Study of the conditional cash transfer programme *Janani Suraksha Yojana* for the promotion of institutional births: Studies from selected Indian states

**Bharat Randive**

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“The idea that some lives matter less is the root of all that is wrong with the world.”

– Paul Farmer
Preface

As a child born in a village in rural Maharashtra, India, I have experienced and witnessed what deprivation and access to health and education mean and how they affect people’s lives. I have struggled against many odds to be the best-performing student possible throughout my schooling and college years. This background influenced my thinking and made me passionate about finding simple, feasible solutions to address people’s real-life problems. My status as a meritorious student has allowed me to earn various scholarships enabling me to study medicine, which is otherwise very expensive. However, though my five years of studying Ayurvedic medicine made me a doctor, it did not take me long to realize the limitations of medical science: specifically, that context often prevents it from benefitting many of those who need it most. This realization resulted in a search for a broader understanding of health issues and underlying causes of systemic problems, ultimately leading me down a seemingly unusual track for medical doctors in India. For a few years, I lived in rural sites as a doctor for community health projects advocating for the primary health care approach and empowering communities, especially women. During my seven-plus years of working with the Foundation for Research in Community Health, Pune, I had the opportunity to debate and discuss at length the social, economic and political issues related to health problems with veterans like Dr. N. H. Antia and many other peers with diverse professions, ranging from academicians, journalists, policy analysts, health activists, economists and lawyers to clinicians, rural practitioners and paramedics. My early research explored the operations of maternal health programmes. My experiences of rural medical practice, my understanding of health complexities, and my passion for social justice have largely influenced my choice of research topic for this doctoral work.

After approximately seven years of working in the field, I was sure I wanted to contribute to the generation of useful evidence for people’s health; thus, I embarked on the endeavour of applied public health research. After being introduced to the MATIND project in 2011 by a senior mentor, Dr. Dileep Mavalankar, I chose to move to the state of Madhya Pradesh, where the project was based, in order to pursue doctoral research from one of the best European universities. My numerous scientific responsibilities while working on the MATIND project offered me opportunities for micro-level study; however, for my thesis, I was more inclined to undertake large-scale, macro-level research. I began this research work by training myself to study health budgets, costing and ways to fit economic models to assess the effects of cash transfer programmes. I formulated several research questions for this
thesis and spent long hours discussing suitable methods with my primary supervisor, Lars Lindholm. Although many of my initial ideas failed to turn into studies, due to either a lack of suitable data or programme design issues, I learned a great deal from the failed experiments, largely thanks to the openness and guidance of Lars, who patiently allowed me to explore so much. The doctoral courses in social epidemiology and multilevel modelling were of great interest to me, and they equipped me to study inequalities and area-level effects. I have enjoyed applying part of this knowledge to the development of paper II of this thesis. I am glad that this thesis is unique and that it answers the very specific questions about cash transfer programmes that policy makers and academicians have been looking for. I hope this evidence is used for further programme design and policy making in resource-poor settings in order to facilitate the efficient use of limited resources to the benefit of the needy.

Bharat Randive

Umea, December 15, 2015
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Abstract

Background: To accelerate the coverage of skilled birth attendance, in 2005, the Indian government initiated a conditional cash transfer (CCT) programme, Janani Suraksha Yojana (JSY) that provides cash to women upon delivering in health facilities. The attempt to increase the utilization of facilities through the JSY, given the health system’s fragile state, has raised concerns about the programme’s success at achieving its intended goal of reducing maternal mortality ratio (MMR).

Aim: To understand the implementation of the CCT policy to promote institutional births in India, with a special focus on nine of India’s poorer states.

Methods: Thesis uses both quantitative and qualitative methods. The changes in coverage and inequalities in institutional births in the nine states following the initiation of JSY were analysed by comparing levels before and during the programme using state and district level data. The association between the coverage of institutional births and MMR was assessed using regression analysis (I). The change in socioeconomic inequalities in institutional births was estimated using the concentration index and concentration curve, and contributions of different factors to inequalities was computed by decomposition analysis (II). The quality of referral services was studied by conducting a survey of health facilities (n=96) and post-partum women (n=1182) in three districts of Madhya Pradesh. Conditional logistic regression was used to study the association between maternal referrals and adverse birth outcomes, while spatial data for referrals were analysed using Geographical Information Systems (III). Semi-structured interviews were conducted with government and non-government stakeholders (n=11) to explore their perceptions of the JSY, and the data were analysed using a thematic framework approach (IV).

Results: In five years, institutional births increased significantly from a pre-programme average of 20% to 49%. However, no significant association between district-level institutional birth proportions and MMR was found (I). The inequality in access to institutional delivery care, although reduced since the introduction of JSY, still persists. Differences in male literacy, availability of emergency obstetric care (EmOC) in public facilities and poverty explained 69% of the observed inequality. While MMR has decreased in all areas since the introduction of JSY, it has declined four times faster in the richest areas than in the poorest (II). Adjusted odds for adverse birth outcomes among those referred were twice than in those who were not referred (AOR 2.6, 95% CI 1.1-6.6). A spatial analysis of the inter-facility transfer time indicated that maternal deaths occurred despite good geographic access to EmOC facilities (III). While most health officials considered stimulus in the form of JSY money to be essential to promote institutional births, non-government stakeholders criticised JSY as an easy way of addressing basic developmental issues and emphasised the need for improvements to health services, instead. Supply-side constraints and poor care quality were cited as key challenges to programme success, also several implementation challenges were cited (IV).

Conclusions: Although there was a sharp increase in coverage and a decline in institutional delivery care inequalities following the introduction of JSY, the availability of critical care is still poor. CCT programmes to increase service utilization need to be essentially supported by the provision of quality health care services, in order to achieve their intended impacts on health outcomes.

Keywords: Maternal health, Conditional cash transfer, Inequality, Referral, India
Original Papers


Paper IV. Randive, B., De Costa, A., Tolhurst, R. India’s JSY cash transfer programme to reduce maternal mortality: Stakeholder perceptions of its appropriateness, achievements and challenges. (Manuscript)
## List of abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>ABSMs</td>
<td>Area-based Socioeconomic Measures</td>
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<td>AHS</td>
<td>Annual Health Survey</td>
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<td>ASHA</td>
<td>Accredited Social Health Activist</td>
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<td>CCT</td>
<td>Conditional Cash Transfer</td>
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<tr>
<td>CEmOC</td>
<td>Comprehensive Emergency Obstetric Care</td>
</tr>
<tr>
<td>CHC</td>
<td>Community Health Centre</td>
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<tr>
<td>CI</td>
<td>Concentration Index</td>
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<tr>
<td>COPASAHA</td>
<td>Community of Practitioners for Accountability and Social Action in Health</td>
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<tr>
<td>DH</td>
<td>District Hospital</td>
</tr>
<tr>
<td>EmOC</td>
<td>Emergency Obstetric Care</td>
</tr>
<tr>
<td>GIS</td>
<td>Geographic Information System</td>
</tr>
<tr>
<td>GoI</td>
<td>Government of India</td>
</tr>
<tr>
<td>INR</td>
<td>Indian Rupees</td>
</tr>
<tr>
<td>JSY</td>
<td>Janani Suraksha Yojana</td>
</tr>
<tr>
<td>LMICs</td>
<td>Low-Middle Income Countries</td>
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<tr>
<td>MDG</td>
<td>Millennium Development Goal</td>
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<tr>
<td>MMR</td>
<td>Maternal Mortality Ratio</td>
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<tr>
<td>MoHFW</td>
<td>Ministry of Health and Family Welfare</td>
</tr>
<tr>
<td>MP</td>
<td>Madhya Pradesh</td>
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<tr>
<td>NRHM</td>
<td>National Rural Health Mission</td>
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<tr>
<td>PHC</td>
<td>Primary Health Centre</td>
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<tr>
<td>SBA</td>
<td>Skilled Birth Attendance</td>
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<tr>
<td>SES</td>
<td>Socio-Economic Status</td>
</tr>
<tr>
<td>SII</td>
<td>Slope Index of Inequality</td>
</tr>
<tr>
<td>RII</td>
<td>Relative Index of Inequality</td>
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<tr>
<td>UNFPA</td>
<td>United Nations Population Fund</td>
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<tr>
<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
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<td>WHO</td>
<td>World Health Organization</td>
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**Introduction**

India has historically been the largest contributor to global maternal deaths. Of the globally estimated 289,000 maternal deaths in 2013, 17% occurred in India (World Health Organization, 2014b). Until 2004, since most deliveries in India took place at home, without skilled birth attendance (SBA) or access to emergency obstetric care (EmOC), the pace of decline in maternal and neonatal mortality remained low. Delivery in health facilities is expected to improve maternal and neonatal outcomes through timely access to SBA and strong referral services to EmOC when needed. In 2005, the Indian government launched a nationwide conditional cash transfer (CCT) programme, *Janani Suraksha Yojana* (JSY), to promote institutional births by providing cash incentives to women upon giving birth in health institutions. The JSY programme represented a major change in the Indian government’s efforts to make childbirths safe, marking a significant departure from the previous “safe motherhood” programmes, which focused mainly on strengthening the health care delivery system.

This thesis aims to explore the implementation of the JSY programme, one of largest CCT programmes of its kind, in the context of low-resource settings. The thesis comprises four sub-studies, which highlight the achievements, challenges and learnings of implementing the JSY programme, a demand-side intervention for improving maternal and neonatal health outcomes. Changes to the coverage of institutional births and the association between this coverage and the maternal mortality ratio (MMR) are assessed. In light of the large socio-economic inequality in access to institutional delivery care, changes to this inequality during the JSY programme are examined, and the availability of EmOC and the decline in maternal mortality among different socioeconomic groups during the programme are also studied. Since large portions of the population live in rural areas, and since specialist services are concentrated in urban areas, strong referral services between lower- and higher-level facilities are crucial to save the lives of women and babies in the event of obstetric complications.

In particular, one sub-study in this thesis focuses on assessing the quality of inter-facility referrals. In addition, the thesis also explores the perceptions of health officials involved in the implementation of the JSY programme at various levels of the health system, as well as the experiences of non-governmental stakeholders working on maternal health issues.

I begin by presenting a background of the burden of maternal mortality, both globally and in India, including an exploration of strategies to address the maternal mortality problem and a discussion of the Indian health system context. Then, I present the objectives of the studies, followed by the study methods and results. Finally, in the discussion section, I present an interpretation of the results and methodological considerations.
Background

Global burden of maternal mortality

In 2000, 189 countries adopted the Millennium Declaration (United Nations, 2000). In so doing, these countries committed to reducing their respective maternal mortality by three-fourths of 1990 levels by the year 2015; this was Millennium Development Goal 5 (MDG5) (United Nations, 2000). The inclusion of this goal in the Declaration increased the global priority of maternal health, as reflected in the participating countries’ strategies. Despite global commitments and focused efforts on maternal mortality reduction, achieving the targeted reduction remains a challenge. The persistence of preventable maternal mortality is seen as not only tragic, but also as an injustice (United Nations Human Rights Council, 2009).

A recent report by the World Health Organization (WHO) estimated that, globally, there were 289,000 maternal deaths in 2013, representing a 45% decline from 1990 levels (World Health Organization, 2014b). Further, a-country level analysis shows that only 19 countries achieved their MDG5 by 2013. An average annual decline of 5.5% was required to achieve this MDG; however, the pace of decline remained below this level in many countries. Of the countries that had MMRs of 100 or more in 1990, 63 making progress with average annual declines between 2 and 5% between 1990 and 2013, while 13 countries did not make sufficient progress (World Health Organization, 2014b).

Despite global efforts to reduce maternal mortality, it remains the greatest inequity of the 21st century. The stark disparities in MMRs of different regions indicate regional differences in the efforts to reduce maternal mortality. In 2013, the MMR of developing regions (230) was 14 times higher than that of developed regions (16). Sub-Saharan Africa (62%) and Southern Asia (24%) account for 86% of global maternal deaths, while two countries, India (17%) and Nigeria (14%), account for one-third of all global maternal deaths (World Health Organization, 2014b).

The WHO analysis of the causes of maternal deaths estimates that about 73% of all maternal deaths between 2003 and 2009 were due to direct causes, including mainly haemorrhage (27.1%), hypertension (14.0%), sepsis (10.7%) and abortion (7.9%) (Say et al., 2014). Another recent study on the causes of maternal mortality revealed that the causes of maternal mortality varied by region and period between 1990 to 2013; however, the report clearly indicates that most maternal deaths occurred during the intrapartum or postpartum period (Kassebaum et al., 2014). Access to facility-based care during this period is, hence, identified as crucial to the preservation of maternal lives. There has been an increase in the global focus on increasing access to SBA and EmOC (Campbell et al., 2006).
Globally, initial (early 1990s) safe motherhood strategy was focused primarily on antenatal care and the training of traditional birth attendants (TBAs) in clean delivery and timely referral to facilities when necessary. Thus, this strategy was one of home-based pregnancy and delivery care, relying on TBAs for the detection of high-risk pregnancies and complications and subsequent referral to health care facilities (Shiffman & Smith, 2007). However, studies on the effectiveness of this approach revealed that symptoms detectable during pregnancy had poor predictive power for maternal mortality (Bergsjo & Villar, 1997; Cochrane, 1973). In addition, both TBA training and antenatal care strategies relied on the assumption of an effective referral, which, in practice, faced numerous barriers. Moreover, evidence regarding the impact of TBA training on maternal mortality remained inconclusive (Sibley et al., 2004; De Brouwere, 1998). Based on such evidences, in 1999, the WHO stated that ‘there is no reason to believe that TBA training can contribute to MMR reduction in isolation’ (World Health Organization, & UNICEF, 1999).

Subsequent to this statement, and given evidence that a large proportion of maternal deaths occur during the intrapartum period, the focus shifted from a TBA-based safe motherhood strategy to a facility-based intrapartum care strategy that included increasing women’s access to SBA and EmOC. SBA was referred to as care provided to a woman and her newborn during pregnancy, childbirth and immediately after birth by an accredited and competent health care provider with access to necessary equipment and the support of a functional health system, including transport and referral facilities for EmOC (World Health Organization, 2004). Such accredited health care provider, capable of providing care for normal delivery and of providing either timely detection and referral or care for complicated deliveries, was termed as a ‘skilled birth attendant’. EmOC (Bailey et al., 2009) was defined as a set of key lifesaving interventions, comprising (1) the administration of parenteral antibiotics, (2) parenteral oxytocics, (3) parenteral anticonvulsants, (4) the manual removal of placenta, (5) removal of retained products of conceptions, (6) assisted vaginal delivery, (7) caesarean section, and (8) blood transfusion. Neonatal resuscitation was later added to these eight signal functions. In 1999, the WHO, along with UNFPA, UNICEF and the World Bank, called on countries to ‘ensure that all women have skilled care during pregnancy, childbirth and immediate postnatal period’ (World Health Organization, & UNICEF, 1999). Thus, health-centre-based intrapartum care strategies were prioritised as the best way to reduce maternal mortality. The leading causes of newborn deaths are intrapartum events, complications from preterm births and sepsis. Hence, in addition to averting maternal deaths, quality intrapartum care can significantly reduce neonatal mortalities due to these causes and can also reduce the high
number of stillbirths each year (about 2.6 million) (World Health Organization, 2014a). In 2000, MDG5 was set to monitor countries’ progress towards the reduction of maternal mortality, and MDG5’s related indicator of progress was set as the proportion of births attended by SBAs. Since then, the global health community has been monitoring the coverage of SBA (Bhutta et al., 2010).

**Coverage of skilled care at birth**

Globally, strategies to reduce maternal mortality (i.e., delivery by SBAs, with the assurance of EmoC) are underutilized, and progress in their coverage is both slow and unequal. The proportion of deliveries attended by SBAs in developing regions rose from 55% in 1990 to 65% in 2010 (United Nations, 2012). The regions with the highest maternal mortalities, including Sub-Saharan Africa and Southern Asia, also have the lowest SBA coverage. Another analysis of post-1990 SBA coverage in 35 low- and middle-income countries (LMICs) revealed that SBA coverage has increased in all countries; however, it also found pro-rich inequalities in its coverage (Victora et al., 2012). Interestingly, this analysis found that countries able to make faster progress in coverage were able to increase coverage among the poorest population subgroups, thus contributing to the reduction of coverage inequalities. An equity analysis of interventions in 54 countries in the countdown to 2015 revealed that SBA coverage was the least equitable of 12 key maternal and child health interventions; specifically, SBA coverage between the wealthiest and poorest population quintiles differed by 52% (Barros et al., 2012). Thus, a major challenge in reducing maternal and neonatal mortality is to speed up SBA and EmOC coverage. Various initiatives to improve access to health facilities during childbirth are, therefore, being implemented in a majority of regions with inadequate access to facility care.

