	25.14
	Middle	20.60%	18.02	23.13	25.05	21.07	18.18	29.51	23.58
	Richer	21.20%	19.69	22.19	24.6	15.55	26.55	21.48	18.21
	Richest	21.00%	25.02	17.29	17.5	7.3	37.02	8.08	10.07
Household Caste	Scheduled Caste	23.00%	21.98	23.69	26.68	25.94	15.5	22.48	21.28
	Scheduled Tribe	9.80%	8.37	10.12	8.98	13.77	4.05	14.21	16.28
	OBC	45.10%	41.89	47.27	45.71	44.98	53.67	47.3	44.27
	None	21.50%	27.01	18.22	17.94	14.33	26.25	15.51	17.17
	Don't know		0.75	0.71	0.69	0.97	0.53	0.5	1
Religion	Hindu	81.40%	77.62	87.71	86.03	91.78	83.31	89.79	94.28
	Muslim	13.50%	17.52	7.5	8.02	5.83	10.39	5.1	3.67
	Christian	2.40%	1.52	2.48	2.56	1.14	4.14	3.41	0.66
	Sikh	1.60%	2.26	1.06	2.01	0.27	0.76	0.16	0.58
	Buddhist	0.60%	0.43	0.76	1.1	0.4	0.43	1.1	0.33
	Other**	0.50%	0.65	0.49	0.28	0.58	0.97	0.44	0.48
Rurality	Urban	32.50%	35.89	30.35	36.26	14.31	47.25	16.93	14.81
	Rural	67.50%	64.11	69.65	63.74	85.69	52.75	83.07	85.19
Postpartum	Interval		92.82	71.54	69.76	87.26	47.67	74.12	93.54
	Postpartum		7.18	28.46	30.24	12.74	52.33	25.88	6.46

**Sterilized includes all women who answer "yes" to the question: "have used female sterilization as a form of family planning" ; excluding hysterectomy patients. Survey weight applied: National women's sample weight (6 decimals, v005); making the sample representative at the national level*

***The category "Other" includes religions reported in less than 1% of cases: Jain, Jewish, Parsi/Zoroastrian, no reported religion & other*

^The General population includes all surveyed women, including those not utilizing any mFP method, those utilizing a recognized modern method (mFP) and those who are sterilized. Sterilization is a recognized mFP method, but is excluded here with the intent of examining this population separately. Sterilized women include all women indicating within the NFHS-5 that they use sterilization as their current form of family planning; women who separately indicate they had a hysterectomy but do not answer in the affirmative to the sterilization question are excluded due to the potential that this procedure was done for other medical reasons.

^^OBC: "Otherwise Backwards Caste" designation as coded in the NFHS

Sterilized women had a similar share of women with a scheduled caste designation to the general population (S: 23.60% v. G: 23.00%) but a higher share of women with a scheduled tribe designation (S: 10.12% v. mFP: 8.37% and G: 9.80%) and the lowest share of women identifying as having no designation at 18.22%. In terms of religious identity, sterilized women were more likely to identify and Hindu than either other mFP users or the general population (S: 87.71% v. mFP: 77.62% and G: 81.40%) and more likely to identify as Christian or Buddhist, but less likely to identify as Muslim or Sikh. Sterilized women were also more likely to live in a rural area than peers (S: 69.65% v. mFP: 64.11% and G: 67.50%). For postpartum status, sterilized individuals were more likely to have initiated their current method during the birthing period (i.e. immediate postpartum) as compared to other mFP users (S: 28.46% v. mFP: 7.18%).

Amongst the sterilized population, we also show patient characteristics by the facility type in which the procedure took place. The highest reported facility type was Government Hospital (41% of the sterilized population) followed by Community Health Centers (CHC) or rural hospitals (26%),[4] Private Hospitals (14%), Primary Health Centers (PHCs) (8%) and, finally, Sterilization Camps (4%).[5] Characteristics of sterilized women differed markedly by facility type. For example, women sterilized in camps and CHCs were much more likely to have no formal education whereas women in Private Hospitals were much less likely to have no formal education (CHC: 48.12% and Camp: 47.51% v. Private: 20.04%). These trends help with wealth index, where women in CHCs and camps were more likely to fall within the lower wealth quintile and those in Private Hospitals least likely (CHC: 29.87% and Camp: 23.01% v. Private: 6.96%). For Caste, government hospitals and CHCs both has a higher share of women identifying as belonging to a scheduled tribe than the overall sterilized population (GH: 26.68% and CHC: 25.94% v. S: 23.69%) whereas camps had the highest relative share of women identifying as part of a scheduled tribe, over 6 percentage points higher than the general sterilized population (C: 16.28% v. S: 10.12%). Religious identity also varied by facility type for sterilized women, with nearly 95% of women sterilized in camps identifying as Hindu but higher shares of Muslim women in private hospitals than the general sterilized population (PH: 10.39% v. S: 7.50%) and higher shares of Christian women in both private hospital and public health centers than the general sterilized population (PH: 4.14% and PHC: 3.41% v. S: 2.48%). CHCs and camps had the highest share of women living in rural areas, with both over 85% (CHC: 85.69% and Camp: 85.19%). Private hospitals had the highest share of sterilizations conducted in the immediate postpartum period (52.33%) and camps the lowest (6.46%). While camps do not usually offer services other than tubal ligation, if a women has limited access to alternate clinical options it is possible that she might give birth at a camp in a planned or un-planned situation.

In summary, in examining the characteristics of sterilized women compared to other mFP users, sterilized women had less formal education, had a lower household wealth quintile, were more likely to belong to a scheduled caste or tribe or identify as Hindu and more likely to reside in a rural area than other women using other methods of modern family planning. Sterilized women were also more likely to have their procedure undertaken in the immediate postpartum period, as compared to method uptake for other mFP users. However, the characteristics of sterilized women varied significantly by facility type, with CHCs and camps serving less educated and poorer women.

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[4] *This designation also includes large Primary Health Centers (PHCs) in cases where the facility was indistinguishable from CHCs by the patient - distinct from the latter category of "PHC" where patients clearly identify the facility as a PHC.*

[5] *Sterilization Camps are a fixed location in which tubal ligation procedures are conducted in rapid succession for a bounded period of time; camps can be set up in existing clinical settings – such as community health centers or non-clinical settings, such as a school. Camps generally last from 1-3 days and no other clinical services are provides, but documentation on camp composition is limited.*

Prevalence of Interagency Variables

For the variables in which there was comparable data for both sterilized women and other modern family planning (mFP) users, results were mixed (Table 2.3). For three variables: not being told about side effects (mFP: 85.8% v. S: 87.9%, difference: 1.8%) and inability to get a condom if needed (mFP: 46.2% v. S: 58.9%, difference: 9.6%) sterilized women had higher rates (i.e. normatively worse performance) on components of the interagency statement. The difference in means was significant at a 0.01 threshold for both variables. Conversely, sterilized women fared better on the other two items in which there was data for both the sterilized and mFP populations: knowledge of alternate mFP options, though in both cases over 90% of women could <u>not</u> name three mFP options (mFP: 99.2% v. S: 94.4%, difference: -3.8%) and not being the primary decisionmaker to initiative a given mFP method (mFP: 8.4% v. S: 8.0%, difference: -0.4%). In addition to variables in which there was a mFP comparison, sterilized women were asked two questions that aligned with constructs in the interagency statement but were only relevant or available for sterilized women. These were: were they told that the tubal ligation procedure is permanent and did they have freedom from financial incentivization. Over 15% of sterilized women were not told that the procedure was permanent prior to their operation and 55.7% of women were given some financial compensation for the procedure and 46.8% those women were given more money than they spent with a mean payment of ₹ 3,100 per procedure.

Examining the interagency variables by facility type, there was significant variation (Table 2.3). Cells are green if the mean value for the interagency variable falls below the mean for the general sterilized population. No one facility type performed better than the mean on all items. For example, government hospitals had lower rates (normatively better) for five items, but preformed worse than the mean on two: ability to get a condom if needed and the share of women incentivized for the procedure. However, while more women got paid in government hospitals – the payment was less likely to exceed what was spent by the patient (GH: 39.3% v. S: 46.8%). Private hospitals had the highest rate of women who were paid more than they spent – at 95.0% with a mean payment of ₹ 7,500 per procedure. Private hospitals also preformed worse than the all-sterilized mean on all items except for share compensated. Similar to government hospitals, camps performed better than the mean for all but two items. In this case, knowledge of alternate options and share of women paid for the procedure; though better than the all-sterilized mean on share of women paid more than they spent (which could be considered financial incentivization).

Table 2.3. Prevalence of Uninformed Consent Variables Amongst Tubal Ligation Patients v. Other mFP Users with National Weights (1154)

		Non-Sterilized mFP Users^	**Sterilized mFP Users**	**Difference^^**	**Facility Type**				
					Government Hospital	**CHC / Rural Hosp / PHC**	**Private Hospital**	**PHC**	**Camp**
		N/A *N = 151,281*	*100%* *N = 188,569*		*41%* *N = 77,766*	*26%* *N = 49,699*	*14%* *N = 26,569*	*8%* *N = 15,761*	*4%* *N = 7,684*
Number & Share Meeting all Pre-Conditions			4,694 2.49%		1,411 1.81%	831 1.67%	1,782 6.71%	265 1.68%	98 1.28%
Not Told Side Effects	*Share not told about side effects*	85.8%	87.9%	**1.8%*****	86.3%^^^	89.5%	89.1%	87.1%	87.8%
	(SE)	(0.0033)	(0.0024)	(0.0041)	(0.0043)	(0.0042)	(0.0053)	(0.0087)	(0.0131)
Not Told Permanence	*Share not told permanence*	-	16.3%	-	14.5%	17.6%	18.3%	16.8%	15.6%
	(SE)	-	(0.0009)	-	(0.0013)	(0.0017)	(0.0024)	(0.0030)	(0.0041)
Does Not Know Alternate Options	*Share do <u>not</u> know 3 or more mfp options*	99.2%	94.4%	**-3.8%*****	94.2%	95.4%	95.6%	90.2%	96.4%
	(SE)	(0.0002)	(0.0005)	(0.0006)	(0.0008)	(0.0013)	(0.0013)	(0.0024)	(0.0021)
Not Able to Get Other Options	*Share cannot get condom if wanted*	46.2%	58.9%	**9.6%*****	61.5%	50.6%	63.3%	63.5%	48.3%
	(SE)	(0.0071)	(0.0078)	(0.0111)	(0.0125)	(0.0161)	(0.0177)	(0.0292)	(0.0245)
Not Decisionmaker	*Share other decisionmaker^^^^*	8.4%	8.0%	**-0.4%*****	7.9%	8.5%	7.1%	7.9%	6.2%
	(SE)	(0.0011)	(0.0006)	(0.0010)	(0.0010)	(0.0013)	(0.0016)	(0.0022)	(0.0028)
Incentivized	*Share compensated for sterilization*	-	55.7%	-	63.5%	72.9%	5.5%	68.2%	74.8%
	Compensated more then spent	-	46.8%	-	39.3%	30.6%	95.0%	34.1%	27.5%
	Amount compensated	-	₹ 3,100	-	₹ 3,368	₹ 2,561	₹ 7,500	₹ 2,920	₹ 2,532

^Other recognized forms of mFP include: the Pill, IUD,

^^Ttset assessing difference in means between individuals who are sterilized versus those utilizing any other recognized form of modern family planning (the comparison excludes all individuals who are not using any form of mFP)

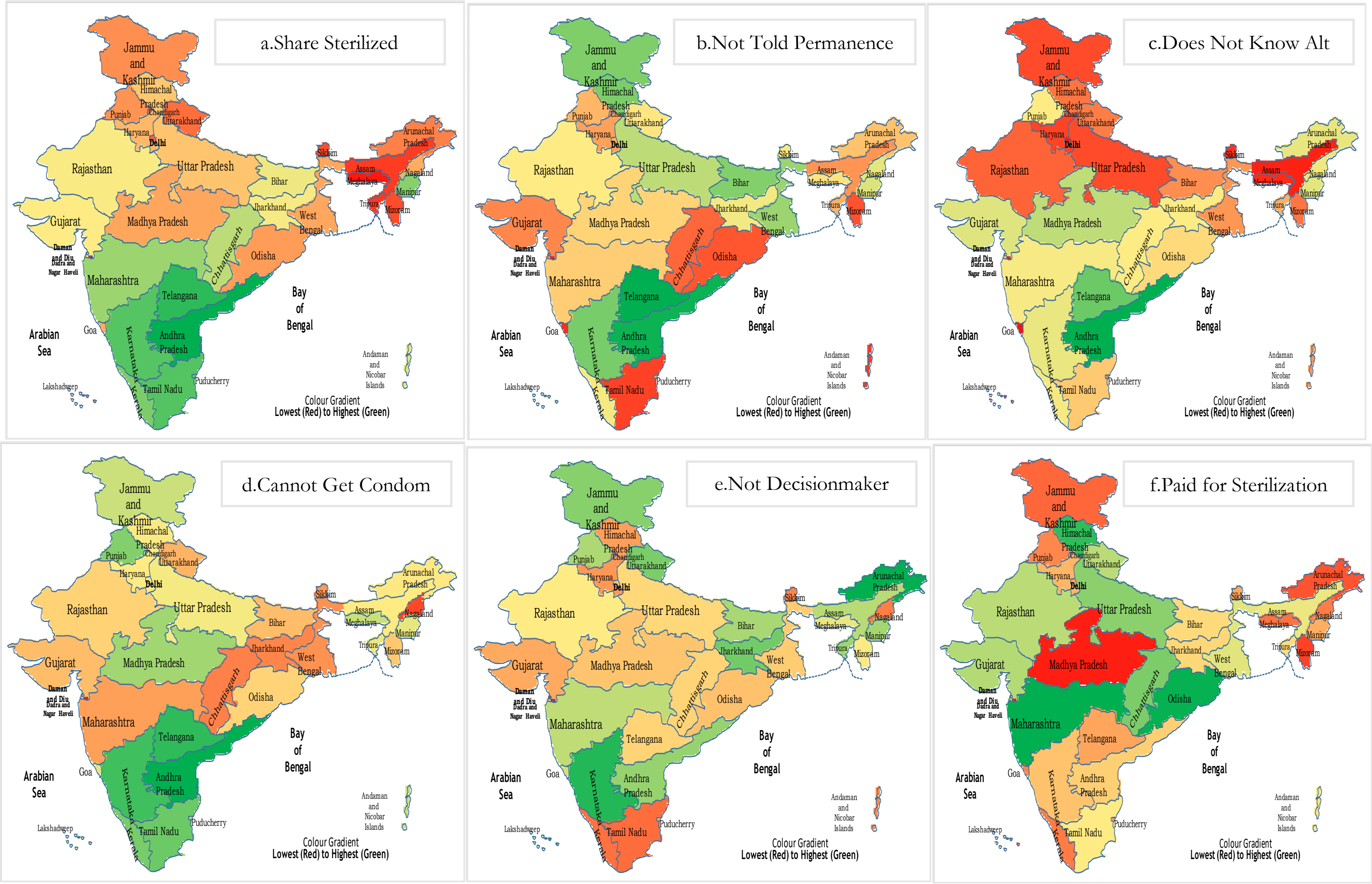
^^^Green: below (better than) all-sterilized mean, Red: above (worse than) than all-sterilized mean

^^^^Not sole decisionmaker is any case in which a patient did not make the decision by themselves or jointly with their partner i.e. sole and joint decisions are coded as a zero whereas cases when someone other than the patient made the decision, the variable is coded as one.

**** Denotes significance at 1%, ** at 5%, and * at 10% level.*

There was also considerable variation between states with no single state performing highly on all measures (Figure 1a-f). First, the share of mFP users who were sterilized varied greatly with a minimum of 6.1% (Manipur) of mFP users sterilized to a maximum of 97.9% (Andhra Pradesh). Each of the following variables (b – f) is collected amongst the sterilized (non-hysterectomy) population in each state or union territory. The share of women who were not told their procedure was permanent (b) had a state-level mean of 14.0% with Telangana at the highest rate of uninformed (State Range: 23.0%; SD: 0.059). For non-independent or jointly made decision (c), Arunachal Pradesh had the highest rate at 17.6% (State Range: 16.9%; SD: 0.042). The overall state mean was higher for inability to get a condom if needed, at 57.9% with a maximum of 91.5% of the sterilized population reporting they could not get a condom in Andhra Pradesh (State Range: 73.9%; SD: 0.162). Andhra Pradesh also had a higher rate than any other state for (c) sterilized women who did not know three or more family planning methods (State Range: 28.6%; SD: 0.055). Payment for sterilization had the second largest range after ability to get a condom, Lakshadweep had only 7.8% of sterilized women reporting payment whereas Madhya Pradesh had 78.1% (State Range: 70.3%; SD: 0.180).

Figure 2.1a-f. Share Sterilized & Uninformed Consent Variables by State



Taken together, no single state performed well on all measures; for example: states with a high share of women who were told about a tubal ligation procedure's permanence, may perform poorly on knowledge of family planning options.

Factors Associated with Uninformed Consent

Table 2.4 reports the results of the Shapley Decomposition analysis amongst the postpartum sterilized population, for whom we have more information on the care (in this case duel-birthing) interaction. We first look at variance in the first outcome: a patient not being told about the procedure's permanence. For this outcome Group IB, or other services, explained 43.67% of variance in the composite score; within this category receipt of anti-natal care (ANC) explained the largest share of variance for not told permanence at 97.83%. This result held when controlling for wealth, education, caste and patient age (Coef: -0.08, p-value: <0.001; results in appendix). Also in this group, receipt of a caesarian section or concurrent abortion explained less than 3% of variance. The group with the next highest share of variance was IA facility/provider which explained 20.28% of variance for the outcome not told permanence. Within this category, the community health worker (CHW) interaction explained the majority of variation at 83.97% with being assisted by a doctor (as opposed to other type of care provider) explaining 15.40% and the public status of a facility explaining just 0.63% of variation. The CHW result held when controlling for wealth, education, caste and patient age (Coef: -0.03, p-value: <0.001; results in appendix). The sub-category on the supply side that explained the least variance was financial at 11.19%, with sterilization payment making up the majority of variance at 72.95%. In contrast to supply-side factors, the demand-side factors included in the postpartum model all fell below 12% with individual time-variant factors explaining 11.45% of variance and clinical complexity only explaining 3.43%.

For the second outcome: decision to undergo sterilization made by someone other than the patient, variance was distributed more evenly across supply and demand categories. The group that explained the most variance was IIB at 37.17%, individual characteristics, with a patient's educational attainment explaining the most within-group variance at 66.65% (Coef: -0.02, p-value: <0.01; results in appendix).. The second highest group for this outcome was IA or the provider/facility at 27.76% with assisted by doctor explaining 78.88% of within-group variance (Coef: -0.02, p-value: <0.01; results in appendix). For this outcome, group IIA explained 15.18% of variance, with all three sub-items explaining more than 20% of within-group variance, suggesting a patient's clinical complexity was more important in informing the primary decisionmaker than it was in being informed about permanence. All other groups explained less than 10% of variation in the decisionmaker outcome.

Table 2.4. Results from Grouped Shapley Decomposition <u>Amongst Postpartum^ Sterilized Individuals</u>: Predictors of Exposure to Coercive Sterilization Sub-Items Amongst NFHS-5 Survey Respondents (N = 45,840)

		Explanatory Variable	**Not Told Permanence**		**Not Decisionmaker**	
			% Variance Individual^	**% Variance Group^^**	**% Variance Individual**	**% Variance Group**
Category I: Supply	***Group A:*** *Policy / Provider / Facility*	*Public facility*	0.63%	20.28%	7.27%	27.76%
		CHW Interaction	83.97%		13.85%	
		Assisted by doctor	15.40%		78.88%	
			100%		100%	
	Group B: *Services*	*C-section*	2.03%	43.67%	60.29%	6.31%
		Abortion	0.14%		10.43%	
		ANC	97.83%		29.28%	
			100%		100%	
	Group C: *Financial*	*JSY Payment*	22.38%	11.19%	0.29%	4.64%
		Sterilization Payment	72.95%		3.27%	
		Insurance	4.67%		96.44%	
			100%		100%	
Category II: Demand	***Group A:*** *Clinical Complexity*	*Breech*	76.43%	3.43%	22.11%	15.18%
		Prolonged Labor	15.64%		33.76%	
		Excessive Bleeding	7.94%		44.13%	
			100%		100%	
	Group B: *Individual Characteristics*	*Caste*	17.11%	9.99%	0.85%	37.17%
		Education	78.86%		66.65%	
		Wealth Index	3.65%		27.97%	
		Religion	0.39%		4.53%	
	Group C: *Individual Time-Variant*	*Parity at sterilization*	12.25%	11.45%	52.71%	8.94%
		Age at sterilization	69.27%		9.45%	
		Marital duration at sterilization	18.48%		37.85%	
			100%		100%	
				100%		100%

^The decomposition is run on a sample that includes all individuals who were sterilized in the immediate postpartum period, this table does not include individuals who underwent interval sterilization.

^^ Sterilization at childbirth is a measure of postpartum sterilization, when the sterilization procedure is undertaken at the time of / directly following a childbirth. This variable includes women who have the same date listed for their birth and sterilization and therefore may be an undercount of true postpartum sterilization prevalence. ANM: auxiliary nurse midwife; LHV: lady health visitor visit in 3 months leading up to interview.

For the interval sterilized population, or those sterilized in a non-birthing period, there were only four sub-groups included in the Shapley model with two groups on the supply side and two on the demand (Table 2.5). For the outcome not told permanence, in the interval sterilized population, the sub-group IA facility type / provider explained the most variation at 53.85%. We were unable to include other, concurrent, services for this population in the model so 53% is limited to the items included within this model. Similar to the postpartum population, for the outcome not decisionmaker individual characteristics explained the most variance (42.05%) with a patient's education explaining the most within-group variation at 48.89%.

Table 2.5. Results from Grouped Shapley Decomposition Amongst Interval^ Sterilized Individuals: Predictors of Exposure to Coercive Sterilization Sub-Items Amongst NFHS-5 Survey Respondents

		Explanatory Variable	**Not Told Permanence**		**Not Decisionmaker**	
			% Variance Individual^	**% Variance Group^^**	**% Variance Individual**	**% Variance Group**
Category I: Supply	***Group A:*** *Facility / Provider*	*Public facility*	8.80%	53.85%	1.13%	12.01%
		CHW Interaction	89.09%		26.53%	
		Sterilization Camp	2.11%		72.34%	
			100%		100%	
	Group B: *Financial*	*Sterilization Payment*	83.48%	29.87%	18.04%	4.64%
		Insurance	16.52%		81.96%	
			100%		100%	
Category II: Demand	***Group A:*** *Individual Characteristics*	*Caste*	44.92%	9.72%	2.52%	42.05%
		Education	49.14%		48.89%	
		Wealth Index	5.10%		37.61%	
		Religion	0.83%		10.98%	
			100%		100%	
	Group B: *Individual Time-Variant*	*Parity at sterilization*	10.75%	6.56%	33.63%	8.70%
		Age at sterilization	49.72%		25.22%	
		Marital duration at sterilization	39.53%		41.15%	
			100%		100%	
				100%		100%

Potential Treatments

Table 2.6 presents the result of the propensity score matched comparisons amongst the immediate postpartum sterilized population, these models examine different supply-side factors (i.e. potential interventions) and estimate how they impact the two coercion outcomes. The "original sample" is unmatched and the kernel matched sample columns compare similar patients within the two exposure groups. The first potential intervention, receiving care in a public facility, was associated with a statistically significant 1.82% decrease in the odds of not being told about procedure permanence; i.e. only 13.73% of patients who received care in a public facility were not told about permanence as compared to 15.55% of demographically similar patients who did *not* receive care in a public facility at a threshold of 0.05. This relationship held for the decisionmaker outcome, but was directionally opposite with the receipt of care in a public facility associated with a 1.75% increase in not being the primary decisionmaker. Interacting with a CHW was associated with a 3.24% decrease in not being told about the procedure's permanence, but a 2.35% increase in not being the decisionmaker. There was no statistically significant relationship for two of the potential interventions: being assistant by a doctor and having a concurrent caesarian section. Seeing an ANC was statistically significant and associated with a decreased odds for both outcomes, including over 8% drop for not told permanence. Janani Suraksha Yojana (JSY) payment, which is a conditional cash transfer provided to compensate women for costs associated with getting to, and delivering within, a recognized health facility, was associated with a decrease for both outcomes. However, insurance while associated with a decreased odds for the decisionmaker variable, was associated with an increased odds of not being told permanence.

Table 2.6. Average Treatment Effect of Each Supply-Side Factor^ for Postpartum Sterilized Women

	Original Sample			Kernel Matched Sample		
	Mean Intervention	Mean Comparison	Standardized Difference	Mean Intervention	Mean Comparison	Standardized Difference
Public Facility						
Not Told Perm	13.72%	16.45%	-2.73%	13.73%	15.55%	**-1.82%****
NDecisionmaker	6.26%	8.53%	-2.27%	6.26%	4.50%	**1.75%****
CHW Interaction						
Not Told Perm	10.22%	17.36%	-7.14%	10.23%	13.46%	**-3.24%*****
NDecisionmaker	7.22%	6.60%	0.63%	7.22%	4.87%	**2.35%*****
Assisted by Doctor						
Not Told Perm	13.82%	15.28%	-1.46%	13.80%	15.55%	-1.74%
NDecisionmaker	6.34%	10.26%	-3.93%	6.32%	7.00%	-0.68%
Caesarian Section						
Not Told Perm	14.31%	13.61%	0.70%	14.31%	9.68%	4.63%
NDecisionmaker	6.49%	8.07%	-1.58%	6.49%	5.15%	1.33%
ANC						
Not Told Perm	12.48%	20.65%	-8.17%	12.45%	20.78%	**-8.33%****
NDecisionmaker	9.26%	11.02%	-1.76%	9.25%	11.31%	**-2.06%****
JSY Payment						
Not Told Perm	11.10%	14.84%	-3.75%	11.10%	21.71%	**-10.61%*****
NDecisionmaker	6.50%	6.97%	-0.47%	6.50%	6.94%	**-0.44%*****
Insurance						
Not Told Perm	17.13%	14.85%	2.28%	17.13%	15.63%	**1.50%****
NDecisionmaker	6.31%	7.06%	-0.74%	6.31%	6.44%	**-0.13%*****

^Concurrent abortion excluded due to inadequate sample size
**** Denotes significance at 1%, ** at 5%, and * at 10% level.*

Table 2.7 presents the result of the propensity score matched comparisons amongst the interval sterilized population, examining the supply-side factors measured for that population. Similar to the postpartum population, both receiving care in a public facility and a CHW interaction were associated with directionally opposite results for the two outcomes. Both interventions resulted in a lower odds for not being told permanence i.e. the intervention increased the odds that the patient was told permanence, but decreased the odds that they were the primary decisionmaker. The intervention associated with the highest improvement was interaction with a CHW, where only 10.15% of interval women who saw a were not told permanence but 20.62% of demographically similar women who did not see a CHW were not told permanence.

Table 2.7. Average Treatment Effect of Each Supply-Side Factor for Interval Sterilized Women

	Original Sample			Kernel Matched Sample		
	Mean Intervention	Mean Comparison	Standardized Difference	Mean Intervention	Mean Comparison	Standardized Difference
Public Facility						
Not Told Perm	14.45%	15.83%	-1.39%	14.45%	19.88%	**-5.43%****
NDecisionmaker	9.09%	8.41%	0.68%	9.09%	8.16%	**0.93%****
CHW Interaction						
Not Told Perm	10.15%	16.49%	-6.34%	10.15%	20.62%	**-10.48%****
NDecisionmaker	10.39%	8.33%	2.06%	10.39%	8.94%	**1.45%****
Sterilization Camp						
Not Told Perm	14.15%	15.54%	-1.39%	14.15%	20.23%	**-6.08%*****
NDecisionmaker	6.73%	8.77%	-2.04%	6.73%	11.81%	**-5.08%*****
Insurance						
Not Told Perm	14.50%	16.11%	-1.61%	14.50%	20.79%	**-6.29%****
NDecisionmaker	7.09%	9.67%	-2.58%	7.09%	11.07%	**-3.97%****

**** Denotes significance at 1%, ** at 5%, and * at 10% level.*

For this population, we were able to look at sterilization camp as a potential intervention. Getting a sterilization at a camp was associated with lower odds for both outcomes with only 6.73% of sterilized women in camps having that decision made by someone else as compared to 11.81% amongst demographically similar women in other care settings. For the interval population, having health insurance was also positively associated with both outcomes. Taken together, the PSM results for both the postpartum and interval sterilized populations suggest there are multiple avenues through which communicating permeance and ensuring the patient is the primary decisionmaker can be improved.

2.5. Discussion

In a nationally representative sample of adult women who underwent tubal ligations across India, I find high rates of uninformed sterilization care, a form of coercion, as defined by the *Interagency Statement on Eliminating Forced, Coercive and Otherwise Involuntary Sterilization.*[19] Out of over 188,000 sterilized women only 4,694 or approximately 2.5% met all preconditions for consent. Examining sub-components of the framework, I find that while nearly 85% *were* informed that the procedure was permanent, this left approximately 16% of women who underwent a sterilizing procedure without being told they would never be able to have children again and in 8% of cases someone other than the patient was the primary decisionmaker to undergo sterilization. Utilizing a variance decomposition approach I find that, for the outcome "not told permanence," a large share of variance can be explained by supply-side or system-modifiable factors. For example, receipt of ANC services prior to delivery explained the most variation in being told that a tubal ligation procedure was permanent for the postpartum sterilized population. Examining system-modifiable factors as potential interventions, I identify seven factors associated with a decreased odds of exposure to coercion outcomes. While overall rates of coerced sterilization care are striking, the findings r.e. potential solutions may be encouraging and inform policies that increase the odds of receiving an informed procedure. If tubal ligation remains a prominent aspect of the Indian family planning agenda, understanding the contemporary persistence of coercive sterilization in routine care settings is particularly critical given recent calls by the central government to invest in population stabilization throughout the country.[45]

The indicators I use to quantify coercion provide a rough estimate of the prevalence of uninformed consent amongst sterilized women in India. However, these data only account for the preconditions necessary for consent and do not examine choice directly. In reality, understanding women's experiences of coercion and the contexts in which choices are made requires far more nuance, such as qualitative examination of how people feel during a care interaction and the extent to which information provided reflects an individual's prior knowledge or values, which may change over time or in different contexts. For example, when women are paid to be sterilized, there may be a monetary threshold under which people do and do not feel comfortable with financial incentivization which varies by context. Providing the cost of transport may be seen as acceptable (particularly in contexts where the cost of transportation prohibits access to care),[46] but payment for sterilization that is equal to a month's salary not – complicating the situation, in certain contexts these two values may be the same. In addition, the relevance of each sub-component of the framework may not hold equal weight for all women or in all contexts. For example, is the knowledge of alternative mFP options relevant in places where those options are not actually available to the patient in practice? Nearly 60% of sterilized women said they were not able to get a condom if needed. This suggests the need for more robust validation of this proof-of-concept measure; assessing how sub-items track with a latent variable of interest – such as a patient's direct assessment of coercion or pressure they faced to receive a tubal ligation – in different contexts. This method of validation can also help identify if, and to what extent, there may be other unmeasured sources of pressure that are not captured in this framework.

A second issue this work raises is one of reproductive governance. Variables related to the provision of care or supply side had a significant impact on the likelihood of undergoing an uninformed sterilization. This, in turn, may lead to stratified reproduction; women residing in contexts where community health workers are scarce or where facilities routinely do not provide information required for informed consent.[47] However, high-profile examples of patient harm are often interpreted as isolated cases.[48] For example, in 2014 the news that 14 women died in two Chandigarh sterilization camps due to medical errors during laparoscopic tubectomy procedures was met with public outcry.[49] Though the deaths of these women rightfully engendered public attention, and ultimately led to the banning of camps throughout India. While the ban may represent a step forward for patient safety, there has been little empirical work or public scrutiny assessing if the issues of pressure and coercion extend beyond camps and across institution types.[50] The doctor who performed the surgeries admitted publicly that his errors may have been due to the pressure he felt to meet a district-level monthly quota, fifteen thousand procedures per month.[51] While camps served as a strategic mechanism to reach quota efficiently, time-limited quota are set and apply to care provided throughout a given district and across cares settings (quota are not publicized by the MoHFW but have been well documented by human rights organizations and qualitative research).[52,53] These data support Human Rights Watch reports[52] and the corresponding hypothesis that less overt forms of patient harm, such as coercion via uninformed care, may be imbedded within the routine delivery of health services.[52] Two findings within this paper support this assertation. First, as shown in Table 2.3 the interagency variables (assessing coercion) are a problem in all care settings. On average, PHCs and CHCs appear to preform worse than camps on these measures. Second, if we treat receipt of the procedure in a camp as an "intervention" (Table 2.7) and compare like-with-like patients, we find camps are statistically significantly associated with a *decreased* odds of coercive care provision.

These findings raise concern. Coercive sterilization, in this more passive form, appears to be a contemporary issue that is not limited to certain care settings (camps) but pervasive across sites of care. However, there is reason for optimism: there is potential for ANC to augment formal system and ensure women get the information they need. While we cannot tell from this analysis how CHWs engaged with patients on this issue, whether CHWs provided information directly or if they helped patients facilitate a more informed visit with other providers, seeing a CHW was associated with a significantly decreased odds of receiving an uninformed sterilization. However, CHWs within the ASHA cadre are not currently salaried and any strategy that relied on CHWs to improve informed consent should also address the underlying conditions of women in these roles.[54] Information campaigns and access to information outside of the health system may also be a viable avenue to explore as evidenced by the role of "information from the internet." However, another system-modifiable factor - site of care, may surprise readers: sterilization camps had the lowest odds of non-autonomous choice – or cases in which the decision to undergo a tubal ligation procedure was made entirely by an individual other than the patient (e.g. partner, provider or other). These findings suggest that while camps may be prone to safety risks due to high patient volume, as evident in the case above, they may also serve as a valuable care option for women seeking to autonomously control their fertility. This finding also supports the hypothesis that targeting sterilization camps alone may be insufficient to address the prevalent issue of ununiformed consent amongst sterilized women.

This work builds on research conducted across several disciplines. Cross national work often uses the Method Information Index (MII) to assess information provided to women seeking reproductive care.[55] However the MII is limited to three variables - information about the side-effects of a given method, what to do if a complication is experiences and receipt of information on other methods of contraception. Rana and Jain extend on the MMI in a 2019 piece using two rounds of the NFHS survey,[18] but do not examine other aspects of informed consent what might drive non-consented care. Other quantitative studies that examine autonomy amongst sterilized patients often focus on autonomy in the home setting. For example, using NFHA-3 data Pallikadavath et al found that sterilized women under the age of 30 had higher autonomy in household decision-making.[6,56] However, this study did not examine autonomous decision-making in the healthcare interaction and compared the sterilized group to non-mFP users, making it difficult to disaggregate effects from utilizing mFP options more generally. Most notably, this dissertation builds on Senderowicz' 2019 work to develop a health system level measure of reproductive autonomy with 2,654 women in Burkina Faso. This piece is unique in several ways: first, it focuses specifically on sterilized women as opposed to other family planning users and it is limited to variables that were collected as part of India's NFHS-5. As a result, it is not as comprehensive in in assessing aspects of autonomy, but provides a proof of concept for how existing large-scale survey tools might be leveraged to better examine reproductive autonomy. Building on work conducted by Jain et al, it also employs a novel grouped variance decomposition approach and explores potential system-modifiable factors that could be leveraged to address issues of uninformed consent.[17,18]

This study has a number of limitations. First, the Interagency Framework and corresponding indicators assessed in this paper are likely an underestimate of the true prevalence of coercion. Inclusion was limited by availability within the NFHS-5, the variables examined here simply assess pre-conditions for informed consent; they do not *directly* assess "voluntariness" or choice. In addition, I do not include any variables that assess freedom from misinformation, which was outlined in the interagency statement (e.g. patients may be told that sterilization is protective against AIDS and HIV). And, with the exception of condoms, we lack data on the actual availability of alternative mFP options and cannot determine if alternate options were known but not accessible. Second, certain questions such as "knowledge of alternative options," may be subject to reporting bias. For this question, survey administrators list each mFP option and the respondent states if they are aware of the option. A more accurate alternative may be framing this as an open-ended question in which the enumerator checks each mFP option listed (unprompted) by the respondent. Third, there is potential for differential reporting or courtesy biases by state or region of the country. Fourth, while the propensity score matching approach allows us to compare patients with similar characteristics, this approach may be subject to unmeasured confounding as we can only match based on factors that are observed. In addition, the examination of potential supply-side solutions is limited by what is available in the dataset and is not meant to represent a full exploration of supply-side factors that might improve the odds that the criteria for consent are met. Finally, the sample is a general population of ever-married adult women. Apart from basic demographic information, we are not able to disaggregate who within the sample also belongs to groups that have been flagged as at a heightened risk of coercion, for example: transgender or otherwise gender diverse individuals, incarcerated persons, people with HIV, people living with mental disability, etc.

CHAPTER 2, REFERENCES

1. United Nations. *Contraceptive Use by Method 2019 Data Booklet.*; 2019.

2. Singh P, Singh KK, Singh P. Factors explaining the dominion status of female sterilization in India over the past two decades (1992-2016): A multilevel study. *PLOS ONE*. 2021;16(3):e0246530. doi:10.1371/JOURNAL.PONE.0246530

3. The proliferation of female sterilization in Brazil and India A comparative analysis of the cohort and parity effects on JSTOR. Accessed August 25, 2021. https://www.jstor.org/stable/29789354

4. Leone T, Padmadas S. The proliferation of female sterilization in Brazil and India: a comparative analysis of the cohort and parity effects. *Genus*. 2008;LXIII(3/4):77-97.

