



Critical comparison of maternity and delivery care patterns in Kerala and India using data from the National Family Health Surveys

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Abstract

Introduction: Sustainable Development Goal 3-target 1 aims to reduce the global maternal mortality ratio to less than 70 per 100 000 live births by 2030. With less than 10 years remaining to achieve this target, there is a need for knowledge regarding the trend in maternal health care for tracking the regions' progress. This study describes the pattern of maternity and delivery care and the trend of maternal mortality ratio in Kerala and India.

Methodology: Data on maternity and delivery care, as well as maternal mortality ratios were analyzed from five National Family Health Surveys and the Registrar General of India's Sample Registration System bulletins.

Results: There has been an improvement in all the maternity and delivery care indicators. Antenatal care was availed by 58.1% of mothers in India and 78.6% in Kerala. Institutional delivery has increased in India from 25.5% in NFHS-1 to 88.6% in NFHS-5, with Kerala achieving almost 100% institutional deliveries. The proportion of births attended by skilled health personnel in India improved from 34.2% in NFHS-1 to 89.4% in NFHS-5 and from 87.8% to 100% in the state of Kerala.

Conclusion: Kerala has achieved the SDG goal well before the targeted time and way ahead of the national MMR, thus demonstrating an excellent model to be followed. Stakeholders in the health sector must strive to maintain the achieved progress. India can achieve this only if the underperforming districts are promptly identified and proper interventions are aptly introduced, monitored and evaluated.

Keywords: Maternity care, Delivery care, Maternal health, National Family Health Survey, Maternal mortality ratio.

Introduction

Maternal mortality is a critical health indicator, because the direct causes of maternal deaths are well-known and, for the most part, preventable or treatable. Prenatal care, competent care by trained

medical personnel during childbirth, and care and support in the weeks following childbirth, prompt diagnosis and treatment of complications can make the difference between life and death for both the mother and the infant. Increased maternal

healthcare access and quality might prevent 54 percent of maternal deaths in low- and middle-income countries, according to estimates.¹ The global maternal mortality ratio (MMR) fell by 44% between 1990 and 2015, from 385 to 216 maternal deaths per 100,000 live births. Despite these gains, the world was far from meeting the Millennium Development Goals' aim of a 75% reduction in global MMR by 2015. Even at present, the decrease in maternal mortality is a chief concern, its importance being evident in the fact that the first target of Sustainable Development Goal 3: “Ensure healthy lives and promote wellbeing for all at all ages” includes the domain of maternal health- “By 2030, reduce the global maternal mortality ratio to less than 70 per 100 000 live births”².

Recognizing the importance of maternal and child care, India has launched several national health

programs in order to achieve a situation in which women will be able to control their fertility, go through pregnancy and childbirth safely, and have successful pregnancies that result in the survival and well-being of both the mother and the child. The evolution of the programs has been summarized in figures 1 and 2. Kerala has a reputation for having one of the best healthcare systems in the country. Kerala, according to numerous health surveys, including the central government's reports, exceeds many other states in terms of health-care standards and life expectancy rates, as well as having the lowest maternal mortality rate and infant mortality rate in the country. Given this robust health system, this study aims to assess the pattern of maternity and delivery care in Kerala and the progress made inattaining SDG-3 targets using the data from the National Family Health Surveys (1992-2020).