**Demand- and supply-side barriers to access to skilled care at birth**

Health and treatment-seeking behaviour models from various disciplines like social psychology, medical sociology and medical anthropology, have been developed and used to identify problematic areas in the utilization of health care services to intervene with specific health system strategies. One of the most well-known models is Andersen’s Health Care Utilization Model (Andersen & Newman, 2005), which considers three groups of factors influencing health behaviours or the use of health services. These are: (i) predisposing factors, such as age, gender, education, prior experience, knowledge about illness, etc.; (ii) enabling factors, such as the availability of services, financial resources to purchase services, etc.; and (iii) need factors, such as perceptions of illness severity, work loss due to illness, etc. Further
health system factors were added to this model. Another popular model groups key factors for health-seeking behaviours into the ‘four As’ (Hausmann-Muela et al., 2003): (i) availability: the geographic distribution of health facilities; (ii) accessibility: road connectivity and transport; (iii) affordability: cost for treatment; (iv) acceptability: cultural and social distance. The main critique of these health-seeking behaviour models is that they centre on personal characteristics and, thus, tend to ‘blame the victim’ in a way by showing individuals themselves as being responsible for the low utilization of health services.

The utilization of health care services is an operational proxy for access to health care services. An analytical framework for understanding the barriers to accessing health services suggests that barriers to access stem primarily from the demand side and/or the supply side (Jacobs et al., 2012). Demand-side factors, such as a low capacity to pay for services, a lack of knowledge of health facilities and services offered, poor education, household preferences, etc., influence the ability to use health services at the individual, household and community levels. Supply-side factors, such as the cost and quality of care, the availability and appropriateness of services, etc., are the health system factors that hinder service uptake. The major supply-side factors limiting the provision of care to the poor are insufficient resources for health, an inappropriate allocation of scarce resources and inadequate provision of quality care. On the demand side, two factors have been said to suppress demand: constraints and preferences. Household income, health care costs and costs to access care are main determinants of constraints, while preferences are influenced by culture, awareness of potential health benefits and services quality.

Hence, measures aimed at increasing the utilization of effective interventions, such as SBA and EmoC, need to be based on a good analysis of underlying access barriers. The analysis of underlying factors that hinder the utilization of health care services helps in the design of appropriate interventions, as well as in the evaluation of interventions to be implemented in various countries. Access barriers may not always be either demand-side or supply-side; these two sides may interact with and influence each other. Hence, solving the access problem many times requires tackling both demand- and supply-side issues (Ensor & Cooper, 2004; O'Donnell, 2007).

Recognising the stagnation in uptake of effective strategies, governments and development partners have been experimenting with various innovative approaches. On the supply side, performance-based financing (Meesen & Musango, 2006; Savedoff & Partner, 2010), such as contracting in or contracting out, has been implemented. In several developing countries, initiatives that work on the demand side through economic incentives have been implemented to increase the utilization of health care services. Examples of popular demand-side financing programmes include voucher
programs (Nguyen, et al., 2012) and conditional cash transfers (Marshall & Hill, 2014).

**Conditional cash transfers (CCTs) to improve health service utilization**

Conditional cash transfers are increasingly becoming popular as measures to improve the utilization of effective interventions, mostly in the health and education sectors. CCTs represent one of the largest demand-side financing initiatives, with a large spread that spans numerous countries and various beneficiary scales. CCT programmes provide monetary benefits to poor people who meet certain pre-set conditions (Fiszbein et al., 2009; Marshall & Hill, 2014; Valencia Lomeli, 2008). In general, the conditions for CCT programmes focus on inducing behavioural change towards desirable behaviours, such as the utilization of preventive health services (like the vaccination of children, antenatal check-ups and deliveries in health facility or the schooling of children). Though the principle aim of CCTs has been to alleviate poverty through the direct transfer of money to poor households, CCT programmes also contribute to building human capital, influencing improvements in both the education and the health of poor people through their conditions.

Historically, CCT programmes have their origins predominantly in 1990 in Latin America, including Mexico, Brazil, Colombia, Honduras, Nicaragua and Ecuador and later have become popular in many other developing countries over the last decade (Rawlings & Rubio, 2003). Popular examples of CCTs include Brazil's BolsaFamilia (Lindert et al., 2007) and Mexico's Oportunidades (Fernald et al., 2008), which cover millions of households. Apart from their popular use as a policy tool to address inequalities and prevent the intergenerational transmission of poverty, CCTs have also been used to address gender disparities in the schooling of children, primarily in South Asian countries.

The literature documents several studies aiming to understand the usefulness of CCTs; although these have created a rich body of knowledge, there remain many unanswered questions. The evaluations so far have shown CCTs to be largely successful at increasing school attendance and the utilization of health services and reducing poverty (Lagarde et al., 2007; Baird et al., 2013). Although there is promising evidence concerning the success of CCTs in increasing health service utilization, the literature remains less clear about their long-term impacts on health outcomes. Several factors are known to be determinants of a CCT program's success at achieving its goals (Doetinchem et al., 2008). Examples of such factors include the design of the CCT programme, the amount of money offered, the programme duration, targeting efficiency and transparency. In addition to these factors, an important role is played by the context in which the CCT
programme is implemented. For instance, in a CCT programme to increase the utilization of health services and, thereby, achieve improved health outcomes, available and good-quality health services within the programme are essential. If the health services provided are not adequately available or are of poor quality, a CCT is unlikely to achieve improved health outcomes. Thus, though CCTs can stimulate demand for health or education, the availability of good-quality supply-side is a prerequisite for the CCT’s success at improving outcomes. The essentiality of good-quality care on the supply side when attempting to raise the demand for services through CCTs is also evident from an overview of five CCTs in South Asian countries by Jehan et al., who documented the increased utilisation of maternal health services, but a lack of evidence of improved maternal health outcomes and suggested the need for improved quality of care (Jehan et al., 2012).

This thesis presents a study of a CCT programme aimed at improving access to SBA and EmOC by incentivizing the utilization of facility births in the Indian context.

**Maternal health situation in India**

India is home to one of the highest number of maternal deaths globally. India’s contribution to the global maternal death burden was 17% in 2013. During the period between 1990 and 2012, India reduced its MMR from 437 to 178 per 100,000 live births (Registrar General of India, 2006a; Registrar General of India, 2013) (Figure 1). According to WHO estimates, India achieved an average annual MMR decline of 4.5% between 1990 and 2013 (World Health Organization, 2014b). However, this decline did not appear to match the pace needed to achieve the MDG5 target of 109 by 2015. Given the size of the country, national estimates conceal wide regional variations. Disaggregated MMR estimates reveal wide inter-state disparities in the maternal health situation (Figure 2). For example, three large states—Kerala, Tamil Nadu and Maharashtra, with MMRs of 66, 90 and 87 per 100,000 births, respectively—have already achieved the MDG5 target (Central Statistical Organization, 2011). However, in nine other large states, MMR estimates still range between 219 and 328. The MMR for Northern states (257) is 2.5 times higher than that for Southern states (105) (Registrar General of India, 2013).
Maternal mortality in India occurs largely due to direct obstetric causes. The latest available analysis of causes of maternal mortality in India shows that haemorrhage (38%) is the leading cause, followed by sepsis (11%), unsafe abortions (8%), hypertensive disorders (5%) and obstructed labour (5%)(Registrar General of India, 2006a). Although these are the biomedical causes of maternal deaths, there also exists a complex chain of socio-demographic and health-system-related causes that lead to the death of women in maternity (Sri B et al., 2012; Sri B, 2015). However, the scarce focus on maternal death reviews thus far has resulted in the neglect of non-medical causes of maternal deaths and the determination of appropriate corrective measures.

Figure 1: Trends in maternal mortality ratio in India. Data source: Sample Registration System, Government of India
Figure 2: Maternal mortality ratio of Indian states (2010-12)
Source: Sample Registration System, Government of India.

Maternal health initiatives in India
Maternal health care in India has been part of the family welfare programme since its inception in 1952. Several interventions were subsequently introduced; however, family planning remained a major intervention. The
The evolution of maternal health programmes in India is shown in Table 1 and briefly described in the following paragraphs.

Table 1: Evolution of maternal health programmes in India

<table>
<thead>
<tr>
<th>Year</th>
<th>Milestone</th>
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<tr>
<td>1952</td>
<td>Family Planning programme adopted by the Government of India</td>
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<td>1961</td>
<td>Department of Family Planning created in the Ministry of Health</td>
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<tr>
<td>1971</td>
<td>Medical Termination of Pregnancy Act (MTP Act), 1971</td>
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<td>1977</td>
<td>Renaming of Family Planning to Family Welfare</td>
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<td>1992</td>
<td>Child Survival and Safe Motherhood (CSSM) Programme</td>
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<tr>
<td>1996</td>
<td>Target-free approach</td>
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<tr>
<td>1997</td>
<td>Reproductive and Child Health Programme-I (RCH-I)</td>
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<tr>
<td>2005</td>
<td>Reproductive and Child Health Programme-II (RCH-II)</td>
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The Child Survival and Safe Motherhood (CSSM) programme was implemented in India between 1992 and 1997 (World Bank, 1997). The CSSM programme broadened the scope of Safe Motherhood programmes beyond previous target oriented family planning programme. This programme focused on essential obstetric care provision through the training of traditional birth attendants (TBAs) and auxiliary nurse midwives (ANMs) to identify high-risk pregnancies. Delivery care services were planned to be community-based and accomplished through the provision of disposable delivery kits. Along with its community-based focus, the programme also emphasised strengthening health services by, for example, establishing First Referral Units (FRUs) for secondary-level obstetric and neonatal care and by strengthening the institutional capacity for logistics, information systems, and information, education and communication (IEC) activities. During the CSSM programme, deliveries assisted by trained personnel increased from 34% in 1991 to 54% in 1996, while facility births increased from 25% to 32% (International Institute for Population Sciences & ORC Macro, 2000). The programme, however failed to establish a functional FRU and referral system, and it suffered from the scarce availability of specialists and blood transfusion facilities.

The CSSM programme was followed by the Reproductive and Child Health-I (RCH-I) programme (World Bank, 2005), which was implemented between 1998 and 2004. In the RCH-I programme, the focus on training TBAs was maintained, despite international evidence of its low effect. This programme emphasised the provision of Ante natal care (ANC), safe home deliveries and institutional deliveries. The RCH-I programme also emphasised operationalization of FRUs. Ultimately, the RCH-I programme was successful in achieving some ANC improvements and institutional deliveries; however, most improvements occurred in the country’s better off states. The
proportion of pregnant women with the minimum of three ANC visits was 45% in 2002 (International Institute for Population Sciences, 2007). Meanwhile, the number of facility births rose slightly, achieving 40% in 2002, while only 11% of births at home were assisted by trained TBAs. The lack of availability of specialists and safe blood transfusion facilities persisted, as did the small number of functional FRUs (World Bank, 2005).

The above-mentioned programmes improved some key maternal health indicators, while others, like the proportion of institutional births, remained slow to improve (Table 2).

**Table 2: Progress in maternal health indicators in India**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ante-natal care: (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any visit</td>
<td>62.3</td>
<td>65.4</td>
<td>65.3</td>
<td>74.0</td>
<td>75</td>
</tr>
<tr>
<td>At least three visits</td>
<td>-</td>
<td>43.8</td>
<td>44.2</td>
<td>44.5</td>
<td>50</td>
</tr>
<tr>
<td>Deliveries: (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Institutional</td>
<td>25.5</td>
<td>33.6</td>
<td>34.0</td>
<td>39.8</td>
<td>47</td>
</tr>
<tr>
<td>Safe delivery*</td>
<td>34.2</td>
<td>42.3</td>
<td>40.2</td>
<td>48</td>
<td>52.7</td>
</tr>
<tr>
<td>Anaemia (in women)</td>
<td>-</td>
<td>-</td>
<td>51.8</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

NFHS: National Family Health Survey DLHS: District-level Household Survey

*Safe delivery: Institutional deliveries + Deliveries conducted at home by skilled staff (not including deliveries by TBAs)

The second phase of the Reproductive and Child Health programme-II (RCH-II) was initiated in 2005 (World Bank, 2012). In its second phase, the programme admitted that the TBA strategy with the high-risk pregnancy approach did not work. Therefore, it began to promote a facility-based intrapartum care model with the objective of improving access to skilled care at birth and EmOC. The RCH-II programme focused on the operationalization of PHCs and CHCs to provide basic emergency obstetric care (BEmOC) services and FRUs for comprehensive emergency obstetric care (CEmOC) services. It also emphasised the coverage and quality of antenatal and postnatal care. The RCH-II programme also engaged the private sector in the provision of maternity care. The RCH-II programme was launched along with an Indian health system reform—the National Rural Health Mission (NRHM) (Ministry of Health and Family Welfare, 2005a)—that promised to increase the allocations to health in the national budget and to make architectural changes to the health system. These characteristics distinguished the context for the RCH-II programme from those of previous programmes. The NRHM is described in more detail in the following sub-sections. Another peculiarity of the RCH II programme has
been the demand-side intervention—that is, the JSY (Ministry of Health and Family Welfare, 2006) cash transfer scheme to promote the utilisation of health facilities for childbirth.

**Janani Suraksha Yojana (JSY) to promote institutional births in India**

Due to the low uptake of facility-based care for childbirth during the previous safe motherhood programmes (i.e., CSSM and RCH I), the JSY was launched in 2005. The JSY is a nationwide flagship programme, under the umbrella of the NRHM that provided monetary incentives to women upon delivering in public or accredited private health facilities. The underlying assumption of the JSY is that, if women deliver in health facilities instead of at home, they will be able to access skilled and emergency obstetric care in the event of complications. However, there exist several financial barriers to accessing health facilities. Hence, cash incentives were proposed as a way to enable women to overcome the financial barriers to accessing institutional care for delivery, ultimately contributing to the reduction of maternal and neonatal deaths. The JSY programme marked a major change in the Indian government’s strategies to make childbirths safe from previous safe motherhood programmes. While previous efforts focused mainly on strengthening the supply side through, for example, the training of birth attendants and the improvement of health facilities’ functionality, the JSY programme seeks to address the demand-side barriers preventing women from accessing health facilities for childbirth.

The JSY is based on the principles of CCTs, which provide monetary benefits to target populations on the condition of engaging in a certain desired behaviour: in this case, delivery in a health facility. The amount of the incentive differs according to state performance regarding the proportions of institutional births at the time of the scheme’s design, to the residence of the intended beneficiary (e.g., rural or urban) and, in some states, to the beneficiary’s economic status (living below poverty line (BPL)) and castes (scheduled castes (SC) or scheduled tribes (ST)) (Table 3).

<table>
<thead>
<tr>
<th>State category</th>
<th>Eligibility criteria</th>
<th>Monetary incentive (INR)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Rural</td>
</tr>
<tr>
<td>Low-performing states</td>
<td>All women delivering in public or accredited private institutions</td>
<td>1400</td>
</tr>
<tr>
<td>High-performing states</td>
<td>Women from BPL, SC and ST households delivering in public or accredited private institutions</td>
<td>700</td>
</tr>
</tbody>
</table>
Since the JSY cash assistance programme is designed to meet the costs related to facility-based delivery, it was planned to be disbursed when women were admitted to institutions for delivery. However, there were issues with transparency; thus, the payment began to be made by account pay cheque at the time of facility discharge. Recently, new mechanisms of direct electronic money transfer to beneficiary bank accounts have been initiated. In the early years of the JSY, in some states, the cash benefit was restricted to women from poor households, aged minimum 19 years, and having either their first or second childbirths. These conditions, however, were found to be discriminatory and contrary to the objectives of the JSY; hence, they faced criticism from civil society organizations and were later removed. The present criteria for receiving the JSY benefit are as noted in the table above. There are provisions for a small payment in the case of home deliveries among poor families; however, this route is not encouraged because it goes against the objective of improving institutional births. Moreover, initially, eligibility for the JSY benefit required women to have completed all of their ANC visits; this, too, was reduced in the ultimate implementation phase. Currently, the condition used in practice is a mandatory 48-hour stay at the facility following the delivery (although reports show many women leave the facility earlier).