5. Pradhan MR, Dwivedi LK. Changes in contraceptive use and method mix in India: 1992–92 to 2015–16. *Sex Reprod Healthc*. 2019;19:56-63. doi:10.1016/J.SRHC.2018.12.006

6. Pallikadavath S, RAJAN I, SINGH A, OGOLLAH R, PAGE S. POST-STERILIZATION AUTONOMY AMONG YOUNG MOTHERS IN SOUTH INDIA. *J Biosoc Sci*. 2015;47(1):75-89. doi:10.1017/S002193201300059X

7. Standards and Quality Assurance in Sterilization Services 2014. Accessed October 27, 2022. https://nhm.gov.in/images/pdf/programmes/family-planing/guidelines/Standards_and_Quality_Assurance.pdf

8. Irfa N, Qurieshi M, Yasmeen J, Sufoora B, Hussain M. Young Females Undergoing Voluntary Tubal Sterilisation: Introspection into Socio-Demographic Correlates and Underlying Factors. 2016;15:6-10. doi:10.9790/0853-1505080610

9. Gormley R, Vickers B, Cheng B, Norman W V. Comparing options for females seeking permanent contraception in high resource countries: a systematic review. *Reprod Health 2021 181*. 2021;18(1):1-18. doi:10.1186/S12978-021-01201-Z

10. Peterson HB, Jeng G, Folger SG, Hillis SA, Marchbanks PA, Wilcox LS. The Risk of Menstrual Abnormalities after Tubal Sterilization. *http://dx.doi.org/101056/NEJM200012073432303*. 2009;343(23):1681-1687. doi:10.1056/NEJM200012073432303

11. Mukasa B, Ali M, Farron M, Weerdt R Van de. Contraception supply chain challenges: a review of evidence from low- and middle-income countries. *https://doi.org/101080/1362518720171394453*. 2017;22(5):384-390. doi:10.1080/13625187.2017.1394453

12. Cottingham J, Germain A, Hunt P. Use of human rights to meet the unmet need for family planning. *The Lancet*. 2012;380(9837):172-180. doi:10.1016/S0140-6736(12)60732-6

13. Kendall T, Albert C. Experiences of coercion to sterilize and forced sterilization among women living with HIV in Latin America. *J Int AIDS Soc*. 2015;18(1):19462. doi:10.7448/IAS.18.1.19462

14. Rowlands S, Amy JJ. Non-consensual sterilization of women living with HIV. *https://doi.org/101177/0956462418758116*. 2018;29(9):917-924. doi:10.1177/0956462418758116

15. Honkasalo J. Unfit for Parenthood? Compulsory Sterilization and Transgender Reproductive Justice in Finland. *J Int Womens Stud*. 2018;20(1):40-52.

16. Pradhan MR, Patel SK, Saraf AA. Informed choice in modern contraceptive method use: Pattern and predictors among young women in India. *J Biosoc Sci*. 2019;52(6). doi:10.1017/S0021932019000828

17. Jain AK. Information about methods received by contraceptive users in India. *J Biosoc Sci*. 2017;49(6):798-810. doi:10.1017/s0021932016000602

18. Rana MJ, Jain AK. Do Indian women receive adequate information about contraception? *J Biosoc Sci*. 2020;52(3):338-352. doi:10.1017/S0021932019000488

19. the WHO. Eliminating forced, coercive and otherwise involuntary sterilization. *The WHO*. Published online 2014. Accessed October 1, 2019. https://www.who.int/reproductivehealth/publications/gender_rights/eliminating-forced-sterilization/en/

20. Mwaikambo L, Speizer IS, Schurmann A, Morgan G, Fikree F. What Works in Family Planning Interventions: A Systematic Review. *Stud Fam Plann*. 2011;42(2):67-82. doi:10.1111/j.1728-4465.2011.00267.x

21. Skeet CH. Forced sterilizations : Addressing limitations of international rights adjudication through an intersectional approach. *Women's Health Limits Law*. Published online December 10, 2019:122-151. doi:10.4324/9781351002387-5

22. Jewell SE. Conceptualising Violence Against Women in the Work of the United Nations Special Rapporteur on Violence Against Women. *SSRN Electron J*. Published online July 6, 2012. doi:10.2139/ssrn.2038113

23. Leung L, Miedema S, Warner X, Homan S, Fulu E. Making feminism count: integrating feminist research principles in large-scale quantitative research on violence against women and girls. *Gend Dev*. 2019;27(3):427-447. doi:10.1080/13552074.2019.1668142

24. *Rome Statute of the International Criminal Court*.; 1998. Accessed January 30, 2021. http://treaties.un.org.

25. Carranza Ko ÑP. Making the Case for Genocide, the Forced Sterilization of Indigenous Peoples of Peru. *Genocide Stud Prev*. 2020;14(2):90-103. doi:10.5038/1911-9933.14.2.1740

26. Lockwood A. Report: China's forced reproductive policies for Uighur women may constitute genocide. JURSIT. Published June 30, 2020. Accessed January 30, 2021. https://www.jurist.org/news/2020/06/report-chinas-forced-reproductive-policies-for-uighur-women-may-constitute-genocide/

27. Senderowicz L. Contraceptive Autonomy: Conceptions and Measurement of a Novel Family Planning Indicator. *Stud Fam Plann*. 2020;51(2):161-176. doi:10.1111/sifp.12114

28. Langer A. Cairo after 12 years: successes, setbacks, and challenges. *Lancet*. 2006;368(9547):1552-1554. doi:10.1016/S0140-6736(06)69486-5

29. Ashford L. *New Perspectives on Population: Lessons from Cairo*.; 1995:1-44. Accessed November 11, 2020. https://pubmed.ncbi.nlm.nih.gov/12289007/

30. Freedman LP, Ramsey K, Abuya T, et al. Defining disrespect and abuse of women in childbirth: a research, policy and rights agenda. *Bull World Health Organ*. 2014;92(12):915-917. doi:10.2471/BLT.14.137869

31. Senderowicz L, Maloney N. Supply-Side Versus Demand-Side Unmet Need: Implications for Family Planning Programs. *Popul Dev Rev*. 2022;48(3):689-722. doi:10.1111/padr.12478

32. Senderowicz LG. Conceptions and Measurement of Contraceptive Autonomy. Published online April 19, 2019. Accessed October 1, 2019. https://dash.harvard.edu/handle/1/40976626

33. Nandagiri R. What's so troubling about 'voluntary' family planning anyway? A feminist perspective. *https://doi.org/101080/0032472820211996623*. 2021;75(S1):221-234. doi:10.1080/00324728.2021.1996623

34. Patil VP, Luck J, Yoon J, Khanna S. Domestic Violence and Sterilization Skew in India: An Instrumental Variable Analysis. *J Interpers Violence*. Published online June 12, 2020:088626052093304. doi:10.1177/0886260520933044

35. Challa S, Manu A, Morhe E, et al. Multiple levels of social influence on adolescent sexual and reproductive health decision-making and behaviors in Ghana. *Women Health*. 2018;58(4):434-450. doi:10.1080/03630242.2017.1306607

36. Metheny N, Stephenson R. How the Community Shapes Unmet Need for Modern Contraception: An Analysis of 44 Demographic and Health Surveys. *Stud Fam Plann*. 2017;48(3):235-251. doi:10.1111/SIFP.12028

37. Ross LJ. Reproductive Justice as Intersectional Feminist Activism. *https://doi.org/101080/1099994920171389634*. 2018;19(3):286-314. doi:10.1080/10999949.2017.1389634

38. Gilliam ML, Neustadt A, Gordon R. A call to incorporate a reproductive justice agenda into reproductive health clinical practice and policy. *Contraception*. 2009;79(4):243-246. doi:10.1016/J.CONTRACEPTION.2008.12.004

39. Groemping U. Relative Importance for Linear Regression in R: The Package relaimpo. *J Stat Softw*. 2006;17(1):1-27. doi:10.18637/JSS.V017.I01

40. Lindeman RH, Merenda PF, Gold RZ. *Introduction to Bivariate and Multivariate Analysis*. (Scott F and C, ed.).; 1980. Accessed August 24, 2021. https://www.scirp.org/(S(czeh2tfqyw2orz553k1w0r45))/reference/ReferencesPapers.aspx?ReferenceID=1986481

41. Law of Two-Child Norm in Panchayats: Implications, Consequences and Experiences. Accessed September 14, 2021. https://www.jstor.org/stable/4416748?seq=1#metadata_info_tab_contents

42. Garrido MM, Kelley AS, Paris J, et al. Methods for Constructing and Assessing Propensity Scores. *Health Serv Res*. 2014;49(5):1701-1720. doi:10.1111/1475-6773.12182

43. Abadie A, Imbens GW. Matching on the Estimated Propensity Score. *Econometrica*. 2016;84(2):781-807. doi:10.3982/ECTA11293

44. Garrido MM. Propensity Scores: A Practical Method for Assessing Treatment Effects in Pain and Symptom Management Research. *J Pain Symptom Manage*. 2014;48(4):711-718. doi:10.1016/j.jpainsymman.2014.05.014

45. Correspondent S. BJP pushes population control bill. *The Hindu*. https://www.thehindu.com/news/national/bjp-pushes-population-control-bill/article37831406.ece. Published December 3, 2021. Accessed December 2, 2022.

46. Mohanty SK, Mishra S, Chatterjee S, Saggurti N. Pattern and correlates of out-of-pocket payment (OOP) on female sterilization in India, 1990–2014. *BMC Womens Health 2020 201*. 2020;20(1):1-13. doi:10.1186/S12905-020-0884-1

47. Riley NE. Stratified Reproduction. In: Riley NE, Brunson J, eds. *International Handbook on Gender and Demographic Processes*. International Handbooks of Population. Springer Netherlands; 2018:117-138. doi:10.1007/978-94-024-1290-1_9

48. Hardee K, Harris S, Rodriguez M, et al. Achieving the Goal of the London Summit on Family Planning By Adhering to Voluntary, Rights-Based Family Planning: What Can We Learn from Past Experiences with Coercion? | Guttmacher Institute. Guttmacher Institute. Published 2014. Accessed November 11, 2020. https://www.guttmacher.org/journals/ipsrh/2014/12/achieving-goal-london-summit-family-planning-adhering-voluntary-rights-based

49. Senderowicz LG. Conceptions and Measurement of Contraceptive Autonomy. Published online April 19, 2019.

50. Ramakant Rai v. Union of India, W.P (C) No 209 of 2003. ESCR-Net. Accessed October 20, 2022. https://www.escr-net.org/caselaw/2013/ramakant-rai-v-union-india-wp-c-no-209-2003

51. Muneeza N. Doctor Arrested After India Sterilization Deaths. USA Today. Published 2014. Accessed November 11, 2020. https://www.usatoday.com/story/news/world/2014/11/13/india-sterilization-deaths/18957653/

52. HRW. India: Target-Driven Sterilization Harming Women. Human Rights Watch. Published 2014. Accessed November 11, 2020. https://www.hrw.org/news/2012/07/12/india-target-driven-sterilization-harming-women

53. Sivaram S, Singh S, Penn-Kekana L. Understanding the role of female sterilisation in Indian family planning through qualitative analysis: perspectives from above and below. *Sex Reprod Health Matters*. 2022;29(2):2080166. doi:10.1080/26410397.2022.2080166

54. Nimavat JH, Jasani PK, Joshi JB, Jadeja YM, Sochaliya KM, Kartha GP. Effectiveness of "ASHA INCENTIVE SCHEME of 2013" on enhancing the functioning of ASHA in motivating couples having two or less children to undergo permanent sterilization in Surendranagar district. *Int J Med Sci Public Health Online*. Published online 2016. doi:10.5455/ijmsph.2016.02022016395

55. Jain AK. Examining Progress and Equity in Information Received by Women Using a Modern Method in 25 Developing Countries. *Perspect Sex Reprod Health*. 2016;42(3):131-140. doi:10.1363/42e1616

56. Pallikadavath S, RAJAN I, SINGH A, OGOLLAH R, PAGE S. POST-STERILIZATION AUTONOMY AMONG YOUNG MOTHERS IN SOUTH INDIA. *J Biosoc Sci*. 2015;47(1):75-89. doi:10.1017/S002193201300059X

CHAPTER 2 Appendix

Appendix 1. Relevance of Treating Interagency Variables as a Scale

Survey items, when used alone, often suffer from random measurement error; when multiple items tap the same underlying concept this can lead to problems of multicollinearity. It is sometimes useful to create scales if items do measure the same underlying concept, given a well-constructed scale is more parsimonious. Here we test the reliability of treating the Interagency survey items as a single scale.

Appendix Table 1a. Variables within the Scale and Overall Cronbach's Alpha

	Obs	Mean	Std. dev.
Not Told Side Effects	18,196	12.9%	0.3357
Not Told Permanence	188,569	15.6%	0.3628
Does Not Know Three	188,569	5.0%	0.2171
Not Decisionmaker	177,763	8.2%	0.2751
Paid For Sterilization	188,569	54.0%	0.4984
Average interitem covariance:			0.0044257
Scale reliability coefficient (CA):			0.1424

The higher Cronbach's Alpha (CA), the better, i.e. the correlation between the observed value and the true value should be as high as possible. A standard point of reference is .80 and above constitutes a strong relationship. For this scale, the CA for this scale is 0.1424, which can be interpreted as very low reliability.

Appendix Table 1b. Testing the Scale with Standardized Items

Item	Obs	Sign	Item-test correlation	Item-rest correlation	Average interitem correlation	Alpha
Not Told Side Effects	17961	-	0.4855	0.0748	0.03	0.1101
Not Told Permanence	17961	+	0.5194	0.1156	0.0166	0.0631
Does Not Know Three	17961	+	0.4784	0.0665	0.0328	0.1195
Not Decisionmaker	17961	+	0.4437	0.0266	0.0466	0.1635
Paid For Sterilization	17961	-	0.4548	0.0392	0.0422	0.1498
Test scale					0.0336	0.1482

Ideally, individual items are correlated with the scale as a whole. Items that do not correlate well with the scale are candidates to be dropped, as they may not measure the same construct as the other variables. The column Alpha indicates what the CA would be if a given item was removed from the scale. Removal would make the CA lower for all items, with the exception of "payment" which would raise the CA marginally to 0.16, still well below a 0.80 threshold.

The items do not appear to be co-linear and may be measuring different constructs of coercion. As a result of low scale reliability, each sub-item is treated as a separate outcome as opposed to examining "coercion" as defined by the Interagency Statement as a scale.

Appendix 2. Regression Output from Shapley Decomposition

Appendix Table 2.2a. Outcome: Not Told Permanence – Postpartum Population, OLS Regression Output Shapley Decomposition

			Coefficient	Std. err.	P>t
Supply	Facility / Provider	Public Facility	-0.0010256	0.0092117	0.911
		CHW Interaction	-0.0386215	0.0089033	0.000
		Assisted by Doctor	-0.0161621	0.0111204	0.146
	Other Care	Caesarian Section	-0.0082509	0.0091792	0.369
		Abortion	-0.0173531	0.0312908	0.579
		ANC	-0.0819154	0.0106762	0
	Financial	JSY Payment	-0.011737	0.0093834	0.211
		Sterilization Payment	-0.0265712	0.0089486	0.003
		Insurance	-0.0158969	0.00888	0.073
Demand	Clinical Complexity	Breech	0.0046985	0.002764	0.089
		Prolonged Labor	-0.0104694	0.0060502	0.084
		Excessive Bleeding	0.0015074	0.0062965	0.811
	Individual	Caste	0.0054628	0.0037992	0.151
		Education	-0.0078081	0.0057406	0.174
		Wealth Index	-0.0063813	0.0039763	0.109
		Religion	0.0008017	0.0005736	0.162
	Individual Time-variant	Parity at sterilization	0.014323	0.0063795	0.025
		Age at sterilization	-0.0153496	0.0057088	0.007
		Marital duration at sterilization	-0.002659	0.0069999	0.704
		_cons	0.2612783	0.0290496	0

Appendix Table 2.2b. Outcome: Not Decisionmaker – Postpartum Population, OLS Regression Output Shapley Decomposition

			Coefficient	Std. err.	P>t
Supply	Facility / Provider	Public Facility	-0.0056019	0.0072469	0.44
		CHW Interaction	0.0231721	0.0070069	0.001
		Assisted by Doctor	-0.0234122	0.0087472	0.007
	Other Care	Caesarian Section	-0.0037108	0.007228	0.608
		Abortion	-0.0059204	0.0244775	0.809
		ANC	-0.0139189	0.0083977	0.097
	Financial	JSY Payment	-0.0117975	0.0073776	0.11
		Sterilization Payment	-0.006395	0.0070391	0.364
		Insurance	-0.0027663	0.0069895	0.692
Demand	Clinical Complexity	Breech	-0.0009548	0.0021827	0.662
		Prolonged Labor	0.007089	0.0048135	0.141
		Excessive Bleeding	0.0117895	0.0049681	0.018
	Individual	Caste	-0.0005717	0.0029871	0.848
		Education	-0.0195519	0.0045242	0
		Wealth Index	0.0001514	0.0031305	0.961
		Religion	0.000091	0.0004679	0.846
	Individual Time-variant	Parity at sterilization	0.0002042	0.0050221	0.968
		Age at sterilization	0.0000679	0.0045014	0.988
		Marital duration at sterilization	0.0047172	0.0055246	0.393
		_cons	0.1211734	0.022893	0

Appendix Table 2.2c. Outcome: Not Told Permanence – Interval Population, OLS Regression Output Shapley Decomposition

			Coefficient	Std. err.	P>t
Supply	Facility / Provider	Public facility	-0.0185713	0.0019034	0
		Sterilization camp	-0.0187626	0.0043174	0
		ANM interaction	-0.0601593	0.0024232	0
	Financial	Sterilization Payment	-0.0370356	0.001947	0
		Insurance	-0.0087861	0.001855	0
Demand	Individual	Caste	0.0070836	0.000847	0
		Education	-0.0085031	0.0010782	0
		Wealth Index	-0.0017603	0.000787	0.025
		Religion	-0.0001808	0.0001076	0.093
	Individual Time-variant	Parity at sterilization	0.0016481	0.0010859	0.129
		Age at sterilization	-0.0126983	0.0013036	0
		Marital duration at sterilization	0.00746	0.0014489	0
		_cons	0.1979626	0.0049465	0

Appendix Table 2.2d. Outcome: Not Decisionmaker – Interval Population, OLS Regression Output Shapley Decomposition

			Coefficient	Std. err.	P>t
Supply	Facility / Provider	Public facility	-0.000151	0.0015212	0.921
		Sterilization camp	-0.0133484	0.0034503	0
		ANM interaction	0.0215639	0.0019316	0
	Financial	Sterilization Payment	-0.0202213	0.0015587	0
		Insurance	-0.0230195	0.0014835	0
Demand	Individual	Caste	-0.0010814	0.0006784	0.111
		Education	-0.0114803	0.000863	0
		Wealth Index	-0.0060996	0.0006282	0
		Religion	0.0005524	0.0000853	0
	Individual Time-variant	Parity at sterilization	-0.0018037	0.0008741	0.039
		Age at sterilization	0.0056626	0.0010419	0
		Marital duration at sterilization	0.0010349	0.0011637	0.374
		_cons	0.1263874	0.0039744	0

Appendix 3. Additional Output from Propensity Score Matching

Appendix Table 2.3a. All Sterilized Women - Average Treatment Effect of Being Sterilized in the Immediate Postpartum Period on Coercion Variables

	Original Sample			Kernel Matched Sample		
	Mean Intervention	Mean Comparison	Standardized Difference	Mean Intervention	Mean Comparison	Standardized Difference
Sterilized During the Postpartum Period						
Not Told Perm	15.86%	15.47%	0.39%	15.86%	19.35%	**-3.49%**
NDecisionmaker	6.73%	8.66%	-1.93%	6.73%	10.04%	**-3.31%**

Appendix Table 2.3b. Interval Sterilized Population - Average Treatment Effect of Facility Type with Matched Comparison

	Original Sample			Kernel Matched Sample		
	Mean Intervention	Mean Comparison	Standardized Difference	Mean Intervention	Mean Comparison	Standardized Difference
Sterilization in Camp						
Not Told Perm	14.15%	15.54%	-1.40%	14.15%	20.23%	**-6.08%**
NDecisionmaker	6.73%	8.76%	-2.04%	6.73%	11.81%	**-5.08%**
Sterilization in Public Hospital						
Not Told Perm	14.44%	16.15%	-1.71%	14.44%	20.66%	**-6.21%**
NDecisionmaker	9.09%	8.38%	-0.70%	9.09%	8.11%	**0.97%**
Sterilization in Private Hospital						
Not Told Perm	17.44%	15.27%	2.17%	17.44%	18.13%	**-0.68%**
NDecisionmaker	8.40%	8.70%	-0.30%	8.40%	8.16%	**0.23%**
Sterilization in CHC						
Not Told Perm	16.01%	15.23%	0.78%	16.01%	23.29%	**-7.28%**
NDecisionmaker	8.39%	8.79%	-0.40%	8.39%	11.80%	**-3.42%**
Sterilization in PHC						
Not Told Perm	16.30%	15.39%	0.88%	16.28%	18.26%	**-2.45%**
NDecisionmaker	8.10%	8.72%	-0.61%	8.10%	10.93%	**-2.82%**

Appendix Table 2.3c. Average Treatment Effect of Sterilization Payment as an "Intervention" for the Postpartum and Interval Sterilized Populations

	Original Sample			Kernel Matched Sample		
	Mean Intervention	Mean Comparison	Standardized Difference	Mean Intervention	Mean Comparison	Standardized Difference
Sterilization Payment – Postpartum Population						
Not Told Perm	13.15%	17.96%	-4.81%	13.15%	16.56%	**-3.41%***
NDecisionmaker	6.54%	6.87%	-0.33%	6.54%	8.53%	**-2.00%***
Sterilization Payment – Interval Population						
Not Told Perm	14.12%	17.67%	-3.55%	14.12%	22.02%	**-7.90%****
NDecisionmaker	8.02%	9.71%	-1.69%	8.02%	12.64%	**-4.62%****

Appendix Table 2.4. Odds Ratio, Receiving an Uninformed Tubal Ligation by Facility Type

	Private Hospital (n = 25,321)	**Public Hospital** (n = 66,420)	**Community Health Center** (n = 33,587)	**Sterilization Camp** (n = 12,414)
Missing Conditions for Consent, Continuous	**0.14***** **(0.003)**	**1.49***** **(0.020)**	**2.31***** **(0.043)**	**2.37***** **(0.61)**
Not Told About Side Effects	0.93 (0.067)	0.94 (0.048)	1.09 (0.069)	1.10 (0.094)
Not Told About Permanence	0.98 (0.020)	**0.82***** **(0.011)**	**0.87***** **(0.014)**	**1.26**** **(0.025)**
Does Not Know 3 Other Methods	1.16* (0.097)	0.99 (0.54)	0.91 (0.056)	0.57* (0.054)
Can Get Condom if Wanted	0.85 (0.132)	0.91 (0.104)	1.20 (0.160)	1.35* (0.220)
Not Decisionmaker / Joint Decision	0.96 (0.030)	**1.22**** **(0.023)**	**0.87**** **(0.022)**	**0.77**** **(0.027)**
Financially Incentivized Sterilization	**0.02***** **(0.001)**	2.03 (0.076)	4.67 (0.224)	5.77 (0.484)

*NOTES: Results shown as odds ratios, standard errors reported in parentheses. Facility types coded as dummy variables, with 1 as facility listed in column heading v. base composed of all other facility types (e.g. patients who received a tubal ligation in a private hospital compared to individuals receiving a tubal ligation in any other facility type). All models control for household wealth, caste and years since sterilization with district fixed effects. *** denotes significance at 1%, ** at 5%, and * at 10% level.*

CHAPTER 3

Facility-Based Delivery & Immediate Postpartum Sterilization in India

An Instrumental Variable Analysis

Liana Rosenkrantz Woskie

The share of women giving birth in facilities has increased dramatically in most low- and middle-income countries over the past 30 years; in 1992 as few at 14% of women living in India gave birth in medical facilities, whereas that share was estimated at 83% in 2014, driven largely by an increase in public hospital use. This transition has been flagged as an opportunity to increase family planning communication and method adoption while women are in facilities, particularly amongst those who do not regularly interact with the healthcare system outside of the birthing experience. This paper exploits variation in the Janani Suraksha Yojana (JSY) or the "*Safe Motherhood Scheme*," at the district level as an instrument to identify the causal effect of increasing institutional delivery on immediate postpartum sterilization amongst women who would not otherwise deliver in facilities. The model finds that high rates of institutional delivery at the community level have a statistically significant effect on a woman's odds of being sterilized immediately following childbirth in Low Performing States (LPS) and Christian-majority states, but not wealthy southern states. These findings hold when controlling for a concurrent caesarian-section and key demographic characteristics, such as family wealth, caste and parity. Using the same model, there were no concurrent changes in the adoption of other forms of modern family planning (mFP). In addition, women sterilized in the immediate postpartum period were 1.3 times more likely to express regret with the procedure than non-postpartum sterilized peers. Higher rates of regret were concentrated amongst women with a historically marginalized caste or tribal designation.

Keywords: Sterilization, Institutional Delivery, Family Planning, Postpartum, Regret, India

3.1. Introduction

The share of women giving birth in facilities has increased dramatically in most low and middle income countries over the past 30 years.[1] The increase in facility-based delivery has been particularly successful in India, with the share of women giving birth in recognized health facilities increasing from 14% in 1992 to as much as 83% in 2014.[2] This shift was driven largely by an increase in public hospital use by poor women, with a 4-fold increase in the proportion of public sector births amongst women in the poorest wealth quintile.[2] This unprecedented increase in women accessing facilities for childbirth motivated a corresponding effort - to leverage the immediate postpartum period for the provision of family planning services, particularly amongst otherwise low healthcare-utilizing women.[3,4]

Using the postpartum period to provide family planning services is longstanding and has been relatively uncontroversial. For example, in collaboration with the Maternal and Child Health Integrated Program (MCHIP) of the U.S. Agency for International Development (USAID) and partners, the World Health Organization (WHO) produced the "*Statement for Collective Action for Postpartum Family Planning*" to emphasize the importance of postpartum family planning (PPFP) and offer general approaches for addressing unmet need.[5] This movement frames PPFP as allowing country programs to deliver counseling and services at a time when couples have the most contact with the health care system, without substantial increases in staff or infrastructure.[3–5] However, the circumstances during and immediately following childbirth, such as heighted stress and acute physical pain as well as corresponding pharmaceutical use (e.g. oral opioids, epidural, nitrous oxide, etc.) may compromise the ability to engage in critical decision-making.[6] Data from the United States suggest women sterilized in the immediate postpartum period, for example, reported almost double the rate of post-sterilization regret after three years when compared to women undergoing interval sterilization (while not recently pregnant or immediately after elective abortion).[7] Given these opportunities and concerns, understanding if, and how, the immediate postpartum period is being leveraged to provide family planning services in India would be important to ensure women are provided with adequate support and counseling.

In addition, the broader evidence base on facility-based delivery has been mixed.[8,9] In a pooled sample across 67 low and middle income countries, Fink and co-authors found no association between institutional deliveries and key health outcomes, such as early neonatal mortality.[9] Protective effects were found for private facilities, but not for public hospitals or health centers. In India specifically, institutional delivery efforts financed primarily through a program called Janani Suraksha Yojana (JSY) and launched in 2005 with an annual budget of over 300 million USD, have had mixed results.[10] Evaluations suggest the policy (a conditional cash transfer program to birthing women) is what drove India's dramatic increase in facility-based delivery, but assessment of the program's effect on health-related outcomes is mixed with many studies finding no concurrent gains in maternal or child health.[11–13] One hypothesis is that smaller or more rural facilities may lack the requisite capacity to handle an influx of patients and as a result they provide lower-quality technical care and struggle to address acute healthcare-amenable causes of death.[14–17] Recent literature supports this hypothesis, suggesting institutional delivery in India was not protective against newborn mortality in districts with low performance on quality-of-care metrics, but was associated with decreased mortality in districts with higher quality.[18]

The dramatic rise in facility-based delivery, paired with a small but growing, body of research suggesting low-quality services in many facilities, raises questions regarding how effectively the in-facility immediate postpartum period has been leveraged to provide patient-centered PPFP services. For example, if facilities struggle to meet an influx of patients, these patients may not receive adequate time or communication from providers or may be exposed to ancillary services prioritized through other programs during birthing encounter. For example, in 2014 Alfano et al found the introduction of the JSY program increased a pregnant woman's odds of receiving a clinically unnecessary ultrasound scan.[19] For reproductive care, this might be positive: a 2020 study by Sen et al finds women who were covered under the scheme had a 12% higher chance of adopting contraception compared to women not covered.[20] Indeed, early descriptive research examining the relationship between institutional delivery and PPFP suggests a positive relationship, with the increasing proportion of women delivering in health facilities leading to an increase in uptake of modern family planning methods.[21] However, in India, female sterilization has long been the most common form of modern family planning (mFP) utilized across the country with a financial incentive scheme promoting its use.[22,23] In this context, we lack a more detailed assessment of the relationship between institutional delivery and sterilization as the primary form of family planning taken up during this period.

In this study, I re-examine the movement to increase institutional delivery in India by focusing on outcomes related to PPFP. This work was motivated by a hypothesis that the rapid increase in institutional delivery paired with India's national family planning programming may have led to an increase in women's likelihood of initiating family planning during the immediate postpartum period; but these gains may be disproportionately concentrated amongst certain contraceptive methods. This, in turn, led to three primary research questions: First: did increasing institutional delivery lead to higher odds of mFP uptake during the immediate postpartum period? Second, was higher uptake of mFP limited to female sterilization or distributed across a diverse range of methods? And, finally, was postpartum sterilization associated with higher rates of regret amongst patients undergoing the procedure as compared to women sterilized outside of the postpartum period?

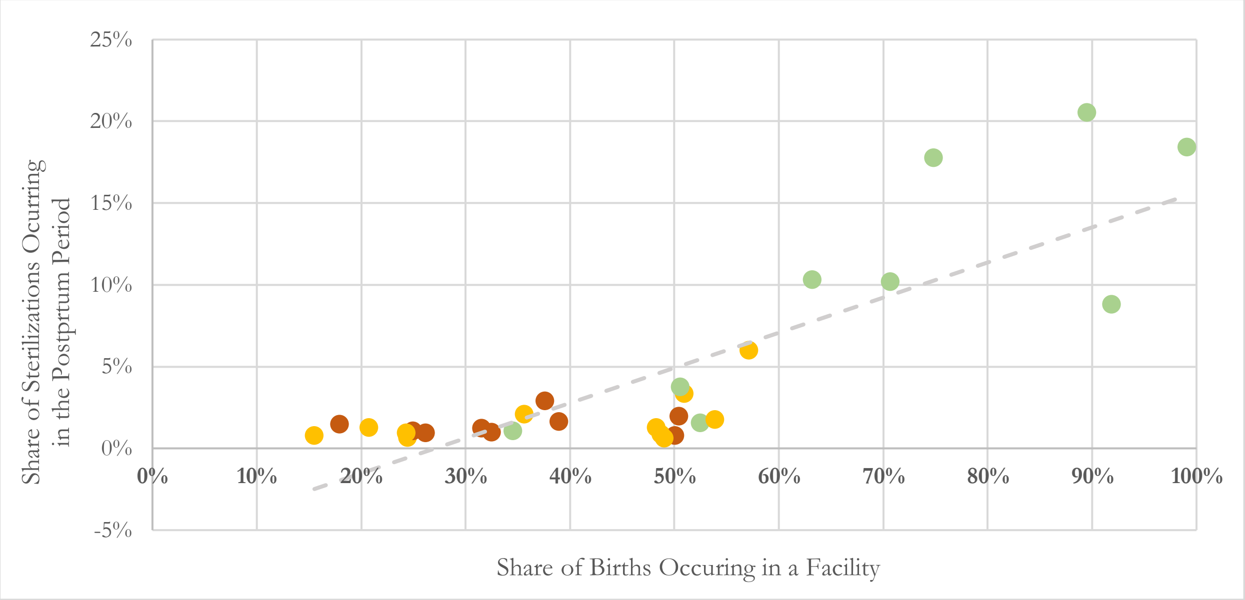
3.2. Empirical Approach

3.2.1. Motivation

Prior to India's investment in increasing institutional delivery, states in India with a higher share of facility-based births also had a higher share of sterilizations occurring in the postpartum period (Figure 3.1). These data raise concern: the recent push to increase institutional delivery may have also led to more women getting sterilized when they entered facilities to give birth. However, people giving birth in institutions at baseline may also be more likely to receive a postpartum sterilization for other reasons (e.g. access to clinical facilities with surgical capacity, preference for clinical intensity, etc.). This is where the endogeneity issue lies: individuals who give birth in facilities likely differ from women birthing in other locations along several important dimensions, such as wealth (observable) or sociocultural preferences for home birth or permanent fertility control (with available data, un-observable). These factors may also align with the odds that a sterilization is consented i.e. affluent women in wealthier states may be able to proactively schedule a postpartum tubal ligation when they give birth if they already decided they wanted this procedure. These issues of unmeasured confounding make it difficult to understand the relationship between increases in facility-based delivery and sterilization.

Figure 3.1 provides an overview of data at the state level, showing the share of births occurring in a facility by the share of sterilizations that occur during the postpartum period. These data demonstrate the relationship between facility-based delivery and immediate postpartum sterilization for births occurring prior to announcement or implementation of the JSY program (instrument). Data points are color coded in line with the three state groups (for more detail on state groups, see Section 3.3.2, Table 3.1 and Figure 3.3, below). The data suggest a positive relationship between the dependent or response variable (postpartum sterilization) and our explanatory variable (institutional delivery) with a Pearson's Correlation Coefficient of 0.83. Examining data at the state level suggests there is a positive relationship and motivates the paper's hypothesis but does not isolate the effect of increasing institutional delivery on immediate postpartum sterilization.

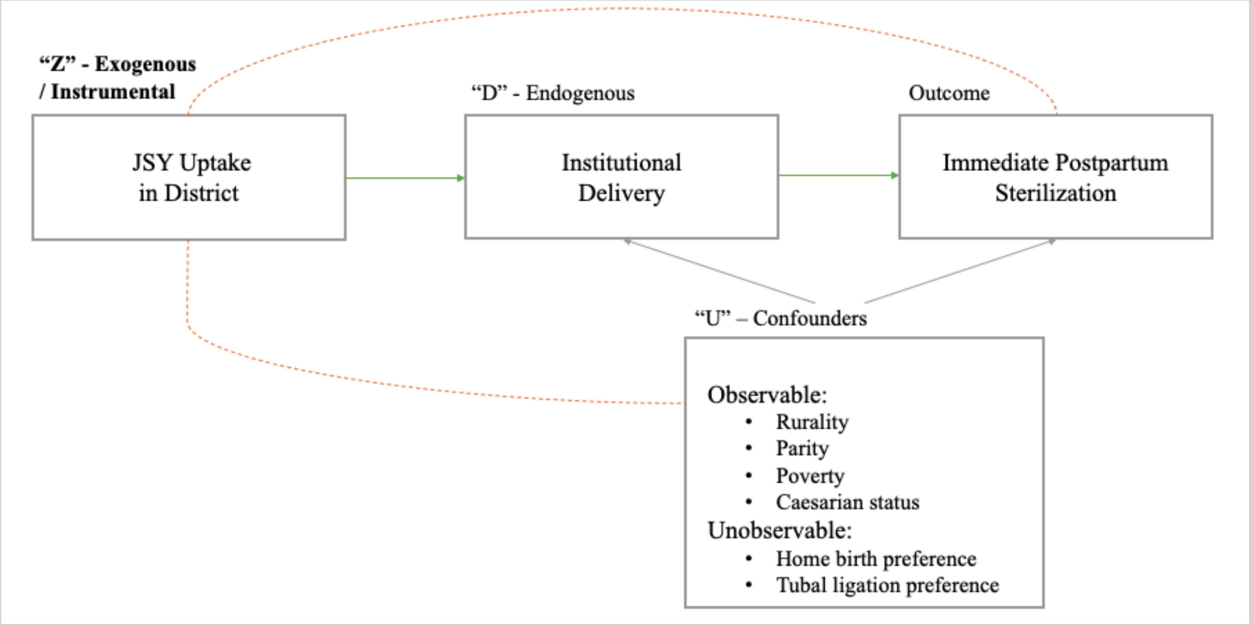
Figure 3.1. Share of Births Occurring in a Facility by Share of Sterilizations Taking Place During the Postpartum Period at the State Level Prior to 2005 (NFHS-3)



Red, State Group I: High priority for the National Rural Health Mission based on low baseline performance on maternal and child health indicators, also called "Low Performing States" by the central government; all women eligible for JSY regardless of socio-demographic characteristics
Orange, State Group II: High Performing States, small norther; JSY eligibility was limited to low-caste / below poverty level women with regional documentary evidence suggesting additional inclusion criteria were employed
Green, State Group III: High Performing States, large southern; JSY eligibility limited to low-caste / below poverty level women

To address this issue, an Instrumental Variable (IV) approach allows me to functionally control for both the observed and unobserved differences between women who are 'treated' (those who give birth in facilities) and those who are untreated, or do not give birth in a facility. To do so, I exploit variation in the policy that drove this shift - the Janani Suraksha Yojana (JSY) program, which provided financial incentives to women if they gave birth in a recognized health facility. I use JSY coverage at the district level as an instrument to identify the causal effect of institutional delivery on sterilization. The program has been well studied with over 20 papers on the relationship between roll out and subsequent increases in facility-based delivery. This motivated the use of JSY as an instrument, it both induces variation in institutional delivery exogenously (relevance) and affects the outcome of interest (sterilization) only through institutional delivery (exclusion restriction). By using JSY as an instrument, I'm able to look at the effect of institutional delivery itself (as opposed to the policy promoting it) and focus on how India's shifting healthcare practices impact reproductive rights.

Figure 3.2. Schematic Depiction of Instrumental Variable (IV) Approach to Identify the Effect of Institutional Delivery on Immediate Postpartum Sterilization



JSY: Janani Suraksha Yojana

This approach is in concept similar to an approach employed by Card and Angrist that used geographic differences in the accessibility of college as a source of exogenous variation to examine the relationship between level of schooling and earnings [24]. The study used "presence of an accredited 4-year college in the local labor market" as an instrument. Similar to JSY coverage, college proximity rate varied by region, urbanicity and was correlated with individual characteristics, such as race and parental education [24]. Instead of examining individuals who grew up in labor markets with and without a nearby college, in this piece we examine women who live in districts with different rates of JSY uptake. In addition, because the instrument is continuous as opposed to binary, the higher the value of the instrument (JSY at the community level) the higher the probability that an individual is treated i.e. has an institutional delivery.[25]

Instrumental variable estimates are generally referred to as local average treatment effects (LATE). That is, the approach captures the effect of institutional delivery for the subgroup of women whose decision to get a postpartum sterilization is affected by institutional delivery rates at the district level – i.e. compliers.[26] The LATE interpretation of IV estimates is based on the exclusion restriction, which is one of the underlying assumptions of a valid instrument. The exclusion restriction assumes that JSY does not affect the decision to give birth in a facility amongst always-takers (women who will always give birth in a facility irrespective of the JSY program) and never-takers (women who will never give birth in a facility even with the JSY program) and thus has no effect on their odds of receiving a postpartum sterilization.[27] This means the differences in postpartum sterilization between those women who had high JSY uptake at the district level and those who did not, are driven mainly by compliers. The results, therefore, are limited to understanding the odds of postpartum sterilization amongst those who would not otherwise deliver in a facility.