The NRHM raised a cadre of trained women community health workers, called ASHAs (Accredited Social Health Activists), who play an important role in implementing the JSY at the grassroots level. The ASHAs, who number approximately one per village or one per thousand population, contact women during pregnancy and motivate them to access facility-based care for childbirths. The NRHM provides an incentive of about INR 600 to the ASHAs who escort women to facilities for childbirth, including payment for the transportation of the pregnant women.

The JSY has assisted 80 million beneficiaries since its inception (Ministry of Health and Family Welfare, 2015), and it is one of the largest CCT programmes for facility births in existence.

The health system in India

India is a federal union of 29 states and 7 union territories, with responsibilities and powers divided between the states and the central governments. Health is, principally, a state subject; thus, the Centre seeks to align the health programmes of the states with national goals through policy guidelines. Preventive services are funded primarily by the central government, while curative hospital-based services are funded by state governments.

The foundations of India’s health system were laid out by the Bhore Committee report in 1946 (Bhore, 1946). The Bhore committee recommended the integration of preventive and curative functions, linkages
with non-health sectors to address indirect causes of ill health and the provision of free health services for all. However, in subsequent years, the Indian health system has been characterized by an overemphasis on vertical programmes, rather than by an integrated care approach (Nundy, 2005).

Examples of such single-purpose vertical programmes include the tuberculosis control programme, the malaria control programme and the much-debated population control programme, among many others. The Alma Ata Declaration in 1978 that critiqued the vertical programme approach and promoted a focus on universal health coverage formed the background for India’s national health policy formed in 1983 (revised in 2002). India established a three-tier health system according to the following norms:

![Figure 3: Three-tier public health system in India](image)

The primary level includes sub-centres and primary health centres (PHCs). Sub-centres (three to five) are attached to PHCs. These sub-centres are manned by female auxiliary nurse midwives (ANMs) and by male multi-purpose workers (MPWs), and the PHCs employ general physicians, staff nurses and paramedical staff. Each PHC is intended to serve a population of 30,000 (20,000 in hilly areas).

The secondary level of the system comprises the Community Health Centres (CHCs), each of which have 30- to 50-bed capacities and some specialist services. Some CHCs are upgraded to FRUs that provide 24-hour access to surgical care, blood transfusions and specialist services. Each CHC is intended to serve a population of 100,000 (80,000 in hilly areas).
The tertiary level comprises district hospitals (one per district), which are 100- to 300-bed facilities with specialist services. Medical colleges are apex institutes with super specialty services available in selected cities. Irrespective of these norms, there remain wide variations in the availability of health infrastructures in different states. Recent rural health statistics show that 40% of specialist positions at secondary-level facilities are vacant (Ministry of Health and Family Welfare, 2012). The private sector has filled the public service deficit in many areas of the country; however, its spread has been restricted to urban areas. Although India has achieved some improvements in health (e.g., reducing total fertility rates from 6 births in the 1970s to 2.3 in 2013 and reducing infant mortality from 80 per 1000 live births in 1990 to 40 in 2013) (Registrar General of India, 2011), the general perception is that the health system has failed to bring about adequate improvements in the health of the population. The lack of adequate resources is thought to be one of the important causes for this perceived failure. Although the Bhore Committee recommended that states should spend at least 15% of their revenues on health, this has not yet happened. The 2013-14 economic survey of India shows that spending on health represents 1.99% of countries total budget, 1.4% of Gross Domestic Product (GDP) and 4.8% of total expenditure (Government of India, 2013). The recent WHO Global Health Expenditure database (2011-15) shows that out-of-pocket health expenditures in India represent 85.9% of all health spending (World Health Organization, 2013). The Indian health system is, hence, one of the most privatized health systems in the world. In fact, health care spending is one of the major causes of poverty in India (Selvaraj & Karan, 2009).

In 2004, the then-newly elected United Progressive Alliance government announced its Common Minimum Programme, which focused on improving health services and revitalizing the public health system. Towards this goal, the government launched an umbrella programme, the National Rural Health Mission, in 2005.

**National Rural Health Mission (NRHM) in India**

With due recognition to the importance of health in the process of economic and social development and with the goal of developing the quality of life of its citizens, in 2005, the Indian government launched the National Rural Health Mission. In 2011, an urban element was added, resulting in the National Health Mission. The main aim of the NRHM is to provide accessible, affordable, accountable, effective and reliable primary health care and to bridge the gaps in rural health care. The NRHM is operational throughout the entire country, with a special focus on 18 states including additional resources. The mission strategy of the NRHM was planned to integrate multiple vertical health programmes and their funds. Thus, the
NRHM developed a plan of action, which included the following major components:

i) Creating a cadre of trained community health workers (ASHAs)

ii) Strengthening sub-centres through the supply of essential drugs, the provision of additional ANMs for each sub-centre where needed, the sanction of new sub-centres according to 2001 population norms and the upgrading and strengthening of existing sub-centres with untied funds of INR 10,000 per annum

iii) Strengthening Primary Health Centres for quality preventive, promotive, curative, supervisory and outreach services through the adequate and regular supply of essential drugs and equipment, the provision of 24-hours services in at least 50% of PHCs (following standard treatment guidelines) and the upgrade of all PHCs to provide 24-hour referral services and provision of second doctors where needed

iv) Strengthening CHCs for first referral care by operationalising all CHCs as 24-hours FRUs through, for example, the posting of anaesthetists and the establishment of and adherence to new Indian Public Health Standards via the setting of norms for infrastructure, staffing, equipment, management, etc. and the promotion of local bodies called Rogi Kalyan Samitis, including citizen representatives, for hospital management.

Unlike centralized planning in the previous years, the NRHM strategy was to promote districts as central units of planning, budgeting and implementation. All vertical health and family welfare programmes were merged into a single common ‘District Health Mission’—and, at the state level, into ‘State Health Missions’. The NRHM also integrated the public health and management cadre into the health system by establishing state and district programme management units.

The NRHM’s goals specific to maternal and child health included reducing the MMR to 100/100,000 births, reducing the fertility rate to 2.1 and reducing the infant mortality rate to 30/1,000 live births. The JSY was the flagship programme of the NRHM for achieving these goals. The NRHM, through the demand generation of the JSY cash transfer programme and through measures to strengthen the supply side of the services, sought to provide improved facilities for institutional delivery, including the provision of referrals, transport, escorts, and improved and free-of-charge care for the poor.
Study justification

Demand-side financing programmes, including CCTs, have been attempted in various countries as newer ways of addressing the problem of underutilisation of health services. India’s JSY is one such CCT programme characterised by large-scale of implementation and a unique health system context. When this thesis was planned, there were few studies on the JSY; thus, it was felt that a study of the programme would be both timely and a useful addition to the knowledge on CCTs for maternal health in resource-poor contexts.

This thesis has global significance. India has historically been the largest contributor to global maternal deaths (of the globally estimated 289,000 maternal deaths in 2013, 17% were from India). This thesis studied nine large Indian states that account for 62% of maternal deaths in India; these states are socioeconomically less developed and have MMRs ranging between 219 and 328—higher than national estimates. Hence, global progress towards the achievement of MDG5, which is largely dependent on reducing maternal mortalities in India, is more specifically dependent on reducing maternal mortalities in the nine studied Indian states. The studies in this thesis focused on these nine states are, therefore, of current global relevance.

The JSY programme represents a major change in the Indian government’s strategy to make childbirths safe, marking a shift from the previous safe motherhood programmes, which primarily focused on strengthening the supply side of care. Experiences of CCTs in various countries show that, in addition to many design-level factors, the contexts in which CCTs are implemented play important roles in success. Notably, the health care supply side was not well equipped to provide adequate care to pregnant women at the time that the JSY programme was initiated, raising concern about the quality of care offered in health facilities and its potential effect on outcomes. However, there was limited literature available about the JSY. Previous studies on the JSY have been limited to exploring implementation processes, constrained by the data on maternal mortality and are based on data from the early years of the JSY. Therefore, to address important knowledge gaps regarding JSY, we examined change in institutional birth coverage following the initiation of the JSY programme and explored the association between the coverage of institutional births and the MMRs in nine Indian states (Paper I).

In addition to the overall low coverage of institutional deliveries in India, there was also a large inequality with regard to access to institutional delivery care. In 2005, only 13% of pregnant women in the poorest population quintile delivered in health facilities, compared with 84% in the richest population quintile. JSY was intended to benefit disadvantaged populations who had poor access to institutional care for childbirth and who
bore the brunt of maternal deaths. Hence, the increase in institutional deliveries following the implementation of JSY must be analysed from an equity perspective. Therefore, we explored the changes in socioeconomic inequality in institutional deliveries five years after the implementation of JSY. We also examined disparities in women’s access to Caesarean section services and MMR reductions among different socioeconomic groups during JSY (Paper II).

From paper I and II, we realised the importance of understanding whether the referral services in the JSY programme functioned effectively, given the criticality of these referral services to the program’s impact on mortality outcomes. The JSY is implemented in a public system with different levels of facilities functioning at various capacities; thus, access to life-saving EmOC is dependent on efficient first-line care and timely referrals when required. However, there were no secondary data or studies on the functioning or quality of referral services in India, especially in the context of the JSY programme. We addressed this knowledge gap through a study of primary data from Madhya Pradesh state (Paper III).

The JSY is one of the largest CCT programmes of its kind in the world, with 80 million beneficiaries since its inception. Increasing numbers of JSY beneficiaries also mean the consumption of larger proportions of public funds allocated to maternal health by the JSY incentive. Meanwhile, the health system continues to face a shortage of funds resulting in staff shortages, medicines, infrastructure, etc. After about a decade of implementation, following sharp increases in institutional births, the views and experiences of policy makers could provide useful insights for nations considering JSY-like programmes for MMR reduction. Also, it was during the implementation of JSY that, for the very first time in India, non-government stakeholders from civil society groups and academia were formally invited by the government to advice on health programmes. Their views regarding the JSY strategy and its implementation are, therefore, important sources of implicit knowledge on the programme. Hence, we conducted a qualitative study to understand views of JSY programme implementers and non-government stakeholders (experts) regarding the JSY programme (Paper IV).
Study objectives

Overall aim
This thesis aims to understand the implementation of the CCT policy to promote institutional births in India, with a special focus on the nine poorer Indian states.

Specific study objectives
1. To assess the change in institutional birth coverage following the initiation of the CCT programme (JSY) and to explore the association between the coverage of institutional births and the MMRs in nine Indian states (Paper I).

2. To estimate the changes in socioeconomic inequality in the utilization of health facilities for childbirth following the initiation of the CCT programme (JSY), to understand the relative contributions of different factors to existing inequalities and to assess existing disparities in access to EmoC and in the decline of MMRs among different socioeconomic groups in nine Indian states (Paper II).

3. To assess the quality of inter-facility obstetric referrals in the CCT programme JSY in three districts of Madhya Pradesh (Paper III).

4. To understand the perceptions of non-government stakeholders and programme implementers regarding the CCT programme (JSY), specifically with regard to its appropriateness in the given context, its achievements, its implementation challenges and its sustainability (Paper IV).
## Materials and methods
In this thesis, I have used both quantitative (I, II, III) and qualitative (IV) methods. Table 4 below provides an overview of the study objectives, the design and the analysis used for the four sub-studies in this thesis.

### Table 4: Study matrix showing sub-study objectives design and analyses

<table>
<thead>
<tr>
<th>Sub-study I</th>
<th>Sub-study II</th>
<th>Sub-study III</th>
<th>Sub-study IV</th>
</tr>
</thead>
</table>
| **Objectives** | i) To assess the change in the coverage of institutional births following the initiation of the CCT program  
ii) To examine the association between the coverage of institutional births and the MMR | i) To estimate the change in socio-economic inequality in the utilization of health facilities for childbirth following the initiation of the CCT programme and to understand the contributions of different factors to existing inequalities  
ii) To assess the disparities in access to EmOC and in MMR declines during the CCT programme | To study the quality of inter-facility referrals in the CCT program | To understand the perceptions of government and non-government stakeholders regarding the CCT programme and its implementation challenges. |
| **Design** | Ecological study | Ecological study | Facility-based cross-sectional survey and record review, nested matched case control study | Qualitative study with semi-structured interviews |
| **Data and sample** | Secondary data for nine Indian states  
States = 9  
Districts = 284 | Secondary data from nine Indian states  
States = 9  
Divisions = 62  
Districts = 284 | Facilities = 96  
Deliveries = 1182, 34 cases of adverse birth outcomes  
Record review (two years) of maternal deaths (n= 124) | Semi-structured interviews with health officials and non-government stakeholders (n=11) |
| **Analysis** | Comparison of institutional delivery proportions before and during JSY  
Multiple regression analysis | Inequality analysis using a concentration curve and concentration index  
Decomposition of the concentration index to understand the contribution of various factors to the inequality  
Slope index and the relative index of inequality to estimate inequalities in MMR decline | Description of referrals,  
Conditional logistic regression for odds of adverse birth outcomes associated with maternal referrals  
Buffer analysis in GIS* for spatial analysis of inter-facility travel time for mothers who died at a CEmOC facility in one district | Thematic framework approach for the analysis of qualitative data |

*GIS: Geographic Information System
Study setting
India is a federal union of 29 states and seven union territories, with distinctly different levels of socio-economic development. The states are grouped into three geographic regions: (i) the Empowered Action Group (EAG) states and Assam, (ii) the Southern states and (iii) other states. With respect to maternal and child health indicators, Southern and “other” states, which have better indicators, are considered ‘high-performing states’, while EAG states and Assam are considered ‘low-performing states’. States are further subdivided into smaller administrative units called districts, each with a population of approximately 1.5 to 2 million. Together, three to five geographically contiguous districts form a division, which is the intermediate administrative unit of the health system (between state at the top and district at the bottom).
Sub-study 1 and study 2 include nine low-performing states (Figure 2)—Bihar, Uttar Pradesh (UP), Uttarakhand, Madhya Pradesh (MP), Odisha, Rajasthan, Jharkhand, Chhattisgarh, and Assam—that constitute about half of India’s population and account for 62% of the country’s maternal deaths. These nine states are subdivided into 284 districts and have relatively poor health indicators in relation to the national average, as shown in Table 5.

Table 5: Demographic and health indicators of the nine study states

<table>
<thead>
<tr>
<th>State</th>
<th>Population (millions) 2011</th>
<th>Rural population (%) 2011</th>
<th>Vulnerable population (SC &amp; ST) (%) 2011</th>
<th>BPL (%) 2009-10</th>
<th>Female literacy (%) 2011</th>
<th>TFR* 2013</th>
<th>Institutional births (%) 2013</th>
<th>Infant mortality rate 2013</th>
<th>MMR 2010-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assam</td>
<td>311.6</td>
<td>86</td>
<td>20</td>
<td>38</td>
<td>67</td>
<td>2.3</td>
<td>74</td>
<td>54</td>
<td>328</td>
</tr>
<tr>
<td>Bihar</td>
<td>1038</td>
<td>89</td>
<td>17</td>
<td>53</td>
<td>53</td>
<td>3.4</td>
<td>60</td>
<td>42</td>
<td>219</td>
</tr>
<tr>
<td>Chhattisgarh</td>
<td>255.4</td>
<td>77</td>
<td>43</td>
<td>49</td>
<td>60</td>
<td>2.6</td>
<td>66</td>
<td>46</td>
<td>230</td>
</tr>
<tr>
<td>Jharkhand</td>
<td>329.6</td>
<td>76</td>
<td>38</td>
<td>39</td>
<td>56</td>
<td>2.7</td>
<td>51</td>
<td>37</td>
<td>219</td>
</tr>
<tr>
<td>MP</td>
<td>725.9</td>
<td>72</td>
<td>37</td>
<td>37</td>
<td>60</td>
<td>2.9</td>
<td>75</td>
<td>54</td>
<td>230</td>
</tr>
<tr>
<td>Odisha</td>
<td>419.4</td>
<td>83</td>
<td>40</td>
<td>37</td>
<td>64</td>
<td>2.1</td>
<td>72</td>
<td>51</td>
<td>235</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>686.2</td>
<td>75</td>
<td>31</td>
<td>25</td>
<td>52</td>
<td>2.8</td>
<td>83</td>
<td>47</td>
<td>255</td>
</tr>
<tr>
<td>UP</td>
<td>1995.8</td>
<td>78</td>
<td>21</td>
<td>38</td>
<td>59</td>
<td>3.1</td>
<td>58</td>
<td>50</td>
<td>292</td>
</tr>
<tr>
<td>Uttarakhand</td>
<td>101.1</td>
<td>69</td>
<td>22</td>
<td>18</td>
<td>70</td>
<td>3.1</td>
<td>58</td>
<td>50</td>
<td>292</td>
</tr>
<tr>
<td>India</td>
<td>1210.9</td>
<td>69</td>
<td>25.2</td>
<td>30</td>
<td>65</td>
<td>2.3</td>
<td>92</td>
<td>40</td>
<td>178</td>
</tr>
</tbody>
</table>

*TFR: Total Fertility Rate

The Government of India has classified these nine states as ‘high-focus states’, implying a need for more focussed attention on and greater allocation of resources to strengthening the health systems of these states. Maternal and child health care in these states are predominantly provided through the government healthcare system, which is formally free of charge.
Study 3 was conducted in three socio-demographically heterogeneous districts of MP. MP is one of the low performing state with relatively poor health indicators compared to national level (Table 5). Institutional births in the state increased from 22% in 2005 to 75% in 2013 while MMR declined from 335 maternal deaths per 100000 live births in 2004-06 to 230 in 2010-12. Maternal health services are mainly provided through government health facilities which are formally free at the point of care. Specialist services for maternity care are mainly available at district head-quarter cities with few exceptions at sub-district level. Private maternity service providers are few and mainly concentrated in urban areas. The JSY program in MP provides a cash incentive to all women who deliver in government health facilities and a few accredited private health facilities. In MP, the government also operates a free to use transport service called Janani Express for pick up and drop of women to facilities for obstetric care.

For study 4, the respondents were health officials from MP state and non-government stakeholders working at national and state levels.

Data sources

Data sources for sub-studies I and II

*The Sample Registration System (SRS)* (Registrar General of India, 2011): The SRS is a large demographic survey carried out periodically in India to generate reliable annual estimates of birth rates, death rates and other fertility and mortality indicators at the national and state levels. At present, the SRS is operational in all states of India and covers about 7.27 million people in 1.5 million households. The sample unit in rural areas is a village. In urban areas, the sampling unit is a census enumeration block (population: 750 to 1000). The SRS comprises continuous enumerations of births and deaths in selected sample units by resident part-time enumerators, as well as an independent survey produced every six months by SRS supervisors. The data obtained by these two independent functionaries are matched. In recording the details of every pregnancy outcome, the enumerators and supervisors are required to enquire about the type of medical attention received by the woman at the time of delivery, including the place of delivery. The proportions of institutional births reported by the SRS between 2005 and 2010 (years) have been used for the analysis in this thesis.

*Annual Health Survey (AHS)* (Registrar General and Census Commissioner, 2011): The AHS is the Government of India’s recent initiative to record district-level health outcomes in the nine ‘high-focus’ states. The rationale for this survey is to identify districts requiring special attention, since these often miss detection in the study of average statistics at the state level. A
special feature of the AHS is that it is the first survey in India to provide estimates of maternal and infant mortalities at a level lower than that of the state.

The first AHS, which was reported in 2010-11, covered all of the districts in the nine study states. The AHS adopted a uni-stage stratified simple random sample without replacement, except in the case of larger villages, surveying 18 million people in 3.6 million households. From selected households, the survey collected background information and information from every married women aged 15–49 years regarding any pregnancy outcomes, places of delivery, child immunisation, and breastfeeding, among others, that took place during the reference period (Jan. 2007 to Dec. 2009). The second round of the AHS was conducted in 2010. The data reported by the AHS, including MMR, proportion of institutional births, Caesarean rates, total fertility rates, and proportions of literate and poor populations were used in this thesis.

**Census of India:** The Indian national census is conducted every ten years across all states in the country. Each household is visited to collect information on a wide range of demographic and socioeconomic indicators of both the households and their individuals. The district-level information on the degree of urbanisation, the vulnerable populations, and the total populations from Census 2001 and 2011 were used as covariates in the analysis presented in this thesis.

The variables used in the analyses in sub-studies I and II are described in Table 6.
<table>
<thead>
<tr>
<th>Variables</th>
<th>Data source</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>State-level institutional birth proportion. Data for years 2005 to 2010 was used in the analysis in sub-study I</td>
<td>SRS</td>
<td>Estimated proportion of childbirths in health facilities (government or private) in each state in a given year.</td>
</tr>
<tr>
<td>Caesarean rates in public hospitals</td>
<td>Author estimates based on AHS-1 and AHS-2 data</td>
<td>Proportion of Caesareans that took place in public hospitals out of total district deliveries. This number was calculated as a product of the proportion of deliveries in government hospitals out of the total number of deliveries that took place in the district and the proportion of Caesarean deliveries out of the total number of deliveries that took place in government hospitals.</td>
</tr>
<tr>
<td>Total Fertility Rates (TFRs)</td>
<td>AHS-1</td>
<td>TFR in a specific year is the number of children that would be born to each woman if she were to live to the end of her childbearing years.</td>
</tr>
<tr>
<td>Crude birth rate (CBRs; 2010)</td>
<td>AHS-2</td>
<td>Number of births per 1000 population in a given area in one year</td>
</tr>
<tr>
<td>District-wise total births</td>
<td>Author estimate</td>
<td>Calculated as a product of the district population in the respective year and the CBR</td>
</tr>
<tr>
<td>Institutional births in each district</td>
<td>Author estimate</td>
<td>Calculated as a product of district institutional birth proportion and total births.</td>
</tr>
<tr>
<td>Number of live births in division (2007-09 and 2010)</td>
<td>AHS-1 &amp; AHS-2</td>
<td>AHS 1 &amp; 2 listed the number of live births in the survey population during the survey reference period</td>
</tr>
<tr>
<td>Number of maternal deaths in division (2007-09 and 2010)</td>
<td>AHS-1 &amp; AHS-2</td>
<td>AHS 1 &amp; 2 listed the number of maternal deaths in the survey population during the survey reference period</td>
</tr>
<tr>
<td>Proportion of poorest households in district</td>
<td>AHS-1</td>
<td>Proportion of households from each district that fell into the poorest quintile of the respective state. The household wealth index was constructed by the AHS at the state level for each of the nine study states using the assets possessed (e.g., ownership and house status) and the facilities availed (e.g., electricity, toilets) by the households to determine each household’s</td>
</tr>
</tbody>
</table>
Data for sub-study III

In the three study districts of MP, we conducted a facility-based cross-sectional survey that included all facilities (both public and private) that conducted at least 10 deliveries a month. At each facility, trained female research assistants spent five consecutive days interviewing all of the women who accessed the facility for delivery care. The interviews gathered data on socio-demographic profiles, deliveries and referral details. When any woman was referred away from the facility during the five survey days, the research assistants met with the concerned nursing staff to obtain details of the referral circumstances.

In one of the three study districts—the one that reported one of the highest MMRs in the state—in addition to the above-mentioned survey, we also conducted a maternal death record review. This review was conducted at the only Comprehensive Emergency Obstetric Care (CEmOC) facility (i.e., the one providing blood transfusion and Caesarean section services, in addition to basic obstetric services) in the district. The CEmOC facility was identified through a district-level facility survey. From the maternal death records at the facility (Apr 2010 to Mar 2012), records for women who were referred to

<table>
<thead>
<tr>
<th>Households asset data</th>
<th>Census 2011</th>
<th>Information on the proportion of households in each district possessing various household assets (e.g., house size and structure, land ownership, vehicles, etc.) and utilizing various facilities (e.g., electricity, drinking water, toilets, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of vulnerable (scheduled castes (SC) and scheduled tribes (ST)) populations 2011</td>
<td>Census 2011</td>
<td>Scheduled castes and tribes are those communities that have been historically subject to social disadvantage and exclusion. They are accorded special status by the Constitution of India and receive special social benefits as part of a programme of positive affirmation.</td>
</tr>
<tr>
<td>District-wise total population 2011</td>
<td>Census 2011</td>
<td>Total population residing in a district</td>
</tr>
<tr>
<td>Proportion of urban population</td>
<td>Census 2011</td>
<td>Proportion of the total population residing in urban areas for every district</td>
</tr>
<tr>
<td>District-wise male literacy 2011</td>
<td>Census 2011</td>
<td>Proportion of literate males in the district</td>
</tr>
</tbody>
</table>
the facility before their death were identified, and the data related to facility location, delivery details, cause of death, and times of arrival and death were extracted.

Data for sub-study IV
This was a qualitative study, in which semi-structured interviews were conducted with two groups of respondents: (i) non-government stakeholders and (ii) government health officials. The non-government stakeholders were selected purposively and included those well-known for their contribution to the maternal health field in India. These stakeholders work in diverse capacities, such as the head of public health institutions (1), members of civil society organizations for national committees formed under the Ministry of Health and Family Welfare to monitor the implementation of national health programmes focused on improving maternal and neonatal health (3), and state-level UN officers working towards with the state government to improve maternal health (1).

The government health officials interviewed were from MP state, working at key positions in the state health department (3) and responsible for overall implementations and monitoring of maternal health programs including the JSY in the state. The health officials working at sub-district level (3) who were involved in the provision of maternal health services and responsible for implementation of the JSY at sub-district level at the time of the study were also interviewed. Thus, a total of 11 interviews were conducted using maximum variation sampling, with the relationship to the JSY programme continuing to be the key sampling principal. We thus ensured our sample included respondents from government sector who work with JSY programme at different levels in health system and involved with it as senior bureaucrats with key decision making roles. The non-government stakeholders were professionals who were invited by the government to member national committees overseeing maternal health, thus they were selected dignitaries who had vast experience in maternal health and also of actively participating in the decision making processes with regard to maternal health policy issues. All of the respondents were above 55 years of age. Three of our respondents were females. I conducted all interviews myself when I was working as a researcher at a teaching medical school in MP and also have experience of working with the JSY programme. I am conversant in both English and the local language, Hindi. I conducted the interviews in either language as preferred by the respondents, some interviews occurred in a mix of both these languages. Before each interview, information on the study was provided, and consent was sought. Interviews were conducted at the offices of the respective respondents located at various places in India, with prior appointments. Except for one official, who declined to participate due to a change in his
schedule, no one rejected the request to participate in the study. Interviews took place from August 2013 to June 2015. Each interview lasted for about forty minutes. The interviews were conducted using a topic guide. The topic guide was developed after conducting relevant literature search and reviewing the key documents with regard to the JSY. All co-authors contributed to finalising the draft topic guide to align with our objectives. The key topics explored during the interviews included perceptions about the strategy of paying money for facility births, supply-side issues, the influence of JSY on maternal mortality, implementation challenges (such as fund flows, financial leakages and sustainability of funding) and population-level behavioural change towards institutional delivery. All interviews were audio-recorded (with the permission of the respondents) and then transcribed and translated to English. The transcripts were checked for accuracy against audio recordings.

**Analyses**

**Sub-study I:** To assess the change in the proportion of institutional births following the introduction of the JSY programme, state-level proportions of institutional births for nine study states between the years 2005 and 2010 were analysed, and trends in the proportions of institutional births were described. Mean institutional delivery proportions before (2005) and during (2010) the JSY were compared to determine whether the observed changes were statistically significant.

To study the relationship between the uptake of institutional births and the MMR at the district level, first, a simple correlation analysis was used, followed by multiple regression analysis. The other socio-demographic variables included in the model were district-level total fertility rate, literacy, Caesarean rates and proportions of poor, urban and vulnerable populations.

**Sub-study II:** We used area-based socioeconomic measures (ABSMs) to analyse socioeconomic inequalities in light of the available data in an aggregated form. ABSMs characterize the socioeconomic profiles of geographic areas, rather than of individuals; thus, they account for both contextual factors (e.g., social influences and access to health facilities) and individual-level variability (e.g., education) (Public Health Ontario, 2013; Denny & Davidson, 2012). First, administrative areas (i.e., districts and divisions) in nine study states were ranked according to their socioeconomic statuses (SESs) using district-level household asset data from the most recent census (2011). The proportion of households in each district to own certain household assets (e.g., television, car, bicycle, etc.), their access to amenities (e.g., toilets, tap water, electricity, etc.) and the physical structures of their dwellings (e.g., the materials used for the floor, roof, walls, etc.) were
used to estimate an asset score for each district using principle component analysis (Filmer & Pritchett, 2001). These scores were used to rank the districts from poorest (lowest score) to richest. The 62 divisions in the nine studied states were similarly ranked according to their SES.

Inequalities in the utilization of institutions for delivery: Concentration curve and concentration index (CI) (O'Donnell & Wagstaff, 2008): The concentration curve was drawn to display the degree of inequality by plotting the cumulative percentage of institutional births on the Y-axis against the cumulative percentage of births on the X-axis, beginning with the poorest district. If the cumulative share of the births equals the cumulative share of institutional births (for example, if in cumulative births of 20%, cumulative institutional births are 20%), the concentration curve would be a 45-degree line called the line of equality. The further the curve is from the line of equality, the higher the degree of health inequality across the districts. Curves were plotted for 2004-2006 and for 2010.

The concentration index (CI), which indicates the magnitude of inequality, was computed using the formula proposed by Fuller and Lury (Fuller & Lury, 1977) as:

\[ CI = (P_1 L_2 - P_2 L_1) + (P_2 L_3 - P_3 L_2) + \ldots \ldots + (P_t L_t - P_{t-1} L_{t-1}) \ldots \]  

Eq. (1)

where \( P_t \) is the cumulative percentage of the population (i.e., births) ranked by the socioeconomic status of the locality (group \( t \)), and \( L_t \) is the corresponding cumulative percentage of the health variable (i.e., institutional births).

The CI ranges from -1 to +1, where a negative value indicates the concentration of an outcome variable (i.e., institutional births) in a disadvantaged group, a positive value indicates concentration in an advantaged group and zero represents perfect equality.

Decomposition of CI: The CI was decomposed to understand the relative contributions of different predictor variables to existing inequalities. The proportion of male literacy, the vulnerable population and poor households in a district, which indicated districts’ SES, as well as the Caesarean section rates for public facilities, which indicated the level of availability of free EmOC, were used as predictor variables. The method proposed by Wagstaff et al. (Wagstaff et al., 2003) was used to decompose the socio-economic inequalities in the uptake of institutional deliveries in 2010.

The methodological steps of the decomposition analysis were as follows:

(i) The health variable (i.e., the district-level institutional delivery proportion) was regressed against its predictors, resulting in coefficients of determinants (\( \beta \))

(ii) Means of the health variable (\( \mu \)) and each of its predictors (\( x_k \)) were generated
Concentration indices for the health variable (C) and its predictors (C_k) were calculated using Eq. (1)

The absolute contribution of each predictor was calculated by multiplying the health variable elasticity $\beta_k x_k / \mu$ with respect to the particular predictor by its concentration index $C_k$.

The percentage contribution of each predictor was calculated by dividing the predictor’s absolute contribution by the concentration index of the health variable, as follows: $(\beta_k x_k / \mu) C_k / C$.

The disparity in EmOC availability was examined by analysing the Caesarean rate (as a proxy for EmOC) in the different socioeconomic groups.

Inequalities in maternal mortality: Slope index of inequality (SII) and relative index of inequality (RII) (Schneider et al., 2005): We examined absolute and relative socioeconomic inequalities in MMRs at the division level using the slope index of inequality (SII) and the relative index of inequality (RII). The SII and RII are regression-based methods for determining the degree of inequality in a population. The SII is an absolute measure of inequality, which expresses the magnitude of change in the health variable per change in relative position (from bottom to top) in the socioeconomic hierarchy. The RII is a relative measure that reflects how many times the health variable of the bottom (i.e., poorest) socioeconomic group is compared to that of the top group. The SII was calculated by regressing division-level MMRs against the divisions’ relative rank in the cumulative distribution of socioeconomic position. The slope of this regression line ($\beta$) represents the SII, which is the estimated difference in MMR between the poorest and richest divisions.