3.2.2. Instrument: Janani Suraksha Yojana

Since its introduction, the flagship conditional cash transfer (CCT) program of NRHM, Janani Suraksha Yojana (JSY) has been successful in its primary intermediate goal: increasing institutional delivery. JSY was implemented nation-wide with support from local health workers, either accredited social health activists (ASHA), auxiliary nurse midwives (ANM), anganwadi workers or traditional birth attendants.[28] These workers identify and interface with pregnant women in the community, working to facilitate antenatal care and promote institutional delivery. In theory, they also arrange for and help pay for transportation to facilities; with additional reimbursement provided if they accompany the woman to a facility at the time of labor. However, qualitative evidence on the program suggests many barriers to the program's roll out, including rent-seeking by service providers from patients and costs of transport that exceeded reimbursement.[14,17] Despite these challenges, the program has been well studied with an established association between program uptake and increased institutional delivery.[10] For example, a 2018 study by Rahman et al utilizing propensity score matching and regression discontinuity found that enrollment in the JSY program contributed to between a 16 and 23 percentage point higher likelihood of having an institutional delivery.[29]

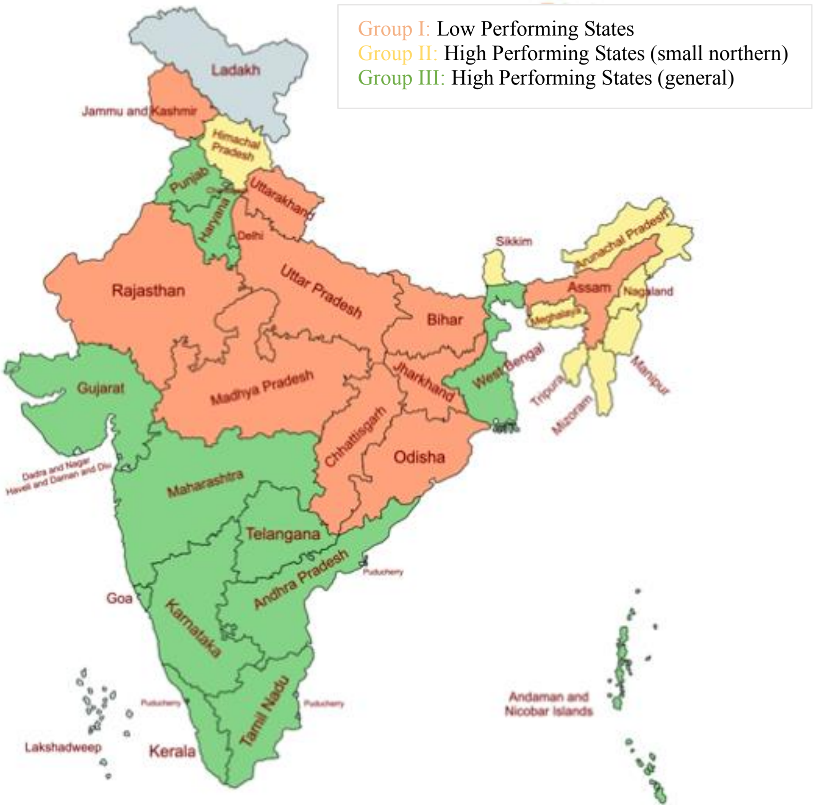
Prior research on JSY, however, has largely ignored the presence of concurrent incentive schemes that may inform behavior *within* the health system itself and to which both pregnant women and providers may be subject during the delivery of care. The largest concurrent incentive scheme in terms of number of participants and overall budget, is a centrally-sponsored initiative aimed at remunerating women for female sterilization.[22] We examine documentation of state-level eligibility for JSY as well as the sterilization incentive scheme. We find there was intentional variation in JSY's roll out and corresponding distribution of the program at the state level. Because of this, we divide the country-wide sample into three core geographic regions based on program eligibility (Table 3.1).

Table 3.1. State Groups Based on JSY Program Eligibility

	States / Union Territories	**Overview of JSY Eligibility**
Group I: *Low Performing States (LPS)*	Uttaranchal, Rajasthan, Uttar Pradesh, Bihar, Assam, Jharkhand, Chhattisgar, Jammu & Kashmir, Orissa, Madhya Pradesh	All women eligible for JSY regardless of socio-demographic characteristics
Group II: *High Performing States (HPS), Small Northern*	Arunchal Pradesh, Nagaland, Sikkim, Manipur, Meghalaya, Himachel Pradesh, Mizoram, Tripura	National documentation states JSY eligibility was limited to low-caste / below poverty level women; documentary evidence suggests additional inclusion criteria were employed
Group III: *High Performing States (HPS), Large Northern*	Haryana, Punjab, Delhi, West Bengal, Gujarat, Maharashtra, Andra Pradesh, Karnataka, Goa, Kerala, Tamil Nadu, Telangana	National documentation states JSY eligibility was limited to low-caste / below poverty level women

The first group is composed of low performing states (LPS)[1] as designated by the central government of India for priority implementation of the National Rural Health Mission (NRHM) of which JSY was the largest fiscal program. These states were designated based on low overall institutional delivery rates prior to 2005 and high population growth projections; all citizens living within these states were eligible to receive JSY regardless of wealth, caste or any other sociodemographic factors. High performing states (HPS) did not have total population eligibility for the JSY program; eligibility was based on individual characteristics, such as poverty and caste designation. For this study, we split government designated HPS into two groups: Group II is composed of a subset of smaller northern HPS that, based on documentary analysis, were designated as "High Focus States" for sterilization and employed additional eligibility criteria for JSY making the program more inclusive (i.e. more people eligible for the program).[30] The final group, III, is made up of HPS that did not have total-population eligibility for JSY and also did not employ additional eligibly criteria. We run the model separately for each subgroup because we *cannot* assume "as good as random" assignment of JSY between the three groups.

Figure 3.3. Mapped State Groups



3.3. Data, Key Variables and Model

3.3.1. Analytic Sample

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[1] *"Performance" in the designation of Low or High Performing States is regarding states' performance on key metrics in 2004, directly prior to the roll out of the National Rural Health Mission. Metrics included, rate of institutional delivery as well as maternal and child mortality. Performance does not refer to post-JSY or reproductive care.*

To look at women giving birth in India, we use the fourth National Family Health Survey of India (NFHS-4) 2015-16. This is a large-scale, multi-round survey conducted in a representative sample of households throughout India. 699,686 women interviewed, which resulted in data on 1,315,617 unique births between 2010 and 2016. The ever-married women's questionnaire, a section of the tool, covers information on different components of maternal and child health including: pregnancy, childbirth, reproductive morbidities, immunization of mothers and children and access and availability of maternal and child health care. The tool includes a series of questions on female sterilization, such as: timing, quality rating, payment and patient autonomy. We use one round of the NFHS which captures deliveries directly following the period in which institutional deliveries were increasing most dramatically across the country. Using a single round also allows us to avoid variation in survey structure and sampling strategy from year to year. This round was fielded in all 29 States and seven Union Territories of India using the same survey instrument translated into 18 languages. In all, 28,586 Primary Sampling Units (PSUs) were selected across the country, of which fieldwork was completed in 28,522 clusters.

3.3.2. Dependent Variables

Using birth-level data, we identify cases where the Century Month Code (CMC) of a given birth matches the date of the mother's start of current family planning method for women who report having undergone a sterilization (date of sterilization), which is also coded as a CMC variable. The CMC for birth is calculated using a combination of the reported month and year of birth and reported age for living children as well as an imputation process for incompletely or inconsistently reported information.[31] This means births can only be matched with the date of sterilization at the month-level. Using this method, we assume that if a sterilization date and birth date match, the sterilization was conducted in the immediate postpartum period (immediately or up to 4 days after birth). Due to a requisite wait time following delivery, any sterilization occurring after the immediate postpartum period would not result in matching CMC codes; and would not be designated "immediate" postpartum.[32] For other modern forms of FP, we include: the pill, inter-uterine devices (IUD), injections, diaphragm, condoms, male sterilization (partner) and female condom.

In the second model, the outcome of interest is post-sterilization regret. The question posed to women was: "Do you regret that you had the sterilization?" with two answer options, yes and no. This is a subjective measure of a woman's regret regarding their sterilization procedure at the time that survey was administered. Because this measure is only captured at a single point in time, it may be subject to positive reporting bias and posed with limited answer options; observed regret is likely an underestimate of true regret.

3.3.3. Independent Variable

Institutional delivery was measured with a binary birth-level variable generated using the "place type" indicator for each delivery. The question posed to women was, "where did you give birth to X child?" After which a list of options was provided with three categories: home birth (woman's home, parents' home or other home), public health sector facilities (government or municipal hospital, community health center, etc.) and private health sector (private hospital, maternity clinic, etc.) If a woman is unable to determine if the facility she gave birth in was a hospital, health centre or other listed facility, the enumerator asked the survey respondent the name of the facility or place of birth; after which the survey team designated a location type. If a live birth took place in a recognized health facility it was given a designation of 1. The resulting variable is the share of births occurring in a hospital, lower-level clinic or otherwise recognized clinical facility in a given district amongst all live births within a given year.

3.3.4. Controls

The NFHS survey collects a wide range of demographic characteristics of female respondents. We employ a flexible control approach; coding each demographic characteristic as a dummy variable. We limit the number of controls to: wealth, rurality, caste and parity at sterilization and show models both with these controls and unadjusted. To measure wealth, I use the Wealth Index, a composite measure of the socioeconomic status of the women's household. It is categorized as: poorest, poorer, middle, richer and richest. Women who are in the poorest and poorer designations are demarcated as "1" whereas all other designations are zero. Rurality is a designation based on where a woman resides (household location) which can be an urban or a rural area. Women's caste was collected along four main categories: Scheduled Caste (SC), Scheduled Tribe (ST), other backwards class (OBC) and others (no historically marginalized caste designation). For the primary IV analysis SC, ST and OBC are combined with "other" for the dummy variable, with no historically marginalized designation as the comparator. Parity at time of sterilization is the number of live births a woman has had at the time of her sterilization (gender agnostic) coded as a binary variable with women who have had zero, one or two births as "one" and women who have had more than two live births as zero. The parity threshold is used due to sterilization policies at the state-level that determine eligibility for sterilization reimbursement (e.g. for travel) at a parity of more than two. Finally, I add cesarean section status to the model due to the hypothesized ease of conducting a dual surgery. These results are shown separately.

3.3.4. IV Model

An ideal instrument is one that induces variation in institutional delivery exogenously (relevance) and affects the outcome of interest (immediate postpartum sterilization) only through institutional delivery (exclusion restriction). Therefore, we discuss these conditions below. To assess the validity of the instrument in terms of the first condition, we started by examining the F-statistic in the first-stage IV regression. We estimated a first stage linear regression in which institutional delivery was the dependent variable and independent variables included the instruments and all control variables included in the second stage. We tested for significance of the instrument using the Cragg-Donald Wald F-statistic test. The null hypothesis for this test is that the instrument is not correlated with institutional delivery. Rejecting the null hypothesis indicates that the instrument predicts institutional delivery. General specification for the first stage regression is as follows:

$$\begin{gathered} instdeliv_{ict} = \propto_0 + \propto_1 jsycov_{act} + \propto X_{ict} + \propto_2 X_{ict} + \\ \propto_3 woman_{ict} + \propto_4 district_c + \varepsilon_{ict} \end{gathered} \tag{1}$$

Where *instdeliv* refers to whether respondent i in county c gave birth at time t; *jsycov* is the rate of JSY cash receipt for the age- and parity-specific group a of the *woman* in *district* c and at time t; X is a vector of respondent's individual characteristics;

woman refers to measured characteristics of each woman; district captures any stable differences between districts; and ε is the error term.

In the second stage, we regressed postpartum sterilization on the predicted value of institutional delivery from the first stage; we show results both unadjusted and also including all controls:

$$postpart_{ict} = \beta_0 + \beta_1 \widehat{instdeliv}_{ict} + \beta_2 X_{ict} + \beta_3 woman_{ict} + \beta_4\, district_c + \varepsilon_{ict} \qquad (2)$$

Where *postpart* represents our primary outcome of interest: immediate postpartum sterilization; *instdeliv* reflects the predicted values of X from the first stage; and X, woman and district include the same controls as in equation (1), excluding the instrument. The coefficient of institutional delivery in the second stage captures the effect of community level institutional delivery on the share of women receiving a sterilization in the postpartum period. Robust standard errors are shown for each model.

3.3.5. Regret Model

To assess the relationship between postpartum sterilization and patient-reported regret, we utilize an Ordinally Least Squares (OLS) logistic regression model with regret as the dependent variable and sterilization type as the independent (postpartum v. non-postpartum). I control for relevant patient-level demographics and examine caste as it interacts with postpartum status. We also conduct sensitivity analyses in which we add the interviewer identification number as a control in an effort to assess the presence of reporting bias and test the impact of an interviewer on a woman's probability of reporting sterilization regret, which aligns with prior work to assess bias in household survey reporting for sensitive topics related to women's reproductive health.[33]

3.4. Results

Table 3.1 presents characteristics of the sample based on the three state groups. Women in each of the three groups differed from one another along several important dimensions. In terms of demographic characteristics, State Group I had the highest share of women falling within the poorest wealth quintile (27.3% v. 8.9% and 9.3%). The largest share of women residing in rural areas (76.1%) the largest share of women belonging to an "other backwards class" and a similar share of women identifying as Hindu to State Group III. State Group II, the sub-set of states that formally fall within the "High Performing State" designation from the central government, but also had the lowest share of individuals without a historically marginalized caste designation (16.4% v. 21.8% and 23.0%) and highest share of women identifying as part of a Scheduled Tribe (66.4%). One of the most pronounced differences, is that State Group II had a much smaller share of women who identified as Hindu (33.3% v. 79.7% and 79.3%), with the largest share identifying as Christian (50.2%). State Group III had the highest share of women in the "richer" and richest" categories at 25.3% and 27.5% respectively. Group III also had the lowest share of women living in rural areas.

For family planning variables, the three state groups also differed. State Group III had the highest share of births occurring in a facility (institutional delivery, at 86.9%), the highest caesarian section rate (22.2%) and the highest share of births occurring in a private hospital (32.6%). State group III also had the highest share of married women between the ages of 15 and 49 who were utilizing a modern family planning (mFP) method at the time of the survey (44.8%). Amongst the mFP utilizing population, State Group III also had the highest share of women who had been sterilized, but the lowest mean parity at time of sterilization (2.7 children). We also look at time between when a woman is interviewed for the NFHS and their sterilizing procedure. For LPS, or Group I, the mean time elapsed was 4.3 years, whereas this was 4.7 years for both Group II and Group III. The share of women reporting they regretted the procedure also varied, with 6.9% in Group I, 8.0% in Group II and 7.5% in Group III.

Table 3.2. Breakdown of Patient Characteristics & Primary mFP Variables by State Group

			Group I Low Performing States (LPS)		Group II Sterilization Focus States (SFS)		Group III High Performing States (HPS)	
			N	%	N	%	N	%
Key Population Demographics	Wealth	Poorest	104,100	**27.3**	7,102	**8.9**	22,047	**9.3**
		Poorer	92,180	**24.2**	19,290	**24.1**	37,996	**16.0**
		Middle	71,598	**18.8**	23,155	**28.9**	52,415	**22.0**
		Richer	58,832	**15.4**	19,490	**24.3**	60,180	**25.3**
		Richest	54,591	**14.3**	11,147	**13.9**	65,563	**27.5**
	Urbanicity	Urban	91,134	**23.9**	23,370	**29.2**	90,231	**37.9**
		Rural	290,167	**76.1**	56,814	**70.9**	147,970	**62.1**
	Caste	S Caste	67,855	**18.7**	6,301	**8.2**	50,657	**22.0**
		S Tribe	48,603	**13.4**	51,094	**66.4**	27,436	**11.9**
		OBC	167,279	**46.1**	6,991	**9.1**	99,430	**43.1**
		None*	79,073	**21.8**	12,606	**16.4**	53,059	**23.0**
	Religion	Hindu	303,736	**79.7**	26,681	**33.3**	188,864	**79.3**
		Muslim	67,088	**17.6**	2,884	**3.6**	24,619	**10.3**
		Christian	4,290	**1.1**	40,279	**50.2**	7,544	**3.2**
		Sikh	1,708	**0.5**	127	**0.2**	13,465	**5.7**
		Buddhist	1,014	**0.3**	5,118	**6.4**	2,849	**1.2**
		Other**	3,465	**1.0**	5,095	**6.4**	860	**0.4**
Primary mFP Variables	Institutional Delivery^		113,932	**72.8**	17,798	**59.8**	63,636	**86.9**
	C-Section^		16,077	**10.3**	3,308	**11.1**	16,286	**22.2**
	Private Hospital Births		24,968	**16.0**	3,101	**10.4**	23,843	**32.6**
	mFP Use		135,285	**35.5**	19,172	**23.9**	106,762	**44.8**
	Sterilized, share of mFP		77,429	**57.2**	7,422	**38.7**	80,799	**75.7**
	Regret Sterilization		5,319	**6.9**	593	**8.0**	6,063	**7.5**
	Years Since Sterilization		**4.3** (0.0065)		**4.7** (0.0189)		**4.7** (0.0061)	
	Parity at Sterilization (mean, CI)		**3.3** (0.0021)		**3.5** (0.0071)		**2.7** (0.0022)	

*None of the above includes answer options "None" and "I Don't Know" (less than 1% in all state groups)

**Other includes all religious designations with less than 1% in any state group, e.g.: Jain, Jewish, Parsi/Zoroastrian & no religion

^birth-level data (all others women-level)

Table 3.3. summarizes the results from the first-stage, which examined the impact of the instrument (JSY) on the linear probability of delivering in an institution. The first stage regression provides an important diagnostic tool to assess the validity of the selected instrument. Results for Model I are unadjusted, whereas Model II includes relevant individual-level covariates (parity, rurality, poverty and caste designation) and, for Model III, caesarean section status, also at the individual level. Conditional on all relevant covariates (Model III), the first-stage results suggest a point increase in the JSY program was associated with a statistically significant increase in an individual's probability of delivering in an institution within two of the state groups. Specifically, in State Group I, for each one-unit change in JSY uptake at the district level, delivery in an intuition increased by 0.560 log points. This finding was highly significant at the 1% level. This model resulted in a larger coefficient in Group II, where each one-unit change in JSY uptake at the district level was associated with delivery in an intuition increased by 0.945 log points (also $p < 0.001$). For Group 3, findings were mixed. The unadjusted model resulted in a negative coefficient (i.e. individuals living in higher JSY-uptake districts were less likely to deliver in a facility), however when accounting for key demographic characteristics, this relationship was positive.

The Cragg-Donald Wald F statistic exceeded the standard threshold of 10 for all models in State Group I and State Group II ($p < 0.001$), but fell below 10 for State Group III in Model I, only reaching the threshold of 10 when adding controls. This raises concern regarding the strength of the instrument in Group III and we find that the Stock and Yogo 10% critical value, which is 16.38, is higher than the first-stage F statistic for the two adjusted State Group III models: 11.96 and 12.19 in Model II and Model III respectively. This suggests the instrument may be weak in State Group III. Taken together, the findings from the first-stage regressions suggest that JSY uptake at the district level has a strong relationship with delivery in an institution, but only in the first two state groups. In addition, all individual demographic characteristics included in Model II were negatively associated with the probability of delivering in an institution e.g. having a historically marginalized caste or tribal designation, being poor or living in a rural area. Conversely, as hypothesized, receipt of a caesarian section was positively associated with delivering in a recognized institution.

Table 3.3. First-Stage Regression, Linear Probability of Delivering in an Institution Based on JSY Uptake (Birth-Level)

	Group I Low Performing States (LPS)	Group II Sterilization Focus States (SFS)	Group III High Performing States (HPS)
Model I: Unadjusted *(503)*	**0.619*****	**1.070*****	**-0.019****
	(0.0060)	(0.0184)	(0.0092)
Cragg-Donald Wald F-statistic	9452.89; $p < 0.001$	2452.15; $p < 0.001$	4.79; $p < 0.05$
Model II: Adjusted	**0.554*****	**0.975*****	**0.064*****
	(0.0173)	(0.0722)	(0.018)
Cragg-Donald Wald F-statistic	969.91; $p < 0.001$	134.75; $p < 0.001$	11.96; $p < 0.001$
Model III: Adjusted & C-Section	**0.560*****	**0.945*****	**0.064*****
	(0.0170)	(0.072)	(0.0182)
Cragg-Donald Wald F-statistic	1020.33; $p < 0.001$	139.25; $p < 0.001$	12.19; $p < 0.001$

Model I: Unadjusted
Model II: Controls (all coded as binary dummy variables): parity of two or more at time of sterilization, rural living designation, poor (1 or 2 out of household wealth quintile), belonging to a historically marginalized scheduled caste or tribe with year fixed effects
Model III: Same as Model II, adding c-section status
Robust standard errors in parenthesis, no clustering. ***$p < 0.001$; **$p < 0.01$; *$p < 0.05$.

Table 3.4 presents results from the second stage of the 2SLS together with results from the OLS models, with three different specifications: unadjusted, basic controls and including caesarian section status. All OLS models were significant at a 0.05 level. The test of exogeneity of institutional delivery was rejected for State Group I and State Group II ($p < 0.01$), indicating that an IV approach is preferred over OLS. In the second 2SLS model, giving birth in an institution (for those who would not otherwise have given birth in an institution) was associated with receiving a postpartum sterilization by 10 percent in State Group I ($\beta =$ 0.109; 95% CI 0.0784 to 0.1256) and 85.7 percent in State Group II ($\beta =$ 0.857; 95% CI 0.7609 to 0.9531).

In the third model, I add a dummy for caesarian section (c-section) status. The addition of c-section does not significantly change the estimated effect of institutional delivery and the dummies are jointly insignificant at the 5 percent level. The fact that the c-section dummy is insignificant suggests the reason women are more likely to receive a postpartum sterilization is not driven by an increase in c-section procedures when giving birth in facilities. Accounting for c-section, in this final 2SLS model, giving birth in an institution was associated with receiving a postpartum sterilization by 13.5 percent in State Group I ($\beta =$ 0.135; 95% CI 0.1100 to 0.1500) and 85.7 percent in State Group II ($\beta =$ 0.857; 95% CI 0.7360 to 0.9360). However, using the same specifications, there is no statistically significant change in the use of other forms of modern family planning resulting from institutional delivery in any of the three state groups. Clustering at the household and sampling-unit level yielded identical results.[2]

Table 3.4. OLS and IV-2SLS Regressions of Postpartum Sterilization & Other mFP Methods (Birth-Level)

	Group I Low Performing States (LPS)		Group II Sterilization Focus States (SFS)		Group III High Performing States (HPS)	
	OLS	**2SLS**	**OLS**	**2SLS**	**OLS**	**2SLS**
Dependent: Immediate Postpartum Sterilization						
Model I: Unadjusted	**0.016***** (0.0005)	**0.037***** (0.0030)	**0.024***** (0.0012)	**0.069***** (0.0064)	**0.065***** (0.0019)	**-2.974*** (1.5170)
Model II: Adjusted	**0.085***** (0.0035)	**0.109***** (0.0235)	**0.346***** (0.0202)	**0.857***** (0.0961)	**0.197***** (0.0073)	**5.648**** (1.6131)
Model III: Adjusted & C-Section	**0.025***** (0.0031)	**0.135***** (0.0200)	**0.234***** (0.0203)	**0.836***** (0.1000)	**0.118***** (0.0072)	**5.664***** (1.6224)
Dependent: Other mFP Methods (line 870)						
Model I: Unadjusted	**0.060***** (0.0024)	**0.276***** (0.0110)	**0.087***** (0.0048)	**0.381***** (0.0184)	**0.041***** (0.0042)	**3.131**** (1.5882)
Model II: Adjusted	0.002 (0.0011)	-0.004 (0.0053)	-0.003 (0.0113)	0.016 (0.0381)	-0.003 (0.0024)	0.066 (0.0837)
Model III: Adjusted & C-Section	0.002 (0.0011)	-0.004 (0.0052)	0.000 (0.0118)	0.017 (0.0395)	-0.004 (0.0024)	0.066 (0.0842)

Model I: Unadjusted
Model II: Controls (all coded as binary dummy variables): parity of 2 or more at time of sterilization, rural living designation, poor (1 or 2 out of household wealth quintile), belonging to a historically marginalized scheduled caste or tribe with year fixed effects
Model III: Same as Model II, adding c-section status
Robust standard errors in parenthesis, no clustering. ***$p < 0.001$; **$p < 0.01$; *$p < 0.05$.

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[2] *National Family Health Survey, IIPS: The NFHS-4 sample is a stratified two-stage sample. The 2011 census served as the sampling frame for the selection of PSUs. PSUs were villages in rural areas and Census Enumeration Blocks (CEBs) in urban areas. PSUs with fewer than 40 households were linked to the nearest PSU. Primary sampling units (PSUs) with over 300 households were segmented into units of approximately 100-150 households. Within these larger PSUs, two of the sub-units were randomly selected for the survey using systematic sampling with probability proportional to segment size. For this paper, we cluster at both the cluster level which, for the NFHS-4 tool, is either a PSU or a sub-segment of a PSU and directly at the PSU level. These approaches result in identical findings in terms of both coefficient and statistical significance.*

Table 3.5 presents three models examining patient-reported regret as a dependent variable following a given sterilization procedure. The first, unadjusted, model suggests a statistically significant relationship between postpartum status and regret. However, when an interaction term is added, Model II shows that the relationship is driven almost exclusively by low-caste women (on average, 6.9% of non-postpartum high caste women express regret) regret is 1.3 times higher for low caste women sterilized during the postpartum period (an additional 2.0% or 8.9% overall). Model III shows that this relationship holds even when controlling for factors that have previously been associated with reports of sterilization regret in India, such as being younger than 25 years of age at the time of the procedure or having experienced the death of at least one son.[34,35]

Table 3.5. Odds of Reporting Regret with the Sterilization Procedure (Women-level, N = 161,624)

	Coefficient (SE)	**Constant**
Model I: Unadjusted		
Postpartum status	**0.016*** (0.0017)**	**0.065*** (0.0015)**
Historically marginalized caste	0.003 (0.0016)	
Model II: Interacting Postpartum and Caste		
Postpartum status	0.001 (0.0035)	
Historically marginalized caste	-0.001 (0.0018)	**0.069*** (0.0016)**
Postpartum X caste	**0.020*** (0.0040)**	
Model III: Interacting Postpartum and Caste & Controlling for Demographic Predictors of Regret		
25 or younger at time of sterilization	**0.004*** (0.0013)**	
Death of 1+ son	**0.010*** (0.0019)**	
Postpartum status	0.000 (0.0035)	**0.066*** (0.0017)**
Historically marginalized caste	-0.002 (0.0018)	
Postpartum X caste	**0.020*** (0.0040)**	

Model I: Unadjusted
Model II: Adding an interaction term for postpartum status and historically marginalized caste designation
Model III: Same as Model II, controlling for demographic predictors of regret
Robust standard errors in parenthesis, ***p < 0.001; **p < 0.01; *p < 0.05.

We also examined whether our results were robust to limiting the sterilized population to tubal ligation patients only (excluding patients who indicate they are utilizing sterilization as their form of family planning and those who indicate they have had their uterus removed) and limiting the study population to women who were sterilized within one year of completing the survey to address potential issues of recall bias. These sensitivity analyses did not yield different results.

3.5. Discussion

By exploiting variation in the Janani Suraksha Yojana (JSY) or the "Safe Motherhood Scheme," at the district level, we attempt to identify the causal effect of increasing institutional delivery on immediate postpartum sterilization amongst women who would not otherwise deliver in facilities. The model finds that high rates of institutional delivery at the community level have a statistically significant effect on a woman's odds of being sterilized immediately following childbirth in State Group I (Low Performing States, LPS) and State Group II (Christian-majority states), but not State Group III (wealthier southern states). These findings hold when controlling for receipt of a caesarian-section and key demographic characteristics, such as family wealth, caste and parity. Using the same model, we find no corresponding uptake in the adoption of other forms of modern family planning (mFP). In addition, women sterilized in the immediate postpartum period were more likely to express regret with the procedure than their non-postpartum sterilized peers. Taken together, these results suggest that the postpartum period has been leveraged to increase sterilization adoption amongst those who would otherwise not give birth in a facility.

The primary findings from this study, on the relationship between institutional delivery and immediate postpartum sterilization, may not be surprising. There are significant material and human resources required to conduct a tubal ligation during the postpartum period; procedures unlikely to occur during a home birth or otherwise outside a standard health facility. In addition, the rise in sterilization during the postpartum period may reflect previously unmet patient demand for family planning services. However, the lack of concurrent increase in other forms of family planning raises concern regarding constrained family planning options in the immediate postpartum period (here assessed as the month of childbirth). In addition, higher rates of regret amongst women receiving a sterilization during the postpartum period as compared to women sterilized outside the birthing period further raises concern regarding how patient-centered these services are. This is of particular concern given the shifting demographics of women delivering in facilities. While we cannot disaggregate patient "compliers" with an IV model, the literature suggests women who would not otherwise deliver in a facility are likely demographically distinct from their "always complying" peers – more likely to belong to a schedule caste or tribe and more likely to be poor.[36] This may also be relevant at the state level, while JSY was not a strong instrument in State Group III (large wealthier southern states); it did preform well in both of the poorer state groups, where there are larger rural populations, more people with a historically marginalized caste designation and more people who identify as part of a religion minority (non-Hindu).

As poor women increasingly deliver in facilities, it is critical to ensure the services they receive are of a high quality and catered to the unique circumstance of the birthing period. The 2014 interagency statement on "Eliminating Forced, Coercive and Otherwise Involuntary Sterilization," which provides rights-based guidance on pre-conditions for consent and service delivery, suggests consent for permanent reproductive procedures should not be obtained during moments of duress, which includes childbirth:

> "As sterilization for the prevention of future pregnancy is not a matter of medical emergency, ensure that the procedure is not undertaken, and consent is not sought, when women may be vulnerable and unable to make a fully informed decision, such as when requesting termination of pregnancy, or during labour, or in the immediate aftermath of delivery."[37]

This aligns with 1990s data from the U.S. which suggests sterilization in the immediate postpartum period is associated with higher rates of regret.[7] This population, interestingly, is more likely to receive key information required for informed consent than women undergoing interval sterilization (Chapter 2); this finding supports the hypothesis that there is something specific to the postpartum period associated with regret. One potential explanation is that women are more likely to receive key information, but the ability to process and in tun make life changing decisions based on that information is lower in a time of duress. Yet, with the exception of clinical exclusion criteria (e.g. uterine rupture) standardized guidelines from the Indian central government do not distinguish best practices for sterilizations conducted in the immediate postpartum period.[38]

One policy option, given patient vulnerability and decision-making capacity during and immediately following labor, is instituting a formalized pre-consent process. For example, the US requires a standard consent form and 30-day waiting period for the country's means-based public insurance program, Medicaid. In some states, failure to comply can result in denial for the procedure.[39] However, commercially insured individuals (who are on average wealthier than Medicaid patients) are rarely subject to this delay, creating what advocates have described as a "two-tiered system of access that restricts reproductive autonomy;" with choice for the wealthy and administrative hurdles for those reliant on public insurance.[39] Given comparatively low rates of hospital utilization in India, pre-consent may require intentionally leveraging allied health professionals, such as ASHA workers – particularly in rural settings.[3] A randomized controlled trial is underway in Pakistan, leveraging Lady Health Volunteers and text-based consent forms that encourage the collection of pre-consent for women who want postpartum contraception.[40]

This analysis builds on existing literature. As of 2020, nearly 20 studies examined India's conditional cash transfer program, JSY.[10] However, only two examined family planning as an outcome of interest. In 2013, Zavier and Santhya published an examination of JSY status and contraception counselling and update in Rajasthan (State Group I). This study, fielded in two districts, found beneficiaries were more likely than non-beneficiaries to have adopted postpartum contraception within three months of delivery, but permanent methods were slightly lower amongst the JSY group.[41] A 2014 Demographic and Health Survey (DHS) report examined the use of family planning in the postpartum period across 36 DHS surveys. The report concluded that postpartum women were less likely to use female sterilization when compared with all currently married women;[42] however this study utilized India's NFHS-3 data which was collected prior to the central government's investment in institutional delivery. Nandi and Laxminarayan examine the effect of JSY on fertility and find the program may have led to an increase in fertility, but does not examine mFP use.[28] In 2020, Sen et al used a propensity score matching approach to examine the JSY program at a national level, looking at the effect of enrollment on maternal care and mFP uptake.[20] While the study found higher rates of mFP use amongst JSY recipients, it did not disaggregate by type of family planning.[20] To our knowledge, this study is the first attempt to examine the causal effect of institutional delivery itself (as opposed to the policy promoting it) on different types of family planning uptake at a national level during the immediate postpartum period. By applying the LATE framework, we are able to look at the effect for women who would not

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[3] *Leveraging ASHA works to collect pre-consent should be undertaken with caution given current incentives; in most states and union territories, tubal ligation is the only form of mFP for which ASHA workers are reimbursed, often on a quota basis. Financially incentivizes to increase tubal ligation volume may bias pre-consent reporting.*

otherwise give birth in an institution; which, given striking increases in institutional delivery across India, is a key population of interest.

This paper is subject to several limitations. First, we identify immediate postpartum sterilizations using a month-level variable that does not allow us to identify the precise date of procedure. However, WHO guidelines state a female sterilization procedure or tubal occlusion (TO) can be performed immediately or up to 4 days after birth, or any time after 6 weeks postpartum.[3] In addition, India's national guidelines suggest a postpartum sterilization should either take place within 7 days of delivery or outside of the immediate postpartum period: 42 days following delivery.[38] In both cases, non-immediate procedures would fall outside the month-window. Second, with an IV model, while we *are* able to test the relevance assumption (the relationship between the instrument and explanatory variable) we are not able to directly test other key assumptions, such as: effective random assignment or exclusion restriction. For effective random assignment, we run the model separately in three states groups where were hypothesize there was within-group, but not between-group random opportunity to participate. We also add a model that controls for key demographic characteristics (e.g. caste and wealth) that may be used to determine JSY eligibility at the sub-national level. For the exclusion restriction, we assume that JSY only affects the dependent variable (immediate postpartum sterilization) only through the endogenous variable (institutional delivery). In other words, we assume there are no other pathways between the instrument and the outcome of interest. While this cannot be tested directly, we conduct the IV separately where we cannot assume random assignment due to variation in program eligibility. Finally, we are not able to measure women's family planning method preferences. There could be a disproportionate preference for permanent methods amongst newly facility-attending women. As a result, we cannot definitively say if the increase in permanent methods, without a concurrent increase in other methods, is inherently negative. However, these findings do suggest the need for a more nuanced examination of immediate postpartum family planning practices and the extent to which service delivery aligns with what patients need and want.

3.6. Conclusion

In conclusion, I find higher institutional delivery led to higher rates of immediate postpartum sterilization amongst women who would not otherwise deliver in facilities. Sterilizations during this period were associated with higher rates of regret, particularly amongst women with a historically marginalized caste designation. Leveraging recent increases in institutional delivery, promoted through the JSY program, may be a relevant and valid way for policymakers and clinical leaders to ensure women have access to the family planning information and services they want; but the status quo approach in India suggests this potential has not been met for all forms of mFP. Indeed, increases in overall mFP may mask the dominant role of sterilization procedures occurring during the postpartum period. Re-focusing policy beyond utilization rates, and ensuring a full suite of family planning options, would not force patients who want to control their fertility to choose between no reproductive coverage or permanent sterilization at a clinical moment in which decision-making may be compromised: childbirth.

CHAPTER 3, REFERENCES

1. Mehedi Hasan M, Soares Magalhaes RJ, Fatima Y, Ahmed S, Mamun AA. Levels, trends, and inequalities in using institutional delivery services in low- And middle-income countries: A stratified analysis by facility type. *Glob Health Sci Pract*. 2021;9(1):78-88. doi:10.9745/GHSP-D-20-00533/-/DCSUPPLEMENTAL

2. Joe W, Perkins JM, Kumar S, Rajpal S, Subramanian S V. Institutional delivery in India, 2004–14: unravelling the equity-enhancing contributions of the public sector. *Health Policy Plan*. 2018;33(5):645-653. doi:10.1093/HEAPOL/CZY029

3. WHO. Programming strategies for Postpartum Family Planning. *Who Web Site*. Published online 2013:45.

4. Morroni C, Glasier A. Increasing the use of effective postpartum contraception: urgent and possible. *Lancet Glob Health*. 2020;8(3):e316-e317. doi:10.1016/S2214-109X(20)30045-0

5. Gaffield ME, Egan S, Temmerman M. It's about time: WHO and partners release programming strategies for postpartum family planning. *Glob Health Sci Pract*. 2014;2(1):4-9. doi:10.9745/GHSP-D-13-00156

6. Rowlands S, Wale J. Sterilisations at delivery or after childbirth: Addressing continuing abuses in the consent process. *Glob Public Health*. 2019;14(8):1153-1166. doi:10.1080/17441692.2019.1583265

7. Hillis SD, Marcheanks PA, Tylor LR, Peterson HB. Poststerilization regret: Findings from the United States Collaborative Review of Sterilization. *Obstet Gynecol*. 1999;93(6):889-895. doi:10.1016/S0029-7844(98)00539-0

8. Powell-Jackson T, Mazumdar S, Mills A. Financial incentives in health: New evidence from India's Janani Suraksha Yojana. *J Health Econ*. 2015;43:154-169. doi:10.1016/j.jhealeco.2015.07.001

9. Fink G, Ross R, Hill K. Institutional deliveries weakly associated with improved neonatal survival in developing countries: evidence from 192 Demographic and Health Surveys. *Int J Epidemiol*. 2015;44(6):1879-1888. doi:10.1093/IJE/DYV115

10. Bhaskar S, Ojha G, VR R, Kumar A, Farooqui H, Sharma A. Effectiveness of Janani Suraksha Yojana (JSY) for Utilization of Reproductive and Child Health Services by Pregnant Women in India: A Systematic Review. *J Mol Clin Med*. Published online 2020.