An analysis was done by arranging all 62 divisions in the nine study states in order from lowest to highest SES, along with their MMRs and the number of live births in the survey population. Then, the proportion of live births in each division, of the total live births in all 62 divisions, was calculated to determine the relative proportion of live births in each division. Using these relative proportions, the cumulative proportion of live births was calculated for all divisions. The midpoint of the live birth proportion for the most deprived socioeconomic division was taken as its relative rank. For each consecutive division, the relative rank was calculated by adding the midpoint of the division’s birth proportion to the cumulative proportion of the previous division. The MMR of the division was then regressed over these relative ranks. The slope of this regression line ($\beta$) is the SII.

The RII_{(mean)} was calculated by dividing the SII estimate by the mean MMR for all divisions. The RII_{(mean)} indicates the proportionate difference in the MMRs of the poorest and richest divisions.
To assess the change in MMR across different socioeconomic groups during the JSY, the MMR for each division quintile was estimated using raw data on the number of maternal deaths and live births in the survey population for each division during 2007-2009 and 2010.

**Sub-study III:** In study III, we assessed the quality of referral services in the JSY programme in the three districts of MP. Although referrals include community-level referrals (where the process begins), we limited this study to referrals between facilities in order to maintain the relevance in relation to the JSY context. We used the term “referral” to mean the movement of women seeking intra-natal care from one health facility to another due to an inability to receive necessary obstetric care at the first facility. To conduct this analysis, we adapted the referral chain model proposed by Jahn and Brouwere, which outlines the three main components of the referral chain: sender, transport and receiver, as depicted in Figure 4. (Jahn & De Brouwere, 2001).

![Figure 4: Model of referral chain, adapted from Jahn and De Brouwere (2001)](image)

To describe inter-facility referrals, we used descriptive statistics and traced referral pathways for referred women in the three study districts. We analysed these by facility level to produce referral patterns.

To examine the association between maternal referrals and birth outcomes, we used a nested, matched case control design with data from the cross-sectional survey. We defined cases as women who delivered at term and had adverse birth outcomes, defined as either intrapartum foetal death or in-facility neonatal death, within 48 hours post-partum. The controls were women who delivered at term and had live neonates at 48 hours post-partum. The controls were matched individually to the cases based on the type of obstetric complication and the place of delivery. Each case was matched to two controls. The association between maternal referrals and
adverse birth outcomes was analysed by calculating odds ratios and using conditional logistic regression to control for potential confounders.

We sought to determine spatial access by measuring the travel time between the sending facility and the receiving CEmOC facility based on the UN standard of a maximum two-hour travel time as an indicator of spatial access. The distance between the sending and receiving facilities was, thus, converted into travel time based on the assumption of an average van speed in the study area of 50 km/hour (based on information provided by key informants, including nursing staff and ambulance drivers, in the study district). To conduct the spatial analysis of the transfer time among in-facility maternal deaths, we plotted the CEmOC facility and all sending facilities from the point at which the deceased mothers were referred to the CEmOC facility on the map. Given that a travel time of two hours to a CEmOC facility is considered standard for adequate spatial access to EmOC (Bailey et al., 2009), we constructed buffers with radii of 50 km (approximately one hour of travel time) and 100 km (approximately two hours of travel time) around the focal CEmOC facility. Deaths among mothers who were referred to the CEmOC facility from facilities located within the 2-hour buffer indicated poor-quality referral services, either at the sender or the receiver level (or both) in the referral chain. Time spent at the CEmOC facility before death was used to assess care at the receiver-level facility. These times between arrival and death were derived from the medical record entries.

**Sub-study IV:**

Thematic framework (Ritchie et al., 2003) approach was used for analysis of qualitative data. The five main steps in analysis followed were familiarisation, framework development, indexing, charting and mapping and interpretation. First, the transcripts were read several times to develop a better sense of the whole dataset. Based on this, a coding framework, which is a list of content in the transcripts was developed. In developing the coding framework we referred to our topic guide and also used newer codes for elements that emerged from the data but were not included in the guide, thus we used a mix of deductive and inductive methods for developing the coding framework. All authors discussed the coding framework and agreed on the final version and the specific meanings of each code. Indexing was done by applying the coding framework consistently to the entire dataset. I used the OPENCODE software for this. Subsequently we lifted the data elements from the indexed transcripts and placed them appropriately under relevant codes onto matrices I developed in Excel spreadsheets to aid this charting of our data. Finally we compared data under each code across and amongst respondent groups to identify patterns in the data. We then grouped data according to these patterns and underlying meanings to
develop the themes. We focused on identifying, summarising and retaining the similarities and differences in the data. We cross-checked the themes with the interview transcripts, thus moving back and forth to ensure the developed themes applied well to the data. I shared the transcripts, OPENCODE files and also the matrices with the charted data with my co-authors and had frequent discussions during the analysis process. This helped all authors to take part in the analysis and allowed for good researcher triangulation

**Ethical considerations**

Studies I and II were based on data available in the public domain; hence, they required no ethical approval. For studies III and IV, ethical approval was obtained from the Institutional Ethics Review Board at R. D. Gardi Medical College, Ujjain, India, as part of the MATIND project.

All women, health officials and non-government stakeholders who participated in the studies were informed of the studies’ purpose before seeking their consent. Participation was voluntary, and no incentives to participate were provided. All participants were informed that they had the right to withdraw their consent at any time without giving any reason and that withdrawal would not affect their care or their work. The confidentiality of all participants was ensured. Informed consent was obtained from all study participants.
Results

The major findings from this thesis are summarised in Table 7 and described in detail below.

Table 7: Major findings of the sub-studies

<table>
<thead>
<tr>
<th>Sub-study</th>
<th>Major findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Institutional birth proportions increased across all nine states, with varying magnitudes. Our analysis was unable to detect a significant association between institutional birth proportion and MMR, indicating the possibility that, although districts achieved increased institutional deliveries due to JSY, they did not necessarily provide high proportions of skilled attendance or manage complications effectively.</td>
</tr>
<tr>
<td>II</td>
<td>Inequality in access to institutional delivery care has declined since the introduction of the JSY program; however, it does continue to exist. Male literacy levels, EmOC availability and poverty explained 69% of the observed inequality. The richest area had 135 fewer maternal deaths per 100,000 live births than the poorest. Maternal mortality declined four times faster in the richest areas than in the poorest during the JSY programme</td>
</tr>
<tr>
<td>III</td>
<td>Findings reveal poor quality of obstetric referral services in JSY-the adjusted odds for adverse birth outcomes were more than twice among those referred than among those not referred. The spatial analysis of the transfer time from a sending facility to a receiving CEmOC facility among in-facility maternal deaths showed that 98% of the deceased mothers were referred from facilities within the two-hour transfer time, indicating that maternal deaths occurred despite good geographic access.</td>
</tr>
<tr>
<td>IV</td>
<td>The study found differing views among participants about the appropriateness of cash transfer programme in the present health system context. The importance of health systems strengthening and quality improvement as pre-requisites for the impact of CCT on health outcomes emerged from many accounts. Participants identified a range of challenges in implementation, including the problems with the ease and timeliness of cash transfers.</td>
</tr>
</tbody>
</table>
Coverage of institutional births and its association with MMR during JSY

The proportion of institutional births increased across all nine studied states subsequent to the introduction of the JSY programme, though the magnitude of the increases varied across states (Figure 5). The average increase during the five years was from 20% to 49% (p < 0.05).

![Figure 5: Trends in institutional births in nine study states](image)

District characteristics for the 284 districts included in sub-study 1 are presented in Table 8. On average, each district had a population of 1.7 million, with varying proportions of poverty, literacy and urbanisation. The proportion of institutional births ranged from 16.8% to 92.5% (mean: 56.2%), demonstrating wide variations in the utilisation of this service. The MMR ranged from a minimum of 183 to a maximum of 451 per 100,000 live births.

<table>
<thead>
<tr>
<th>District characteristics</th>
<th>Mean (minimum, maximum)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (million)</td>
<td>1.7 (0.2, 5.2)</td>
</tr>
<tr>
<td>Literacy (%)</td>
<td>72.0 (48, 89.8)</td>
</tr>
<tr>
<td>Poor households (%)</td>
<td>21.4 (1, 63.5)</td>
</tr>
<tr>
<td>Urban population (%)</td>
<td>17.4 (1.2, 80.4)</td>
</tr>
<tr>
<td>Vulnerable population (%)</td>
<td>29.3 (5.9, 89.7)</td>
</tr>
<tr>
<td>Total fertility rate</td>
<td>3.2 (1.7, 5.9)</td>
</tr>
<tr>
<td>Institutional birth proportion</td>
<td>56.2 (16.8, 92.5)</td>
</tr>
<tr>
<td>C-section rate</td>
<td>5.8 (1.1, 19.4)</td>
</tr>
<tr>
<td>MMR</td>
<td>313.7 (183, 451)</td>
</tr>
</tbody>
</table>
We observed (Table 9) that those districts with higher fertility rates and higher levels of economic deprivation had lower institutional birth proportions ($r = -0.37$ and $-0.28$, respectively); conversely, higher literacy and urbanisation in a district were positively correlated with institutional birth proportions ($r = 0.38$ and $0.32$, respectively). The proportion of vulnerable population in a district did not show much influence on the uptake of institutional births ($r = 0.07$). There was no correlation between the proportion of SC/ST populations in a district and the institutional birth proportion when these groups were analysed separately (data not shown).

Table 9: Correlation of district characteristics with institutional births % and with MMR

<table>
<thead>
<tr>
<th>District characteristics</th>
<th>Institutional births (%)</th>
<th>MMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institutional births (%)</td>
<td>1</td>
<td>-0.11</td>
</tr>
<tr>
<td>Literacy (%)</td>
<td>0.38</td>
<td>-0.34</td>
</tr>
<tr>
<td>Poor households (%)</td>
<td>-0.28</td>
<td>0.25</td>
</tr>
<tr>
<td>Urban population (%)</td>
<td>0.32</td>
<td>-0.18</td>
</tr>
<tr>
<td>Vulnerable population (%)</td>
<td>0.07</td>
<td>-0.08</td>
</tr>
<tr>
<td>Total fertility rate</td>
<td>-0.37</td>
<td>0.40</td>
</tr>
<tr>
<td>Caesarean rate</td>
<td>0.40</td>
<td>-0.19</td>
</tr>
</tbody>
</table>

A simple correlation between the district characteristics and the MMR (Table 9) showed that the fertility rate and the proportion of poor households in a population were positively correlated with MMR ($r = 0.40$ and $0.25$, respectively). On the contrary, higher literacy and urbanisation were negatively correlated with MMR ($r = -0.34$ and $-0.18$, respectively). The proportion of births in an institution and the proportion of births by Caesarean section (CS) each had a small negative correlation with district MMR ($r = -0.11$ and $-0.19$, respectively). A scatter plot of institutional birth proportions and MMRs does not show a strong relationship between institutional birth proportions and MMRs in the districts (Figure 6).
We built a regression model to explore the association between the proportion of institutional births and the MMR. The covariates included are as mentioned in Table 8. This model was unable to detect a significant association between the institutional birth proportion and the MMR [95% CI: -0.10, 0.68] after adjusting for other confounders (Table 10). Districts with higher fertility rates or higher poor population proportions were significantly associated with higher MMRs. Conversely, districts with high literacy and high urbanisation were associated with lower MMRs. Districts with high C-section rates were associated with higher MMRs.

Table 10: Regression model assessing MMR correlates

<table>
<thead>
<tr>
<th>Variables</th>
<th>Regression coefficients (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Literacy</td>
<td>-1.44 (-2.61, -0.26)</td>
</tr>
<tr>
<td>Poor households</td>
<td>1.10 (0.33, 1.87)</td>
</tr>
<tr>
<td>Urban population</td>
<td>-0.62 (-1.29, 0.05)</td>
</tr>
<tr>
<td>Vulnerable population</td>
<td>-0.46 (-0.96, 0.04)</td>
</tr>
<tr>
<td>Total fertility rate</td>
<td>29.7 (15.99, 43.49)</td>
</tr>
<tr>
<td>Institutional births</td>
<td>0.29 (-0.10, 0.68)</td>
</tr>
<tr>
<td>Caesarean rate</td>
<td>5.08 (1.84, 8.33)</td>
</tr>
</tbody>
</table>
Inequalities in institutional births, EmOC, and MMR reduction during JSY

Institutional birth proportions during the implementation of JSY in 2010 show similar average increases across all district groups (poorest to richest) from their pre-JSY (2004-06) levels. Among the 20% of births that occurred in the poorest districts, institutional deliveries increased from an average of 16% to 45%, while, among those in the richest districts, institutional deliveries increased from an average of 40% to 69% (Figure 7).

![Figure 7: Institutional birth proportions by districts' socioeconomic status in 284 districts](image)

When we plotted the concentration curves for the pre-JSY (2004-06) and during-JSY (2010) institutional delivery proportions, both curves lay below the line of equality (Figure 8), indicating a disproportionately lower concentration of institutional deliveries in poor areas than in rich ones during these periods. However, the concentration curve for the 2010 period was closer to the equality line, suggesting that the degree of inequality during the JSY period (2010) was lower than that in the pre-JSY period (2004-06). Moreover, the CI for institutional deliveries decreased from 0.19 in 2004-06 to 0.09 in 2010, again suggesting a reduction in inequality following the introduction of JSY.
When we decomposed the CI to understand the contribution of each of its determining factors, we observed that the degree of inequality in male literacy contributed 30% to the overall inequality in institutional deliveries (Table 11). This effect was followed by that of EmOC availability (measured as the proportion of Caesarean sections in public facilities in each district), which contributed 20%, and by the proportion of poor households in a district, which contributed 18%. Although the proportions of vulnerable populations (SC and ST) in a district were statistically significant predictors of uptake of institutional births, their contributions to inequality were negligible. The variables included in the decomposition model explain the major portion (69%) of inequality; the remaining unexplained (31%) part could be due to factors not included in the model.

Table 11: Decomposition of concentration index of institutional deliveries

<table>
<thead>
<tr>
<th>Predictors</th>
<th>CI of predictors</th>
<th>Elasticities</th>
<th>Absolute contribution</th>
<th>Relative contribution (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male literacy</td>
<td>0.042</td>
<td>0.6427</td>
<td>0.027</td>
<td>30</td>
</tr>
<tr>
<td>Poor households in district</td>
<td>-0.178</td>
<td>-0.0910</td>
<td>0.016</td>
<td>18</td>
</tr>
<tr>
<td>Caesarean in public facilities</td>
<td>0.150</td>
<td>0.1186</td>
<td>0.018</td>
<td>20</td>
</tr>
<tr>
<td>Vulnerable population</td>
<td>0.012</td>
<td>0.0941</td>
<td>0.001</td>
<td>1</td>
</tr>
<tr>
<td>Subtotal</td>
<td></td>
<td></td>
<td>0.062</td>
<td>69</td>
</tr>
<tr>
<td>Residual</td>
<td></td>
<td></td>
<td>0.028</td>
<td>31</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>0.09</td>
<td>100</td>
</tr>
</tbody>
</table>
We observed that EmOC in public facilities was limited. Of the total deliveries in the poorest district quintile, 1.4% had Caesarean sections in public hospitals; however, in the richest quintile, this proportion was 3.3% (Figure 9). The utilization of Caesarean services from private hospitals was 2.3% in the poorest quintile, compared with 5.5% in the richest quintile.

![Figure 9: Median Caesarean section usage (%) by district quintile, ranked from poorest to richest](image)

Our estimates for the SII for the MMR for 2007-2009 was -97. In 2010, it was -135. This implies that the richest division experienced 97 fewer maternal deaths per hundred thousand live births than the poorest division during 2007-09 and 135 fewer maternal deaths during 2010. The greater SII in 2010 (-135 vs -97) reveals an increase in inequality as a consequence of the lower decline in the MMR in the poorer divisions than in the richer ones (Figure 10). The RII in the MMR was -0.30 in 2007-2009 and -0.49 in 2010, indicating 30 and 49% lower MMRs, respectively, in the richest division than in the poorest one. The greater RII in 2010 indicates increased inequality in this period.