11. Randive B, Diwan V, De Costa A. India's Conditional Cash Transfer Programme (the JSY) to Promote Institutional Birth: Is There an Association between Institutional Birth Proportion and Maternal Mortality? Baradaran HR, ed. *PLoS ONE*. 2013;8(6):e67452. doi:10.1371/journal.pone.0067452

12. Bhaskar S, Ojha G, VR R, Kumar A, Farooqui H, Sharma A. Effectiveness of Janani Suraksha Yojana (JSY) for Utilization of Reproductive and Child Health Services by Pregnant Women in India: A Systematic Review. *J Mol Clin Med*. Published online 2020. Accessed September 27, 2021. https://ejmcm.com/article_8264.html

13. Malhotra H. Why Healthcare CCTs may not Improve Children's Health: Insights from India's Janani Suraksha Yojana. :46.

14. A G, J F, H R, VR R, D S, S V. Barriers and prospects of India's conditional cash transfer program to promote institutional delivery care: a qualitative analysis of the supply-side perspectives. *BMC Health Serv Res*. 2018;18(1). doi:10.1186/S12913-018-2849-8

15. Chaturvedi S, Upadhyay S, De Costa A. Competence of birth attendants at providing emergency obstetric care under India's JSY conditional cash transfer program for institutional delivery: An assessment using case vignettes in Madhya Pradesh province. *BMC Pregnancy Childbirth*. 2014;14(1). doi:10.1186/1471-2393-14-174

16. Chaturvedi S, De Costa A, Raven J. Does the Janani Suraksha Yojana cash transfer programme to promote facility births in India ensure skilled birth attendance? A qualitative study of intrapartum care in Madhya Pradesh. *Glob Health Action*. 2015;8(1). doi:10.3402/GHA.V8.27427

17. Vellakkal S, Reddy H, Gupta A, Chandran A, Fledderjohann J, Stuckler D. A qualitative study of factors impacting accessing of institutional delivery care in the context of India's cash incentive program. *Soc Sci Med*. 2017;178:55-65. doi:10.1016/J.SOCSCIMED.2017.01.059

18. Lee HY, Leslie HH, Oh J, et al. The association between institutional delivery and neonatal mortality based on the quality of maternal and newborn health system in India. *Sci Rep*. 2022;12(1):6220. doi:10.1038/s41598-022-10214-y

19. Alfano M, Arulampalam W, Flores A. Widening the Gender Gap: The Unintended Consequences of Conditional Cash Transfers in India. Published online 2014.

20. Sen S, Chatterjee S, Khan PK, Mohanty SK. Unintended effects of Janani Suraksha Yojana on maternal care in India. *SSM - Popul Health*. 2020;11:100619. doi:10.1016/J.SSMPH.2020.100619

21. Williamson J, Bietsch K. *Trends in the Relationship Between Place of Delivery and Postpartum Contraceptive Use*.; 2018.

22. Singh P, Singh KK, Singh P. Factors explaining the dominion status of female sterilization in India over the past two decades (1992-2016): A multilevel study. *PLOS ONE*. 2021;16(3):e0246530. doi:10.1371/JOURNAL.PONE.0246530

23. Mohanty SK, Mishra S, Chatterjee S, Saggurti N. Pattern and correlates of out-of-pocket payment (OOP) on female sterilization in India, 1990–2014. *BMC Womens Health 2020 201*. 2020;20(1):1-13. doi:10.1186/S12905-020-0884-1

24. Card D. *Using Geographic Variation in College Proximity to Estimate the Return to Schooling*.; 1993.

25. Acemoglu D, Johnson S, Robinson JA. The Colonial Origins of Comparative Development: An Empirical Investigation. Published online June 1, 2000. doi:10.3386/W7771

26. Angrist J, Pischke JS. *Mostly Harmless Econometrics*. Princeton University Press; 2009.

27. Jones D. *The Economics of Exclusion Restrictions in IV Models*.; 2015.

28. Nandi A, Laxminarayan R. *The Unintended Effects of Cash Transfers on Fertility: Evidence from the Safe Motherhood Scheme in India*. Vol 29.; 2016.

29. Rahman MM, Pallikadavath S. How much do conditional cash transfers increase the utilization of maternal and child health care services? New evidence from Janani Suraksha Yojana in India. *Econ Hum Biol*. 2018;31:164-183. doi:10.1016/J.EHB.2018.08.007

30. *Revised Compensation Package to Acceptors of Sterilization and IUD Insertions at Public Health Facilities and Private Accredited Facilities*. Government of India, Ministry of Health and Family Welfare; 2007.

31. DHS. Calculating the Age of Children. The DHS Program. Published 2021. Accessed March 29, 2022. https://dhsprogram.com/data/calculating-the-age-of-children.cfm

32. WHO. *Programming Strategies for Postpartum Family Planning*.; 2013.

33. Leone T, Sochas L, Coast E. Depends Who's Asking: Interviewer Effects in Demographic and Health Surveys Abortion Data. *Demography*. Published online January 22, 2021. doi:10.1215/00703370-8937468

34. Singh A. Sterilization regret among married women in India: Trends, patterns and correlates. *Int Perspect Sex Reprod Health*. 2019;44(4):167-176. doi:10.1363/44E7218

35. Pal G, Chaurasia H. Revisiting Post-Sterilization Regret in India. *J Obstet Gynecol India*. 70(4):295-303. doi:10.1007/s13224-020-01309-5

36. Joe W, Perkins JM, Kumar S, Rajpal S, Subramanian S V. Institutional delivery in India, 2004–14: unravelling the equity-enhancing contributions of the public sector. *Health Policy Plan*. 2018;33(5):645-653. doi:10.1093/HEAPOL/CZY029

37. the WHO. Eliminating forced, coercive and otherwise involuntary sterilization. *The WHO*. Published online 2014.

38. Quality Assurance Manual for Sterilization Services. Published online 2006.

39. Maykin MM, Pilliod RA, Werner EF. Discriminatory regulations on postpartum sterilization for Medicaid recipients propagate health inequities. *Lancet Reg Health – Am*. 2022;6:100113. doi:10.1016/J.LANA.2021.100113

40. Gul X, Hameed W, Hussain S, Sheikh I, Siddiqui J ur R. A study protocol for an mHealth, multi-centre randomized control trial to promote use of postpartum contraception amongst rural women in Punjab, Pakistan. *BMC Pregnancy Childbirth*. 2019;19(1):283. doi:10.1186/s12884-019-2427-z

41. Zavier AJF, Santhya KG. How conditional cash transfers to promote institutional delivery can also influence postpartum contraception: Evidence from Rajasthan, India. *Int J Gynecol Obstet*. 2013;123(SUPPL.1):e43-e46. doi:10.1016/J.IJGO.2013.08.003

42. Winfrey W, Rakesh K. DHS COMPARATIVE REPORTS 36 USE OF FAMILY PLANNING IN THE POSTPARTUM PERIOD. Published online 2014.

CHAPTER 3: Additional Tables & Figures

Supplement 3.1. Full 2SLS with Postpartum Sterilization as Outcome, "Model III" Controlling for C-Section

	Group I Low Performing States (LPS)	Group II Sterilization Focus States (SFS)	Group III High Performing States (HPS)
Facility-Based Delivery	0.130*** (0.0200)	0.836*** (0.0979)	6.88*** (2.4235)
Parity of 2 or More	-0.0285*** (0.0048)	-0.131*** (0.0272)	-0.66*** (0.2492)
Rural Designation	-0.032*** (0.0065)	0.0248 (0.0351)	0.174 (0.0987)
Poor	0.003 (0.0042)	0.0713** (0.0305)	0.330*** (0.1237)
Marginalized Caste	-0.018*** (0.0064)	0.0376 (0.0300)	0.1074** (0.0490)
Caesarian Status^	0.505*** (0.0113)	0.208*** (0.0450)	-0.544 (0.3208)

CHAPTER 4

Satisfaction with Coercive Sterilization Care: Discordant Quality Ratings, the Role of Remuneration and Postpartum Procedure Timing

Liana Rosenkrantz Woskie

Patient-reported satisfaction is often used as a measure to assess the patient centeredness of health systems. However, due to asymmetry of information, there is concern that patients may be unable to discern low quality serves and /or express dissatisfaction when services are of poor quality. To examine this issue, I look at how women exposed to coercive or otherwise involuntary sterilization procedures, using an internationally agreed-upon framework for the provision of non-coercive or otherwise involuntary sterilization care, rate the quality of their care. With a sample of over 180,000 sterilized women, I find a statistically significant and positive relationship between being exposed to coercion variables and the odds of reporting low quality. However, I also identify high rates of discordant scoring; i.e. over 95% of women who undergo a tubal ligation procedure rate their care highly regardless of if they were provided with adequate information for informed consent; a recognized form of coercion. Further, discordance is more pronounced if a patient belongs to a historically marginalized caste. In examining system-modifiable factors, I find that both conditional cash transfers to the patient and procedure timing (e.g. during the immediate postpartum period) negatively impact the odds that a women will report a low-quality rating after receiving a coercive sterilization procedure. For the postpartum sterilized population, labor complexity and health of the newborn, both eclipse any statistically significant relationship. This work problematizes status quo approaches in patient-centeredness measurement for a frequent, yet understudied, surgical procedure with practical implications for quantifying coercive reproductive care.

Keywords: Sterilization, Reporting, Performance Measurement, Payment, Quality, Satisfaction, India

4.1. Introduction

Tubal ligation is a procedure for which uninformed consent constitutes a form of coercion or otherwise involuntary care.[1–3,4] In line with this, India has clear guidelines for collecting informed consent from individuals undergoing sterilizing procedures that are outlined and required by the Ministry of Health and Family Welfare.[5] These guidelines require patient and provider sign-off confirming basic information was provided to, and understood by, the patient (e.g. that the procedure is permanent, alternate options were available, etc). This in turn triggers patient eligibility for various services, such as an indemnity scheme.[6] However, multiple civil cases filed with the Indian Supreme Court and reports by Human Rights Watch suggest that while clinics report the exclusive provision of informed sterilization care, in practice these guidelines are often disregarded.[7,8] Apart from consent forms, the primary strategy used to hold facilities, and the broader health system, accountable to sterilized patients in India is a measure of patient satisfaction.[9] Satisfaction is widely recognized as an outcome indicator of person-centeredness: care that is respectful of, and responsive to, individual patient preferences, needs and values, and ensures that patient values guide clinical decisions.[2] Definitions of "person-centeredness" vary, but consistently center patients' ability to exercise informed choice – in line with international norms for sterilization care.[3–5] However, we currently lack an understanding of how sterilized women who are *not* given the opportunity to provide informed consent rate the quality of their care and if these subjective measures, such as satisfaction ratings, are able to pick up on issues of uninformed consent.

Currently a series of short surveys designed to elicit patients' experiences and satisfaction with care are the primary mechanism used to hold facilities, and the broader health system, accountable to sterilized patients in India (Appendix Table 4.1).[5] Satisfaction, generally collected with a Likert scale survey item, is a simple measure or rating collected from patients and widely recognized as an outcome indicator of person-centeredness: care that is respectful of, and responsive to, individual patient preferences, needs and values.[6] While simple, in line with reproductive justice scholarship, the routine collection of patient satisfaction data across a population is intended to provide a channel by which patient values can inform and potentially guide clinical practice beyond any given individual interaction.[2] However, existing evidence suggests several issues arise when using patient-reported ratings to evaluate health system performance, especially amongst systemically underrepresented patients. First, individuals evaluate services by comparing personal standards with perceptions of the service received; in line with Amartya Sen's scholarship on patient-reported outcomes, this is an inherently subjective process.[7] An evaluation of satisfaction, by definition, reflects a patient's own background and expectations, which may vary significantly between people who receive comparable services.[8] A 2013 evaluation in the U.S. for example, found that variation in patient satisfaction was largely attributable to patient-level factors i.e. characteristics (91.2% - 95.6%), and to a lesser extent health system-related factors (4.4% - 8.8%).[9] Another study found that expectations of the system were strongly related to satisfaction, explaining up to 14% of the variation in satisfaction with nursing care.[10] In countries with poorly resourced health systems, this may be particularly relevant. Tancred and colleagues found that approximately 16% of women seeking care for childbirth in Tanzania reported being disrespected or abused during treatment (assessed through a set of questions on objective behaviors of staff). However, in the same study, over 73% of the respondents reported being satisfied, or very satisfied, with their care.[11] These data suggest when people are routinely subject to low quality services, there may be a high threshold for rating care negatively.

A related concern, relevant to both satisfaction and experience measures (Table 4.1), is asymmetry of information: patients may be unable to identify poor quality services due to lack of medical expertise or limited prior experience with the health system.[12,13] In line with this, Siam et al assessed the accuracy of perceptions of maternity facility quality in Nairobi, Kenya and found patients often misperceived facilities' technical quality, particularly in contexts with fewer clinical options and lower baseline quality.[14] If baseline quality is low, this may compound issues of asymmetry by setting lower expectations of care which may, in turn, impact care ratings.[8] Given the prominence of satisfaction ratings, it is important to understand if less overt forms of coercion in care, such as uninformed consent, are captured by subjective quality ratings. For sterilized women, uninformed consent constitutes a recognized form of coercive or otherwise involuntary reproductive care, with internationally agreed upon pre-conditions for consent.[15–17,18] However, we lack an understanding of how sterilized women who are *not* given the opportunity to provide informed consent rate the quality of their care and if these subjective measures are able to pick up on instances of more normalized forms of coercion. The aforementioned challenges highlight the importance of ensuring sterilization patients have adequate channels through which they can engage in shaping social institutions (in this case population policy and care infrastructure) that advance welfare and, where relevant, flag instances of overt harm (in this case uninformed consent, a recognized form of coercion).

To explore these issues in more depth, I look at the care experiences of adult married women who have undergone tubal ligation procedures in India and their satisfaction ratings. Tubal ligation patients were chosen for three reasons: First, data is collected on both patient care ratings (subjective) and uninformed consent variables amongst a representative sample of ever-married women across India. Second, there are clear guidelines for more objective aspects of person-centeredness, as outlined in the inter-agency report entitled: "*Eliminating forced, coercive and otherwise involuntary sterilization,*" (such as being informed of procedure's permanence, Table 2). Third, tubal ligation is a frequent outpatient procedure, between 4 and 5 million tubal ligations are currently performed in India annually.[19] It is also a procedure that is available in all states, in urban and rural areas and to women of different socioeconomic backgrounds.[20] With patient-level data, I answer the following questions: 1.) Employing an internationally agreed upon framework to identify uninformed consent, do women who are exposed to uninformed consent report lower quality of care? 2.) Amongst women who are not told key information required for informed consent, what patient-level factors inform odds of reporting dissatisfaction? And, finally, 3.) What system-modifiable factors might improve reporting concordance? Identifying uninformed tubal ligation patients, or people who have received coercive sterilization care, and the extent to which this is reflected in satisfaction ratings, disentangles two important concepts: satisfaction and experience. If reporting is concordant, satisfaction-based measures may be adequate to capture instances of uninformed consent, a potentially routinized form of coercion for sterilized women.

4.2. Background

In India, tubal ligation makes up approximately 70% of all modern family planning methods currently in use amongst women aged 15-49; with roughly four million procedures conducted annually.[20] In an effort to protect against rights violations, India has guidelines for collecting informed consent from individuals undergoing sterilizing procedures that align with international norms and are required by the Ministry of Health and Family Welfare (MoHFW).[21] These guidelines require patient and provider sign-off confirming basic information was provided to, and understood by, the patient (e.g. that the procedure is permanent, alternate options were available, etc.).[21] This in turn triggers patient eligibility for various services, such as an indemnity scheme in the case of failed sterilization procedures or overt physical harm.[22] However, multiple civil cases filed with the Indian Supreme Court and reports by Human Rights Watch suggest that while facilities report the *exclusive* provision of informed sterilization care (i.e. 100% of procedures meet preconditions for consent), in practice there is significant heterogeneity in adherence within routine clinical practice.[23,24] Consent forms may be subject to both reporting bias on the demand side and gaming on the supply side. For example, forms are signed by patients, but done so in the presence of health personnel where the subject of the form is directly related to the performance of the personnel collecting the form. Similar situations have resulted in courtesy bias: wherein a patient provides information in line with perceived expectations, potentially due to fear of repercussion.[25] In addition, facilities are not legally permitted to conduct sterilizing procedures without informed consent.[21] As a result, providers and administrative facility staff have a clear incentive to ensure all forms signed affirmatively; it is illegal to conduct a procedure otherwise. Simultaneously, reports of state- and district-level quotas for sterilization persist, placing pressure on providers to meet volume-based goals, often at the risk of job-loss or financial repercussion.[23]

In this context, patient surveys hold unique relevance as a potential democratic channel to communicate if care is meeting patient needs and protect against (or at minimum identify) issues of coercion. Accordingly, patient surveys, collected after care has been delivered, are heralded as a strategy to ensure the person-centeredness of health services, and are increasingly used within regulatory mechanisms, such as public reporting or performance-based financing programs. Within these surveys, two distinct types of metrics are commonly used: 1.) Patient satisfaction measures (a subjective evaluation of a healthcare interaction, explicitly eliciting normative judgement from the patient) and 2.) Patient experience measures (a recounting of a healthcare interaction, often phrased to minimize normative judgement from the patient) (Table 4.1).[8] Patient experience measures assess something that should, or should not, occur in a healthcare setting, such as telling a patient that a tubal ligation procedure is permanent.[26] Individuals who receive the exact same care may differ in how they judge that care, but should not (in theory) differ in recounting what occurred during their given care interaction.[7] In addition to measuring different things, these concepts have distinct tradeoffs and purposes. For example, a question that assess more objective occurrences e.g. "Were you told about the side effects of your sterilizing procedure?" will result in different information than a subjective question that asses similar content but is framed in terms of an individual's satisfaction e.g. "Were you satisfied with how providers communicated information about side effects during the course of your visit?"[10] Personal standards for information on side effects may differ by individual or community – with some women wanting less information rather than more.[10]

Table 4.1. Measures of Patient-Centeredness**:** Satisfaction versus Experience

Measure Type	Application	Description	Example Survey Items
Patient Satisfaction	**Outcome /** *Dependant Variable*	Subjective: An evaluation of a healthcare interaction, explicitly eliciting normative judgement from patient Actively reflects the patient's individual values, prior experiences with care and/or other patient-specific considerations	• Q: How would you rate the quality of care provided during and directly following your sterilization?

Patient Experience	**Process/** *Exposure Variables*	Objective: A recounting of a healthcare interaction, often phrased to minimize normative judgement from the patient Reliant on a normative point of reference, often external to the patient (e.g. clinical practice guidelines)*	• Q: Before your sterilization operation, were you told by a healthcare provider that you would not be able to have any (more) children because of the operation? • Q: Were you ever told by a health worker about side effects or problems you might have with the method?

**In line with the WHO Interagency Statement on Coercive and Otherwise Involuntary Sterilization, the Ministry of Health and Family Welfare standards clearly outline the need to communicate both procedure permanence and risk of side effects. Indian National Standards & Quality Assurance in Sterilization Services also include: "The following features of the sterilization procedure should be explained to the client: It is a permanent procedure for preventing future pregnancies. It is a surgical procedure that has a possibility of complications, including failure, requiring further management."*

In the case of sterilization care, however, providing basic information is seen as a pre-condition for informed consent, ensuring women have the information required to make a decision.[18,21,27] The *Interagency Statement on Eliminating Forced, Coercive and Otherwise Involuntary Sterilization* uses a rights-based framework to outline information that is required for a person to make an informed or voluntary decision, such as knowledge that the procedure is permanent.[18] In this context, coercive tubal ligation can be seen as a form of "non-consented care" or involuntary care. The information that health systems are required to provide to patients, as outlined in this document, is a baseline – in line with recent work to define contraceptive autonomy, it is a minimum standard for a woman to decide, for herself, if she wants to undergo a tubal ligation procedure.[28] In the case of rights-violating sterilization care, patient preferences for information might vary, but providers should not to assume a patient has full information at intake with the corresponding risk being over-provision. In line with this, unlike yelling, or physical abuse, coercion can include behavior that is normalized or potentially unknown as a rights violation to the patient, such as withholding information.[29] This aligns with prior literature on disrespect and abuse during childbirth – in which behavior (such as non-provision of information) is deemed normatively "bad" within international standards, but my be so common within a specific care context that it is not consistently regarded as disrespect or abuse by patients.[30] Consistent with reproductive justice scholarship, the expectations, meanings, intentions, and rationalizations that surround a violation – and lead to its normalization - often reflect deeper dynamics of power in the societies in which they are embedded.[29,31]

The normalization of repressive dynamics within sterilization care, in turn, may mask instances of reproductive in-justice (in this case coercion) if the health system exclusively relies on subjective measures to ensure accountability. Feminist economic scholars have called for the need to analyze the role of institutionalized power in perpetuating inequalities.[1] In India, a number of factors raise particular concern.[32] India's recent movement to increase the share of births that occur in facilities may have led to a concurrent rise in sterilizations preformed in the immediate postpartum period.[33,34] Women reporting satisfaction regarding a care interaction that includes both a birth and a sterilizing procedure may rate their care fundamentally differently than non-birthing peers. Clinical outcomes unrelated to the surgery may inform satisfaction.[35] For example, maternal and newborn outcomes have been found to affect satisfaction ratings in India as well as the Gambia, Ghana and Thailand.[36–39] The birth of a healthy child, or survival of mother, often eclipsing judgement regarding other aspects of the care interaction.[35] This relates to an additional consideration: as more women enter facilities, the characteristics of those facilities may inform satisfaction reporting. While this may be driven by the provider-patient interaction, satisfaction with private care also appears to be strongly correlated with a facility's accessibility or physical environment, such as: ease of reaching the facility, opening hours, cleanliness, etc. unrelated to the provision of information.[40] Any of these factors could incite favor-dependence, a situation in which patients' free expression of their preferences is compromised by external factors. In a classic example: decisions made while employed are, to an extent, dependent on the approval of said employer.[1] Feminist economic theorists have advocated for the critical analysis of institutionalized power and its role in perpetuating inequality. This may be particularly relevant in India: the majority of sterilized women (approximately 60%) were beneficiaries of one of the country's largest conditional cash transfer (CCT) programs.[41] Since the early 1980s, the central government has provided financial support to "acceptors" of sterilization though a one-time CCT following the procedure.[42] Yet, we do not know if, or how, receipt of payment for a sterilization procedure might mediate how patients report their satisfaction with uninformed care.

As outlined in Figure 1, if satisfaction is an adequate stand-alone measure to ensure health system accountability to patients, it should be able to identify when uninformed care is occurring (i.e. poor satisfaction and receipt of uninformed care should be positively associated).

Figure 4.1. Assessing Discordance: Satisfaction and Informed Consent (As Assessed via Patient Experience Items)

		Informed Consent	
		Yes	**No**
Satisfied	**Yes**	Satisfied, Informed *(concordant)*	Satisfied, Uninformed* *(discordant)*
	No	Not Satisfied, Informed *(discordant)*	Not Satisfied, Uninformed *(concordant)*

**Area of focus, "expectations" hypothesis – as an unknown rights violation, individuals undergoing a sterilization without informed consent may still rate their care highly*

While uninformed consent may be a low bar for satisfaction, and is unlikely satisfaction's only prerequisite, the current strategy being utilized to hold the health system accountable to sterilized patients should be able to identify cases where coercion (in this case uninformed care) does occur. For this reason, this analysis focuses on rating discordance - when an uninformed individual rates their care highly. This is important not because satisfaction measures inherently *need* to capture instances of uninformed consent, but because satisfaction measures are currently used in isolation to hold health systems accountable to patients and incorporated within Indian hospital performance schemes.[43] If satisfaction measures do not capture the provision of uninformed care, a recognized form of coercion, there would be utility in augmenting this measurement strategy.

4.3. Methods

Data & Participants

To look at women who have undergone a sterilization procedure in India, I use the National Family Health Survey of India (NFHS). This is a large-scale, multi-round survey conducted in a representative sample of households throughout India conducted under the stewardship of the Ministry of Health and Family Welfare (MoHFW), Government of India. The ever-married women's questionnaire, a section of the tool, covers information on different components of maternal and child health including: pregnancy, childbirth, reproductive morbidities, immunization of mothers and children and access and availability of maternal and child health care. The tool includes a series of questions on female sterilization, including issues of: timing, quality rating, payment and variables related to the provision of information I use only the most recent round of the NFHS-5, which was collected between 2019 and 2021. Using a single round of the NFHS also allows us to avoid variation in survey structure and sampling strategy from year to year. In all, 707 districts were sampled within 27 states and 8 union territories. The protocol for the NFHS-5 survey, including the content of all the survey questionnaires, was approved by the IIPS Institutional Review Board and the ICF Institutional Review Board. The protocol was also reviewed by the U.S. Centers for Disease Control and Prevention (CDC).

Measures

The primary dependent variable of interest was a patient care rating where the patient is asked to subjectively rate the quality of sterilization services: "How would you rate the care you received during and immediately after the operation: very good, all right, not so good, or bad?" Because the NFHS-5 asks a separate question regarding if a woman has received a hysterectomy, all women indicating they have been sterilized, and do not indicate a hysterectomy, are assumed to have undergone a tubal ligation. The rating is posed in the form of a 4-point Likert scale with the following answer options: very good, all right, not so good and bad. For all primary analyses used in this paper a new variable "dissatisfied" is coded as a dummy variable utilizing a top box approach in which the two positive options are grouped and the two negative ratings are grouped.

For exposure to non-patient centered care, I use the inter-agency report "*Eliminating forced, coercive and otherwise involuntary sterilization,*" which outlines preconditions for non-coercive care that are within the control of the health system or provider. These preconditions are rights-based, as outlined by the WHO, and meant to ensure people have the absolute baseline amount of information required to make an informed decision. Each of the four items is clearly outlined in the interagency statement and has corresponding text in the standardized sterilization consent form provided by the Indian Ministry of Health and Family Welfare in 2006 which is required in all Indian States and Union Territories. Specifically, I look at four "coercion" variables, each coded as a normatively negative dummy variable for exposure to the given aspect of coercion (Table 3). The first is: knowledge of side effects, in which a binary measure is posed to the patient where they are asked if they were told about side effects of the procedure *by a health or family planning worker*. The second item is knowledge of permanence in which the patient is asked if they were told the "sterilization would result in no more children." The third item is patients not knowing alternate family planning options. The final is if the patient indicates their decision was not independent or jointly made, but made mainly by a partner or husband. For this study "independent" and joint" decision are both coded as non-coercive, whereas "mainly husband/partner" is coded as coercive.

Scoring discordance (Figure 1) is defined as an individual who is exposed to one of the four coercion variables, but rates their care highly (upper right quadrant). Individuals who are *not* exposed to a coercion variable but rate their care negatively may also be discordant (lower left quadrant), but are not the focus population of this paper. Exposure to each coercion variable is a separate binary measure limited to individuals responding to the question i.e. all women reporting receipt of a sterilization procedure. For "knowledge of side effects" a random subset of the population was asked this question.

Table 4.2. Exposure Variables Used to Assess "Uninformed Consent" as Delineated in the Interagency Statement on Forced, Coercive or Otherwise Involuntary Sterilization

Domain		Interagency Text	Informed Consent Form* Government of India	Variable NFHS-5 Survey**
Informed Choice	**Not Told Side Effects**	*There are potential side-effects of the sterilization procedure, and follow-up care will be required (details should be provided)*	*I am aware that I am undergoing an operation that carries an element of risk.*	• Were you ever told by a health worker about side effects or problems you might have with the method? • Yes: 0 • No: 1
	Not Told Permanence	*The procedure is permanent, people who may want to have a child in the future should choose a different method of contraception*	*I know that for all practical purposes this operation is permanent.*	• Before your sterilization operation, were you told by a healthcare provider that you would not be able to have any (more) children because of the operation? • Yes: 0 • No: 1
Access / Full Choice	**Does Not Know Alternate Options**	*There are alternative temporary methods of contraception, including long- and short-term methods (details of available methods should be provided)*	*I am aware that other methods of contraception are available to me.*	• Now I would like to talk about family planning - the various ways or methods that a couple can use to delay or avoid a pregnancy. Have you ever heard of (METHOD)?^ • Respondent is able to name three methods: 0
Free Choice	**Not Independent Decision**	*The decision to undergo contraceptive sterilization is a decision to be made by the individual only*	*I have decided to undergo the sterilization/re-sterilization operation on my own without any outside pressure, inducement or force.*	• Who was the decisionmaker for using this contraception? • Mainly Respondent: 0 • Joint decision: 0 • Mainly husband, partner: 1

**Ministry of Health and Family Welfare, Government of India. Standards for Female and Male Sterilization Services, Annexure 4: Informed Consent Form for Sterilization Operation/Re-Sterilization. Each item has corresponding text within the Indian Government's pro-forma sterilization consent form mandatory across all states and union territories.*
***All variables coded as dummies, with the normatively negative response option (e.g. not told permanence) set to one*
^Methods listed by enumerator

Patient characteristics include: the highest level of educational attainment of the respondent, with the following four options: no education, primary education, secondary education and higher education. The wealth index is computed using a Principal Component Analysis (PCA) based on arbitrary scoring of household economic indicators (composed of both asked and observed variables, such as material of the floor, walls and roof). The index is then divided into five quintiles. Household caste includes the following options: scheduled caste, scheduled tribe, other backways caste (OBC), none and other (none and other combined). Religion includes: Hindu, Muslim, Christian, Sikh, Buddhists/neo-Buddhists and "other", which is an option for respondents and also includes actively posed religions with less than 1% of the population identifying (e.g. Judaism). Rurality is also included as a binary variable assigned at the Primary Sampling Unit (PSU) level and assigned in the Women's Questionnaire by the enumerator.

Time-variant characteristics include variables regarding the care context and patient-level characteristics at the time of the sterilization procedure. These include compensation for the sterilization procedure (binary), amount received and amount spent. It also includes the type of facility in which the sterilization was conducted. This variable is generated using the "source for current users" which covers all family planning users, but for this study is limited to individuals reporting receipt of a sterilization. Given the permanent nature of sterilizing procedures, the last "source" or location of family planning services is assumed to be the location in which the procedure was conducted. Age at time of sterilization is also included and broken up into five categories by age group (standardized by NFHS). Finally, I also look at parity at time of sterilization i.e. the number of births a women has had at the time she underwent a sterilizing procedure. This variable does not account for the death of children after the birthing period.

Empirical Approach

To answer question one, do patients exposed to coercion variables (uninformed consent) rate their care worse than those who have not, I utilize a logit model, examining dissatisfaction as a dichotomous outcome and exposure to each of the four uninformed consent / coercion variables as predictors separately. For each predictor, I run two models: I: unadjusted with year and district fixed effects and then II: adjusted – controlling for key demographic characteristics: education level, wealth index, caste, religion and rurality. These variables are also shown descriptively across the population in Table 3a. I then show the response breakdown visually in a decision tree to understand what share of women report dissatisfaction. For the postpartum sterilized population (amongst whom more data is collected), I run two additional models. Model III controls for the following variables related to labor complexity: receipt of a caesarian section, breech labor, excessive bleeding, prolonged labor and time spent at hospital (an indirect measure intended to assess aspects of complexity not measured directly). Model IV controls for the following variables related to the newborn child: if the child lived, the sex of the child and child's weight relative to other infants. Inclusion of these variables was motivated by prior literature suggesting birthing women may rate or express satisfaction with care fundamentally differently than peers, with labor complexity and health of the child eclipsing other features of the interpersonal interaction during a care visit.[36,39]

To answer question two, amongst women who are not told key information required for informed consent, what factors inform odds of reporting discordance? I use satisfaction as the outcome and each of the four coercion variables as an exposure. I then control for the same demographic characteristics and one time-variant characteristic (parity at time of birth) showing the coefficient for each. I also run this model separately for the postpartum population with the aforementioned variables related to clinical complexity and the newborn child (Appendix Tables 4.4 and 4.6). To better understand the role of distance from procedure to interview on reporting, I also calculate an R-squared for three of the four coercion variables (inadequate data over time for "told side effects" variable) which represents the proportion of variance in reporting discordance that can be examined by the year in which the procedure took place.

Finally to answer question three, what system-modifiable factors might improve reporting concordance, I employ a Propensity Score Matching (PSM) approach where each model is limited to the population exposed to a coercion variable (e.g. total N for "not primary decisionmaker" is 14,660) or women who report not being the primary or joint decisionmaker for the procedure. The outcome is coded as a binary variable where 1 is women who report a non-autonomous decision AND a negative care rating and 0 is women who are exposed to this coercion variable, but report a positive experience. I examine four supply- or system-modifiable factors i.e. factors directly addressable within, or by, the health system in contrast to factors that fall outside the control of the healthcare system but affect access to, or use of, reproductive care (such as rurality). The four variables are: being paid for the sterilization, interacting with a Community Health Worker prior to the procedure, going to a private facility and being sterilized in the immediate postpartum period. These variables are treated as potential "treatments" using a propensity score matching approach.[44,45] This approach is relevant given that nonrandom treatment assignment (i.e. patient's odds of being exposed to each system-modifiable factor) is likely for the sterilized popualtion.[46] Wealth, for example, is likely both related to the odds of getting a sterilization within a private facility as well as the odds of reporting concordance. To compare patients who are similar to one another - I match covariates between individuals who did and did not receive a given treatment, making it easier to isolate association that receipt of the "treatment" has with the outcome of interest: not making an autonomous decision to undergo the procedure. Functionally, this method compresses the relevant factors into a single score; in this case the time and non-time variant demographic characteristics. Individuals with similar propensity scores are then compared across the treatment and comparison groups. Using this method, I am able to generate an average treatment effect (ATE) for each system-modifiable factor and generate a standardized difference.). The potential treatments are not meant to be comprehensive, but to better understand how the organization of care effects reporting and provide insight into a handful of potentially modifiable factors.

4.4. Results

Table 1a presents basic demographic characteristics of the sample. Women differed from one another along several important dimensions. First, sterilized women who were not told about the procedure's permanence and rate their care poorly were on average more likely to have no formal education than the overall sterilized population (47.4% v. 35.8%). Women reporting dissatisfaction were also more likely to be in the poorest wealth quintile as compared to the overall sterilized population (24.8% v. 17.0%). In addition, dissatisfied women were more likely to belong to a scheduled caste (25.2% v. 23.7%) and live in a rural designated sampling unit.

Table 4.3a. Characteristics of Sterilized Women by Informed & Reporting Status

		Sterilized	Not Told Permanence N = 29,414			Not Independent Decision N = 14,660		
		N = 188,569	Overall N = 29,414	Satisfied N = 28,069	Dissat. N = 1,345	Overall N = 14,660	Satisfied N = 14,017	Dissat. N = 643
General Demographic Characteristics								
Education	No Education	35.8%	39.3	38.9	47.4	43.6	43.5	45.3
	Primary	17.0%	16.1	16.0	17.7	16.1	16.2	14.5
	Secondary	40.9%	39.3	39.6	32.9	36.1	36.1	36.8
	Higher	6.3%	5.3	5.5	1.9	4.2	4.2	3.4
Wealth Index by Quintile	Poorest	17.0%	18.2	17.8	24.8	20.8	20.9	19.0
	Poorer	20.4%	20.7	20.6	22.9	22.1	22.0	25.0
	Middle	23.1%	23.1	23.0	25.0	22.5	22.4	24.4
	Richer	22.1%	22.3	22.5	18.2	21.1	21.4	17.0
	Richest	17.3%	15.8	16.1	9.1	13.4	13.3	14.6
Household Caste	Sched. Caste	23.7%	24.2	24.1	25.2	23.8	23.8	22.8
	Sched. Tribe	10.1%	9.1	9.1	8.6	12.2	12.2	11.6
	OBC	47.3%	45.6	45.7	43.5	46.8	47.0	43.0
	None	18.2%	20.1	20.0	21.2	16.4	16.2	20.6
Religion	Hindu	87.7%	87.3	87.2	89.5	86.5	86.7	83.3
	Muslim	7.5%	7.7	7.8	7.3	8.9	8.6	13.1
	Christian	2.5%	2.7	2.7	1.8	2.0	2.0	1.4

	Sikh	1.0%	0.9	0.9	0.4	1.1	1.1	0.4
	Buddhist/Neo	0.8%	0.8	0.8	0.4	1.0	1.0	0.3
Rurality	Urban	30.4%	28.4	28.8	21.6	24.6	24.5	26.5
	Rural	69.7%	71.6	71.2	78.4	75.4	75.5	73.5

For care context and time invariant characteristics (Table 3b), women also differed by informed and reporting status. There was a smaller share of women reporting dissatisfaction despite not being told permanence if the procedure was conducted in the immediate postpartum period (18.6% v. 28.5%). This is a normatively negative finding: women who are not told that the procedure was permanent would be expected to be dissatisfied with the quality of care received. There was also a lower share of women who were compensated within the dissatisfied category when compared to the full population (49.6% v. 55.7%). Facility type also varied, with a higher share of concordant reporters (those who were not told permanence and reported dissatisfaction) having received care in public hospitals and public health centers (PHC) but fewer in private hospitals.

Table 4.3b. Characteristics of Sterilized Women by Informed & Reporting Status

		Sterilized	Not Told Permanence N = 29,414			Not Independent Decision N = 14,660		
		N = 188,569	Overall N = 29,414	Satisfied N = 28,069	Dissat. N = 1,345	Overall N = 14,660	Satisfied N = 14,017	Dissatisfied N = 643
Care Context & Time-Variant Characteristics								
Postpartum		28.5%	28.2	28.7	18.6	23.7	23.8	21.1
Payment	Compensated	55.7%	50.5	50.5	49.6	52.7	52.9	47.7
	Mean spent	₹ 80,841	79,002	78,877	81,504	79,872	79,778	81,748
	Mean comp	₹ 3,100	3,174	3,188	2,883	3,952	3,894	5,240
	Share above net neutral	46.7%	51.9%	51.8%	52.3%	50.7	50.4	56.5
Facility	Pub Hospital	39.4%	34.9	34.8	37.1	38.7	38.6	39.9
	CHC	24.8%	26.7	26.7	26.2	26.1	26.1	26.3
	PHC	9.1%	9.4	9.2	13.9	8.8	8.7	10.4
	Camp	3.2%	3.1	3.0	3.3	2.5	2.5	2.4
	Priv Hospital	17.1%	19.1	19.5	11.6	15.5	15.6	14.0
Age at Sterilization	<25	43.2%	45.3	45.2	47.3	41.9	41.7	45.5
	25-29	36.2%	34.7	34.9	31.5	35.3	35.3	34.1
	30-34	15.5%	14.8	14.9	12.9	16.6	16.6	15.1
	35-39	4.2%	4.0	3.9	6.1	5.1	5.1	4.3
	40-44	0.8%	1.0	0.9	1.7	1.1	1.1	1.0
	45-49	0.1%	0.2	0.1	0.5	0.2	0.2	0.0
Parity	0	0.1%	0.1	0.1	0.1	0.1	0.1	0.0
	1	3.4%	3.4	3.4	3.8	4,4	4.4	3.2
	2	46.0%	44.5	44.7	40.9	40.9	40.8	43.7
	3	29.0%	29.4	29.5	27.4	29.4	29.6	26.1
	4	12.9%	13.3	13.2	15.7	14.5	14.4	16.7
	5+	8.7%	9.4	9.2	12.1	10.7	10.8	10.3

Table 4.4 shows the relationship between exposure to each of the four coercion variables and the odds of reporting a negative quality rating. For three of the four variables, there is a statistically significant odds ratio with a value above one, suggesting a positive relationship between exposure to the variable and odds of reporting dissatisfaction. The unadjusted relationship appears strongest for patients who were not told permanence (OR: 1.720, p <0.05) followed by alternate options unknown to the patient and patient reporting that they did not make a decision independently (OR: 1.558 and 1.566, respectively, both p<0.05). These results held, though in each case with a smaller odds ratio, when controlling for patients' demographic characteristics, such as: caste, religion, rurality, educational attainment and key care context variables, such as: facility type and procedure timing. However, when the analysis was limited to the postpartum sterilized

population (for whom more data is collected), the addition of variables related to labor complexity (Model III) and attributes of the child (Model IV) washed out any statistically significant relationship.

Table 4.4. Do Women Exposed to "Coercion" Variables Report Lower Quality of Care?

Exposure		**Model I**	**Model II**	**Model III**	**Model IV**
		Unadjusted	*Patient Characteristics*	*Labor Complexity*	*Attributes of Child*
Total Sterilized Population (N = 188,569)					
Informed Choice	Patient Not Told Side Effects*	0.868 (0.1142)	0.882 (0.1182)	-	-
	Patient Not Told Permanence	**1.720***** (0.0550)	**1.678***** (0.0549)	-	-
Access / Full Choice	Alternate Options Unknown to Patient	**1.558***** (0.0826)	**1.484***** (0.0765)	-	-
Free Choice	Patient Did Not Make Independent Decision	**1.566***** (0.0674)	**1.484***** (0.0661)	-	-
Postpartum Sterilized Population (N = 45,840)					
Informed Choice	Patient Not Told Side Effects*	0.833 (0.2465)	0.774 (0.2480)	0.833 (0.2725)	0.817 (0.2634)
	Patient Not Told Permanence	**1.428***** (0.1072)	**1.341***** (0.1049)	1.226 (0.2355)	1.213 (0.2300)
Access / Full Choice	Alternate Options Unknown to Patient	**1.573***** (0.1618)	**1.399**** (0.1482)	1.148 (0.4314)	1.105 (0.4193)
Free Choice	Patient Did Not Make Independent Decision	**1.608***** (0.1668)	**1.529***** (0.1647)	1.111 (0.2989)	1.158 (0.3025)

**P ≤ 0.05, **P ≤ 0.01, ***P ≤ 0.001*

Model I: Unadjusted with district & year fixed effects

Model II: Adjusted, controlling for all patient characteristics included in Table 2a, facility type and procedure timing with district and year fixed effects

Model III: Adjusted, same as Model II with the addition of variables related to labor complexity: receipt of a caesarian section, breech labor, excessive bleeding, prolonged labor, and length of time spent at place of delivery

Model IV: Adjusted, same as Model II with the addition of variables related to the newborn child: if child lived, sex of child and child's weight

Figure 4.2 explores this breakdown descriptively. Each decision tree depicts the share of the total study population (188,569 sterilized individuals) that was exposed to each coercion variable and of those individuals, what share were satisfied and dissatisfied. For each exposure variable, less than 5% of the population expressed dissatisfaction / a low quality rating ranging from 2.8% (not told side effects) to 4.6% (not told permanence). With the exception of "not told side effects" in each case, this share was larger than the share of non-exposed individuals reporting dissatisfaction e.g. 2.7% of individuals who were told that the procedure was permanent expressed dissatisfaction / a low quality rating whereas this share was 4.6% amongst exposed individuals.

Figure 4.2. Decision Trees, Exposure to Coercion & Share Dissatisfied by Exposure Variable

Table 5 shows patient-level characteristics that inform reporting discordance amongst women exposed to each of the four coercion variables. In line with Table 3 (though shown in inverse), three of the four exposure variables result in a statistically significant odds ratio of less than one within the row "score discordance," meaning exposure to these variables corresponds with a higher odds of reporting dissatisfaction. For each control variable, the odds ratio represents the predicted change in odds due to that variable. Only two demographic variables had an odds ratio above one: 1.) if the woman reported belonging to a historically marginalized caste or 2.) had more than two children at the time of sterilization. Amongst women belonging to a marginalized caste, for the exposure variable "not told permanence" the odds of reporting discordance were approximately 1.21 times larger than people who did not report this designation, but had similar characteristics r.e. the other controls. This relationship was similar for two other exposure variables: not making an independent decision and alternative mFP options unknown to the patient (OR: 1.24 and 1.23 respectively, both p <0.05). Having a parity of two or more was associated with a higher predicted odds of discordance for only two exposure variables: not making an independent decision and alternative modern family planning (mFP) options unknown to the patient with a lower OR in both cases than caste designation (OR: 1.01 and 1.08 respectively, both p <0.05). All other patient characteristics (coded as dummies) were associated with a lower predicted odds of reporting discordance.

Table 4.5. What Patient-level Characteristics Inform the Odds of Reporting Discordance i.e. Satisfaction with Uninformed Care (total sterilized population)

	Not Told Permanence (Denominator: 188k) OR (robust SE)			
	Not Told Permanence N = 29,414	Not Independent Decision N = 14,660	Alt. Options Unknown to Patient N = 9,355	Patient Not Told Side Effects N = 2,356
Score Discordance	**0.596*****	**0.668*****	**0.707*****	1.142
	(0.0195)	(0.0297)	(0.0386)	(0.1530)
Controls				
No Formal Education	**0.845*****	**0.8496*****	**0.852*****	0.877
	(0.0259)	(0.0270)	(0.0263)	(0.0855)
Marginalized Caste	**1.214*****	**1.240*****	**1.230*****	1.107
	(0.0443)	(0.0466)	(0.0450)	(0.1301)
Low Wealth Quintile	**0.834*****	0.834***	0.842***	**0.818****
	(0.0250)	(0.0260)	(0.0254)	(0.0759)
Not Religious Majority	**0.829*****	**0.834*****	**0.831*****	**0.760****
	(0.0325)	(0.0336)	(0.0325)	(0.0888)
Rural Designation	**0.907*****	**0.921****	**0.910****	1.044
	(0.0339)	(0.0357)	(0.0340)	(0.1219)
Parity of 2+	1.078	**1.009*****	**1.082*****	1.166
	(0.0318)	(0.0335)	(0.0318)	(0.1071)
Constant	2.38e-06***	2.38e-06***	3.15e-06***	9.19e-42

Outcome: Satisfaction; Exposure: Coercion / uninformed consent variables, by column
All models with district & year fixed effects; time since sterilization is significant

For the postpartum sterilized population, this relationship held when using the same model presented in table 4.5, but was no longer significant when variables related to labor complexity and child attributes were added (Appendix Table 4.6). Specifically, excessive bleeding during the birthing period and child's weight washed out any statistically significant relationship. I further examine the role of time (which is used as a fixed effect in Table 4). The NFHS survey tool does not include data on the precise date of each sterilization, but women are asked to provide the month and year in which they underwent the procedure. I find that a more recent procedure is positively associated with reporting discordance if the exposure variable was: not making an independent decision. So women who did not make an independent decision to get the procedure were less likely to have discordant quality ratings if they got the procedure in a more recent year (R^2 = 0.8055). The R^2 assessing significance of the relationship between year of sterilization procedure and the two other exposure variables for which there was available data was less than 0.01 (Appendix Figure 4.1).

Table 4.6 shows three system-modifiable factors posed as interventions. The first "intervention" is payment for the sterilization procedure (as compared to not receiving any payment for the procedure), which resulted in an average treatment effect of -1.44% (2.10% v. 3.54%; P ≤ 0.001). This means individuals who were paid for their sterilization were less likely to report a low-quality rating than non-paid peers with similar demographic characteristics. The second system-modifiable factor, if the patient interacted with a Community Health Worker prior to the procedure (as compared to not seeing a CHW prior to the procedure), resulted in a positive ATE of 0.86% (3.27% v. 2.42%; P ≤ 0.001). Seeing a CHW increased the odds of scoring concordance; i.e. patients were more likely to express dissatisfaction when they lacked autonomous decision-making power after seeing a CHW. The third system-modifiable factor, going to a private facility (as compared to going to a public facility), resulted in a positive ATE of 0.75% (2.57% v. 1.82%; P ≤ 0.001).

Table 4.6. Average Treatment Effect of Supply-Side Factors on Scoring Concordance (Outcome: Not Decisionmaker)

	Average Treatment Effect (ATE)					
	Original Sample			Kernel Matched Sample^		
	Mean Intervention	Mean Comparison	Standardized Difference	Mean Intervention	Mean Comparison	Standardized Difference
Paid for Sterilization						
	2.10%	2.89%	-0.79% (0.0020)	2.10%	3.54%	**-1.44%***** (0.0099)
CHW Interaction						
	3.27%	2.31%	0.97% (0.0026)	3.27%	2.42%	**0.86%***** (0.0102)
Private Facility						
	2.57%	2.47%	0.12% (0.0022)	2.57%	1.82%	**0.75%***** (0.0092)
Procedure Timing (Postpartum)						
	1.80%	2.68%	-0.88% (0.0024)	1.80%	1.86%	**-0.05%*** (0.0118)

**P ≤ 0.05, **P ≤ 0.01, ***P ≤ 0.001*

^All models match on the following characteristics: historically marginalized caste designation, wealth index, highest educational attainment, religious identity, rural living designation, parity at sterilization and age at sterilization

Finally, procedure time or getting a sterilization in the immediate postpartum period (as opposed to interval sterilization) also had a statistically significant relationship with the odds of reporting concordance with a negative ATE of -0.05% (1.80% v. 1.86%; P ≤ 0.05). Only 1.80% of women who received a tubal ligation during the immediate postpartum period and did not make this decision for themselves rated their care negatively.

4.5. Discussion

In a sample of one hundred and eighty-eight thousand women who underwent tubal ligations across India, over 95% of women who were subject to uninformed consent, a recognized form of coercion, rated their care positively. While three measures of uninformed consent (not being told permanence, not making the decision independently and not knowing alternate options) were associated with a higher odds of reporting negative satisfaction ratings, one item (not being told about side effects) had no statistically significant relationship with satisfaction ratings at all. Belonging to a historically marginalized caste or having two or more children at the time of sterilization made scoring discordance more likely to occur. In exploring system-modifiable factors, both payment to the patient and procedure timing, appeared to induce favor dependence - obfuscating the relationship between exposure to coercive services and the democratic channel meant to reveal them (patient satisfaction ratings). These data suggest that while patient quality ratings do provide some signal that uninformed care is occurring, subjective ratings may be insufficient to reveal the true scale of the problem and, in turn, mask routinized forms of coercion in the delivery of sterilization care. This research has implications for the measurement of person-centeredness and health system accountability, particularly in contexts where compromised patient autonomy may constitute a more normalized form of structural violence.

The data used in this paper build on prior research while shedding light on the relationship between objective and subjective metrics collected from patients with findings relevant to reproductive justice scholarship.[8,47–49] The positive and statistically significant relationship between uninformed consent and negative quality ratings is promising and may be useful in informing performance measurement and accountability mechanisms at the systems level. These findings are also counter to prior literature that centers asymmetry of information and patient (in)ability to discern low quality services; ultimately situating concerns regarding the validity of patient satisfaction ratings with the patient.[50] These data suggest women *do* recognize when low quality services are provided, but this is inconsistently reflected in subjective ratings in part due to system modifiable factors, such as: payment to patients and procedure timing. In examining these factors, we can expand the conversation regarding channels for patient voice by locating responsibility beyond the patient – to better understand how the system itself, and ways in which care is structured, may compromise patient voice via favor dependance. This builds directly on Reproductive Justice scholarship by conceptualizing coercion as an act that can manifest through structural forces, such as the organization of care.[31,51] By actively assessing mechanisms through which institutionalized discrimination may impact reporting, we can examine existing measurement strategies' ability to represent patient voice. Accordingly, these data also motivate a more practical exploration of considerations in measurement, such as controlling for baseline patient characteristics or clinical complexity; as is common with satisfaction reporting in higher income contexts (e.g. the U.S.' HCAHPS survey tool which is risk-adjusted at the facility-level to account for differences in patient complexity).[52–54] One group for which this may be particularly relevant is women with a historically marginalized caste designation, defined in this paper as someone who belongs to a scheduled caste, scheduled tribe or "otherwise backwards caste" (OBC). The odds of reporting discordance amongst this group was approximately 1.2 times higher than patients with otherwise similar demographic characteristics. These findings are distinct from, but align with, previous research on satisfaction reporting which finds factors related to social exclusion (such as: poverty, racial minority status or low educational attainment) are associated with higher overall satisfaction ratings, driven not by the receipt of better care, but lower baseline expectations of the system.[48,55–57] In this case, routinized forms of coercion may be normalized and lead to artificially *high* reports of satisfaction. In addition, for the postpartum population the relationship that exists between exposure to coercion and reporting low quality care is "washed out" by factors unrelated to the doctor-patient interaction i.e. when women experience complexity during childbirth (e.g. excessive bleeding) or a low birthweight child.

Discordant quality ratings, or rating "bad" quality care highly is common for other health services and problematic for accountability generally, but has unique consequences in the case of uninformed sterilization. Human rights bodies, such as the Committee on the Elimination of all Forms of Racial Discrimination and European Court of Human Rights, have affirmed that the failure to provide reproductive health information and to ensure full, free and informed consent for sterilization – particularly amongst those belonging to ethnic minorities – is a violation of basic human rights.[58] This includes the right to information, women's right to determine the number and spacing of their children, the right to be free from inhumane and degrading treatment, and the right to private life.[58–60] However, absent mechanisms of accountability, these rights mean little; if you do not know the baseline state of violations it is near impossible to ensure laws, policies and programs are effectively implemented. The data presented here provide concern: not only is the prevalence of coercive sterilization high, but certain groups are less likely to raise issue – impacting the potential for identification and redress. International human rights standards require states to ensure effective accountability processes (including monitoring and evaluation), the availability of effective remedies in the development, implementation and monitoring of human rights-related laws, policies and programs.[61] Augmenting satisfaction ratings with items that more objectively assess the actual receipt of key information (in which the patient is not asked to make a subjective assessment, but simply comment on the provision of key information) allows for a more direct assessment of coercion. Indian standards for sterilization practice do include an assessment of informed consent, with a provider checklist item: "*Informed consent [was] given by the client*." However, the item is binary and does not employ a functional definition of coercion, in which patients are asked whether pre-conditions for consent were actually met in practice. As a result, the response "yes" may be subject to measurement error if there is variation in patient knowledge of what constitutes "informed" consent or, as noted earlier if this designation is automatically populated by health personnel.

Satisfaction ratings remain important – but the two forms of assessment can complement one another: providing information on what patents value as well as rights-based standards for information provision.[18,21] Due to the prevalence of female sterilization in India, it is reasonable to assume patients already know a significant amount about sterilizing procedures when they arrive at a health facility. For example, Sivaram et al find women default to sterilization because "*It worked for their mother's generation*," suggesting high community and familial knowledge regarding the procedure.[62] In line with this, women may not want lengthily descriptions of side effects – and this hypothesis is supported by the data presented here for at least one exposure: there was no statistically significant relationship between the variable "not told side effects" and low satisfaction. However, for the other three exposures, each resulted in a higher odds of reporting dissatisfaction; suggesting women do value this information. And, for the variable "independent decision" the finding regarding year of sterilization (Appendix Figure 4.1) may shed additional light: more recent procedures were associated with less discordance. It is not possible to identify the reason for this finding given the data available, but this finding could reflect a change in social norms over time. For example: increasing public recognition that reproductive decisions regarding sterilization should not be made by an individual other than the patient. The findings regarding clinical complexity and child health amongst the postpartum population also hold implications for assessment. That outcomes of a birth might eclipse other aspects of care in satisfaction ratings has been shown in other populations. This is the first examination of this issue for sterilization care and, given the increasing prevalence of sterilizations conducted in the immediate postpartum period, has important implications for the utility of satisfaction ratings to "catch" issues of coercion.

Examining system-modifiable factors provides some insight into what might improve reporting concordance within the control of the health system. For example, payment for sterilization resulted in a negative treatment effect – i.e. a patient who was not told about the procedure's permanence and is paid for their sterilization (any amount) is less likely to rate their quality of care negatively than un-paid peers with similar characteristics. While the payment is meant to cover costs associated with receiving a sterilization, it is fixed at the state level with the same amount of money disbursed regardless of a woman's expenditure on the procedure or ability to pay.[41] There is strong evidence to suggest out-of-pocket spending is high in India, and reimbursement relevant for women to avail themselves of needed reproductive and maternal health services.[41,63] There is also a broad literature on CCTs regarding uptake of targeted health behaviors which suggests CCTs are generally effective in reaching their immediate aims i.e. the objectives that are directly incentivized – such as the use of preventative services.[64,65] There is minimal research assessing how receipt of a CCT might impact patient-reported outcomes, such as satisfaction ratings. Given that most CCTs aim to reduce inequities, this work sheds early light on the potential externalities of patient-payment on patient-reported metrics.[65] Indirect effects of CCTs refer to impacts on other aspects of individual beneficiaries' care experience beyond the health-related outcome of interest.[65] One indirect effect that has been previously identified in the literature is behavioral - patient disinhibition.[65] This work suggests patients who are paid for care may be more likely to undertake risky behaviors, and in turn subject themselves to harm. The converse appears true here: receipt of payment leading to patient inhibition; a form of "courtesy" or reporting bias where patients do not feel they can rate reimbursed care negatively.[25] As patient satisfaction is increasingly used to assess health system performance in India and other countries where CCT programs are common, is important to evaluate the indirect effects of conditional cash transfers. Absent evaluation, and in line with feminist economic scholarship, payment may induce favor dependance – compromising the ability of patients to freely express dissatisfaction.[1]

This work builds on research conducted to date across several disciplines. First, it extends on research that has explored issues of discordance in measuring disrespect and abuse amongst women giving birth in Tanzania. This research assessed gaps in self-reported versus third-party-observed disrespect and abuse in a population of approximately 230 women giving birth in facilities. A broader literature explores patient satisfaction ratings and the role of patient expectations building on a globally-fielded survey conducted through the World Health Survey in the early 2000s.[48] This effort, led by the World Health Organization (WHO), was an attempt to better understand how patients in different contexts, and with different characteristics, rate care of objectively different levels of quality (as assessed through standardized vignettes).[10,48] Since, a number of studies have built on this work, providing further insight into the role of expectations and how they might inform subjective ratings in different contexts.[47,55,66] However, this literature on expectations and satisfaction, does not examine sterilization care specifically. Amongst sterilization patients, Mohanty and co-authors have examined patterns and correlates of out-of-pocket payment (OPP) for female sterilization in India, including how much women were reimbursed for their care.[41] However, this work did not look at the relationship between exposure to coercive care and payment or how payment might impact quality reporting. The most relevant paper that this work builds on is a 2020 paper by Bansal and Dwivedi, "Sterilization Regret in India: is Quality of Care a Matter of Concern."[67] The authors show a two-fold increase in regret when women are subjected to poor quality of care (using a quality rating as an exposure, as opposed to outcome, as it is used in this paper). This paper builds on their work by examining exposure to objective issues of coercion and exploring scoring discordance directly; this paper does not examine issues of sterilization regret, due to a strong existing literature on this topic which finds regret is often driven by factors outside the control of the health system, such as: divorce, death of a spouse or death of a child.[68–71]

Limitations

This work is subject to several limitations. First, I use a narrow definition of coercion that includes only four items outlined within WHO's Interagency Framework on Eliminating Coercive and Otherwise Involuntary Steirlization.[18] Data was limited to items available in the NFHS survey tool and lacked important aspects of the framework, such as: the provision of *mis*information regarding sterilizations (e.g. that tubal ligation procedures protect against sexually transmitted disease). In addition, the variables that are included are meant to represent a baseline of information needed, and may not capture other aspects of coercion or pressure (e.g. if a provider repeatedly suggests the procedure or withholds other services). However, this limitation likely leads to an underestimate of coercion amongst the sterilized population studied. Second, there is minimal data to assess baseline clinical severity or identify women who are known to be at heightened risk of coercive care and have been flagged by human rights organizations (e.g. individuals who are HIV+, people who are incarcerated or otherwise living in congregate settings, people with mental and developmental health diagnoses, transgender individuals, etc.). These populations may both be more likely to receive a coercive sterilization and also be less likely to express dissatisfaction. In addition, with the data at hand, it is not possible to disentangle *why* people are rating their care highly. Some women, for example, may have access to information outside the health system and as a result not feel they need "permanence" explained by a provider. However, as outlined in the Interagency Statement, this information must be provided by the state regardless of a patient's baseline knowledge. This is a clear limitation: there is no requirement for a bi-directional exchange of information in which the patient conveys what they already know or expresses to a provider what they value. Finally, the designation for "Caste" is limited by the NFHS survey tool, the findings presented here suggest a more nuanced examination is warranted.

CONCLUSION

In summary, I find women who have received coercive tubal ligation care are more likely to rate their care poorly than non-coerced peers. However, due to the sheer number of women subject to coercive care that rate their care highly, subjective measures of satisfaction appear to be an insufficient stand-alone measure of accountability. Focusing on satisfaction alone, while also paying women who undergo tubal ligation procedures, may mask the scale of uninformed consent; obfuscating a key channel for patient voice. This is particularly concerning for patients belonging to a historically marginalized caste, for whom exposure to uninformed care resulted in a higher odds of reporting satisfaction. These findings hold important implications for policymakers interested in holding the health system accountable to sterilized patients and mitigating instances of structural coercion in reproductive care more broadly.

REFERENCES

1. Hill M. Development as Empowerment. *Fem Econ*. 2003;9(2-3):117-135. doi:10.1080/1354570022000077962
2. Popay J, Roberts H, Sowden A, et al. Guidance on the Conduct of Narrative Synthesis in Systematic Reviews A Product from the ESRC Methods Programme. Published online 2006.
3. Sen A. Population policy: Authoritarianism versus cooperation. *J Popul Econ*. 1997;10(1):3-22. doi:10.1007/s001480050029
4. Roberts D. Reproductive Justice, Not Rights. *Dissent Univ Pa Press*. 2015;62(4):79-82.
5. National Accreditation Board for Hospitals & Healthcare Providers (NABH). Accessed April 5, 2021. https://nabh.co/BenefitsofAccreditation.aspx
6. Kruk ME, Larson E, Twum-Danso NAY. Time for a quality revolution in global health. *Lancet Glob Health*. 2016;4(9):e594-e596. doi:10.1016/S2214-109X(16)30131-0
7. Linder-Pelz S. Toward a theory of patient satisfaction. *Soc Sci Med*. 1982;16(5):577-582. doi:10.1016/0277-9536(82)90311-2
8. Larson E, Sharma J, Bohren MA, Tunçalp Ö. When the patient is the expert: measuring patient experience and satisfaction with care. *Bull World Health Organ*. 2019;97(8):563-569. doi:10.2471/BLT.18.225201
9. Zhu J. Patient Experience with Hospital Care: Examining the Factor Structure, Measurement Invariance, Predictors, and Sources of Variation Using the HCAHPS Survey - ProQuest. Accessed November 17, 2022. https://www.proquest.com/openview/6712e3511edb91493504be1ba516c77e/1.pdf?pq-origsite=gscholar&cbl=18750
10. Thompson AG, Suñol R. Expectations as determinants of patient satisfaction: concepts, theory and evidence. *Int J Qual Health Care J Int Soc Qual Health Care*. 1995;7(2):127-141.
11. Tancred T, Schellenberg J, Marchant T, et al. Using mixed methods to evaluate perceived quality of care in southern Tanzania. *Int J Qual Health Care J Int Soc Qual Health Care ISQua*. 2016;28(2):233-239. doi:10.1093/intqhc/mzw002
12. Bloom G, Standing H, Lloyd R. Markets, information asymmetry and health care: Towards new social contracts. *Soc Sci Med*. 2008;66(10):2076-2087. doi:10.1016/j.socscimed.2008.01.034
13. Blomqvist Å. The doctor as double agent: Information asymmetry, health insurance, and medical care. *J Health Econ*. 1991;10(4):411-432. doi:10.1016/0167-6296(91)90023-G
14. Siam ZA, McConnell M, Golub G, Nyakora G, Rothschild C, Cohen J. Accuracy of patient perceptions of maternity facility quality and the choice of providers in Nairobi, Kenya: A cohort study. *BMJ Open*. 2019;9(7):29486. doi:10.1136/bmjopen-2019-029486
15. Fried ST. Violence against Women. *Health Hum Rights*. 2003;6(2):88. doi:10.2307/4065431
16. IJRC. Forced Sterilization as a Human Rights Violation: Recent Developments. International Justice Resource Center. Published March 21, 2019. Accessed October 20, 2022. https://ijrcenter.org/2019/03/21/forced-sterilization-as-a-human-rights-violation-recent-developments/
17. World Health Organization. *Ensuring Human Rights in the Provision of Contraceptive Information and Services: Guidance and Recommendations*. World Health Organization; 2014. Accessed November 7, 2022. https://apps.who.int/iris/handle/10665/102539
18. the WHO. Eliminating forced, coercive and otherwise involuntary sterilization. *The WHO*. Published online 2014. Accessed October 1, 2019. https://www.who.int/reproductivehealth/publications/gender_rights/eliminating-forced-sterilization/en/

19. Bansal A, Dwivedi LK, Ali B. The trends of female sterilization in India: an age period cohort analysis approach. *BMC Womens Health*. 2022;22(1):272. doi:10.1186/s12905-022-01857-0

20. Singh P, Singh KK, Singh P. Factors explaining the dominion status of female sterilization in India over the past two decades (1992-2016): A multilevel study. *PLOS ONE*. 2021;16(3):e0246530. doi:10.1371/JOURNAL.PONE.0246530

21. Standards for Female and Male Sterilization Services. Published online 2006.

22. *Manual for Family Planning Indemnity Scheme*.; 2013.

23. HRW. India: Target-Driven Sterilization Harming Women. Human Rights Watch. Published 2014. Accessed November 11, 2020. https://www.hrw.org/news/2012/07/12/india-target-driven-sterilization-harming-women

24. Devika Biswas v. Union of India & Others, Petition No. 95 of 2012 | ESCR-Net. Accessed November 3, 2021. https://www.escr-net.org/caselaw/2017/devika-biswas-v-union-india-others-petition-no-95-2012

25. Hameed W, Ishaque M, Gul X, et al. Does courtesy bias affect how clients report on objective and subjective measures of family planning service quality? A comparison between facility- and home-based interviews. *Open Access J Contracept*. 2018;9:33-43. doi:10.2147/OAJC.S153443

26. What Is Patient Experience? Accessed November 20, 2022. https://www.ahrq.gov/cahps/about-cahps/patient-experience/index.html

27. Gonzales B. Voluntary Sterilization: Counseling as a Prerequisite to Informed Consent. *Med Law*. 1982;1. Accessed August 9, 2021. https://heinonline.org/HOL/Page?handle=hein.journals/mlv1&id=35&div=8&collection=journals

28. Senderowicz L. Contraceptive Autonomy: Conceptions and Measurement of a Novel Family Planning Indicator. *Stud Fam Plann*. 2020;51(2):161-176. doi:10.1111/sifp.12114

29. Freedman LP, Kruk ME. Disrespect and abuse of women in childbirth: challenging the global quality and accountability agendas. *The Lancet*. 2014;384(9948):e42-e44.

30. Sando D, Ratcliffe H, McDonald K, et al. The prevalence of disrespect and abuse during facility-based childbirth in urban Tanzania. *BMC Pregnancy Childbirth*. 2016;16(1). doi:10.1186/s12884-016-1019-4

31. Ross LJ. Reproductive Justice as Intersectional Feminist Activism. *https://doi.org/101080/1099994920171389634*. 2018;19(3):286-314. doi:10.1080/10999949.2017.1389634

32. Wilson K. For Reproductive Justice in an Era of Gates and Modi: The Violence of India's Population Policies. *Fem Rev*. 2018;119(1):89-105. doi:10.1057/s41305-018-0112-0

33. Zavier AJF, Santhya KG. How conditional cash transfers to promote institutional delivery can also influence postpartum contraception: Evidence from Rajasthan, India. *Int J Gynecol Obstet*. 2013;123(SUPPL.1):e43-e46. doi:10.1016/J.IJGO.2013.08.003

34. The DHS Program - Use of Family Planning in the Postpartum Period (English). Accessed March 31, 2022. https://dhsprogram.com/publications/publication-cr36-comparative-reports.cfm

35. Srivastava A, Avan BI, Rajbangshi P, Bhattacharyya S. Determinants of women's satisfaction with maternal health care: a review of literature from developing countries. *BMC Pregnancy Childbirth*. 2015;15(1):97. doi:10.1186/s12884-015-0525-0

36. George A. Quality of Reproductive Care in Private Hospitals in Andhra Pradesh: Women's Perception. *Econ Polit Wkly*. 2002;37(17):1686-1692.

37. Availability and quality of emergency obstetric care in Gambia's main referral hospital: women-users' testimonies | Reproductive Health | Full Text. Accessed November 21, 2022. https://reproductive-health-journal.biomedcentral.com/articles/10.1186/1742-4755-6-5

38. D'Ambruoso L, Abbey M, Hussein J. Please understand when I cry out in pain: women's accounts of maternity services during labour and delivery in Ghana. *BMC Public Health*. 2005;5(1):140. doi:10.1186/1471-2458-5-140

39. Chunuan S, Kochapakdee W. Patient Satisfaction with Nursing Care Received during the Intrapartum Period. *Thai J Nurs*. 2003;7.

40. Balogun OR. Patients Perception of Quality of Antenatal Service in Four Selected Private Health Facilities in Ilorin, Kwara State of Nigeria. *Niger Med Pract*. 2007;51(4):80-84. doi:10.4314/nmp.v51i4.28847

41. Mohanty SK, Mishra S, Chatterjee S, Saggurti N. Pattern and correlates of out-of-pocket payment (OOP) on female sterilization in India, 1990–2014. *BMC Womens Health 2020 201*. 2020;20(1):1-13. doi:10.1186/S12905-020-0884-1

42. Satia JK, Maru RM. Incentives and disincentives in the Indian family welfare program. *Stud Fam Plann*. 1986;17(3):136-145.

43. India's insurance scheme shifts to value-based care performance measure. Healthcare IT News. Published January 10, 2023. Accessed January 10, 2023. https://www.healthcareitnews.com/news/asia/indias-insurance-scheme-shifts-value-based-care-performance-measure

44. Garrido MM, Kelley AS, Paris J, et al. Methods for Constructing and Assessing Propensity Scores. *Health Serv Res*. 2014;49(5):1701-1720. doi:10.1111/1475-6773.12182

45. Abadie A, Imbens GW. Matching on the Estimated Propensity Score. *Econometrica*. 2016;84(2):781-807. doi:10.3982/ECTA11293

46. Garrido MM. Propensity Scores: A Practical Method for Assessing Treatment Effects in Pain and Symptom Management Research. *J Pain Symptom Manage*. 2014;48(4):711-718. doi:10.1016/j.jpainsymman.2014.05.014

47. Roder-DeWan S, Gage AD, Hirschhorn LR, et al. Expectations of healthcare quality: A crosssectional study of internet users in 12 low-and middle-income countries. *PLoS Med*. 2019;16(8). doi:10.1371/journal.pmed.1002879

48. Bleich S. How does satisfaction with the health-care system relate to patient experience? *Bull World Health Organ*. 2009;87(4):271-278. doi:10.2471/BLT.07.050401

49. Leonard KL. Is patient satisfaction sensitive to changes in the quality of care? An exploitation of the Hawthorne effect. *J Health Econ*. 2008;27(2):444-459. doi:10.1016/j.jhealeco.2007.07.004

50. Sen A. Health: perception versus observation. *BMJ*. 2002;324(7342):860-861. doi:10.1136/bmj.324.7342.860

51. Gilliam ML, Neustadt A, Gordon R. A call to incorporate a reproductive justice agenda into reproductive health clinical practice and policy. *Contraception*. 2009;79(4):243-246. doi:10.1016/J.CONTRACEPTION.2008.12.004

52. Giordano LA, Elliott MN, Goldstein E, Lehrman WG, Spencer PA. Development, Implementation, and Public Reporting of the HCAHPS Survey. *Med Care Res Rev*. 2010;67(1):27-37. doi:10.1177/1077558709341065

53. HCAHPS: Patients' Perspectives of Care Survey, Public Reporting. Centers for Medicare and Medicaid Services. Published 2021. Accessed February 14, 2021. https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/HospitalQualityInits/HospitalHCAHPS

54. Westbrook KW, Babakus E, Grant CC. Measuring Patient-Perceived Hospital Service Quality: Validity and Managerial Usefulness of HCAHPS Scales. *Health Mark Q*. 2014;31(2):97-114. doi:10.1080/07359683.2014.907114

55. Bowling A, Rowe G, Mckee M. Patients' experiences of their healthcare in relation to their expectations and satisfaction: a population survey. *J R Soc Med*. 2013;106(4):143-149. doi:10.1258/jrsm.2012.120147

56. Bowling A, Rowe G, Lambert N, et al. The measurement of patients' expectations for health care: a review and psychometric testing of a measure of patients' expectations Executive summary. *Health Technol Assess*. 2012;16(30). doi:10.3310/hta16300

57. Rosenheck R, Wilson NJ, Meterko M. Influence of patient and hospital factors on consumer satisfaction with inpatient mental health treatment. *Psychiatr Serv Wash DC*. 1997;48(12):1553-1561. doi:10.1176/ps.48.12.1553

58. Geneva) UC on the E of RD (94th sess : 2017 : Concluding observations on the combined 11th and 12th periodic reports of Slovakia : Published online January 12, 2018. Accessed November 22, 2022. https://digitallibrary.un.org/record/1483351

59. María Mamerita Mestanza Chávez v. Peru (Inter-American Commission on Human Rights). Center for Reproductive Rights. Accessed November 22, 2022. https://reproductiverights.org/case/maria-mamerita-mestanza-chavez-v-peru-inter-american-commission-on-human-rights/

60. Albert G, Szilvasi M. Intersectional Discrimination of Romani Women Forcibly Sterilized in the Former Czechoslovakia and Czech Republic. *Health Hum Rights*. 2017;19(2):23.

61. Cole WM. Convention on the Elimination of All Forms of Discrimination against Women (CEDAW). In: *The Wiley Blackwell Encyclopedia of Gender and Sexuality Studies*. John Wiley & Sons, Ltd; 2016:1-3. doi:10.1002/9781118663219.wbegss274

62. Sivaram S, Singh S, Penn-Kekana L. Understanding the role of female sterilisation in Indian family planning through qualitative analysis: perspectives from above and below. *Sex Reprod Health Matters*. 2022;29(2):2080166. doi:10.1080/26410397.2022.2080166

63. Leone T, James KS, Padmadas SS. The burden of maternal health care expenditure in India: multilevel analysis of national data. *Matern Child Health J*. 2013;17(9):1622-1630.

64. Lagarde M, Haines A, Palmer N. Conditional Cash Transfers for Improving Uptake of Health Interventions in Low- and Middle-Income Countries: A Systematic Review. *JAMA*. 2007;298(16):1900-1910. doi:10.1001/JAMA.298.16.1900

65. Krubiner CB, Merritt MW. Which strings attached: Ethical considerations for selecting appropriate conditionalities in conditional cash transfer programmes. *J Med Ethics*. 2017;43(3):167-176. doi:10.1136/medethics-2016-103386

66. Rao JK, Weinberger M, Kroenke K. Visit-specific expectations and patient-centered outcomes: a literature review. *Arch Fam Med*. 9(10):1148-1155.