The reduction in the MMR during JSY (2007-2009 to 2010) was estimated to be four times higher in the richest division quintile than in the poorest one.
Quality of referral services during JSY
A total of 1182 women accessed the 96 study facilities for delivery care during the five-day surveys at each facility. Of these women, 11% (111) were referred to these facilities, while 69 were referred out of these facilities. Prolonged labour was the most common reason for referral (39%); other reasons included leaking amniotic fluid (13%), haemorrhage (8%), pre-eclampsia (7%) and facility dysfunction (e.g., the non-availability of staff or power and water shortages at sending facilities) (7%). Over one-third (40%) of referrals from CHCs (secondary-level facilities) were for prolonged labour, and one-fifth were for leaking membranes—both conditions ideally expected to be managed at secondary-level facilities.
Referral patterns mapped by tracing the referral pathways showed that CHCs received very few, if any, referrals. Referrals were made from CHCs and PHCs, and most of these women (70%) accessed care at the DHs. However, when second-order referrals were made beyond the DHs, half of the cases accessed care at private hospitals. Bypassing the referral chain (e.g., direct referrals from PHCs to DHs) was common. Referrals from public to private facilities were rare (Figure 11).
Data on the delivery outcomes of the 1113 mothers who were treated at study facilities (excluding the 69 who were referred out) showed that 36 had adverse birth outcomes (i.e., intra-partum foetal death or early neonatal death), including 2 among the pre-term births.

In the matched case control design for studying the association between maternal referrals and adverse birth outcomes at term delivery, the adjusted odds for adverse outcomes were twice as high among those who were referred than among those who were not (OR 2.6, 95% CI 1.1-6.6) (Table 12).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Odds ratio (95% CI)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal referral</td>
<td>2.6 (1.08; 6.6)</td>
<td>0.04</td>
</tr>
<tr>
<td>Age</td>
<td>1.8 (0.60, 5.51)</td>
<td>0.28</td>
</tr>
<tr>
<td>Education</td>
<td>1.2 (0.43–3.43)</td>
<td>0.70</td>
</tr>
<tr>
<td>Below poverty line</td>
<td>2.1 (0.80–5.31)</td>
<td>0.13</td>
</tr>
<tr>
<td>Parity</td>
<td>0.6 (0.19–2.02)</td>
<td>0.43</td>
</tr>
<tr>
<td>ANC visit</td>
<td>1.2 (0.57, 2.48)</td>
<td>0.63</td>
</tr>
<tr>
<td>Provider</td>
<td>0.3 (0.07, 1.25)</td>
<td>0.10</td>
</tr>
</tbody>
</table>
The maternal death record review showed that, during the two years, 124 deaths occurred among the 10,474 births at the CEmOC facility. Of the maternal deaths, 55 occurred in women who were referred in to the facility. Most of these referrals were sent from CHCs. The buffer analysis of the travel time between the sending facilities and the CEmOC facility (i.e., the receiver) revealed that, for 54 of the maternal deaths (98%), the sending facility was located within two hours of the CEmOC facility, indicating good geographic access (Figure 12). The median time between mothers’ arrival at the CEmOC facility and death was 6.75 hours (IQR: 2.1–32 hours).

Figure 12: Buffer analysis of transfer time between referring facilities and receiver CEmOC facility for the 55 mothers who died at the CEmOC facility. (Circles in the figure are buffers with radii of 50 km and 100 km around the CEmOC facility.)
Perceptions of the JSY programme and its implementation challenges

Analysis of interviews revealed three main themes as presented in Table 13. These themes include perceptions about the appropriateness of program design, the health system context and implementation challenges.

Table 13: Themes and sub-themes

<table>
<thead>
<tr>
<th>Theme</th>
<th>1. Appropriateness of CCT program and its design</th>
<th>2. Program context: Pathways and priorities for MMR reduction</th>
<th>3. Program implementation and its challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-themes</td>
<td>Analysis of central problem: problem with the people or with the health system?</td>
<td>Underlying models of development and health improvement</td>
<td>Design of JSY: narrow and exclusive policy and programme approach</td>
</tr>
</tbody>
</table>

The theme ‘appropriateness of program design’ highlights the respondent’s perceptions about appropriateness of the JSY program to address the issue of low uptake of facility births and maternal mortality. This theme emerged from three subthemes which are: analysis of central problem, models of development and health improvement, and program design. In subsequent themes respondents explain how the health system context influences the JSY program outcomes and challenges in the implementation of the program. The description of each theme is presented below.

Appropriateness of CCT program and its design:

Analysis of central problem: problem with people or with the system: The JSY program aimed to address the problem of low utilization of facility care for childbirth. There were contrasting views among the respondents on the reason for low utilization of health facilities for childbirth at the start of the program; most health officials perceived this to stem from the reluctance of
women to give birth in a facility while non-government respondents viewed it as oversimplification of complex maternal health issues.

Several health officials argued that utilization of health facilities for deliveries had been low before JSY, which was preventing provision of appropriate care to manage complications. Hence the priority was to improve uptake of intrapartum care in health facilities. Responses indicated that health officials felt increasing facility deliveries (creating demand) was a first step and as they had now achieved this through the JSY, they could now focus on fixing the problems with health systems with regard to quality.

“When this scheme started, the institutional delivery rate was very low- 26% - and nearly 74% women used to deliver at home where complications can’t be managed. The deliveries were conducted either by the family members or by the dais. So, first thing was to promote institutional delivery at that time. This scheme was very important in mobilizing women for coming to the institution. Now we have generated the demand and it’s up to us how we manage the safe delivery services.”- Health official

In contrast, several non-government stakeholders challenged the underlying assumption of holding people responsible for low utilization; one argued that ‘blaming people’ for low utilization is ‘not an honest analysis of the problem’. There is a trust deficit between the health system and people which is the reason for low uptake. Another one similarly emphasised that the problems are with the health system rather than with the people.

“...when JSY was announced we were shocked to find out that the onus was on the poor people [for low utilization and now government trying] to bribe [people] with the money to come to the hospital. We don’t know why the government took such a decision because the problem was not with the poor people but with the system. We thought that if we wanted to bring down the maternal mortality we should have done lot of efforts to do skilled birth attendants training, to strengthen EmOC, CEmOC and to ensure that the facilities had medicines”- Non-government stakeholder

Underlying models of development and health improvement: This theme presents the range of views about the notion of demand generation. Most of the health officials viewed the non-utilization of health facilities for childbirth as a problem of individual or family behaviour, and hence supported the need of a stimulus (such as a financial incentive) to change behaviour towards institutional births- aligning with the behaviourist model
of development. In contrast, several non-government participants viewed health system and social structures as the problem and emphasised the importance of an enabling environment where people are empowered to take rational decisions and health systems are in place to meet the demand; aligning their perceptions with an empowerment model of development.

Some health officials perceived the incentive as providing financial support to poor families to enable accessing a facility for childbirth. They did not see it as merely a means to attract poor women to give birth in facilities.

“This is definitely a very good scheme. It is not just an incentive to the patients coming for institutional delivery. It is sort of a financial support to poor people. Through this scheme the facility is utilized fully and we can improve our quality of service then definitely we can improve the indicators.” – Health official

Although most of the health officials praised the JSY, one official found JSY as a short term solution.

".....giving incentive is a short term solution and looking for a solution in a very simplified way". -Health official

Several non-government respondents criticised this model of development, one of them argued that the model which assumes cash meets people’s need, is ‘neoliberal thinking’ that undermines responsibility of the state towards service provision. Another non-government respondent, who expressed the importance of empowering people to make conscious decisions, perceived that paying cash for utilisation of services was an ‘easy way out’. He emphasised the need to work on broader determinants of utilization of health services. One argued that although giving cash to poor would change behaviour, it is not necessarily the appropriate way of doing it.

“You can’t treat humans like rat[s]. Human beings have to be treated with dignity and respect and the second is autonomy. If we are talking about empowerment and capacity building then our job is to help all human beings make best choice for themselves.”- Non-government stakeholder

When asked about the sustainability of the model of behaviour change, there were differing views about what would happen in the hypothetical scenario that the government stopped paying the incentive. Most respondents, government officials as well as non-governmental stakeholders, agreed that there would be decline in the utilization of facilities as those coming only for
money will stop coming to facilities. However most of them felt that continued utilisation hinges on quality: if there is improvement in quality of care, women will continue utilization irrespective of the money, but if quality continues to be poor, increased utilization will not be sustained even with the incentive.

Design of JSY: narrow and exclusive policy and programme approach
Some participants, both experts and officials, criticised the narrow focus of the JSY programme from two perspectives: first its exclusive focus on intrapartum care over other maternal health services such as antenatal and postnatal care; and second its prominence in the health system, thus encouraging a narrow focus on a single intervention rather than wider health systems strengthening.

JSY’s focus on facility births for MMR reduction was criticised by few non-government respondents and one official as being too narrow, since other women’s health issues which impact maternal health need to be addressed. Tackling anaemia and nutrition in pregnancy, and strengthening family planning and abortion services were given as examples of health issues affecting MMR, which are not addressed by the JSY. One non-governmental stakeholder and one health official argued that the lack of emphasis on antenatal and postnatal care resulted in lost opportunity to prevent deaths, for example through the identification of complications like preeclampsia, and managing anaemia. Two non-governmental respondents perceived that JSY had become a ‘one point agenda’ for public health system since ‘mental and physical space in the health system’ had been diverted to this single policy. This was compared to the historical focus on the family planning program in India.

Program context: Pathways and priorities for MMR reduction
This theme presents the perceptions of implementers and non-government stakeholders regarding the possible pathways of influence of the JSY on maternal mortality reduction and therefore priorities for action. Most participants agreed that reduction in maternal mortality post JSY had not been as great as expected and offered several explanations for this.

One official and several non-governmental respondents attributed the problem to poor quality of care and agreed on the need to improve quality of care for reduction in MMR. Several non-governmental respondents expressed the view that there had been a decline in quality of care offered at health facilities due to the increased burden of institutional deliveries, driven by the JSY, laid on the weak health system. They expressed the view that
there were only limited efforts to improve the supply side capacity and felt that MMR would decrease faster only if quality of care improves.

“We are lacking human resources. We should be getting 5-7 staff nurses but we are working with [a] single staff nurse. This is a major problem whether she (nurse) is going to deliver the baby or she is going to maintain the record. Because of this finally what happens is work happens with the untrained people”. -Health official

Both officials and non-governmental participants highlighted systemic problems in service delivery during the JSY program, such as bed shortages, inadequate supplies and human resource issues including under-staffing, lack of competencies among staff, and poor attitudes and behaviour of staff.

“….when a woman is admitted to the hospital and she is in labour, the way the ANMs speak to them [in] very derogatory language. The patients feel very bad and they think that even if you have to pay money it is better to go in the private hospital.”- Non-government stakeholder

Apart from issues with biomedical care, several non-governmental respondents discussed abuse and neglect of women during delivery by staff as a violation of human rights.

**Program implementation and its challenges:**

In addition to challenges in provision of good quality maternal services, some practical issues regarding JSY program implementation were discussed both by non-governmental stakeholders and health officials. One important issue from officials’ perspectives was women’s reluctance to stay in the facilities for 48 hours after delivery. The first 48 hrs period after delivery is considered critical for the mother and the new born, hence mothers are expected to stay in facilities for this period to observe occurrence of any postnatal complication and early treatment. However as the JSY cash transfer is conditional on delivery, most of them expect discharge soon after delivery, undermining the provision of postnatal care.

“...in our society delivery is not thought as anything very complicated. So, the patients come to hospital only for Rs. 1400 and soon after delivery i.e.- within 1-2 hours they want to go back home. It becomes difficult for us to keep them in hospital for even 1 day and 48 hours is out of question.”-Health official
Transfer of monetary benefit to beneficiaries is a major task in the implementation of the JSY program. Both officials and non-governmental stakeholders described the changes in payment mechanism over time in order to improve the transparency in the payment system. The initial payment by cash disbursed to women at the time of discharge from hospital which was first changed to payment into a bank account by cheque, and more recently to e-payment.

The e-payment system was seen as an improvement by some health officials citing it improves transparency and reduces risk of malpractice. Several non-government respondents raised concerns about irregularities in the program and expressed the need to validate institutional deliveries reported under the JSY since they perceive that not all deliveries recorded as institutional, occurred in facilities. Initiatives were however being implemented to control irregularities in payments, as described by senior level implementers. These included physical or telephonic verification of beneficiaries by senior officials.
Discussion
The results of the four sub-studies presented in this thesis are important, given that the focal geographic region (i.e., the nine studied Indian states) of these studies is one of the hotspots of global maternal deaths, representing an approximately 12% contribution to these deaths (World Health Organization, 2014b; Registrar General of India, 2013). Hence, efforts made to reduce maternal mortality in this region have global consequences, and learning from the strategies implemented in this area will contribute to the knowledge base for informed maternal health policies globally.

Our analysis shows that use of health facilities for childbirth in the nine studied states increased sharply following the implementation of the JSY cash incentive programme (I). It was also observed that, although inequality in access to institutional delivery care persists, it has reduced following the introduction of the JSY programme (II). Despite the steep rise in the uptake of institutional delivery care and the reduction in inequality following the introduction of JSY, our analysis was unable to detect a significant association between institutional delivery uptake and MMR in the studied districts (I). MMR was found to have decreased in all areas post-JSY; however, it was found to have declined four times faster in the richest areas than in the poorest (II). Poor access to critical life-saving intrapartum care, such as Caesarean care (II); poor quality of referral services (III); and supply-side issues resulting in poor intrapartum care (IV) present important challenges to JSY that must be addressed in order to translate the gains in the utilization of health facilities for childbirths to a more rapid decline in MMR. In this section, I discuss the important results from the four sub-studies, with reference to the wider available literature on the experiences of cash transfers in LMICs.

Changes in coverage and inequalities in institutional births
The proportion of institutional births at the state level increased two to three times over the five year period since the launch of the JSY programme (I). Since the JSY programme was launched simultaneously nationwide, with some variation in its initiation, a robust assessment of the effect of JSY on institutional delivery uptake was not possible due to the non-availability of a comparison group. However, the slow rise in institutional births under the CSSM and RCH-I programmes (1992-2004), which were implemented before the JSY programme and during which institutional births remained below 25% in nine study states (International Institute for Population Sciences, 2007), along with the sharp increase in institutional births following the initiation of JSY, suggests that JSY has contributed to converting a significant proportion of home births into institutional births. We assume that this sudden increase could largely be fuelled by JSY, since
this was the main NRHM intervention targeted towards improving the uptake of institutional births. The NRHM has a supply-side strengthening component apart from the JSY component, which could be argued to be a factor in the increased institutional deliveries; however, this is likely to have a lesser influence on the institutional delivery results, since the major changes that were expected at health facilities largely remain a distant reality. One study that attempted to analyse the impacts of JSY, using variations in the initiations of JSY programmes across states in India confirmed that JSY had a positive effect on the utilisation of in-facility services for childbirths, but little or no effect on antenatal care (a behaviour that was not explicitly incentivised) (Powell-Jackson, 2011).

Another possible reason for the increase in institutional births could be the contribution of deliveries in private hospitals, which do not provide JSY incentive. However, this contribution is likely small, given the low availability of private-sector hospitals in nine studied states (specifically, an average of 13% of all births occurred in private institutions in the studied districts) (Registrar General and Census Commissioner, 2011). Further, of the births that occurred at private facilities, those mothers delivering at JSY-accredited private institutions were eligible for the cash benefit, suggesting that non-JSY institutional births represents only a small proportion of all institutional births. A study that assessed the influence of JSY on place of delivery found that the JSY programme was associated with a substitution away from private health providers, thus confirming the unlikelihood that the increase in institutional births was driven by private sector (Powell-Jackson, 2011). Another study confirmed that, in the 'high focus' states of MP, Rajasthan, UP, Orissa, and Bihar, the vast majority of all institutional births do occur under the JSY programme: That is, on average, only 12.9% of all institutional births occur outside the JSY programme facilities (United Nations Population Fund–India, 2009).