67. Bansal A, Dwivedi LK. Sterilization regret in India: Is quality of care a matter of concern? *Contracept Reprod Med*. 2020;5(1):1-12. doi:10.1186/s40834-020-00115-8

68. Pal G, Chaurasia H. Revisiting Post-Sterilization Regret in India. *J Obstet Gynecol India*. 70(4):295-303. doi:10.1007/s13224-020-01309-5

69. Singh A. Sterilization Regret Among Married Women in India: Trends, Patterns and Correlates. *Source Int Perspect Sex Reprod Health*. 2018;44(4):167-176. doi:10.1363/44e7218

70. Ramanathan M, Mishra US. Correlates of female sterilization regret in the southern states of India. *J Biosoc Sci*. 2000;32(4):547-558. doi:10.1017/S0021932000005472

71. Wilcox LS, Chu SY, Eaker ED, Zeger SL, Peterson HB. Risk factors for regret after tubal sterilization: 5 years of follow-up in a prospective study. *Fertil Steril*. 1991;55(5):927-933. doi:10.1016/s0015-0282(16)54301-5

APPENDIX

Appendix Table 4.1. Accountability / Regulatory Mechanisms that Incorporate Patient Surveys Relevant to Sterilized Women in India

	Mechanism Type	**Sterilization Specific**	**Satisfaction / Experience Questions**	**Measure Type(s)**
Standard & Quality Assurance in Sterilization Services	Clinical Standards*	Sterilization Only	*[Client Exit Interview]* Q: Did you receive written instructions about post-operative care? Q: Did you feel free to ask questions? Q: Do you have any suggestions for improving sterilization services? *Additional Qs not listed r.e. privacy and post-discharge plans*	Experience & Satisfaction
National Quality Assurance Standards (NQAS)	Accreditation	Facility Wide	*[Mera Aspitaal platform]* Q: Overall rating of care: - Very satisfied - Satisfied - Not Satisfied Q If not satisfied, service(s) dissatisfied with: - Staff behavior - Cleanliness - Treatment cost - Quality of care - Others	Satisfaction
NITI Aayog District Hospital Ranking	Public Reporting			
Kayakalp Rewards	Performance Based Financing			
PM-JAY Value-Based Purchasing	Value-Based Insurance *[Proposed]*	TBD**	Q: Tell us overall experience of the treatment in Hospital - Very good - Good - Satisfactory - Poor - Very Poor Q: Reason for poor? - Open ended	Satisfaction (Proposed)

** Standard & Quality Assurance in Sterilization Services provide the longest survey tool to collect information from patients, but is not tied to incentives (financial;, public reporting, etc.), does not include questions that align with international norms on non-coercive sterilization care and does not include any direct questions regarding patient satisfaction or quality ratings.*

***2019 petition to remove tubal ligation as an insurance-eligible procedure within prior iterations of PM-JAY due to its inclusion in family planning schemes; procedure list for new PM-JAY Value-Based Purchasing scheme not yet available.*

Appendix Table 4.2 (4b). Do Women Exposed to "Coercion" Variables Report Lower Quality of Care? (POSTPARTUM)

Exposure		**Model I**	**Model II**	**Model III**	**Model IV**
		Unadjusted	*Patient Characteristics*	*Labor Complexity*	*Attributes of Child*
Informed Choice	Patient Not Told Side Effects*	0.833 (0.2465)	0.774 (0.2480)	0.833 (0.2725)	0.817 (0.2634)
	Patient Not Told Permanence	**1.428***** (0.1072)	**1.341***** (0.1049)	1.226 (0.2355)	1.213 (0.2300)
Access / Full Choice	Alternate Options Unknown to Patient	**1.573***** (0.1618)	**1.399**** (0.1482)	1.148 (0.4314)	1.105 (0.4193)
Free Choice	Patient Did Not Make Independent Decision	**1.608***** (0.1668)	**1.529***** (0.1647)	1.111 (0.2989)	1.158 (0.3025)

**P ≤ 0.05, **P ≤ 0.01, ***P ≤ 0.001*
Model I: Unadjusted with district & year fixed effects
Model II: Adjusted, controlling for all patient characteristics included in Table 2a, facility type and procedure timing with district and year fixed effects
Model III: Adjusted, same as Model II with the addition of variables related to labor complexity: receipt of a caesarian section, breech labor, excessive bleeding, prolonged labor, and length of time spent at place of delivery
Model IV: Adjusted, same as Model II with the addition of variables related to child: if child lived, sex of child and child's weight

Appendix Table 4.3 (4c). Do Women Exposed to "Coercion" Variables Report Lower Quality of Care? (INTERVAL)

Exposure		**Model I**	**Model II**
Informed Choice	Patient Not Told Side Effects*	0.866 (0.1274)	0.898 (0.1326)
	Patient Not Told Permanence	**1.803***** (0.0638)	**1.772***** (0.0640)
Access / Full Choice	Alternate Options Unknown to Patient	**1.570***** (0.0971)	**1.438***** (0.0916)
Free Choice	Patient Did Not Make Independent Decision	**1.536***** (0.0727)	**1.467***** (0.0716)

**Question regarding knowledge of side effects posed to a randomly selected subset of the sample, 18,196*
All models: Outcome: poor quality rating; Exposure: respective coercion variable
Model I: Unadjusted with district & year fixed effects
Model II: Adjusted, controlling for all patient characteristics included in Table 2a, facility type and procedure timing with district and year fixed effects

Appendix Table 4.4 (5b). What Patient-level Characteristics Inform the Odds of Reporting Discordance i.e. Satisfaction with Uninformed Care (POSTPARTUM)

	Not Told Permanence (Denominator: 188k) OR (robust SE)			
	Not Told Permanence N = 29,414	Not Independent Decision N = 14,660	Alt. Options Unknown to Patient N = 9,355	Patient Not Told Side Effects N = 2,356
Score Discordance	**0.750*** **	**0.641*** **	**0.694*** **	1.302
	(0.0587)	(0.0689)	(0.0741)	(0.4156)
Controls				
No Formal Education	**0.776*** **	**0.776*** **	**0.797** **	1.094
	(0.0561)	(0.0586)	(0.0586)	(0.3050)
Marginalized Caste	1.118	1.143	1.127	1.030
	(0.0962)	(0.1010)	(0.0968)	(0.2600)
Low Wealth Quintile	0.976	0.961	0.994	1.028
	(0.0659)	(0.0679)	(0.0673)	(0.2148)
Not Religious Majority	**0.847***	**0.835***	0.846	1.013
	(0.0680)	(0.0691)	(0.0679)	(0.2425)
Rural Designation	0.920	0.941	0.926	1.371
	(0.0664)	(0.0709)	(0.0669)	(0.2925)
Parity of 2+	**1.153***	**1.171** **	**1.156***	1.476
	(0.0760)	(0.0799)	(0.0761)	(0.2991)
Constant	7.88e-11**	4.85e-11**	3.90e-10**	1.03e+41

**P ≤ 0.05, **P ≤ 0.01, ***P ≤ 0.001*

Outcome: Satisfaction; Exposure: Coercion / uninformed consent variables

All models with district & year fixed effects; time since sterilization is significant

Appendix Table 4.5 (5b). What Patient-level Characteristics Inform the Odds of Reporting Discordance i.e. Satisfaction with Uninformed Care (INTERVAL)

	Not Told Permanence (Denominator: 188k) OR (robust SE)			
	Not Told Permanence N = 29,414	Not Independent Decision N = 14,660	Alt. Options Unknown to Patient N = 9,355	Patient Not Told Side Effects N = 2,356
Score Discordance	**0.565*** **	**0.681*** **	**0.696*** **	1.125
	0.0204	0.0332	0.0445	0.1661
Controls				
No Formal Education	**0.876*** **	**0.884*** **	**0.884*** **	0.882
	0.0296	0.0309	0.0300	0.0927
Marginalized Caste	**1.234*** **	**1.258*** **	**1.250*** **	1.129
	0.0499	0.0523	0.0506	0.1493
Low Wealth Quintile	**0.810*** **	**0.812*** **	**0.815*** **	**0.790***
	0.0273	0.0283	0.0276	0.0830
Not Religious Majority	**0.800*** **	**0.810*** **	**0.802*** **	**0.653*** **
	0.0361	0.0377	0.0362	0.0870
Rural Designation	0.929	0.944	0.934	0.966
	0.0408	0.0429	0.0410	0.1395
Parity of 2+	1.046	1.067	1.049	1.082
	0.0344	0.0362	0.0344	0.1103
Constant	.0000349*	5.00e-06*	.0000344*	8.00e-62*

**P ≤ 0.05, **P ≤ 0.01, ***P ≤ 0.001*

Outcome: Satisfaction; Exposure: Coercion / uninformed consent variables

All models with district & year fixed effects; time since sterilization is significant

Appendix Table 4.6 (5b). What Patient-level Characteristics Inform the Odds of Reporting Discordance i.e. Satisfaction with Uninformed Care (POSTPARTUM)

	Not Told Permanence (Denominator: 188k) OR (robust SE)			
	Not Told Permanence N = 29,414	Not Independent Decision N = 14,660	Alt. Options Unknown to Patient N = 9,355	Patient Not Told Side Effects N = 2,356
Score Discordance	0.810 (0.1549)	0.917 (0.2492)	0.916 (0.3472)	1.243 (0.4080)
Controls				
No Formal Education	0.889 (0.1784)	0.889 (0.1799)	0.886 (0.1799)	1.080 (0.3075)
Marginalized Caste	0.908 (0.1872)	0.919 (0.1896)	0.914 (0.1883)	1.024 (0.2727)
Low Wealth Quintile	0.799 (0.1187)	0.811 (0.1224)	0.802 (0.1197)	0.957 (0.2101)
Not Religious Majority	1.013 (0.1879)	0.994 (0.1851)	1.015 (0.1882)	0.966 (0.2439)
Rural Designation	1.078 (0.1761)	1.096 (0.1806)	1.077 (0.1764)	1.235 (0.2800)
Parity of 2+	1.226 (0.1910)	1.247 (0.1960)	1.230 (0.1913)	**1.657*** (0.3516)
C-Section	0.856 (0.1306)	0.817 (0.1266)	0.854 (0.1305)	**0.601*** (0.1468)
Breech	1.049 (0.0515)	1.064 (0.0552)	1.047 (0.0516)	1.095 (0.0774)
Excess Bleeding	**0.918***** (0.0641)	**0.916***** (0.0663)	**0.920***** (0.0643)	**0.957**** (0.0941)
Prolonged Labor	0.805 (0.0466)	0.799 (0.0461)	0.806 (0.0467)	0.780 (0.0564)
Time in Hospital	0.999 (0.0006)	0.999 (0.0006)	0.999 (0.0006)	0.999 (0.0008)
Child Alive	1.276 (0.6143)	1.300 (0.6241)	1.273 (0.6135)	1.071 (0.7895)
Sex of Child	1.074 (0.1571)	1.096 (0.1619)	1.074 (0.1571)	1.052 (0.2182)
Child Weight	**0.824*** (0.0743)	**0.822*** (0.0756)	**0.824*** (0.0745)	**0.785*** (0.0869)
Constant	1.13e-63	5.26e-63	1.05e-65	5.26e-09

**P ≤ 0.05, **P ≤ 0.01, ***P ≤ 0.001*

Outcome: Satisfaction; Exposure: Coercion / uninformed consent variables

All models with district & year fixed effects; time since sterilization is significant

Appendix Table 4.7. System-Modifiable Factors & Reporting Concordance: Odds of Reporting Dissatisfaction Amongst Individuals Exposed to Coercion / Uninformed Consent Variables

	Coercion Variable Odds Ratio (SE)			
	Not Told Permanence N = 29,414	Not Independent Decision N = 14,660	Alt. Options Unknown to Patient N = 9,355	Patient Not Told Side Effects N = 2,356
Explanatory Variable 1: Payment (Any)				
Model I	0.851***	0.736***	0.813**	0.100
	(0.0480)	(0.0589)	(0.0821)	(0.2520)
Model II	0.811***	0.734***	0.808**	0.952
	(0.0480)	(0.0617)	(0.0837)	(0.2618)
Model III	0.761***	0.707***	0.790**	0.875
	(0.0469)	(0.0615)	(0.0850)	(0.2433)
Explanatory Variable 2: Postpartum Status				
Model I	0.634***	0.692***	0.739***	0.651
	(0.0485)	(0.0760)	(0.0835)	(0.2052)
Model II	0.652***	0.704***	0.799	0.673
	(0.0524)	(0.0810)	(0.937)	(0.2371)
Model III	0.642***	0.680***	0.680	0.683
	(0.0525)	(0.0792)	(0.0792)	(0.2387)
Explanatory Variable 3: Facility Type, Public Hospital				
Model I	1.168***	1.093	1.166	1.113
	(0.0671)	(0.0884)	(0.1196)	0.2790
Model II	1.177***	1.042	1.185	1.229
	(0.0698)	(0.0881)	(0.1251)	(0.3207)
Model III	1.178***	0.902	1.034	1.246
	(0.0699)	(0.1112)	(0.1758)	(0.5405)
Explanatory Variable 4: Facility Type, Private Hospital				
Model I	0.638***	0.835	0.667**	0.886
	(0.0575)	(0.1106)	(0.1182)	(0.3036)
Model II	0.728***	0.874	0.726	1.160
	(0.0688)	(0.1198)	(0.1325)	(0.4385)
Model III	0.605***	0.696	0.6322	2.914
	(0.0940)	(0.1566)	(0.2001)	(2.1492)

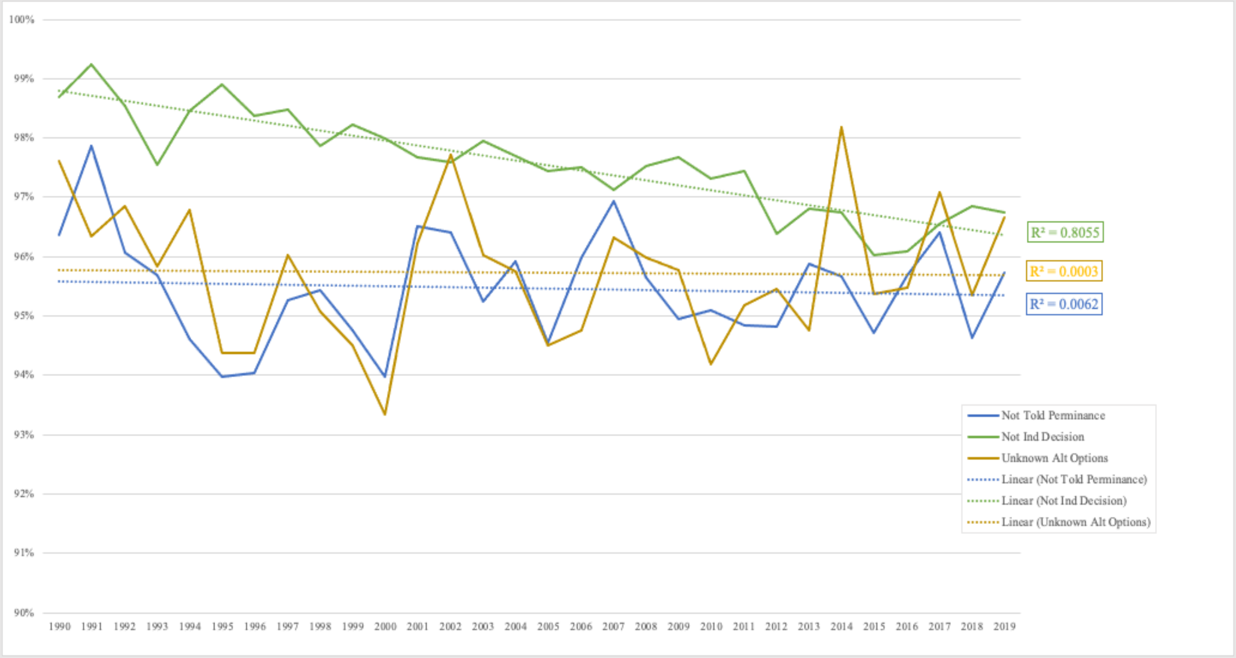
Model I: District & year fixed effects, no controls

Model II: Demographic controls

Model III: Demographic and time-variant controls e.g. parity at time of sterilization & age at time of sterilization (also controlling for other explanatory variables in this table e.g. Payment Model III controls for both postpartum status and location of procedure)

Positive and significant relationships highlighted in green; negative and significant relationships in red.

Appendix Figure 4.1. Share of Coerced Respondents with Discordant Quality Ratings by Year of Sterilization Procedure



COVID-19 Disclaimer

The content in the following Chapter (Chapter 5) is not specific to sterilized women. In-person data collection was impacted, and prematurely concluded, due to the COVID-19 pandemic and corresponding safety concerns in early 2020. As a result, this chapter addresses a conceptually relevant topic, but does so utilizing data collected directly prior to COVID-19 with a general inpatient population.

CHAPTER 5

Are We Measuring What We Think We're Measuring: Conceptual Equivalence & Content Validity of the Consumer Assessment of Health Providers and Systems Survey (HCHAPS) in India

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With increasing use of patient experience and satisfaction measures to routinely assess health system performance in India, we sought to formally pre-test the Consumer Assessment of Health Providers and Systems Survey (HCAHPS) tool. This study involves structured pre-testing with 70 patients, providers and experts in Orissa, India. We used a three-stage process to test semantic equivalence, conduct cognitive testing and assess content validity. Data was collected in 2019. Raters produced a total of 570 relevance scores. When assessing items' relevance to patients, the all-item mean was 3.50 out of 4 (SE = 0.145). When assessing relevance given the hospital environment, the all-item mean was lower: 3.36 out of 4 (SE = 0.174). During cognitive testing, concerns arose regarding the relevance of specific items e.g. the receipt of help when needing to use the restroom or the provision of an explanation for prescribed medicines. These concerns were largely driven by lack of clarity on, and prior experiences with, who holds responsibility for a given task rather than the survey item's lack of importance to the patient. When assessed based on relevance to patients, these same items performed well; with i-CVI rating of "good" or "excellent" for all items. Taken together, these findings suggest that inpatients in Odisha, India may value similar things to patients where the HCAHPS tool has been previously validated. We find that the HCAHPS tool has adequate content validity and construct validity to merit quantitative study in Indian inpatient settings. However, pre-testing raised fundamental questions regarding patient expectations and who holds responsibility for the quality of inpatient care in Odisha, India.

Keywords: Patient-Centeredness, Measurement, Content Validity, Reporting, Hospital, India

5.1. Introduction

Measuring patient satisfaction with hospital care is a priority for the Ministry of Health and Family Welfare (MoHFW) of India. Mera Aspataal (My Hospital) is a MoHFW initiative used to capture patient feedback on the services received from both public and empaneled private health facilities.[1] The development of this platform was informed by the U.S.' Consumer Assessment of Health Providers and Systems (CAHPS) tool and a review of other, previously validated, patient experience surveys.[2] The tool, which focuses on patients' overall satisfaction with hospital care and reasons for dissatisfaction, has been scaled up through the country. Currently, data collected through Mera Aspataal informs three major policy efforts: public reporting (Niti Aayog District Hospital Ranking), the country's national hospital accreditation program (National Quality Assurance Standards) and a results-based financing effort focused on hospital cleanliness (Kayakalp Rewards).[2] To populate these policy efforts, data on satisfaction is routinely collected from millions of patients across India annually.

Implicit in any measurement effort is the assumption that tools are consistently understood and variation represents the underlying content you hope to assess, as opposed differences in how people understand or interpret the data collection tool.[1] While the MoHFW asks patients about patient satisfaction with care and reasons for dissatisfaction through Mera Aspataal, we do not know how those filling in the feedback interpret, understand and value the questions asked. Understanding the factors and considerations that underly patients' satisfaction is particularly important in India, where we have limited sources of routine data on the quality of care delivered in inpatient settings.[3,4] Given large increases in hospitalizations in India,[5–7] ensuring we have well tested and validated measures to assess how patients are experiencing care, and in turn their satisfaction with that care, is critically important.[7] Yet, the tool underlying the Mera Aspataal platform has never been formally pre-tested in India. Developed in the United States (U.S.) the HCAHPS tool has been formally tested in high-income countries outside the U.S., including in six European countries as well as in Saudi Arabia.[8,9,10] More recently, it was tested in a small sample in Brunei.[11] While this body of work suggests the HCAHPS tool is relevant for assessing patient-centeredness across a wide range of health systems, we lack information on the tool's applicability in low and middle income countries (LMICS) and India specifically.

Given the growing relevance of measuring patient-centeredness in Indian policymaking, in this study, we sought to formally pre-test the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) in Odisha, India. To do so, we built on methodology used to develop this instrument in the early 2000s.[12,13] We sought to assess the tool's applicability in Odisha, India by answering the following: first, how do people understand the questions posed in the HCAHPS tool and do they have conceptual equivalence in an Indian inpatient setting (i.e. how do individuals interpret each HCAHPS item and is this in line with the question's intended construct)? Second, what is the construct validity of survey items posed within HCAHPS in an Indian inpatient setting (i.e. do people familiar with Indian hospital care think that questions posed in the instrument adequately capture the construct "patient satisfaction")? And, finally, where concerns with the instrument do arise, what drives these issues? The ultimate goal of this work was twofold: to inform the routine measurement of patient's experiences in Indian hospitals and to help interpret the current status quo measure: overall satisfaction ratings.

5.2. Methods

5.2.1. Survey Tool

The instrument used in this study is the U.S. Hospital Consumer Assessment of Healthcare Providers and Systems, or HCAHPS tool. We used the 2018 version of the HCAHPS survey tool in full, which informed the development of the Mera Aspataal platform. It is structurally distinct in that questions regarding patients' experiences are posed as stand-alone survey items as opposed to reasons for dissatisfaction. It is also more comprehensive than the abbreviated instrument utilized within Mera Aspataal. The HCAHPS tool includes an overall rating related to satisfaction with the hospital: "*Using any number from 0 to 10, where 0 is the worst hospital possible and 10 is the best hospital possible, what number would you use to rate this hospital during your stay?*" and 28 additional questions. 19 of those questions assess patients' experiences with specific aspects of care across six domains: interpersonal care from nurses, interpersonal care from doctors, the hospital environment, general experience, after hospital care and understandings of care. The core questions employ a 4-point Likert-scale. The additional 9 questions collect demographic information. Information on the process used for translation and back-translation (English-Odia) can be found in the Supplement.

The tool employed in Mera Aspataal (which was not available in full at the time of this study) is shorter and structured to generate an overall Patient Satisfaction Score (PSS) and, if a patient is dissatisfied, elicit reasons for dissatisfaction using a pre-determined set of options (e.g., cleanliness, staff behavior, etc.) adapted from the HCAHPS tool.

5.2.2. Cognitive Testing & Conceptual Equivalence

Adapting an instrument for use in a new context requires not only translating the instrument from the source language to the target, but also performing a cross-cultural evaluation of the instrument's applicability[14–17] i.e. item measures the concept, or construct, as it was intended (i.e. is the instrument measuring the same things in India as it does in the U.S. and as researchers intend) (Table 5.1). For a tool to be valid, respondents must interpret questions consistently and have the information required to answer each question to ensure their answers are substantively meaningful.[12] Towards this end, cognitive testing – a process in which respondents talk through what each survey items means to them – was utilized to identify problems of conceptual equivalence.[12] Derived from social and cognitive psychology, the goal of this process is to explore the processes by which respondents answer survey question; ultimately ensuring observed variation reflects real differences and is not the result of heterogeneity in how the questions are interpreted.[18]

Processes for cognitive testing vary; we followed protocol developed for the U.S.' HCAHPS survey in 2002-03 and published in 2005.[12] After preparation of an initial "cognitive testing" (CT) version of the HCAHPS instrument in Odia (the primary spoken language of Odisha, India) a draft protocol was prepared and administered by the research team. Participants included 50 Odia-speaking individuals who were potential hospital users, 27 were women and 23 were men. All cognitive testing was conducted in Odia, with clarifying discussion in Odia, Hindi and English and took place in Bhubaneswar, India. Cognitive testing included participants reviewing each question in full and talking through their understanding of the question as well as the use of scripted probes to elicit additional insights into respondents' cognitive processes as they answered and thought-through the survey items.[19] This process concluded with a series of general questions about the tool overall, allowing respondents to provide additional feedback about the items and to assess the comprehensiveness of the instrument.[12] In line with prior research, issues were thematically categorized after all cognitive testing was completed. An additional translation check was also integrated into cognitive testing, which serves as a final assessment of any errors that may have occurred during the translation process - helping to ensure semantic equivalence.

Table 5.1. Methods Employed in Qualitative Pre-Testing of the HCAHPS Tool in Odisha, India

	Purpose	Process	Participants
Step 1 *Translation*	Ensure semantic equivalence: transfer and assess if individual data elements in one dictionary (English) create an equivalent meaning in a second system (Oriya)	**Translation and back translation:** - Translation by 2 bi-lingual forward-translators, - Back-translation by 2 bi-lingual back-translators, - Identification of points of divergence with review by research team & 5th (PhD-level) bi-lingual translator	**N = 5+**
Step 2 *Cognitive Testing*	Identify how individuals interpret each survey item and how their cognitive processing relates to the construct intended by the researcher / original survey instrument	**Focus groups:** - Group run-through of all survey items paired with structured probing to elicit cognitive processes and assess participants' understanding and interpretation of each survey item, if framing is logical and answerable, if response options are adequate, etc.	**N = 50^**
Step 3 *Content Validity Indexing*	Assess the extent to which tool items represent facets of the construct "Patient Experience" i.e. do the survey item included within HCAHPS represent what is important to patient-centeredness in Odisha, India	**Individual interviews:** - Each interviewee rates each item's relevance to 1.) patient-centeredness and 2.) the Odisha inpatient setting on a 4 point Likert-scale - Interviewees provide information on why they rated each item as they did	**N = 15***

^Cognitive testing participants included 27 women and 23 men, demographics aligned with the Gates Foundation's Assessment on Health System Performance in Odisha, India survey's demographic data on individuals who have received hospital care in the 2019 calendar year.

**Demographic information for individuals undergoing full content validity indexing interviews can be found in supplementary file 3.*

5.2.3. Content Validity

Regardless of whether items are interpreted as intended, it is fundamental that they are relevant. Content validity is the degree to which questionnaire items constitute an adequate operational definition of a construct.[20] In this case, the construct of interest was patients' satisfaction. We used a standard method employed in survey validation and used in 2012 to assess the relevance of HCAHPS in five European countries: Content Validity Indexing (CVI).[8] To do so, we interviewed 15 individuals about the relevance of each survey item. Interviewees were people familiar with public hospital care in Odisha, India and included: patients (hospital patients on the day of discharge), healthcare providers (currently providing clinical care in Odisha, India) and researchers (experienced in collecting data from inpatient settings in Odisha, India) (Supplementary file 3). Each interview was in-person and lasted approximately 1 hour. The interviews involved the provision of verbal instructions on how to use a Likert scale to evaluate relevance (using the following scale: 1 = Not relevant, 2 = Somewhat relevant, 3 = Relevant and 4 = Highly relevant) after which the rater was asked to explain why they did, or did not, think the item was relevant. Two separate scores were captured: 1.) The item's relevance to patient satisfaction, and 2.) The item's relevance given the clinical setting. This approach was motivated by the Cognitive Testing process, which uncovered concerns regarding how care is organized (discussed further in results). By allowing raters to provide two distinct scores, we were able to better understand if low ratings were due to concerns with the item's perceived relevance to our primary construct of interest (patient satisfaction), or other issues, such as: feasibility and structural constraints in the inpatient setting. At the end of the interview, raters had the opportunity to provide comment on the survey as a whole.

Interviews were conducted in Odia, Hindi and English and took place in Bhubaneswar and Cuttack, India. After all interviews were complete, we produced raw item-level scores (an average of all raters' evaluations of a given question). We then produced an i-CVI score, or the share of raters giving a rating of either 3 or 4 (dichotomizing the ordinal scale into "relevant" and "not relevant" and producing a percentage – the share of interviewees who felt the item was somewhat or very relevant). Using thresholds developed by Cicchetti and Sparrow, we interpret ratings of 74% and higher to be "excellent" and 60 – 74% "good" in terms of item relevance.[21]

5.2.4. Patient and Public Involvement

The methodology utilized in this study is a structured process to engage patients in the adaptation and use of the HCAHPS tool. Patients were involved through critical engagement with survey items, each of which is used as process or outcome measure. Patients assessed item relevance based on personal priorities and preferences as well as perceived likelihood of an event occurring in practice given experiences with care. A summary of results was provided to patients to ensure accurate representation of feedback. The final aim is to improve the HCHAPS tool's ability to capture patient experience and, in turn, inform policy through patient-centered performance measurement. Patients were not involved in recruitment, but were central to the development and assessment of outcome measures.

5.3. Results

5.3.1. Cognitive Testing

All core questions within the HCAHPS tool underwent cognitive testing. Three categories of problems were identified, issues of: construct, information and relevance. Problem categories, with representative items are presented in Table 5.2. First, there were items that respondents did not interpret in line with the intended item construct. Second, as with cognitive

Table 5.2. Survey Items Posed in the HCHAPS Tool and Cognitive Testing Issues by Type (N = 50)

Survey Domain	Survey Item	Full Item Text *(English)*	Cognitive Testing Issues by Type	
			Type^	**Brief Description**
Care From Nurses	*Courtesy & Respect*	During this hospital stay, how often did nurses treat you with courtesy and respect?		N/A
	Listen Carefully	During this hospital stay, how often did nurses listen carefully to you?	**Construct**	"Listening carefully" may not be seen as distinct from being treated with respect.
	Explain	During this hospital stay, how often did nurses explain things in a way you could understand?	**Construct**	Patient must define 'how often', which lacks a point of reference.
	Timely	During this hospital stay, after you called a nurse, how often did you get help as soon as you wanted it?	**Construct, Information**	Patient must define 'how often'. Patients may not know who is a nurse and who is not.
Care from Doctors	*Courtesy & Respect*	During this hospital stay, how often did doctors treat you with courtesy and respect?		N/A
	Listen Carefully	During this hospital stay, how often did doctors listen carefully to you?	**Relevance**	Doctors may not be responsible for listening to patients.
	Explain	During this hospital stay, how often did doctors explain things in a way you could understand?	**Relevance**	Doctors may not be responsible for explaining care to patients.
Hospital Environment	*Room Clean*	During this hospital stay, how often were your room/ward and bathroom kept clean?	**Relevance**	Families are often responsible for cleanliness.
	Quiet	During this hospital stay, how often was the area around your room/ward quiet at night?	**Construct, Relevance**	Lack of clarity in the concept "quiet". In open hospital wards, it may not be possible to maintain quiet.
General Experience	*Bathroom Help*	How often did you get help in getting to the bathroom or in using a bedpan as soon as you wanted?	**Relevance**	Families are often responsible for bedpans.
	Talk Pain	During this hospital stay, how often did hospital staff talk with you about how much pain you had?	**Construct**	Patient must define 'how often', which lacks a point of reference.
	Talk Pain Treatment	During this hospital stay, how often did hospital staff talk with you about how to treat your pain?	**Construct**	
	Explain Med Purpose	Before giving you any new medicine, how often did hospital staff tell you what the medicine was for?	**Information, Relevance**	Lack of clarity on what constitutes "new" medicine. Doctors rarely "give" medicine, it is purchased externally.
	Explain Med Side Effects	Before giving you any new medicine, how often did hospital staff describe possible side effects in a way you could understand?	**Information, Relevance**	
After Hospital	*Assessment of Post-Discharge*	During this hospital stay, did doctors, nurses or other hospital staff talk with you about whether you would have the help you needed when you left the hospital?	**Construct**	Understood as: "When you go home will you get the help that you need"
	Receipt Discharge Guidance	During this hospital stay, did you get information in writing about what symptoms or health problems to look out for after you left the hospital?	**Relevance**	Patents may be illiterate.
Understandings of Care	*Preferences Seriously*	During this hospital stay, staff took my preferences and those of my family or caregiver into account in deciding what my health care needs would be when I left.	**Relevance**	The doctor may not concern themselves with care after discharge.
	Understand Responsibilities	When I left the hospital, I had a good understanding of the things I was responsible for in managing my health.	**Construct**	Lack of clarity on what the patient is told v. what the patient understands.
	Understand Purpose of Meds	When I left the hospital, I clearly understood the purpose for taking each of my medications?		N/A

^ Construct: Was the item understood differently than its intended construct
Information: Was there unclear or inadequate information for a patient to answer this question reliably

testing of the original HCAHPs tool, we found that for some items respondents lacked the information they needed in order to answer; including additional clarification for certain concepts. Finally, while assessing relevance is not the primary intent of cognitive testing, there were a number of items that measured constructs respondents felt may not be applicable in the Indian inpatient setting.

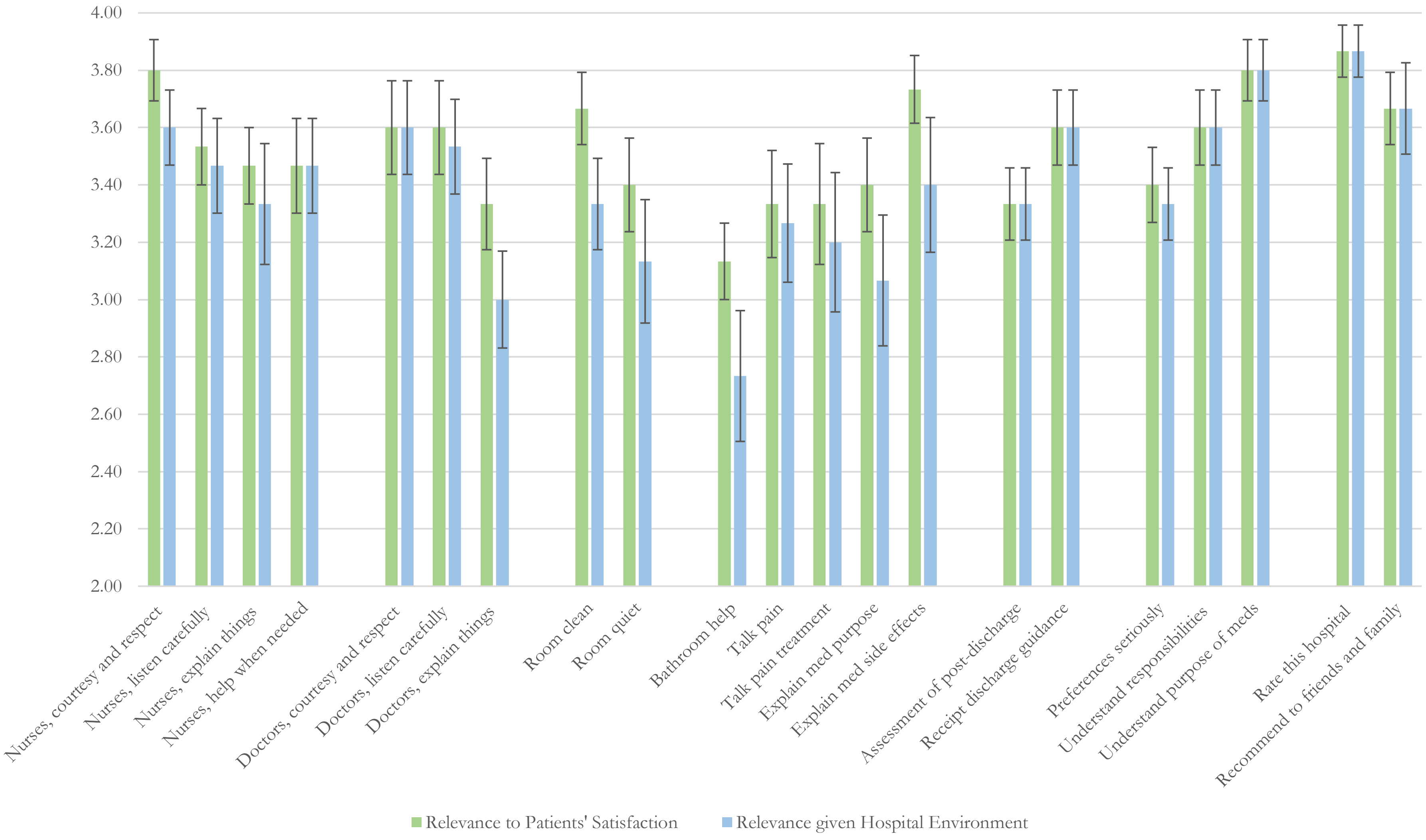
Issues related to item construct were common amongst questions that included temporal framing to assess frequency of a given activity or set of activities. This included questions, such as: "During this hospital stay, how often did nurses listen carefully to you?" where the concept 'how often' lacks a point of reference outside the item answer options. Questions that put further responsibility on the patient to define key metrics, such as "How often did you get help as soon as you wanted it?" provided a double concern. The question includes two subjective assessments – for the former the reference point for this item is the patient's own desire for help, as opposed to a more objective measure of frequency. For a number of participants, the question was first interpreted as "how quickly" did you get help, which required this item to go through an additional round of translation and back translation to ensure the construct, and two subjective components, were being conveyed as intended. Another question that was comprehended inconsistently was "When I left the hospital, I had a good understanding of the things I was responsible for in managing my health." While some participants understood the question as intended, others interpreted it to be assessing whether a provider had told the patient what was needed as opposed to if the patient themselves *understood* what was needed.

The second category, information issues, only arose for three items. One example was the question: "Before giving you any new medicine, how often did hospital staff tell you what the medicine was for?" The concept 'new medicine' required further clarification: is this inclusive of any new medicine, including medicines that the patient had previously been prescribed, or exclusive to new medicines in which the patient was not familiar? Cognitive testing participants also expressed concern regarding the word "given". In Odisha, pharmacies exist largely outside of the inpatient setting, so patients and their families may be responsible for acquiring their own medicines. As such, it would be unusual for a healthcare provider to directly *give* a patient any medicine. Concerns regarding responsibility were common and consistent across the third, and most common, category of concern: relevance. While assessing item relevance is not the objective of cognitive testing, this method is exploratory and meant to uncover cognitive processes involved in how an individual thinks as they answer a given survey item. As a result, issues of relevance can, and in this case did, arise. Questions about communication as well as physical environment were both flagged. For example, the question "During this hospital stay, how often did doctors explain things in a way you could understand?" raised discussion on doctors' responsibility to provide explanations of care.

5.3.2. Content Validity

For the content validity component of this study, 15 raters individually evaluated the relevance of the 19 core survey items twice, once assessing the relevance of the survey question to our primary construct of interest: patient satisfaction and once assessing relevance given the Odisha inpatient setting. Using this process, raters produced a total of 570 relevance scores. Figure 5.1 presents the mean CVI rating for each item, rater demographics are summarized in Supplementary file 3 and numerical values underlying Figure 5.1 are provided in Supplementary item 4. When assessing items' relevance to patient satisfaction, the all-item mean was 3.50 out of 4, four being most relevant (SE = 0.145). The all-item mean when assessed based on relevance given the hospital environment was lower: 3.36 out of 4 (SE = 0.174). Similarly, the i-CVI for patient satisfaction was 99% as compared to 93% for the hospital environment, with only 2 items scoring below a 74%

Figure 5.1. Mean Content Validity Indexing Scores Assessing Items' Relevance to Patient Satisfaction and the Clinical Setting



(excellent) when assessed based on hospital environment. When raters were asked why they provided a lower hospital relevance score for a given item, the primary reason underlying answers was concern that what was being assessed (e.g. the provision of discharge guidance or an explanation of medications' purpose) was unlikely to occur in practice.

The item "How often did you get help in getting to the bathroom or in using a bedpan as soon as you wanted?" had the lowest mean relevance rating for both patient satisfaction and hospital environment (3.13, SE = 0.133 and 2.73, SE = 0.228, respectively). This item was seen as problematic given the hospital environment due to concerns that the families of the patient may be wholly responsible for ensuring the patient was able to use the bathroom or bedpan during their inpatient stay. This led to corresponding concern that the question may not be assessing the quality or performance of the facility, but rather the adequacy of a patient's own family support. There was also discordance in raters' scores for the item: "During this hospital stay, how often did doctors explain things in a way you could understand?" (3.33, SE = 0.159 and 3.00, SE = 0.169, respectively). Content raised in individual CVI interviews on this item paralleled concerns discussed in Cognitive Testing: while raters felt the provision of information from doctors was highly relevant to a patients' satisfaction, there was concern that doctors were rarely responsible for explaining medical care to patients. Clinical raters, specifically, noted that while it might be ideal to provide tailored explanations, patients were often expected to take clinical guidance at face value within a busy inpatient ward. Similar issues arose with questions related to medicines. The item: "Before giving you any new medicine, how often did hospital staff describe possible side effects in a way you could understand?" had one of the highest overall ratings when assessed based on relevance to patient satisfaction (3.73, SE = 0.118), however the rating for hospital environment was lower (3.40, SE = 0.235) with concerns centering on who within the hospital held responsibility for the explanation of side effects, if anyone.

5.4. Discussion

The HCAHPS tool performed well in cognitive testing and had adequate construct validity to merit further study, and potentially use, in the public Indian inpatient setting; however, concerns arose regarding the relevance of specific items (e.g. the receipt of help when needing to use the restroom or the provision of an explanation for prescribed medicines). These concerns were largely driven by lack of clarity on, and prior experiences with, who holds responsibility for a given item rather than the item's lack of importance to the patient. When assessed based on their relevance to patients' satisfaction, these same questions performed very well; with i-CVI rating of "good" or "excellent" for all items. Taken together, these findings suggest that inpatients in Odisha, India may value similar things from their care as do patients where the HCAHPS tool has been previously validated elsewhere in the world.[8] However, certain actions assessed through the tool (e.g. the provision of post-discharge guidance, explanations of medications' purpose, etc.) may not currently be occurring in practice within public hospitals in Odisha.

Beyond the importance of ensuring patients have the opportunity to express their dissatisfaction, the changing fiscal landscape for hospital evaluation and payment in India under the multiple aforementioned policies incentivizing this issue has made the need to understand how patients consider questions regarding satisfaction more pressing. As the Mera Aspataal platform is further scaled up throughout the country and hospitals are both assessed and paid based on their scores,[3] rigorous evaluation of what questions should be posed, how these questions are understood and, in turn, what they are actually assessing is critical. From a measurement perspective these findings should be encouraging – the HCAHPS tool was understood consistently and all items within the instrument were viewed as relevant and important to patients' satisfaction. However, the high volume of issues with items' relevance given the inpatient setting, particularly regarding what actions fell within the purview of the hospital and what clinical staff should be expected to be responsible for, may raise concern. The current strategy, which is centered on a satisfaction rating and reasons for dissatisfaction is attractive in its feasibility and simplicity. However, these findings suggest that the current measurement strategy may fail to identify some sources of dissatisfaction. For example, a patient may report being satisfied with a care interaction in which they were not provided with information on their medications' purposes or side effects if they do not believe these actions are the responsibility of the hospital. Patients may still be satisfied with their care, but if patients *do* value this information (as they indicated in this study), using the HCAHPs tool could provide an aspirational point of reference when conducting more comprehensive assessments of patient satisfaction. In line with this, it may be useful to augment these routine assessments by strategically fielding the more robust HCAHPS instrument (i.e. to randomly selected hospitals). This data could, in turn, be used to identify specific areas of concern and inform improvement plans, aligning with further development of the Mera Aspataal platform.[2]

This work builds on prior literature. There are several pre-testing studies of the HCAHPS tool. However, these studies focus on the applicability of HCAHPS in other high income contexts and utilize quantitative methods such as confirmatory factor analysis.[8–10] In this study we make a more fundamental assessment of the tool's intended constructs and applicability in an LMIC setting utilizing methods similar to those employed in the tool's initial development for the U.S.[12] This also builds on prior work conducted in India to more broadly understand and model the construct of patient satisfaction.[22,23] In addition, there is some research that has utilized the HCAHPS tool within specific populations in India as an outcome measure, but we were unable to find any documentation of formal adaptation or pre-testing processes that might be useful in informing the tool's use in routine measurement.[24] Assessing the relevance of an internationally validated tool in full may allow India to benchmark progress on patient satisfaction and experience externally. Such comparisons require careful attention to the contextual and conceptual equivalence of tools in new contexts, as was conducted here. This work additionally extends on a body of literature utilizing vignettes – which aims to understand differences in how individuals pass judgement on care given a fixed clinical example.[25,26] In utilizing a formative mixed-methods approach, this work allows us to better understand why these differences might occur – for example, it appears patients do value aspects of care, such as the provision of information on medication side-effects, but do not expect it to be provided in practice. Using vignette data, it is not possible to disaggregate *why* people rate the same clinical examples differently. Differences in vignette ratings could be due to differences in what patient's value from care or what they expect.

This study has several limitations. First, pre-testing was undertaken in Odisha, India. Odisha is a unique and rural state with a large tribal population, which may pose challenges to the external validity of these findings for the whole of India.[34] In addition, the sample of respondents for the CT and CVI are both small and not necessarily representative of the final populations that would be surveyed. Because of this, some issues that affect only a subgroup of the population may be missed. In addition, CT or CVI raters may be more motivated than the average survey respondent, which may lead us to understate problems with questions and should be assessed during a full administration of the survey tool. With this in mind, in our study for both the CT and CVI our numbers are *larger* than those published in the pre-testing of the HCAHPS tool in 2005 (CT: 41 v 50 and CVI: 12 v 15). An additional concern is that when using measures of inter-rater agreement (e.g. CVI) there may be bias in rater selection and multiple factors may inform a rater's evaluation. For example, if the value of the CVI is low, it could mean that the items were not good operationalizations of the underlying construct, that the construct specifications or directions to the experts were inadequate, or that the experts themselves were biased. This motivated our use of two distinct scores if the justification for a given answer did not align with the primary construct of interest; it also highlights the need for future empirical work to assess the reliability of this tool. In addition, a common concern with the CVI approach is the possibility of chance agreement between raters.[20] To address this, we used a formula introduced by Polit et al to calculate a modified kappa statistic by factoring in the probability of chance agreement and the proportion of chance agreement between the raters.[20] However, with 10 or more raters the values of the i-CVI and k* converge and any i-CVI value greater than 0.75 yields a k* greater than 0.75. Therefore, we present only our primary results.

In summary, in the first formal pre-testing of the HCAHPS tool in India, we find that the tool provides a promising baseline for more robust measurement of patient satisfaction in Indian public hospitals. While both cognitive testing and content validity indexing raised questions regarding the organization of inpatient care and who holds responsibility for that care, all items scored highly on the aggregated i-CVI. Data collected through the HCAHPS tool may help to identify sources of dissatisfaction in the inpatient setting that are unreported or unidentified using other measures. Further development and testing is required to inform how the tool preforms in practice, as well as a feasibility study to determine its practical relevance.

CHAPTER 5, REFERENCES

1. National Health Portal of India, Gateway to Authentic Health Information. Accessed April 26, 2021. https://www.nhp.gov.in/mobile-mera-aspataal

2. SAATHII. *Mera Aspataal: An Initiative to Capture Patient Feedback and Improve Quality of Services.*; 2019.

3. Kumar A. The Health of our Hospitals, A First Step Towards Measuring Perfomance. In: ; 2018.

4. Mohanan M, Hay K, Mor N. Quality Of Health Care In India: Challenges, Priorities, And The Road Ahead. *Health Aff (Millwood).* 2016;35(10):1753-1758. doi:10.1377/hlthaff.2016.0676

5. Kastor A, Mohanty SK. Disease and age pattern of hospitalisation and associated costs in India: 1995-2014. *BMJ Open.* 2018;8(1):e016990. doi:10.1136/bmjopen-2017-016990

6. Chatterjee P. India launches Ayushman Bharat's secondary care component. *Lancet Lond Engl.* 2018;392(10152):997. doi:10.1016/S0140-6736(18)32284-0

7. Jana A, Basu R. Examining the Changing Health Care Seeking Behavior in the Era of Health Sector Reforms in India: Evidence from the National Sample Surveys 2004 & 2014. doi:10.1186/s41256-017-0026-y

8. Squires A, Bruyneel L, Aiken LH, et al. Cross-cultural evaluation of the relevance of the HCAHPS survey in five European countries. *Int J Qual Health Care.* 2012;24(5):470-475. doi:10.1093/intqhc/mzs040

9. Delnoij DMJ, Asbroek G ten, Arah OA, et al. Made in the USA: the import of American Consumer Assessment of Health Plan Surveys (CAHPS®) into the Dutch social insurance system. *Eur J Public Health.* 2006;16(6):652-659. doi:10.1093/eurpub/ckl023

10. Alanazi MR, Alamry A, Al-Surimi K. Validation and adaptation of the hospital consumer assessment of healthcare providers and systems in Arabic context: Evidence from Saudi Arabia. *J Infect Public Health.* 2017;10(6):861-865. doi:10.1016/j.jiph.2017.02.002

11. Islam S, Muhamad N. Patient-centered communication: an extension of the HCAHPS survey. *Benchmarking.* Published online 2021. doi:10.1108/BIJ-07-2020-0384

12. Levine RE, Fowler FJ, Brown JA. Role of Cognitive Testing in the Development of the CAHPS® Hospital Survey. *Health Serv Res.* 2005;40(6p2):2037-2056. doi:10.1111/j.1475-6773.2005.00472.x

13. Elliott MN, Zaslavsky AM, Goldstein E, et al. Methods Effects of Survey Mode, Patient Mix, and Nonresponse on CAHPS s Hospital Survey Scores. doi:10.1111/j.1475-6773.2008.00914.x

14. Erkut S. Developing Multiple Language Versions of Instruments for Intercultural Research. *Child Dev Perspect.* 2010;4(1):19-24. doi:10.1111/j.1750-8606.2009.00111.x

15. Johnson TP. Methods and Frameworks for Crosscultural Measurement. *Med Care.* 44. doi:10.2307/41219500

16. Tran T, Nguyen T, Chan K. *Developing Cross-Cultural Measurement.* Vol 1. Oxford University Press; 2018. doi:10.1093/acprof:oso/9780190496470.001.0001

17. Weeks A, Swerissen H, Belfrage J. Issues, Challenges, and Solutions in Translating Study Instruments. *Eval Rev.* 2007;31(2):153-165. doi:10.1177/0193841X06294184

18. Collins D. Pretesting Survey Instruments: An Overview of Cognitive Methods. *Qual Life Res.* 12:229-238. doi:10.2307/4038871

19. Westbrook KW, Babakus E, Grant CC. Measuring Patient-Perceived Hospital Service Quality: Validity and Managerial Usefulness of HCAHPS Scales. *Health Mark Q.* 2014;31(2):97-114. doi:10.1080/07359683.2014.907114

20. Polit DF, Beck CT, Owen S V. Is the CVI an acceptable indicator of content validity? Appraisal and recommendations. *Res Nurs Health*. 2007;30(4):459-467. doi:10.1002/nur.20199

21. Cicchetti D V, Sparrow SA. Developing criteria for establishing interrater reliability of specific items: applications to assessment of adaptive behavior - PubMed. *Am J Ment Defic*. 1981;86(2).

22. Chahal H, Mehta S. Modeling patient satisfaction construct in the Indian health care context. *Int J Pharm Healthc Mark*. 2013;7(1):75-92. doi:10.1108/17506121311315445

23. Rao KD, Peters DH, Bandeen-Roche K. Towards patient-centered health services in India—a scale to measure patient perceptions of quality. *Int J Qual Health Care*. 2006;18(6):414-421. doi:10.1093/intqhc/mzl049

24. Khetrapal S, Acharya A, Mills A. Assessment of the public-private-partnerships model of a national health insurance scheme in India. *Soc Sci Med*. 2019;243. doi:10.1016/j.socscimed.2019.112634

25. Valentine N, Verdes-Tennant E, Bonsel G. Health systems' responsiveness and reporting behaviour: Multilevel analysis of the influence of individual-level factors in 64 countries. *Soc Sci Med*. 2015;138:152-160. doi:10.1016/j.socscimed.2015.04.022

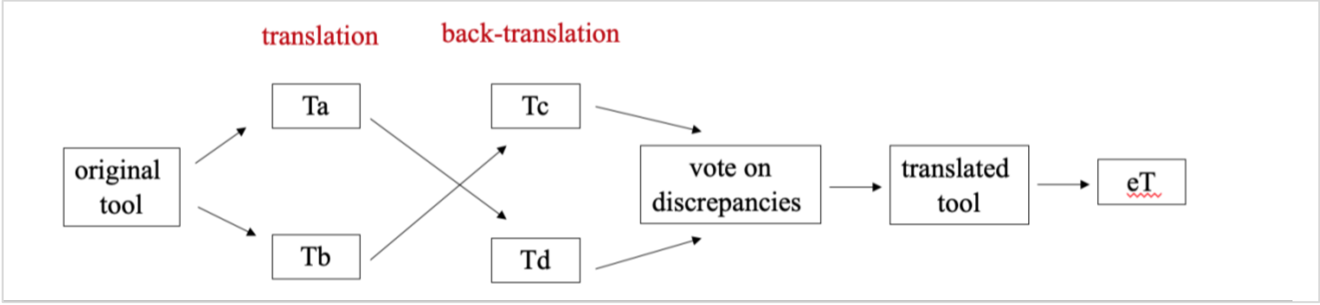
26. Rice N, Robone S, Smith PC. Vignettes and health systems responsiveness in cross-country comparative analyses. *J R Stat Soc Ser A Stat Soc*. 2012;175(2):337-369. doi:10.1111/j.1467-985X.2011.01021.x

Supplementary 5.1. Translation & Back Translation of the HCAHPS Tool

We underwent a multi-step translation process to ensure the instrument is appropriately translated into Oriya, the primary language spoken in Odisha, India. The process was focused on ensuring semantic equivalence and involved the following steps:

1.) Review of the instrument by representatives from Odisha prior to translation to identify US health system-specific terms that might pose a problem for translation.
2.) Use of experienced translators to both forward and back translate the tool,
3.) A review of the resulting translations by a third party to confirm consistency and quality of translation and also ensure meaning was conveyed in Oriya as intended,
4.) A field-test of the translated survey tool with medical professionals proficient in both English and Oriya to identify any additional translation issues in a clinical setting and, finally,
5.) A blind re-translation for problem items identified through steps 2 to 5.

Where discrepancies in translation were identified, they were resolved based on the consensus of a small group comprised of the primary survey team and bilingual team members.



Tx = Translator X
eT = Final Tool

Supplementary 5.2. Extension of Methods in Line with Consolidated Criteria for Reporting Qualitative Studies (COREQ)

Domain	Cognitive Testing (CT)	Content Validity Indexing (CVI)
Domain I: *Research team and reflexivity*	CT was facilitated by both male and female trained facilitators with masters level education who were fluent in Oriya, Hindi and English. All CT was observed by a third-party researcher who took notes on content that arose arising the sessions. CT participants were introduced to researchers prior to the sessions, which included information on: interest in topic and reasons for conducting the research, as well as researchers' backgrounds and prior experiences.	CVI interviews were conducted by two - three female researchers who collectively spoke Oriya, Hindi and English. CVI interviewers had maters level training or above. All CVI raters were provided with background on the study, research and researchers' motivations.
Domain II: *Study design*	The CT process consisted of five 10-person focus groups to assess comprehension, memory retrieval, information summarization, etc. when processing survey items within a previously developed and validated survey tool. Participants were selected using a purposive sampling approach and overall were slightly more educated than the general population of Odisha, India. There were no participant dropouts. The sessions were not audio-recorded, field notes were taken during sessions by a second (non-facilitating) researcher. Each group underwent three one hour sessions.	The CVI process consisted of fifteen one hour interviews with purposively sampled individuals across 3 categories: patients, providers and health services researchers (outlined in Supplementary file). Data were collected in unoccupied clinical settings, such as hospital offices. Each interviewer was provided with a printed version of the survey tool with English and Odiya text side by side. Field notes were taken at the time of interview as raters provided descriptive context with each rating.
Domain III: *Analysis and findings*	One primary coder conducted all initial coding followed by two secondary coders. Themes were identified in advance and based on Levine et al, 2005.[1] Participants did not provide feedback on the data.	Rating data was entered into Microsoft Excel and summarized quantitatively; corresponding comments on why raters chose a given score were collected and summarized by one coder.

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[1] Levine RE, Fowler FJ, Brown JA. Role of Cognitive Testing in the Development of the CAHPS® Hospital Survey. *Health Services Research*. 2005;40(6p2):2037-2056. doi:10.1111/j.1475-6773.2005.00472.x

Supplementary 5.3. Demographics of Respondents Undergoing Full Content Validity Indexing Interviews (N = 15)

Group I: Expert Raters

	Title	Education Level	Experience (years)	Level of English	Area of Expertise
ER 1	Research Scientist	PhD	10 yrs	5	Health Systems & Mental Health
ER 2	Data Collector	BSc	5 yrs	3	Social Sector Research
ER 3	Data Collector	PG	23 yrs	4	Qualitative Research
ER 4	Patient Educator	BSc	6 yrs	3	Patient Education
ER 5	Research Coordinator	MSW	12 yrs	4	Hospital Care & Sanitation

Group II: Clinical Raters

	Title	Educational Level	Experience (years)	Level of English	Area of Expertise
CR 1	Nursing Officer	BSc Nursing	1 yr	3	Gastro
CR 2	Senior Resident	MBBS, MD, DM	14 yrs	5	Gastro-Anto
CR 3	Staff Nurse	BSc Nursing	3 yrs	3	Pulmonology
CR 4	Senior Nursing Officer	BSc Nursing	8 yrs	5	Neurology
CR 5	Senior Resident	M Surgery	8 yrs	5	Neurology

Group III: Patient Raters

	Profession	Educational Level	Age	Level of English	Diagnosis
PR 1	House Wife	10th Form	34	3	Neuro, Not Disclosed
PR 2	Technician	B Tech	26	5	Ortho, Torn Ligament
PR 3	Teacher	Masters in Ed	58	5	Gen Medicine, DM & Fever
PR 4	Care Assistant	12th Form	27	1	Dengue Fever & Anemia
PR 5	House Wife	5th Form	45	1	Type II DM & Metabolic Seizures

ER = *Expert Rater; an individual who has collected data in the inpatient setting in Odisha, India*
CR = *Clinical Rater; clinicians currently providing inpatient medical care in Odisha, India*
PR = *Patient Rater; patients at point of discharge from hospitals in Odisha, India*

Supplementary 5.4. Results of the Content Validity Index (CVI) for HCAHPS Survey Items in Odisha, India (N = 15)

Survey Domain	**Survey Item**	**Relevance to Patients' Satisfaction**		**Relevance given Hospital Environment**		**i-CVI^**	
		Mean Item Rating	SE	Mean Item Rating	SE	Patients' Satisfaction	Hospital Environ.
Care From Nurses	*Courtesy & Respect*	**3.80**	0.107	**3.60**	0.131	100%	100%
	Listen Carefully	**3.53**	0.133	**3.47**	0.165	100%	93%
	Explain	**3.47**	0.133	**3.33**	0.211	100%	93%
	Timely	**3.47**	0.165	**3.47**	0.165	93%	93%
Care from Doctors	*Courtesy & Respect*	**3.60**	0.163	**3.60**	0.163	93%	93%
	Listen Carefully	**3.60**	0.163	**3.53**	0.165	93%	93%
	Explain	**3.33**	0.159	**3.00**	0.169	100%	80%
Hospital Environment	*Room Clean*	**3.67**	0.126	**3.33**	0.159	100%	93%
	Quiet	**3.40**	0.163	**3.13**	0.215	100%	93%
General Experience	*Bathroom Help*	**3.13**	0.133	**2.73**	0.228	100%	73%^
	Talk Pain	**3.33**	0.187	**3.27**	0.206	100%	80%
	Talk Pain Treatment	**3.33**	0.211	**3.20**	0.243	100%	67%^
	Explain Med Purpose	**3.40**	0.163	**3.07**	0.228	100%	80%
	Explain Med Side Effects	**3.73**	0.118	**3.40**	0.235	100%	87%
After Hospital	*Assessment of Post-Discharge*	**3.33**	0.126	**3.33**	0.126	100%	93%
	Receipt Discharge Guidance	**3.60**	0.131	**3.60**	0.131	100%	100%
Understandings of Care	*Preferences Seriously*	**3.40**	0.131	**3.33**	0.126	100%	93%
	Understand Responsibilities	**3.60**	0.131	**3.60**	0.131	100%	100%
	Understand Purpose of Meds	**3.80**	0.107	**3.80**	0.107	100%	93%
Outcomes	*Rate this hospital*	**3.87**	0.091	**3.87**	0.091	100%	100%
	Recommend to friends and family	**3.67**	0.126	**3.67**	0.159	100%	93%
All-Item Mean		**3.50**	0.145	**3.36**	0.174	99%	93%

**The object of the CVI was to assess how relevant raters (patients, providers and people who have conducted research in Odisha, India) find each HCAHPS question to the primary construct of interest, 1.) patient satisfaction and 2.) the hospital environment. Rating scale (for each individual question): 1 = not relevant; 2 = somewhat relevant; 3 = relevant; 4 = highly relevant.*

^ The item-level content validity index, or "i-CVI" is the share of experts giving a rating of either 3 or 4 to each item (dichotomizing the ordinal scale into "relevant" and "not relevant"). Interpretation for survey tools: Fair = 0.40 to 0.59; Good = 0.60 – 0.74; and Excellent > 0.74.

CHAPTER 6

Conclusion

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The overarching objective of this thesis was to better understand if coercive or otherwise involuntary sterilization is a contemporary issue in the Indian general population, what drives and it and how we measure it. The four empirical chapters are focused on answering research questions relating to the prevalence of uninformed sterilization, how national policies effect sterilization practice patterns and, finally, how we measure poor quality sterilization care and implications for holding health systems accountable to patients. This final chapter brings together the key findings of this thesis as a whole. It is organized as follows. First, I summarize the main objectives and findings of each chapter. In addition to synthetizing the main findings, their significance for research and implications for policy are discussed in sections 6.3. While the specific limitations of each empirical chapter were discussed in the corresponding sections of Chapters 2-5, overarching limitations of this thesis are described in section 6.5. Finally, I discuss potential directions for future research.

6.1. Summary of Objectives and Findings

This section provides an overview of the main objectives and findings of this thesis. The central aim of this thesis as set out was to examine if, and to what extent, involuntary sterilization care remains an issue in contemporary India and what factors inform this issue. I focused on factors assessed through an existing nation-wide survey tool (the NFHS): autonomous choice, informed consent, and post-sterilization regret.

The overarching research question, as described in Chapter 1 was:

> *To what extent is coercive or otherwise involuntary female sterilization a problem in the routine delivery of healthcare in India and how can we better assess this issue?*

The initial empirical contribution of this thesis is provided in Chapter 2: a review of the prevalence and drivers of contemporary uninformed sterilization. This review of existing data, collected through the NFHS, applies a WHO framework within a general and nationally representative population of people who identify as women. Prior literature has focused largely on discrete (i.e. bounded) and more overt instances of coercion (e.g. physical force) or the contemporary prevenance of coercive or otherwise involuntary sterilization in "special" populations; those deemed to be at a heightened risk of involuntary medical treatment or reproductive coercion, specifically: those in detention or prison settings, those with mental health diagnoses, physical disabilities, transgender individuals, etc.[1] While these populations remain a significant concern and likely face higher rates of involuntary care, the data presented in Chapter 2 provide a strong case for the pervasive nature of involuntary sterilization care even in a general adult population. To do so, the first unique contribution of this chapter is a descriptive presentation on the general characteristics of women who are sterilized versus those utilizing other forms of modern family planning. This table demonstrates that on average in contemporary India, women who are sterilized are more likely to have less formal education, have lower household wealth and are more likely to belong to a scheduled caste or tribe than women utilizing other forms of mFP.

The differences in descriptive characteristics between sterilized women and other mFP users, while raising concern, do not directly reflect issues of involuntary care. Because of this, in Chapter 2 I then examine variables outlined in the WHO Interagency Statement and assesses difference between sterilized women and those using other forms of mFP where there is comparable data. I find that in the general population, sterilized women were statistically significantly more likely to not be told about side effects and not be able to get another mFP option than non-sterilized women utilizing another form of mFP. In contrast, sterilized women were statistically significantly less likely to not know alternate mFP options and not be the primary or joint decisionmaker to use their current mFP method. Looking at coercion variables by facility type, there was significant variation with no one facility type preforming better than the all-sterilized mean for all variables. Sterilization camps and government hospitals both preformed better than the mean on five out of seven indicators, whereas smaller public facilities, such as community health centers (CHCs) and private hospitals preformed worse than the all-sterilized mean for 5 out of seven indicators and better on only two. Across facility types, over 55% of the sample indicated they had received compensation i.e. a conditional cash transfer (CCT) for the procedure. And, just over 45% of all sterilized women (in any facility) indicated they received *more* money than they spent, for example on transportation, cost of lost work, etc. This is at odds with the MoHFW assertation that CCTs for sterilization are exclusively meant to compensate individuals for expenses incurred when seeking sterilization care.[2,3]

In examining performance on these variables at the state level, there was wide variation between states, states who performed comparatively "well" on one item (e.g. communicating permanence) did not necessarily perform well on other aspects (e.g. communication of alternate options). Due to this variation, I look at two variables within the Interagency Framework (Not Told Permanence and Not Decisionmaker) as outcomes separately, utilizing a grouped variance decomposition approach. This model allows us to identify which factors inform the odds that a woman will be exposed to these outcomes. What drives the two aspects of informed consent appears quite distinct – for *not told permanence*, "supply-related" factors explained nearly 83% of variance in the composite score; within this category a patient's interaction with an auxiliary nurse midwife (ANM) or lady health visitor (LHV) explained the largest share of variance. Unlike *not told permanence*, the category that explained the most variance for the "*not decisionmaker*" outcome was a patient's individual characteristics followed by facility or supply side factors. In examining some of these drivers as potential solutions utilizing a propensity score matching approach, I find that only 12% of patients who saw an ANC or LHV had were *not told permanence* as compared to 19% of demographically similar patients who did not see a health worker (a normatively worse outcome). Having accessible information on the internet and sterilization timing (in the immediate postpartum period) were both associated with lower odds of being exposed to the two coercion variables examined in the model; this finding held when matching on basic demographic characteristics, such as wealth quintile and education.

In Chapter 3, I find that high rates of institutional delivery at the community level had a statistically significant effect on a woman's odds of being sterilized immediately following childbirth in Low Performing States (LPS) and Christian-majority states, but not wealthy southern states. These findings held when controlling for caesarian-section status and key demographic characteristics, such as family wealth, caste and parity. Using the same model, I find there were no concurrent changes in the adoption of other forms of modern family planning (mFP), such as: IUDs, implants, the pill, etc. In addition, on average, women sterilized in the immediate postpartum period were 1.3 times more likely to express regret with the procedure than non-postpartum sterilized peers. Higher rates of regret were concentrated amongst women with a historically marginalized caste or tribal designation.

In Chapter 4, I explore issues of how we *measure* quality of care and health system performance amongst sterilized women. To do this, I look at scoring concordance between exposure to the coercion variables examined in Chapter 2 and more subjective quality ratings. Exposure to coercion is assessed using objective experience measures (e.g. were you told about X during your visit) as recalled by the patient whereas for the quality ratings, patients are asked to make a subjective assessment of their care. I find there was a statistically significant and positive relationship between a woman being exposed to three "coercion" variables and the odds of reporting the receipt of low-quality care: not being told the procedures permanence, not knowing alternate mFP options and if the patient did not make the decision to undergo sterilization independently. However, there was no statistically significant relationship for one coercion variable - *not told side effects* and odds of reporting low quality care. Indeed, there were high rates of discordant scoring overall; over 95% of women who underwent an "uninformed" tubal ligation procedure rated their care highly. In addition, discordance was more pronounced if a patient belonged to a historically marginalized caste. In examining system-modifiable factors, I find that both CCTs to the patient and procedure timing (e.g. during the immediate postpartum period) negatively impact the odds that a women will report a low-quality rating after receiving a coercive sterilization procedure. For women sterilized in the immediate postpartum period, I have additional data on characteristics of the birth interaction and healthcare utilization – for this population, both characteristics of the child and complexity of labor had a "washout" effect – where a low birth baby or excessive bleeding essentially canceled out any statistically significant relationship between exposure to coercion variables and odds of reporting low quality.

To explore issue of subjective patient ratings in more detail within an Indian inpatient setting, Chapter 5 provides an in-depth mixed methods assessment of a tool used to measure "patient centeredness" in inpatient settings. Due to data collection limitations during COVID-19, this piece focuses on a general inpatient population and not sterilized women specifically. I find that the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) tool performed well in cognitive testing and had adequate construct validity to merit further study, and potentially use, in the public Indian inpatient setting. However, high overall scores – assessing the perceived importance of each item within the tool – contrasted with consistently lower expectations that actions would occur in practice. For example, a patient might value the provision of an explanation for prescribed medicines, but not expect an explanation to be provided in practice. Concerns were largely driven by lack of clarity on, and prior experiences with, who holds responsibility for a given item rather than the item's lack of importance to the patient. This work sheds light on why patients might express satisfaction with low quality technical care, even if they recognize and even actively *value* items assessing technical care (relevant to issues raised in Chapter 4).

Table 6.1. Summary of Contributions Related to Uninformed Sterilization Care

Chapter 2: Uninformed Consent Amongst Sterilized Women in India
Q: Looking at a general population, what is the prevalence of uninformed tubal ligation care in India and what drives it?

- Comparing non-sterilized mFP users and sterilized women, sterilized women had less formal education, lower household wealth, were more likely to belong to a scheduled caste or tribe or identify as Hindu.
- For "not told side effects" and "not able to get alternate options" care for sterilized women was worse, for example sterilized women were 9.6% less likely to get a condom if needed.
- Sterilized women were less likely to have someone else make the devision for them, but rates of non-autonomous choice were higher than other mFP users and the all-sterilized mean in smaller public facilities, such as community health centers / rural hospitals.
- States that may perform well on one aspect of informed consent (e.g. communicating permanence) may not perform well on other aspects (e.g. communication of alternate options).
- Looking at the variable "told permanence," supply-related factors explained approximately 83% of variance
- Using a propensity score matching approach, I identify four supply-side modifiable factors that may improve the odds of receiving informed consent: Seeing an ANC prior to childbirth, ability to access information on the internet, and sterilization during the immediate postpartum period.
- When accounting for basic patient characteristics, receipt of sterilization care in a private hospital was associated with a *higher* odds of not making an autonomous choice.

Chapter 3: Facility-Based Delivery & Immediate Postpartum Sterilization in India
An Instrumental Variable Approach
Q: To what extent did the movement to increase facility-based birth / delivery impact sterilization practice patterns?

- High rates of institutional delivery at the community level had a statistically significant effect on a woman's odds of being sterilized immediately following childbirth in Low Performing States (LPS) and Christian-majority states, but not wealthy southern states.
- These findings held when controlling for caesarian-section status and key demographic characteristics, such as family wealth, caste and parity.

- No concurrent changes in the adoption of other forms of modern family planning (mFP), such as: IUDs, implants, the pill, etc.
- In addition, on average, women sterilized in the immediate postpartum period were 1.3 times more likely to express regret with the procedure than non-postpartum sterilized peers.
- Higher rates of regret were concentrated amongst women with a historically marginalized caste or tribal designation.

Chapter 4: Discordant Quality Ratings & Female Sterilization Patients
Q: Are we identifying these rights violations i.e. do standard performance measures used to assess patient-centeredness "pick-up" on issues of uninformed consent?

- There was a statistically significant and positive relationship between three "coercion" variables and the odds of reporting low quality: not being told the procedures permanence, not knowing alternate mFP options and if the patient did not make the decision to undergo sterilization independently
- There was no statistically significant relationship between not being told about side effects and odds of reporting low quality care.
- However, there were high rates of discordant scoring; i.e. over 95% of women who underwent an "uninformed" tubal ligation procedure rated their care highly.
- For the postpartum population, the addition of variables related to labor complexity OR attributes of the child washed (particularly birthweight) out any statistically significant relationship.
- Discordance is more pronounced if a patient belongs to a historically marginalized caste.
- In examining system-modifiable factors, both conditional cash transfers to the patient and procedure timing (e.g. during the immediate postpartum period) negatively impact the odds that a women will report a low-quality rating after receiving a coercive sterilization procedure.

Chapter 5: Are We Measuring What We Think We're Measuring: Pre-Testing the Consumer Assessment of Health Providers and Systems Survey in India
Q: Why might people be satisfied with the receipt of poor-quality care?

- The HCAHPS tool performed well in cognitive testing and had adequate construct validity to merit further study, and potentially use, in the public Indian inpatient setting.
- However, concerns arose regarding the relevance of specific items (e.g. the receipt of help when needing to use the restroom or the provision of an explanation for prescribed medicines).
- These concerns were largely driven by lack of clarity on, and prior experiences with, who holds responsibility for a given item rather than the item's lack of importance to the patient.
- When assessed based on their relevance to patients' satisfaction, these same questions performed very well; with i-CVI rating of "good" or "excellent" for all items.
- Taken together, these results suggest patients do *value* the receipt of information and other aspects of care measured through common process indicators, but do not anticipate that they will occur in practice.
- This, in turn, may inform overall satisfaction ratings – i.e. what is the point of expressing a low rating if care did aligned with expectations and is unlikely to change?
- These findings provide mixed-methods evidence in support of the hypothesis that low patient expectations may drive artificially high patient satisfaction ratings, ratings that are at odds with a patients' true (but not expressed) values.

6.2. Contributions to the Literature

The findings presented in this thesis make both substantive and methodological contributions to the literature on coercive and otherwise involuntary female sterilization care and how we measure health system performance that has implications for future research in the area.

6.2.1. Substantive Contributions

First, the findings demonstrate the contemporary prevalence of uninformed female sterilization, a recognized form of coercion or otherwise involuntary sterilization care.[1] In addition to providing the first country-level quantification of this issue within a nationally representative sample, I identify facility or supply-side factors (e.g. type of facility in which the procedure took place, timing of the procedure, interaction with an ancillary health worker, etc.) as primary drivers of "unknown permanence" a key aspect of uninformed consent. This work provides unique evidence that this form of coercion is both routinized and structural. This work also identifies potentially actionable factors (such as engagement with CHW or ASHA workers) that are associated with a higher odds of receiving informed consent, even when accounting for patient demographic characteristics.

A theme that is relevant across papers is sterilization in the immediate postpartum period. Chapter 3 identifies a causal effect of increasing institutional delivery at the community level on the odds of women being sterilized in the immediate postpartum period. This suggests more women are being sterilized the postpartum period in India. In Chapter 2 (prevalence) I explore the average treatment effect of system-amenable factors and find the postpartum variable is negatively associated with coercive or otherwise involuntary sterilization care. In other words, women who are sterilized in the immediate postpartum period may be *more* likely to be told the procedure was permanent. However, the postpartum period is also associated with higher rates of post-sterilization regret. Prior literature on post-sterilization regret from the United States also found higher rates of regret amongst women who had the procedure done at the time of birth (both c-section and vaginal). While the data from India presented in this Thesis suggest women are more likely to meet the criteria for informed consent if they are sterilized immediately postpartum, there may be other factors contributing to the odds of reporting regret. For example – women would be given relevant information on alternate methods, information on permanence, etc. but not be in a state of mind to process or make a life-altering decision in that moment. In addition, amongst those who are sterilized in the postpartum period, it appears both labor complexity and health of the newborn impact reporting discordance – making it more likely that coercion is not "pickup up" by status quo performance measures, such as satisfaction. Taken together, these data are preliminary, they suggest procedure timing (e.g. directly following a birth) is important, but may not be normatively good or bad i.e. have a complicated, or more nuanced, relationship with women's reproductive autonomy.

An additional cross-cutting theme is payment for sterilization. In Chapter 2, I provide a quantification that aligns with prior research published in 2020 by Mohanty et al who found 61.6% of all sterilized women in India reported receipt of payment.[4] However, this work was conducted in the context of assessing out of pocket payment (OPP) and focused on the period 1990-2014.[4] This thesis provides a more contemporary estimate (also over 60%), including an assessment of the share of women who are paid more than they spent (over 50% of all sterilized women) and, in Chapter 4, examines how payment might relate to subjective patient reported outcomes (satisfaction, or care ratings). In doing so, I find receipt of *any* payment is a factor that inhibits reporting concordance, this relationship holds when controlling for patient characteristics, such as caste designation, wealth index, parity at sterilization, etc. This is a unique contribution: prior research has associated payment for sterilization with *lower* rates of patient-reported regret.[5] My work suggests payment may inform reporting bias – meaning caution should be taken in interpretation, especially when assessing patient-reported outcomes, amongst women paid for the services they are being asked to evaluate.

6.2.2. Methodological Contributions

In addition to providing substantive contributions i.e. baseline information assessing a common, but understudied, issue in sterilization care, the work presented in this thesis provides multiple methodological contributions.