Demand-side interventions via cash incentives were observed to have positive influences on the utilization of health services in other LMICs. A review of evidence for demand-side financing of sexual and reproductive health services in LMICs also reports the increased utilisation of services as an effect of demand-side financing strategies (Witter & Somanathan, 2012; Lagarde et al., 2007). For example, Nepal’s similar cash incentive programme showed positive effects on women’s utilisation of maternity services (Timothy & Jackson, 2010).

Since JSY was intended to benefit those who experienced the access barriers most acutely, JSY’s ability to increase institutional deliveries across different socioeconomic sub-groups—and, specifically, among the poorest groups—was a concern. Our district-level inequality analysis shows that, although inequality in access to institutional delivery care persists, it has been reduced since the introduction of JSY (II). Since we have used ABSMs to analyse
inequality, inequality in the utilization of health facilities in our analysis should be understood as an effect of the socioeconomic characteristics of living areas, rather than of individual socioeconomic positions.

When we sought to further understand the contributions of various factors to existing inequalities, our decomposition analysis revealed that most inequalities (69%) were explained by demand- and supply-side factors. On the demand side, male literacy levels and economic deprivation across socioeconomic areas contributed to existing inequalities, while, on the supply side, the level of EmOC availability across different areas was a contributor (II). These factors contributed to the inequalities through their associations as determinants of access to care in health facilities and their unequal distribution across socioeconomic areas. Apart from unequal distribution, the relative contribution of male literacy may also be due to the fact that household decisions tend to be made largely by men. More educated men may be better informed about the cash incentive programme, the availability of health facilities and the advantages of birth at a health facility. Female literacy, by contrast, was not found to contribute to inequality, perhaps because it is equally low across all areas. Another factor explaining inequality is poverty, which is a well-recognized barrier to the utilization of health services. It is known that individual-level poverty poses various barriers to accessing care, such as the financial incapability to afford care (Gabrysch and Campbell, 2009; Bonu et al., 2009). By contrast, area-level poverty results in a lack of social commodities, including health facilities, schools, and market places (Macintyre et al., 2008). We observed that, despite an overall increase in institutional births during JSY, more than half of the women in the poorest districts delivered at home in 2010 (II). These findings suggest that, in poor areas, there were other barriers to accessing institutional care that outweighed the benefits of the cash incentive. Since poor women bear the highest burden of maternal deaths and since these are the women who are most likely face multiple barriers (Mohanty, 2012) (i.e., beyond economic ones), there is a need to develop mechanisms in addition to JSY to reach this most vulnerable group. The level of EmOC availability in public facilities is indicative of the kind of public health care services available in a given area. Poor availability of functional public health services could make access to care more difficult, resulting in low levels of utilization. This may explain the contribution of inequality in EmOC availability to inequality in institutional delivery uptake (II).

A decomposition analysis can improve our understanding of how factors affect inequality through, for example, the more unequal distribution of factors or the greater association of factors with health outcome variables. Such an analysis clarifies that factors strongly associated with health outcome variables do not necessarily contribute to health inequalities if they
are equally distributed across socioeconomic groups. Hence, the findings of the decomposition analysis facilitate the shift from tackling average health problems to focusing more specifically on tackling health inequalities. Our decomposition analysis suggests that, in addition to overall efforts to address the issue of low utilization of health facilities for childbirth, special efforts must be made to address the unequal distribution of factors across socioeconomic groups, since this is contributing to existing inequalities in the utilization of health facilities. Since contributing factors extend beyond the health care system, tackling inequalities in institutional births requires a multi-sectoral approach.

Our findings are consistent with those of other studies indicating that barriers to accessing health services could emerge from either supply-side factors, such as the unavailability of health services, and/or demand-side factors, such as low levels of education, poverty, etc. Thus, solving the access problem requires tackling both demand- and supply-side issues (Ensor & Cooper, 2004; O'Donnell, 2007). A study exploring the client perspective of facility births in one of our study states found that, despite a willingness to engage in institutional deliveries, several barriers, including poor infrastructure, a lack of quality care, staff behaviours, difficulties in accessing care, corruption and delays in the provision of monetary benefits prevented women’s access to institutional care (Rai et al., 2011). Experience from the neighbouring Bangladesh suggests that, although demand-side financing programmes have increased the utilization of maternal health services in poor population groups, a pro-rich slant in utilization has continued to show that demand-side financing programmes alone are not sufficient measures (Ahmed & Khan, 2011). The contribution of illiteracy and poverty to inequality in institutional deliveries was reported by an Indian study conducted prior to JSY, though this study reported effects of literacy among both women and men (Goli et al., 2013).

**Quality of care: A major concern in JSY**

Quality of care is a complex process depending on multiple factors in care delivery (Donabedian, 1988; Lohr, 1990). Various survey reports and studies have assessed the structural quality of health services during JSY and indicated serious gaps in required standards (Ministry of Health and Family Welfare, 2012; International Institute for Population Sciences, 2010). The JSY programme sought to reduce the risk of maternal death by providing mothers with better access to life-saving EmOC, including Caesarean sections. This health-facility-based intrapartum care model can only be successful if the care that is needed is available at facilities accessed or at referral-level facilities (and if referrals are managed appropriately). Hence, instead of repeating assessments of structural quality, and in light of the earlier reports available on this subject, we chose to assess the quality of
care during the JSY by analysing access to EmOC among different socioeconomic population subgroups and reviewing the quality of referral services provided.

The population-level Caesarean rate serves as a proxy of a population’s level of access to and use of EmOC. Although there are no standard recommendations for the proportion of births in a given setting that should occur through Caesarean section, a recent WHO analysis found that increases in Caesarean section rates up to 10% at the population level are associated with decreases in maternal, neonatal and infant mortality (World Health Organization, 2015). Conversely, Caesarean section rates under 5% tend to indicate that a country has inadequate access to EmOC services (Bhatta et al., 2010) and suggests underlying health system weaknesses (Schrade et al., 2011). Our findings of a low proportion of Caesarean sections in public facilities (1.4% in the poorest area and 3.3% in the richest area) reveals poor access to free EmOC services during the JSY programme in the nine study states (II). The population-level median Caesarean proportion in the poorest area, including Caesareans conducted in private hospitals, was 4.1%, while it was 9.2% in the richest area (II). This finding suggests that more women in the richest areas were able to purchase EmOC services; however, women in the poorest areas were not able to avail this option, might be due to its unavailability or unaffordability. Thus, our findings of low access to Caesarean services indicate a lack of availability of skilled attendance and EmOC during the JSY programme. An important reason for this situation is the acute shortage of obstetricians and anaesthetists in the public sector. Over 50% obstetrician positions at CHCs were vacant in 2011 (Ministry of Health and Family Welfare, 2012). In the nine studied states, the proportion of FRUs with blood storage facilities ranged from 0 to 26%, while the proportion of FRUs offering Caesarean section services ranged from 0 to 38% (International Institute for Population Sciences, 2010). Such low access to critical care during childbirth was widely present in LMICs; of 51 countdown countries, 33 reported rural Caesarean section rates below 5%, while four countries reported rates below 1% (Niger, Ethiopia, Burkina Faso, and Chad) (Bhatta et al., 2010). As is the case with India, many of these countries experience acute shortages of doctors, nurses and midwives. It was revealed that interventions like skilled and emergency care at birth, which require 24-hour availability of clinical services, had much lower coverage than those interventions that it is possible to routinely schedule, such as immunisations and antenatal care (Group, 2008). Various forms of supply-side inadequacies during JSY have resulted in a loss of opportunities to avoid many preventable maternal and neonatal deaths or stillbirths, even when women do approach facilities for care. This has been also evident from our findings of the poor quality of referral services, indicating maternal deaths occurred despite good geographic access and
there were higher chances of adverse birth outcomes among referred women (III).

Studies exploring the links between skilled attendance at births and maternal mortality suggest a need for 1) a partnership of skilled attendants (i.e., health professionals with the skills to provide care for normal and/or complicated deliveries) and 2) an enabling environment of equipment, supplies, drugs and referral transport (Graham et al., 2001). However, the competence of the nursing staff responsible for most JSY deliveries fell far short of the basic abilities required for life-saving care (Chaturvedi et al., 2014). A study using observations of deliveries in public facilities during the JSY programme reported several gaps in the quality of care women received in these facilities and indicated that many of the gaps resulted from a lack of enabling environments (Chaturvedi et al., 2015b). Respondents in our qualitative study (IV) also frequently mentioned systemic problems with service delivery during JSY such as staff and bed shortages, inadequate supplies, and incompetent staff, all of which indicate a lack of an enabling environment and a resultant poor quality of care offered.

A recent report by the UN Rapporteur on Health (Hunt, 2010) noted:

...the focus in India is on increasing institutional delivery, but institutional delivery is not a proxy for access to skilled birth attendance or life saving care.

The respondents in our qualitative study also raised concerns that, due to the lack of amenities in hospitals or to women coming to facilities only for the money, without any awareness of safe delivery protocols, many mothers and babies are discharged within hours of delivery (IV). This can result in lost opportunities to provide essential post-partum care, to detect danger signs in mothers and infants, to provide newborn care counselling and to establish early breastfeeding practices. The rapid increase in institutional deliveries without significant investment in strengthening the health system following JSY led to an enormous strain on the public health care system, which further compromised the existing quality of care. For example, respondents mentioned several instances of deliveries conducted by untrained support staff. JSY payments have been linked to deliveries at institutions; however, there were no efforts to ensure that quality care was being offered to the women who accessed facility care. Khanna (2013) has criticised this by saying that the ‘equating of institutional deliveries with safe deliveries is in fact the biggest flaw in India’s maternal health policy’ (Khanna, 2013). The investigation by Sri B et al. on the high number of maternal deaths in 2010 in the Barwani district of MP found a lack of skilled birth attendance, a failure to carry out emergency obstetric care and referrals that never resulted in treatment (Sri B et al., 2012). Their report questioned the policy of giving
cash to pregnant women to deliver in poor-quality facilities. Moreover, a 2009 Human Rights Watch Report identified four important reasons for the slow decline in maternal mortality in the Uttar Pradesh state of India, as follows: barriers to emergency obstetric care, poor referral practices, gaps in care continuity, and improper demands for JSY incentives (Human Rights Watch, 2009).

Health system strengthening is widely recognised as key for maternal health improvement. Experience shows that when health systems lack capacity, they are less likely to respond to the opportunities generated by isolated interventions, such as CCT, for demand generations. Instead, such programmes may actually reduce the resources available to the already resource-constrained health system (Travis et al., 2004).

This experience of JSY, which increased the utilization of services within the context of an insufficient supply of appropriate care to improve health outcomes, is similar to that of other CCT programmes. Evaluations of Mexico’s Progresa program (Behrman & Hoddinott, 2005) and Brazil’s Bolsa Familia (Lindert et al., 2007), two large CCT programmes, shows that these programmes had positive effects on school enrolment; however, their effects on learning outcomes are limited and inconclusive. Based on the findings of a systematic review of CCTs, Lagarde et al. suggested that, in resource-poor settings, in which geographical inaccessibility and poor service quality are critical issues, expanding health care capacity should be a preliminary step to the introduction of CCT programs (Lagarde et al., 2007). Gaarder et al., who reviewed the impact of CCT on health outcomes, also highlighted the need for an equal emphasis on measures to improve quality of care and user empowerment, along with CCT programs (Gaarder et al., 2010). Our findings of the JSY experience reiterate the fact that, for CCT to result in its intended outcomes, strong supply-side availability is imperative. Although efforts were taken by the Indian government to improve service delivery under the NRHM, our findings indicate that these were insufficient to bring about the changes required in the situation on the ground.

**Maternal mortality reduction: Monetary incentives are not sufficient**

An analysis of the correlation between skilled birth attendance and MMR shows that countries with low MMRs also have high proportions of skilled birth attendance, as well as high proportions of maternal complications managed through high-quality EmOC services (Paxton et al., 2005). Our findings of no association between the proportion of institutional births and the MMR suggest that, although districts in the studied states have achieved increase in institutional delivery, they may not be providing adequate skilled attendance or effective management of complications (I).
Lower levels of access to Caesarean services in public facilities, particularly in the poorest areas, indicates that women in these areas are less likely to receive critical life-saving EmOC in the event of complications (II). Our findings of higher levels and slower declines in maternal mortality in the poorest areas than in the richest ones during the JSY programme reiterate the inability of the CCT programme to influence health outcomes in areas with limited resources (II).

Another important aspect in the occurrence of adverse outcomes is the quality of intrapartum referral care. Good-quality referral care can play a critical role in resource-poor settings like our study area, where CEmOC is available only at higher levels, such as district hospitals. The monitoring of labour to identify any deviations from the normal labour progress, the detection of any emergency complications arising during labour or the intra- or postnatal periods, timely decisions regarding referrals and pre-referral stabilization, the availability of good referral transport, and prompt treatment at referral facilities are key components of good referral care (Jahn & De Brouwere, 2001). A study in MP showed that partographs, which are used to help with the early detection of abnormal labour progress, are not routinely used in JSY facilities (Chaturvedi et al., 2015c). A high proportion of referred mothers among the total maternal deaths at the CEmOC facility in our study, despite the small inter-facility referral distance, indicates a poor quality of referral care at either the sending or the receiving facility (III).

It is well recognised that good, safe motherhood programmes need to be complemented by a wider continuum of care, including access to family planning, safe abortion services, antenatal and post-partum services, and the treatment of co-morbidities, such as nutritional deficiencies and HIV (Campbell et al., 2006). The JSY incentive is offered exclusively for intrapartum care, with no emphasis on ante-natal or postnatal care. Although care during the intra-partum period is crucial, the context where anaemia is prevalent and share of maternal deaths during the ante-natal and postnatal periods is substantial, the JSY programme’s exclusive focus on intra-partum care might lead to a neglect of care for a large proportion of complications that can arise during the antenatal and postnatal periods. Notably, data from a large household survey in India showed that only one in six women received postnatal care (International Institute for Population Sciences, 2010).

Other areas requiring attention include unsafe abortions and family planning. Unsafe abortions contribute 8% to the total number of maternal deaths in India. However, studies show that access to safe abortion services remains restricted, especially in rural areas (Chaturvedi et al., 2015a). Of the estimated 6.7 million abortions per year, only one million are thought to be provided by certified cadres at authorised centres (Paul et al., 2011). It has
been well-established that family planning interventions are the most cost-effective ways to prevent maternal deaths (Goldie et al., 2010); however, coverage for these services in India remains low. The contraceptive prevalence rate among currently married women is 56% (International Institute for Population Sciences, 2010) and it is concerning that the unmet need for family planning has risen, even in well-developed states, as known from early reports of the recent round of the household survey. These issues highlight the need for comprehensive programmes for improved maternal health outcomes, rather than programmes (e.g., JSY) focused only on facility births/intra-partum care.

An analysis of the factors reducing maternal mortality in the bordering country of Bangladesh, which achieved substantial reductions in maternal mortality despite its low coverage of skilled delivery care, showed that access to and use of CEmOC, reduced fertility rates and abortion-related deaths and improved women’s education were main contributors to reducing MMR (Chowdhury et al., 2009). Similarly, Nepal achieved a 48% reduction in MMR between 1996 and 2005, without a significant increase in facility births; authors report that women’s awareness, family planning and safe abortions contributed to this reduction (Rajendra, 2012). Experience from Sri Lanka, which achieved a substantial MMR reduction much earlier than other South Asian countries, demonstrates that, despite low economic development, a competent midwifery cadre backed by effective CEmOC services can address a large number of preventable maternal deaths (Pathmanathan & Liljestrand, 2003). Honduras reduced its MMR from 182 to 108 between 1990 and 1997 through an emphasis on developing referral centres to provide EmOC. Deliveries at first-referral-level hospitals doubled during the seven years of the programme. This shift was correlated with efforts to make EmOC available in rural and urban health centres and district hospitals (Prata et al., 2010). These examples from developing countries suggest that a focus merely on facility births is inadequate to reduce MMR and that better referrals and EmOC are crucial.