First, in examining the contemporary prevalence of involuntary sterilization, I utilize a variance decomposition approach. This approach, formulated to assess transferable utility within game theory studies, has only recently been applied to health and care delivery contexts. It is a method that allows us to understand the marginal contributions of players, or in this case, factors, that may contribute to the odds of a patient receiving involuntary care. In variance decomposition, any factor/player is sensitive to the other factors being examined – the Shapley approach addresses this issue, effectively "neutralizing" dependance by allocating each factor the expectation of their marginal contribution.[6] The expectation is computed based on all possible sequences in which the factor might contribute. As a result, it functionally allows us to disregard the order in which factors are added to the model i.e. how they are nested – this is a unique, and more accurate,[6] method of assessing sources of heterogeneity in our primary outcome(s) of interest: involuntary sterilization care. In doing so, we are able to identify the relative importance of potential "drivers" and more accurately inform solutions e.g. if we want to improve the odds a patient is told a tubal ligation procedure is permanent, allied health professionals may be able to play a significant role whereas these same workers may play a less impactful role if the outcome of interest is whether a patient is the primary decisionmaker when undergoing a sterilizing procedure.

A second contribution is the use of a propensity score matching approach to identify system-modifiable solutions. The example of public v. private hospitals provides a clear example of why this approach is substantively useful. Patients who receive care at public v. private facilities are, in average, very different from one another. Utilizing the PSM approach, we are able to "match" similar patients between the intervention and comparison group – functionally asking the question: if the same patient went to X facility v. Y, what would their odds be of being exposed to our outcome of interest. This method is important in contexts where the delivery of care might appear better in a given clinical context, but differences are ultimately driven by differences in the underlying patient population. For example – without the PSM approach at the individual level, it appears that going to a private hospital would improve your odds of being the primary decisionmaker for a sterilizing procedure. However, after matching on patient characteristics, patients were *less* likely to make an autonomous decision in private hospitals. This has important implications – without using this methodological approach, policymakers might think moving women into private facilities might address issues of involuntary care. However, it appears public hospitals are actually better at ensuing women undergoing sterilizations are the primary decisionmakers.

A third contribution is the use of an instrumental variable (IV) approach. Similar to the issues of endogeneity outlined above, the volume of sterilizations undertaken in the immediate postpartum period would likely be driven by factors such as variation in surgical capacity. People giving birth in institutions at baseline may also be more likely to receive a postpartum sterilization for other reasons (e.g. access to clinical facilities with surgical capacity, preference for clinical intensity, etc.). This is where the endogeneity issue lies: individuals who give birth in facilities likely differ from women birthing in other locations along several important dimensions, such as wealth (observable) or sociocultural preferences for home birth or permanent fertility control (with available data, un-observable). While changes in where women deliver has been widely documented, the impact of this change in practice patterns on reproductive care generally and sterilization practices specifically has been under-studied. To address this issue, the IV approach allows me to functionally control for both the observed and unobserved differences between women who are 'treated' (those who give birth in facilities) and those who are untreated, or do not give birth in a facility. To do so, I exploit variation in the policy that drove this shift - the Janani Suraksha Yojana (JSY) program, which provided financial incentives to women if they gave birth in a recognized health facility. I use JSY coverage at the district level as an instrument to identify the causal effect of institutional delivery on sterilization.

A fourth contribution is the use of scoring discordance at the patient-level as an outcome. Unlike the above, this is not an application of a *method* in a novel context – but it is a novel approach to how we conceptualize "outcomes" when measuring health system performance. In this case the outcome itself is discordance – allowing us to test if status quo performance measures (patient satisfaction) are picking up on key aspects of involuntary care. In doing so, this allows us to identify where status quo measures might fall short in identifying instances of involuntary care and for which populations. This method reiterates the importance of assessing not just subjective quality ratings, but more objective aspects of care that might not be viewed as a rights violation by the patient.

Finally, Chapter 4 provides a more in-depth exploration of why patients might rate their care highly despite being subjected to what would externally be considered poor quality care. Through this mixed-methods process of content validating indexing we are able to parse apart concepts that might otherwise be conflated. For example - patients do think the provision of information at a clinical visit is important – they just do not expect it to occur in practice, this in turn, may bias subjective ratings up despite the receipt of poor-quality care. These findings have implications for the interpretation of traditional, quantitative survey adaptation / validation techniques, such as confirmatory factor analysis and other strategies that assess the strength of relationship between a latent variable (in this case satisfaction) and a series of sub-items meant to represent that variable. With these techniques, items are often dropped if the strength of the relationship to the latent variable falls below a pre-determined threshold. However, this research suggests a low coefficient might reflect low expectations as opposed to patient values.

Taken together, these contributions set a foundation for the study of sterilization care as it relates to coercive and otherwise involuntary service provision, as well as how we hold systems accountable to patients more broadly.

6.3. Implications for Policy

The research presented in this thesis also has implications for policy on sterilization care and performance measurement. India currently has policies in place regarding informed consent and formally only supports "voluntary" sterilization procedures. The data presented in this thesis suggest the clinical guidelines underlying these policies are inconsistently followed. As this thesis demonstrates, even if a woman were to sign a consent form – a clinical standard reported at 100% compliance[7] - her odds of receiving the information required to provide informed consent is low. In other words: a consent form alone (universally required) does not guarantee a women met the basic preconditions outlined in Chapter 2 of this thesis. Given the presence of clinical standards that outline, for providers, the information required for a patient to provide informed consent (in line with the WHO Interagency Statement), the policy issue at hand appears to be one of application and enforcement rather than the exclusive need to instate *new* policy. There are two main implications given this context, first: the need for more robust measurement of informed choice to identify where current policy is falling short. And second: investment in, and research on, efforts that might address the contemporary prevalence of uninformed consent. This is not just an issue of measuring uninformed consent more effectively, but also recognizing where and why protocol are not working, and which policies might be employed to ensure women are provided with relevant information. Ultimately, this also requires examining successes and they extent to which they may be transferable.

We can organize potential approaches into three categories: 1.) holding perpetrators of abuses accountable for their actions i.e. routine accountability, 2.) providing support or some form of reparations for victims of such abuses i.e. support for victims, including guarantees to things like truth, and 3.) implementing a set of institutional reforms at the state level that ensure the non-repetition of abuses in the future i.e. institutional reforms.[8][1]

1.) Routine Accountability

Every Indian state and union territory examined in this thesis failed to ensure pre-conditions for consent were met for at least some of their sterilized population. As a result, a nation-wide approach to ensure existing consent processes are adhered to and ensure accountability in the case of standards violations is both relevant and necessary. In addition, the prevalence of uninformed consent within the general sterilized population and across facility types suggests the issue is not limited to special populations, facility types or those pre-identified as at-risk populations,[2] it is a much broader problem across the country – though one that may impact certain groups (the majority of which I was not able to examine separately in this thesis) more acutely. These findings are at odds with prior literature on coercive sterilization care and suggest uninformed consent, as a recognized form of coercion, is both more routine and normalized than previously understood. This has significant implications for accountability and redress.

The status quo approach for accountability in sterilization care is case-specific and often reactive: for example, through public interest litigation or complaints filed by individuals claiming medical negligence.[9] A case filed in 2005, Ramakant Rai vs Union of India, resulted in the Supreme Court directing the Government of India to develop and publicize new guidelines for quality of care for sterilization procedures. As noted in the introduction, almost a decade later, another case was filed, claiming that sterilization camp surgeries were being conducted in unhygienic and unethical conditions, in turn violating fundamental rights guaranteed under Articles 14, 15 and 21 of the Indian Constitution (Devika Biswas versus Union of India 2012).[10,11] In the ruling for the second case, legislators confirmed that *every* guideline outlined in the prior

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[1] *These categories are a simplified model adapted from the field of transitional justice, defined as the "Formal and informal procedures implemented by a group or institution of accepted legitimacy around the time of a transition out of an oppressive or violent social order, for rendering justice to perpetrators and their collaborators, as well as to their victims."*

[2] *Groups identified as "at risk" for coercive and otherwise involuntary sterilization by the World Health Organization include, but are not limited to: people living with HIV/AIDS, persons with disabilities, indigenous people and ethnic minorities, and transgender or intersex people.*

2005 filing was ignored, including processes for informed consent. This ruling, made on the basis of a legal investigation into clinical errors in the state of Bihar, aligns with the findings in this thesis which provide a unique quantification of the pervasive nature of this issue and supports a call for more routine measures of accountability.[12] It is particularly concerning given that this work comes in the wake of several policy efforts undertaken in response to the more recent 2012 Devika Biswas ruling – efforts meant to address failures of enforcement.

An alternative approach involves more routine measurement and a movement away from individual-level redress to more systemic approaches. Specifically, existing survey tools (such as the NFHS) and random "spot checks" may be relevant to assess the ongoing prevalence of uninformed consent and identify areas of concern. Use of an "operational" definition of informed consent (in which patients are asked about specific attributes of informed consent with more objective framing) may be both a more feasible and practical way to assess the prevalence of uninformed consent. As demonstrated in Chapter 2, many of the variables outlined in the WHO Interagency Statement are already collected through household surveys. However, these data are not actively used to assess this issue from a policy perspective. These measures could be added to indicator suites used to assess mFP coverage – including decrementing estimates of contraceptive prevalence by excluding sterilized women that do not meet pre-conditions for consent. This aligns with work proposed by Senderokowitz et al regarding the need to incorporate measures of reproductive autonomy more proactively within mFP accounting. More routinely collected data can also be used to inform public reporting platform and other incentive schemes – but needs to be critically evaluated to minimize unintended effects, such as influencing patient-reported responses to surveys and intentional gaming, common when public reporting and incentive schemes are introduced.

Specific factors identified through this work suggest routine measurement of this issue, while critical, should be undertaken with caution. For example, more subjective measurement of this issue (e.g. through satisfaction ratings) may only uncover the "tip of the iceberg" – and should be augmented with more objective measures. In addition, the presence of conditional cash transfers may further bias patients towards positive care ratings and mask the provision of uninformed care. For context: starting in 1981, there has been a centrally-sponsored conditional cash transfer program for sterilization care with the stated aim of compensating women for loss of wages incurred on the day of sterilization, transportation costs, drugs or required dressings.[13] However, as evidenced in this thesis, these payments often exceed the amount that a women expends during a sterilization visit and receipt of payment is negatively associated with reporting concordance. According to a 2015-16 budget analysis, 95.7% of funds for sterilization went towards patient compensation.[14] Given the prominence of both cash transfers and subjective patient ratings in the assessment of person-centered care, these finding suggest a more robust approach is needed to routinely assess the quality of sterilization care. In doing so, measurement can re-focus accountability away from individual providers and towards broader areas of concern, such as private facilities (that may be subject to less public oversight) within a given district. Given the high level of state-control over health administration, states can use this data to pro-actively identify high and low performers in terms of informed consent and design improvement plans accordingly. The first step, however, is recognizing that coercive sterilizations persist today.

2.) Support for Victims

Following the 2005 Ramakant Rai supreme court ruling, the Government of India instituted an indemnity scheme – in which "victims" and families of deceased victims could be compensated for failed sterilization care, complications or death. The scheme, introduced in 2005 and updated in 2013, was meant to ensure people harmed by low-quality sterilization care were able to recover costs incurred due to failed care.[15] However, subsequent evaluation of the scheme suggests it is largely inadequate in reaching these goals, with significant barriers in the allocation of funds.[16] In addition, the scheme focuses on overt instances of physical harm – aspects of quality that would often be categorized as "safety" or adverse events. It covers death following sterilization, failure of sterilization (the procedure was not effectively conducted, requiring proof via subsequent pregnancy), and costs of treatment associated with adverse medical events arising from an unsafe sterilization procedure.[13] While the scheme stipulates that facilities should follow "pro forma" consent guidelines, patients are not eligible for coverage if they are sterilized without informed consent. In addition, claims must be filed within 90 days of the qualifying "event" – so if uninformed consent were covered, a patient would have to know they were permanently sterilized without their consent within 90 days of the procedure.

Two updates to the indemnity scheme could help address this issue. First – outlining a clear definition of coercion within the compensation scheme that aligns with both the central government guidelines and WHO interagency statement.[1,7] Second - including coercion as a compensation-eligible category. However, complicating the issue of patient indemnity, to be eligible for the indemnity scheme a patient (or representative of the patient) must fill out a pro-forma consent form required by the scheme *prior* to sterilization. The form includes multiple sub-sections outlining, and requiring recognition of, many of the aspects of informed consent provided in the WHO Interagency Statement. In signing the document (either with name or fingerprint) the patient acknowledges they decided to undergo the procedure "without any external pressure." However, any representative can complete this form and it is required – i.e. no patient can be eligible for / enroll in the compensation scheme without signing it. Given the high rates of unknown permanence, lack of alternate options and other issues uncovered in Chapter 2 of this thesis, there appears a significant gap between signed consent forms (reported at 100% of contemporary sterilization cases) and patient-reported receipt of the information agreed to in these forms.

While there are multiple challenges to ensuring "*support for victims,*" of coercive care, it is clear that we require mechanisms that support patients beyond physical harm. It is also important to note that an *uninformed* sterilization may still be a *wanted* sterilization i.e. women who are not provided with the information required for informed consent may have still chosen to be sterilized if provided with that information. Complicating the situation, there are significant and compounding issues regarding access to care. The notion of unconstrained patient choice – sometimes referred to as the "choice framework" utilized by US scholars – has been critiqued by Indian rights activists as emerging in a context where choice operates within, and is a function of, much broader support systems for maternal and child care, other social welfare measures and a better social environment for women to make a given choice.[17,9] Arathi, for example, argues that for the majority of women in India (both rural and urban), the 'choice' to get sterilized may arise primarily out of "necessity and desperation."[9] So while one outcome – controlled fertility – may be the active goal of a patient, how this choice is undertaken and if it is truly "free" necessitates a much more nuanced understanding of intersecting issues regarding access to comprehensive options and social support. For example, a women may want more children, but not have the ability to feed additional children – this, in turn, could impact the "choice" to be sterilized. One corresponding consideration when compensating victims could be to ensure any monetary re-allocation does not require contingencies – women could choose to address immediate consequences of the sterilizing procedure, or adjacent social issues that may have informed the receipt of a coercive sterilization, like social needs.

3.) Institutional Reforms

Perhaps most importantly, the contemporary prevalence of uninformed consent highlights the need for a comprehensive set of institutional reforms that extend beyond bounded responses to acute mistreatment – such as the aforementioned sterilization camp deaths. This is particularly relevant considering existing national guidelines are not being consistently followed. This research explores, and points towards, a number of factors that may inform actionable policy solutions - for example: further supporting ASHA workers' role in providing reproductive counseling, access to internet-based information, timing of the procedure, and other system-modifiable factors that may positively inform the odds of meeting preconditions for consent. This work also identifies factors that are unlikely to inform significant change – such as moving poorer or historically marginalized patients to private facilities, which appear to serve these patients worse than public alternatives. These findings would benefit from further research on provider knowledge and behavior to better understand if providers know what information they should provide and simply fail to do so, or if they do not know/understand the current national standards. For example, the same provider in a private facility could give objectively lower-quality care (in this case less informed) to poor women than wealthy women based on a tiered payment structure; suggesting the provider knows what should be communicated, but provides that information differentially. Alternatively, private providers could be undertrained in national standards, but wealthy women are more likely to ask (and in turn receive) information outlined in the standards. Differentiating these issues is important for informing improvement and would build on a significant, and growing, literature examining the "know-do" gap in healthcare delivery.[18]

However, there is a broader issue of budget allocation for reproductive care and how relevant policies are enforced. For example, in a 2016-17 analysis of the budget, India spent 85% of its total expenditure for family planning on female sterilization.[14] In addition, only ~60% of the allocated budget was actually disbursed. This is also an issue that extends beyond India. Of India's approximately half a billion mFP budget in 2020, over 130 million (nearly 30%) was made up of overseas development assistance. Moreover, India's history of family planning programming and reliance on sterilization specifically, is imbedded within a much broader trend within the global reproductive care space that prioritizes access to services and utilizes volume-based measures of coverage, such as unmet need for FP services, with only an emerging critical eye towards the extent to which the services, themselves, are rights affirming.[19] Diversifying the budgetary portfolio to cover other forms of mFP and utilizing unspent budget to track, enforce and compensate instances of coercion could help create an environment where institutional reforms can be both fielded and tested.

Table 6.2. Policy Approaches for Redress Using a Transitional Justice Framework: Holding Perpetrators Accountable, Providing Support for Victims and Institutional Reform

	Current	**Potential**
Holding perpetrators accountable	Individual-level	Group-level - Routine measurement

	- Extremely rare; loss of license in high-profile cases (e.g. sterilization camp death)	- Accountability beyond the individual provider; e.g. regional level - Potential to inform: reporting, performance based financing, assessing what works
Providing support for victims	Indemnity for failed surgery - Limited to "failed" cases (death, complication, etc), no redress for coercion – or clear definition of what constitutes coercion	Indemnity for coercion - Expand indemnity scheme beyond safety to include instances of "coerced & otherwise involuntary" - At the community level? E.g. high rates in a given district – that district has to pay?
Institutional reforms for non-repetition	Unenforced policy - Well articulated policy supporting informed consent,* lack of enforcement capacity - Highly concentrated budget	Budget, enforcement - Budget beyond compensation - Enforcement capacity Equal incentives for other forms of mFP

**Consent is currently framed and measured as a "structural variable" i.e. presence of a form, as opposed to a process measure – which assesses if an action occurred in practice, such as the provision of information on a procedure's permanence (via patient report, observation, mystery patient, etc).*

Beyond national law, this also has important implications for contemporary human rights litigation outside India. For example, in early 2016, Prosecutor Marcelita Gutiérrez was forced to drop charges of crimes against humanity against the Peruvian president and Ministry of Health. While Gutiérrez and her team had identified over 200,000 instances of coercive sterilizations amongst indigenous women between 1996 and 2000, they "*Lacked conclusive evidence that the practice was state policy rather than a series of isolated cases.*"[20] The case highlighted the need for the evidence I am working to generate with this these: are uninformed sterilizations across India a series of isolated events undertaken by physicians who are acting in bad faith or is this form of violence against women imbedded within the institutions and policies that govern care? The roadblocks faced by human rights advocates and litigators working to combat coercive sterilization underscore the need to re-evaluate how we might routinely measure rights abuses with actionable data. Scales that assess issues of repression, such as the Political Terror Scale (PTS) or the Cingranelli–Richards human rights scale, for example are highly aggregated and rarely focus on issues of routinized medical repression. Commonly used subjective health system performance measures, such as those evaluated in Chapters 4 and 5 of this thesis, are not picking up on (and appear to obfuscate) these abuses. Interviews suggest this is due to repeated exposure to disrespectful healthcare over time which may systematically lower patients' expectations of care.

6.4. Limitations of the Thesis

As discussed throughout this thesis, there are several limitations to consider when interpreting the findings. Specific limitations have been detailed in the four empirical chapters. This section discusses two limitations that apply more generally: limitations of the data used, of the methods implemented and then two limitations that effect the interpretation of the thesis: the Instrumental Variable (IV) method and contextualizing the final empirical chapter, which does not focus on sterilized patents specifically.

6.4.1. Patient-Reported Data

All data used in this thesis is patient-reported. This provides a unique window into the sterilization care by posing questions that assess what should have occurred during a given clinical interaction. However, we have no other sources of data (e.g. visit observation or clinical records) to confirm the extent to which how patients report this information aligns with what occurred in practice. Information may have been provided to patients on alternate options, procedure permeance, or other factors outlined in the WHO Interagency Statement, but the patient simply does not remember this content being communicated. In Chapter 4 (reporting discordance) "time since procedure" which is a variable assessing the distance between a sterilizing procedure and when the patient was interviewed, was related to reporting discordance. For example, if the exposure variable was: not making an independent decision (i.e. women who did not make an independent decision to get the procedure) having less time elapse between the procedure and interview meant they were less likely to have discordant quality ratings / more likely to express dissatisfaction with care quality. This issue merits further study to better understand how best to collect data regarding sterilization care. There is also reason to believe alternate sources of data may be biased in different ways. For example, if providers know they should consistently provide information on procedure permeance, in the absence of patient actors, visit observation may be subject to a positive reporting bias e.g. providers doing what they know they *should* do, as opposed to what they generally do in practice.

6.4.2. Counting Sterilizations

Patient-reported data also raised issues of how the survey tool used to collect this data is framed. For example, the NFHS poses questions regarding sterilization care within the reproductive health survey module. This is logical from a reproductive health perspective. However, from a human rights perspective, this may lead to an undercount of women with permanently curtailed fertility. For example, many women who have undergone a hysterectomy do not respond in the affirmative to the question: "*Are you currently doing something or using any method to delay or avoid getting pregnant?*" which is the primary prompt within NFHS to assess if a respondent has been sterilized. A separate question is posed regarding hysterectomy, "*Some women undergo an operation to remove the uterus. Have you undergone such an operation?*" In this thesis, the primary focus is women who respond "sterilization" when asked the former question, but do not indicate that they have had their uterus removed. Women who indicate they have had their uterus removed may have medical indications for removal, such as: prolapse of the uterus, cancer of the womb, ovaries or cervix or, in some cases, heavy periods or pelvic pain. While all women undergoing procedures that permanently effect fertility should have access to information and be able to provide informed consent, we do not have any data on the clinical context in which a uterus might be removed – making it difficult to compare these patients to tubal ligation patients, where the primary purpose of the procedure is to limit fertility. As a result of this limitation, the estimates provided in Chapter 2 do not include hysterectomy patients and may undercount the true prevalence of uninformed sterilization from a human rights perspective.

A second issue with counting sterilized persons using patient-reported data is the issue of unknown sterilizations. Patients are only included in this sample if *they have identified themselves* to survey enumerators as having undergone a sterilizing procedure. Human Rights Watch and other entities have uncovered high rates of "unknown" sterilizing procedures. One example is Black women in the southern U.S. undergoing what became colloquially known as "Mississippi appendectomies."[21] Teaching hospitals, especially, would conduct clinically unnecessary sterilizing procedures (both hysterectomy and tubal ligation) to train medical residents.[21] Many of these procedures occurred in the immediate postpartum period and were undertaken without consent or, in some cases, any communication – leaving women to find out they were sterilized only years later. We do not know if this is an issue in India and, if it is, how prevalent a practice it might be. In the U.S. the Boston Globe reported on this practice at Boston City Hospital, noting that medical records would often not include information on sterilizing procedures even if they had been conducted. This suggests the true prevalence of sterilizing procedures may also be underreported in clinical or insurance claims data.

6.4.3. Instrumental Variable Approach

An instrumental variable approach was implemented in Chapter 3 to examine the causal relationship between institutional delivery at the community level and the odds of being sterilized in the immediate postpartum period. For the primary model, I used JSY uptake (a conditional cash transfer program that incentivized birth in a facility) as the instrument. This approach assumes that, conditional on basic patient characteristics, variation in postpartum sterilization practice patterns are exogenous to the direct receipt of JSY or JSY uptake at the district level. Fidelity to this assumption motivated the approach to run the IV model separately in the three geographic regions defined by program eligibility. However, there is no way to empirically test this assumption directly.

In addition, a key limitation of the IV approach is that the effect estimated is a Local Average Treatment Effect (LATE). The method produces an estimate of the effect on immediate postpartum sterilization only for women whose birthing location may have *changed* because of instrument (JSY uptake at the district level). The approach does not estimate the effect of increased institutional delivery at the district level on postpartum sterilization status amongst those who would have given birth in a facility anyway, irrespective of the increase in institutional deliveries in their district. As a result, it is impossible to identify the specific subpopulation in which we find a causal estimate: we have no way of identifying who exactly the women are who would not have given birth in a facility.

6.4.4. Curtailed Data Collection, COVID-19

In addition to limitations of the methodology employed throughout this thesis, the thesis was also subject to several practical barriers due to the COVID-19 pandemic. For example, in-person data collection in India was cut short in Spring 2020 due to safety concerns. As a result, the final empirical chapter (5) focuses on a general inpatient population, as opposed to the initially proposed project which was meant to build on the HCAHPS validation by posing similar questions sterilized patients and assessing content validity amongst this population.

6.5. Directions for Future Research

Throughout this thesis, the individual chapters make several specific recommendations for future research based on the analysis conducted in each chapter. Taken together, this body of work, while answering several important questions regarding prevalence and measurement of an important human rights issue, also raises many more. Here, I provide three broader areas for future research that would extend on the findings presented throughout. These areas are presented in the context of sterilizations being the most common form of family planning utilized globally and recognition that issues of coercion and uninformed consent should be studied beyond India.

6.5.1. Methodological

The first area for future research is methodological. As raised above, a key limitation to the work presented in this thesis is that I am only able to capture data from one source: the patient. The mechanism of collection is also a concern, the NFHS is a pre-structured survey tool where sterilization care is not a primary area of inquiry. It would be useful to inform future research that triangulates information on sterilization care through multiple sources, e.g.: clinical practice data, the patient (qualitative in addition to structured survey data), the provider and policy documents.

In addition, survey tools that do not frame sterilization in terms of reproduction may broaden our ability to account for women who have undergone hysterectomy procedures or other sterilizing events and who may functionally be permanently sterilized, but would not indicate as such in response to a survey posing a question r.e. reproductive health. This has important implications for quantifying human rights abuses. For example, in a 2020 case in the U.S. women were told they required hysterectomy procedures while interned in an Immigration and Customs Enforcement (ICE) facility to address health issues unrelated to reproduction.[22,23] The women underwent these procedures which led to a loss in the ability to have children. However, how women conceive of (and in turn report) sterilizing procedures undertaken in contexts of "medical need" is not well understood. We do, however, know there is a significant gap in NFHS-5 reporting - with approximately 50% of women who know they have had their uterus removed *not* indicating "sterilization" as their current reproductive method.[24] As noted in the data limitations section, these women are not asked corresponding questions regarding quality of care. Other approaches that augment existing survey data but do frame sterilization as an issue of reproduction (i.e. including events where sterilization / curtailed reproduction may be a secondary outcome) would help us better understand the true scale of sterilization and the extent to which procedures meet basic pre-conditions for informed consent.

While new methods of data collection are needed, we can also better (or more creatively) utilize one of the primary sources we have. Another methodological area of research is the use of large-scale household surveys (like the NFHS) to construct time-series datasets composed of sterilized women. The IV approach was appealing, in part, because it is a quasi-experimental method that produces a causal estimate without the need for time-series data. However, it is rare that a situation meets the assumptions and criteria for an IV. This makes leveraging cross-sectionally collected data more relevant. Because sterilizing procedures are a significant and singular event in a patient's life (with few exceptions in the case of procedure failure), the procedure may be uniquely relevant given the shortcomings of using event-history techniques with time-series data. While data is collected from survey respondents at a fixed point in time (e.g. Sept 2019 - March 2020), many survey tools on reproductive care collect the date or month in which a sterilizing procedure took place, for example formatted as a century month code (CMC), with the date of sterilization going back multiple years. While imperfect, this information can be used to assess the effect of a policy implemented in 2018; constructing a pre-trend using sterilizations with CMC dates prior to when the survey was fielded. This process would have to be undertaken with caution (e.g. time-variant characteristics, mobility between districts, recall, etc.).

6.5.2. Impact Evaluation

This relates directly to a second area of research – the need for impact evaluations examining the effect of policies aimed at improving involuntary care or that effect sterilization practice patterns more broadly. This builds on the need for more robust and routine measurement of involuntary sterilization care. Specifically, if a new public reporting program is instituted, it is critical to evaluating the roll out of that intervention - to see if the policy has its intended effect and identify unintended consequences. In addition, given the prevalence of uninformed care, there is a corresponding need to ensure that this evaluative work centers, and intentionally includes, outcomes related to women's reproductive rights and justice - not just coverage i.e. assessing how many women receive reproductive services. This can be done proactively for future policy efforts – both in how polices are rolled out and which metrics are chosen for evaluation.

This is particularly relevant given the many sterilization-related policies that have been formally announced (e.g. the removal of a quota-driven strategies in 1994) but may continue in practice, as documented by health workers and human rights organizations. Indeed, there have been numerous policy efforts intended to improve the quality of sterilization care. However, these policies are rarely evaluated. Relevant to this thesis, in 2005 the central government issued clinical practice guidelines in response to reports of unsafe conditions – while I look at the prevalence of involuntary care in Chapter 2, I do not formally evaluate the roll out of the 2005 release of guidelines nor do I isolate the effect of issuing these guidelines. The guidelines could have had no effect – with practice patterns relatively unchanged, or the point prevalence data presented in Chapter 2 could reflect a significant improvement if compared to care that would have been provided in the absence of those clinical guidelines. Without an evaluation, we simply do not know which policies have worked as intended and which have not. Similarly, in 2016 the Supreme Court of India ruled that all sterilization camps be closed. However, I find issues of coercion are not limited to camps. In both cases, we would benefit from leveraging quasi-experimental methods to better understand if policies are working as intended.

6.5.3. Special Populations

A third area of research is the need to examine the prevalence of coercive and otherwise involuntary sterilization beyond the general population. While examining a general population was useful in highlighting the pervasive nature of uninformed consent, there is reason to believe that uninformed consent is not evenly distributed across the general population.[1] Specifically, individuals living with HIV, those in prison settings or otherwise detained, people with mental health diagnoses, transitioning from one gender to another, and others, may face higher rates of coercive and otherwise involuntary care generally, and sterilization care specifically.[1]

This work would benefit from critical engagement with the field of Reproductive Justice; which calls for a non-individualistic examination of rights alongside (and intersecting with) other social justice issues, such as: poverty, housing, prisoners rights, immigration policy and violence against women, amongst other issues.[25] Led (largely) by Black women in the United States and community-based organizations, the movement and corresponding field of scholarship, calls for the acknowledgement of multiple forms of oppression in order for issues of "choice" or "voluntariness" to be truly understood, let alone achieved.[26,27] The movement is particularly relevant for groups that are subject to multiple, often historically entrenched, forms of societal oppression and for whom routine forms of reproductive coercion may be more normalized. Returning to the example of Boston City Hospital, in 1972 medical students spoke out against "undocumented" sterilizations; sterilizations that were performed immediately postpartum or concurrently with other surgical procedures, but not recorded or otherwise captured in clinical records. The procedures, largely hysterectomies, were justified as a learning opportunity for medical students and normalized as standard practice within the hospital.[21] Uncovering these cases, among other rights violations, led to the creation of the Committee to End Sterilization Abuse (CESA) and the Committee for Abortion Rights and Against Sterilization Abuse, both of which informed for the U.S.' federal sterilization guidelines in 1979 and corresponding enforcement mechanisms.[28,29]

A significant challenge cited in historical accounts of the early Reproductive Justice movement and corresponding enforcement of sterilization guidelines was the differential medical experiences faced by white women v. women of color, particularly Black and African American women.[29] In the 1970s, white women's reproductive advocacy on sterilization care centered on overcoming barriers to accessing tubal ligations.[29] A segregated medical system, compounded by underreporting of sterilization care, made it challenging for reproductive justice advocates such as Doctor Rodriguez-Trias, to advocate for relevant protections against coercive care. In a 1978 testimony, Rodriguez-Trias discussed how minority women were often coerced into consenting to sterilization due to living situations and other social factors. She stated: "The lack of employment opportunities, education, daycare, decent housing, adequate medical care, safe effective contraception and access to abortion create an atmosphere of subtle coercion."[30] This testimony, and efforts taken throughout the Reproductive Justice movement, highlight the importance of policy that extends beyond any one individual's reproductive rights and recognizes the broader social context and attendant pressures.

6.6. Conclusion

While often framed as a historical practice or limited to isolated cases, the data presented in this thesis provide evidence that routinized forms of coercive sterilization are a widespread and contemporary issue. Made up of four related papers, it examines how we think about and measure informed consent, and in turn quantify human rights abuses amongst sterilized women.

The **first paper** provides the first quantification of a human rights-based framework presented in the WHO's "*Interagency Statement on Eliminating Forced, Coercive and Otherwise Involuntary Sterilization*," using patient-level data from over 180,000 sterilized women. The **second paper** re-evaluates the roll out of a large nation-wide policy; employing an instrumental variable (IV) approach to estimate the effect of increased institutional delivery on tubal ligation practice patterns. The **third** and **fourth papers** look at how people rate their care. This process involves testing conceptual equivalence and construct validity of patient ratings with 65 qualitative subjects as well as an examination of how these measures preform quantitatively. The goal of this work is to see if commonly used performance measures adequately capture instances of coercion and explore why patients who are subject to coercion might rate their care highly.

This body of work problematizes status quo approaches in patient-centeredness measurement with practical implications for quantifying rights abuses for an important population: sterilized women. The findings are relevant given current accounting practices that may mask, rather than reveal, issues of coercion in healthcare as well as the demographic effects of uninformed sterilization concentrated within specific populations.

CHAPTER 6, REFERENCES

1. the WHO. Eliminating forced, coercive and otherwise involuntary sterilization. *The WHO*. Published online 2014. Accessed October 1, 2019. https://www.who.int/reproductivehealth/publications/gender_rights/eliminating-forced-sterilization/en/

2. *Revised Compensation Package to Acceptors of Sterilization and IUD Insertions at Public Health Facilities and Private Accredited Facilities*. Government of India, Ministry of Health and Family Welfare; 2007.

3. *Enhanced Compensation Scheme - 2014' For Sterilization Services*. Government of India, Ministry of Health and Family Welfare; 2014.

4. Mohanty SK, Mishra S, Chatterjee S, Saggurti N. Pattern and correlates of out-of-pocket payment (OOP) on female sterilization in India, 1990–2014. *BMC Womens Health 2020 201*. 2020;20(1):1-13. doi:10.1186/S12905-020-0884-1

5. Bansal A, Dwivedi LK. Sterilization regret in India: Is quality of care a matter of concern? *Contracept Reprod Med*. 2020;5(1):1-12. doi:10.1186/s40834-020-00115-8

6. Sharapov D, Kattuman P, Rodriguez D, Velazquez FJ. Using the SHAPLEY value approach to variance decomposition in strategy research: Diversification, internationalization, and corporate group effects on affiliate profitability. *Strateg Manag J*. 2021;42(3):608-623. doi:10.1002/smj.3236

7. Standards for Female and Male Sterilization Services. Published online 2006.

8. Bates, Genevieve. Racial Justice as Transitional Justice: Framing and Public Support for Racial Justice Initiatives in the United States.

9. Arathi PM. Unaccountable Deaths and Damages: An Analysis of Socio-Legal Implications of Sterilisation Camp Deaths in Bilaspur, Chhattisgarh. In: *Universallising Healthcare in India*. Springer Singapore; 2021:141-154.

10. Ramakant Rai v. Union of India, W.P (C) No 209 of 2003. ESCR-Net. Accessed October 20, 2022. https://www.escr-net.org/caselaw/2013/ramakant-rai-v-union-india-wp-c-no-209-2003

11. Devika Biswas v. Union of India & Others, Petition No. 95 of 2012 | ESCR-Net. Accessed November 3, 2021. https://www.escr-net.org/caselaw/2017/devika-biswas-v-union-india-others-petition-no-95-2012

12. Biswas D. IN THE SUPREME COURT OF INDIA CIVIL ORIGINAL JURISDICTION. 2012;(95):51.

13. *Manual for Family Planning Indemnity Scheme*.; 2013.

14. Muttreja P, Singh S. Family planning in India: The way forward. *Indian J Med Res*. 2018;148(7):1-9. doi:10.4103/ijmr.IJMR_2067_17

15. Satia J, Chauhan K. Steps Taken by the Government of India to Improve Quality of Care. In: Satia J, Chauhan K, eds. *Improving Quality of Care in Family Planning: A Research and Advocacy Agenda for India*. Springer; 2018:33-52. doi:10.1007/978-981-10-8132-3_3

16. Jadhav BJ, Gomare M, Chandanshive V. Failed tubectomy procedures: a retrospective study. *Int J Reprod Contracept Obstet Gynecol*. 2021;10(10):3775-3779.

17. Nigam S. Compulsory Coercive Sterilizations and Women's Health: A Judicial Perspective. Published online March 21, 2017. doi:10.2139/ssrn.2938599

18. Mohanan M, Vera-Hernández M, Das V, et al. The know-do gap in quality of health care for childhood diarrhea and pneumonia in rural india. *JAMA Pediatr*. 2015;169(4):349-357. doi:10.1001/jamapediatrics.2014.3445

19. Senderowicz L. Contraceptive Autonomy: Conceptions and Measurement of a Novel Family Planning Indicator. *Stud Fam Plann*. 2020;51(2):161-176. doi:10.1111/sifp.12114

20. Peru: Forced Sterilization of 272,000 Indigenous Women "Not a Crime Against Humanity." Accessed May 31, 2020. https://stopgetrees.org/peru-forced-sterilization-of-272000-indigenous-women-not-a-crime-against-humanity/

21. Roberts. *Killing the Black Body*. Vintage Books, Random House; 1997.

22. Ghandakly EC, Fabi R. Sterilization in US Immigration and Customs Enforcement's (ICE's) Detention: Ethical Failures and Systemic Injustice. *Am J Public Health*. 2021;111(5):832-834. doi:10.2105/AJPH.2021.306186

23. Sterilization in US Immigration and Customs Enforcement's (ICE's) Detention: Ethical Failures and Systemic Injustice | AJPH | Vol. 111 Issue 5. Accessed October 26, 2022. https://ajph-aphapublications-org.ezp-prod1.hul.harvard.edu/doi/full/10.2105/AJPH.2021.306186?role=tab

24. Kumar K, Singh A, Tsui A. Measuring contraceptive use in India: Implications of recent fieldwork design and implementation of the National Family Health Survey. *Demogr Res*. 2022;47:73-110. doi:10.4054/DemRes.2022.47.4

25. Price K. What Is Reproductive Justice? *Meridians*. 2020;19(S1):340-362. doi:10.1215/15366936-8566034

26. Roberts D. Reproductive Justice, Not Rights. *Dissent Univ Pa Press*. 2015;62(4):79-82.

27. Eaton AA, Stephens DP. Reproductive Justice Special Issue Introduction "Reproductive Justice: Moving the Margins to the Center in Social Issues Research." *J Soc Issues*. 2020;76(2):208-218. doi:10.1111/josi.12384

28. The Face of Women's Health: Helen Rodriguez-Trias | AJPH | Vol. 92 Issue 4. Accessed December 4, 2022. https://ajph.aphapublications.org/doi/full/10.2105/AJPH.92.4.566

29. Alonso P. Autonomy Revoked: The Forced Sterilization of Women of Color in 20th Century America. *Health Equity*. 2018;2(1):249-259. doi:10.1089/heq.2017.0045

30. The Helen Rodriguez-Trias Papers 1929-2002 (Bulk 1981-2001). Accessed December 4, 2022. https://centropr-archive.hunter.cuny.edu/sites/default/files/faids/rodriguez_triasb.html