Efforts to reduce maternal mortality must go beyond health system interventions, since factors like poverty and gender discrimination have been established as powerful predictors of child and maternal survival (McAlister & Baskett, 2006). Poverty raises risks through a variety of mechanisms, including poor nutrition and poor access to (and limited demand for) health care services, due to geographic, cultural and financial barriers (Solar & Irwin, 2007).

We, therefore, highlight that efforts aimed at increasing access to skilled care through, for example, CCTs must be complemented by improvements in the quality of care provided, including in the areas of referrals, EmOC services, and other, broader socio-economic issues that concern women’s health.
Health improvement model: Behaviourist vs. empowerment approach

The JSY program represents a major change in maternal health strategies from the previous safe motherhood programs (World Bank, 1997; World Bank, 2005) in India. Prior to the JSY, the Indian government’s efforts were mainly focused on strengthening the supply side, such as training of birth attendants and improving the functionality of health facilities. However the JSY program represents a shift in approach by aiming at increasing utilization of health facility for childbirth by incentivising pregnant women to utilise services. Participants in our qualitative study (IV) held differing views with regard to the low utilisation of health services - either framing it as a behaviour ‘problem’ of individuals / communities or highlighting systemic failures.

A recent study on access barriers identifies that both demand and supply side barriers and their interactions lead to low utilization of health services (Jacobs et al., 2012). Evaluations of safe motherhood programs prior to the JSY suggested the need to address supply side issues in order to achieve improvement in maternal and neonatal health. During these programs, non-availability of skilled care provision in various parts of the country including shortages of specialists, blood transfusion services and functional FRUs were important reasons identified for suboptimal achievements in maternal health improvements. However most health officials understand the low utilisation of health services as a demand side problem of individual behaviour and therefore perceive the policy of giving an incentive as appropriate. This understanding of health officials seems to draw on a health behaviour model (Hausmann-Muela et al., 2003) which tends to believe that the individuals themselves are responsible for inadequate health-seeking behaviour. Behaviourist approaches, which emphasise individual ‘failure’ to utilise services have been criticised as a ‘victim blaming’ (Tones, 2005), because they do not acknowledge the underlying structural and social determinants of health-related behaviour. Behaviour change interventions such as CCT have been critiqued from this perspective, as focusing on individual behaviour in response to the stimulus of incentives, while laying less emphasis on addressing underlying systemic problems. An analysis of CCT programs aiming to change decisions about place of delivery found that efforts to increase utilization of facility births are most appropriate where the supply side is adequately developed to deliver services (Fiszbein et al., 2009). Similar individual-focused behaviour change approach was adopted historically in the Indian health sector with regard to the family planning program, in which individuals were offered monetary incentives to ‘accept’ sterilisation. However despite high expenditure, and disruption of the health services, the family planning program failed to yield the desired decline in fertility rate (Bose, 1985; Banerji, 1985).
Lavinas (2013) identifies a shift in strategies of improving health towards behaviourist approaches in various countries, as part of a process of change in the role of government away from the welfare state towards a new model of an ‘enabling state’ which facilitates the play of market forces by providing public support for private responsibility (Lavinas, 2013). In this shift, governments are withdrawing from providing universal welfare systems and services and shifting towards individualized models with a greater emphasis on cash benefits.

The behaviourist approach of increasing utilization was contrasted by other respondents with the empowerment model of health promotion, which emphasises enabling people to take decisions in their best interests and to improve the social conditions which create and sustain damaging behavioural patterns (Watt, 2007; Hubley & Copeman, 2008). This model stresses that to promote health, the social, economic and environmental factors that influence individuals’ health and health related behaviour need to be taken into account (Scriven et al., 2010; Estacio et al., 2013; Marmot, 2005). The failure to recognise social determinants of health problems before cash transfer programs are introduced, has been found to lead to unintended consequences or failures of CCTs (Handa & Davis, 2006).

Studies from other developing countries with contexts similar to India’s, including Bangladesh, Nepal, Sri Lanka, have also shown that women’s education and empowerment are key factors contributing to substantial decline in maternal mortality (Koblinsky et al., 2008; Rajendra, 2012; Prata et al., 2010). Recently, Mumtaz et al. have argued that addressing powerlessness, inferiority and invisibility of women are essential to improve maternal health services, especially for very poor women (Mumtaz et al., 2014) and equally an overall improvement in the health system and awareness among women is required to ensure that the JSY can be said to empower women in a sustainable way (Gopichandran & Chetlapalli, 2012).

**Methodological considerations**

This section discusses methodological considerations in interpreting the findings of the studies in this thesis. Although this thesis has studied crucial aspects of a demand-side financing strategy and has returned important findings regarding the experience of CCTs for maternal health in a setting similar to that found in many LMICs, the findings must be understood with respect to their strengths and limitations.

One of the strengths of this thesis is that two studies are based on large datasets from nine states, which, together, constitute half of India’s population and represent approximately 75% of the total potential number of JSY beneficiaries in the country. Although these studies are based on aggregate data, the data are generated from the government’s recent initiative of annual health surveys; hence, the data are very recent.
Moreover, the aggregation is conducted at lower administrative units, rather than at state levels (which may hide intra-state variations). The AHSs are the first surveys to estimate MMRs at lower level than states, and these data provide the opportunity for more robust analyses, such as the one conducted in this thesis. Another strength of this thesis is its use of various methods to complement the requirements of answering the research questions. That is, the thesis has used both quantitative and qualitative approaches and advanced statistical methods besides newer applications of GIS tools for the analysis.

The data in papers III and IV are primary data. For the facility survey in paper III, I was personally involved in all steps, beginning with developing the research questions, through to designing the tools, piloting, developing the standard operating procedures for data collection, training the data collectors, supervising the data collection process onsite and engaging in quality checks to ensure that the data were fairly representative and of good quality.

Although study III was conducted in MP and the findings could vary for different states in India, we believe that the findings from this study are applicable to all nine states with high MMRs, due to similarities in levels of socio-economic development, education, health system functioning and JSY implementation. Hence, this thesis covers a large area comprising the focus of the JSY intervention.

In paper I, we assessed the possibility of an association between the district-level institutional birth proportion and the MMR. The AHS estimates MMRs for groups of three to five geographically contiguous districts. During our analysis, these pooled estimates were attributed to individual districts. The results of the study should be interpreted with caution because the association between institutional birth proportions and MMR can be confounded by other known and unknown factors. One important factor is the quality of care offered in health facilities. However, in the absence of precise data on the quality of care provided in the studied districts, this study is unable to control for the confounding effect of district-level variations in care quality. Other factors could include districts’ road networks, emergency transport services, the nutritional status of pregnant women, the availability of safe abortion services, etc. Some confounders, such as cultural practices, awareness of the need for and availability of health care services, etc., influence maternal mortality via mothers’ access to institutional births (which was included in our analysis). Variables used in the analysis (e.g., poverty, literacy, urbanisation) serve as proxies for these factors. We acknowledge that residual confounding is likely to be present. However, despite the limitations of this ecological study, it explores the association between district-level variations in institutional birth uptakes and MMRs using data at the smallest available unit of analysis (i.e., the district) during
the implementation of the JSY programme; thus, it makes an important contribution to the literature and has been discussed in policy circles and widely cited.

Caesarean rates may reflect the extent to which the need for critical life-saving obstetric care is met; however, counter-intuitive findings of an association between Caesarean rates and MMRs suggests a need for further exploration of the appropriateness and quality of Caesarean and post-operative care. It could be possible that the sudden rise in institutional deliveries resulted in overcrowding in facilities and/or compromised quality of care in operation theatres or postnatal wards, resulting in more deaths. Another possibility could be the higher rates of Caesarean sections, which expose more women to higher risks, in private hospitals. In the 284 studied districts, the median Caesarean rates for public and private sectors reported by the AHS were 5 and 28%, respectively. When we conducted a regression analysis using a stratified Caesarean rate for public and private facilities, the results showed that Caesarean rate in private facilities, but not in public ones, was significantly associated with higher mortality rates. This needs to be explored further. Bertan et al., in their analysis of global and regional estimates of Caesarean rates show that, although Caesarean rates below 15% are associated with lower maternal mortality, higher rates are largely correlated with higher maternal mortality (Betran et al., 2007).

In paper II, we used ABSM to analyse inequalities. Although ABSM provides an opportunity to account for contextual factors and individual-level socioeconomic statuses, it does have some limitations, For example, not all those living in highly deprived areas necessarily have low SESs (or vice versa). We used ABSM because it has the advantage of characterizing the entire population and was sufficiently applicable to the currently available secondary data. A study comparing estimates of disparities using ABSM and individual-based socioeconomic measures concluded that area-based estimates are analogous to those yielded by individual measures (Subramanian et al., 2006).

We compared the proportion of institutional delivery uptake before the JSY programme with that five years after the programme began, with the implicit assumption that all deliveries during this time frame were JSY births. However, bias due to deliveries outside the JSY facilities is likely to be minimal given low proportion of deliveries in these facilities and evidence of shift in deliveries from private to public facilities (Powell-Jackson, 2011).

Since the decision to utilize healthcare services is influenced by multiple factors, there may be factors contributing to the inequality in institutional care uptake other than those included in our decomposition analysis (II). That said, although our analysis includes few factors, the ones included are important and are considered good proxies for the supply- and demand-side barriers (Jacobs et al., 2012).
Changes in the MMR during JSY were analysed over a short period of time (2007-09 and 2010). These changes to MMR could be attributable to factors other than institutional births promoted by JSY; therefore, a cautious interpretation of these results is necessary. Despite these limitations, this study makes an important contribution by exploring the existence of area-based socioeconomic inequalities in the context of large-scale cash incentive programmes using the latest available data.

In paper III, we lacked data on the delivery outcomes of mothers referred out from study facilities. This pattern, however, is unlikely to be very different from that of mothers referred into study facilities, who were included in our study. We assume the van speed to be 50 km/hour; hence, a 100 km distance represents two hours of travel time. These numbers were determined from the triangulation of information from van drivers, nurses and our own experiences with these roads. Our results would remain unchanged even if one were to assume the speed to be 10 km/hour faster or slower. Moreover, we do not know how long after the onset of their complications the women had arrived at the facility or what modes of transport were used. But, in line with Knight et al., we argue that the responsibility for care rests with the facilities and that this responsibility includes referral services once a woman has reached a facility. It is important not to shift the blame to users when facilities are dysfunctional (Knight et al., 2013). Fourth, the reasons for referral could have been reportedly differently by various staff members, which could result in the misclassification of referral indications in our descriptive results. However, this non-differential does not affect the results of our matched case control design.

We were unable to consider birth weight and congenital anomalies in the case control design due to the limited availability of reliable data; thus, these could be possible confounders. Hence, we suggest that our findings be interpreted in light of these considerations. Moreover, our study has wide confidence intervals due to its use of small number of cases and controls. Our sample includes 34 cases and 68 controls. Thus, the study has a power of 47% at an alpha of 0.05, suggesting the need for a cautious interpretation of the results. Further, since the study was focused on inter-facility referrals, we did not study the family/community level of the referral chain.

In the qualitative study (IV), I consistently followed measures to ensure trustworthiness in terms of credibility, dependability, conformability and transferability. I have been working in the field of public health research in India with a focus on maternal health issues, my familiarity with the study context was useful to ensure credibility. The guides developed for the interviews ensured consistency in data collection method while also allowing for probing when required. I conducted all the interviews myself building good rapport with the potential respondents. Aware of the importance of
reflexivity in qualitative research, during this work I frequently reflected on my role and my pre understanding. Interview participants might be affected by social desirability; my paper I in this thesis was already published and widely circulated when I was conducting the interviews for study IV, leaving a potential that the respondents’ awareness of this might have altered their responses; we used probing and triangulation to minimize this possibility.

The dependability of the findings was enhanced by revisiting the topic guide during the study and making need based changes to the study design; for instance we modified our sampling after initial interactions with facility level implementers. We purposively selected interview respondents who would provide rich data on the cash transfer policy; however other possibly important perspectives from other actors like service providers or health workers may have been omitted.

My prior experience in qualitative health research and the complementary backgrounds of my coauthors were helpful to strengthen the trustworthiness of data analysis and interpretation. We discussed the preliminary analysis and checked the developed themes with the data in the transcripts. We purposefully chose to use framework approach to analysis as it is considered more suitable to applied qualitative health research addressing policy related questions in which the objectives of the research are preset and defined by specific information needs. The framework approach tends to be more informed by a priori reasoning while also allowing to draw more inductively from the data. Using this approach allowed me to better integrate the findings from the qualitative study with those from my quantitative analyses in the other three papers. Besides this approach has advantages of more transparency and rigor. We also considered the advantage of this approach that it makes it smoother for researchers working at distance to collectively work on the data and participate in the analysis since the analysis is designed so that it can be viewed and assessed by people other than the primary analyst. In order to meet transferability criteria, i.e. the extent to which the findings could be transferred to other settings, I have provided a ‘thick description’ of the study context. I have also provided a description of the participants, the data collection and analysis procedures and quotations in the text representing a variety of respondents, as to allow readers to judge the relevance of the findings to other settings.
Conclusions

This research focused on analysing the implementation of the JSY cash transfer programme in India, with a special focus on the country’s nine poorer states. The study showed that the JSY programme led to a significant increase in institutional births and a decline in inequalities related to access to institutional delivery care. However, the availability of critical life-saving obstetric care, such as Caesarean section services and referral care, was found to still be poor.

The studies also found MMRs to be higher and to decline slower in poor areas during the JSY programme. The studies found no association between the proportion of institutional births and MMRs, indicating the possibility that the high institutional birth proportions achieved during JSY are, in themselves, inadequate for reducing the MMR. Supply-side inadequacies were perceived to result in poor care quality at JSY facilities, thus contributing to the programme’s inability to achieve a commensurate decline in maternal mortality.

Furthermore, instead of pointing to the low utilization of facility care as resulting from an individual inability to access health care services, it is critical to take into account the social, economic and environmental factors affecting health-related behaviours when addressing the issue of low utilization of health services.

CCT programmes to increase service utilization need to be essentially supported by the provision of quality health care services, such as EmOC and referral care in the JSY programme, in order to achieve the programme’s intended impact on health outcomes.

Though CCT programmes implemented in low-resource settings have promising potential to increase demand for services, supply-side constraints can limit their ability to improve long-term health outcomes.

Recommendations:

1. To translate the gains in institutional delivery coverage subsequent to JSY into faster reductions to maternal mortality, it is important to ensure that all women accessing institutions for delivery receive good-quality obstetric care, including referral care.
2. Supply-side inadequacies in various forms, including human resources, medicines and supplies, blood transfusion facilities and infrastructures, need to be urgently addressed.
3. The efficient use of present health care resources must be supported by the adoption of best management practices, such as the functional split of emergency and routine obstetric care at overloaded referral facilities.
4. Interventions aimed at improving maternal health should take a continuum-of-care approach rather than focusing exclusively on specific aspects of care provision.

5. An increased allocation of finances for the health sector within the government budget, as well as the prioritization of financial allocations within health sectors based on research evidence instead of ad hoc policy making, needs to be considered.

6. Broader determinants of access to care, including poverty, illiteracy, geographic constraints, cultural beliefs and practices, must be addressed through short-term and long-term strategies in order to improve maternal health outcomes.

**Recommendations for further research:**

1. Although socioeconomic inequalities in accessing institutional care for delivery have declined following the implementation of JSY, there are still areas that have low levels of institutional births. There is a need to understand more about the individual- and area-level characteristics that contribute to variations in programme achievements.

2. Despite the increase in institutional birth uptake, the pace of MMR decline is slow. It is not clear whether maternal deaths are occurring among women who are still delivering at home or among those who access health facilities. Such an analysis will guide further actions to reduce MMR.

3. There is no incentive for health care providers to cater their services to the increased number of women accessing care due to the JSY programme. Instead, there is a disincentive for providers as a result of the increased work load, which might affect the quality of care offered. There is need to explore whether incentivizing staff improves quality of care, including staff behaviours towards pregnant and post-natal women.

4. The efficient use of resources in a setting like India should be a guiding principle for the allocation of finances among various interventions. There is a need to study the efficiency of the financial resources devoted to the JSY programme.

5. There is a need to understand community views on the policy of giving incentives, specifically with regard to whether community members prefer money or quality health care services.
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