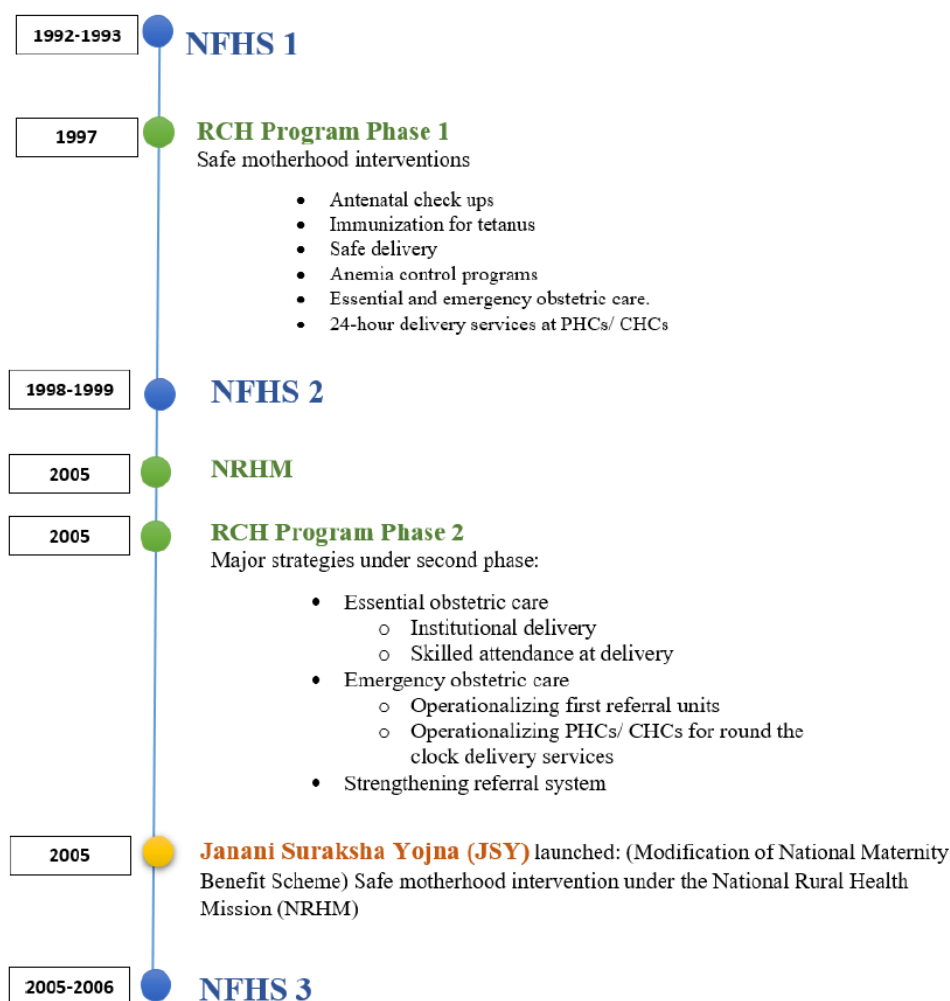


Figure 1: Timeline of maternal health care programs till NFHS-3



Figure 2: Timeline of maternal health care programs from NFHS-3 to NFHS-5

Methodology

A secondary data analysis was done to assess the pattern of maternity and delivery care in Kerala. The data for the study is obtained primarily from the five National Family Health Surveys (NFHS)³. The National Family Health Survey (NFHS) is a multi-round, large survey that is undertaken in a sample group of Indian households. In 1992–93, the Government of India's Ministry of Health and Family Welfare conducted India's first National Family Health Survey (NFHS-1). The survey's major goal was to gather accurate and up-to-date data on fertility, family planning, mortality, and maternal and child health. Since the first study in 1992-93, there have been three rounds of the survey. The second National Family Health Survey (NFHS-2) was undertaken in 1998-99 and was a key step in further strengthening the database in preparation for India's Reproductive and Child Health strategy. Further rounds of

Family Health Surveys were conducted in the years 2005-06, 2014-15 and 2019-21 providing additional information on nutrition, anemia, and the use and quality of health and family planning services in India.

This study analyzes the following domains under maternal and child health: 1) Maternity care 2) Delivery care. There have been minor changes in the indicators under these domains and in the methodology of conducting NFHS over the years. The trend of Maternal Mortality Ratio in India and Kerala (from 2001 to 2018) was analyzed with the data obtained from bulletins of the sample registration system (SRS) released by the Registrar General of India (RGI)^{4,5,6}

Results

Maternity Care

Antenatal care: According to NFHS 1, the percentage of women receiving antenatal care in

India and Kerala was 62.3% and 97.3%, respectively. These figures increased to 65.4% for India and 98.8% for Kerala in NFHS 2. (Table 1) Indicators for antenatal care in NFHS 3-5 included the percentage of mothers who had an antenatal checkup in the first trimester, mothers who had at least 4 antenatal care visits and mothers who had full antenatal care. These data for India and Kerala are shown in (Table 2). The percentage of mothers receiving two doses of tetanus toxoid increased from 53.8% in NFHS 1 to 92% in NFHS 5 for India. For Kerala, it increased from 89.8% in NFHS1 to 95.2% in NFHS 5. The percentage of

mothers receiving iron/folic tablets in India and Kerala were 50.5% and 91.2% respectively in NFHS 1. These figures increased to 57.6% for India and 95.2% for Kerala in NFHS 2. (Table 1). From NFHS 3, the indicator to measure iron and folic acid supplementation was- Mothers who consumed iron-folic acid for 100 days or more when they were pregnant. In NFHS 4 additional indicators- Mothers who consumed iron-folic acid for 180 days or more when they were pregnant were included. Data for the same is presented in Table 2.

Table 1: Indicators of maternity and delivery care in India and Kerala from NFHS 1 and 2

INDICATORS	NFHS 1 (1992-1993)		NFHS 2 (1998-1999)	
	INDIA	KERALA	INDIA	KERALA
Percentage receiving Antenatal care	62.3	97.3	65.4	98.8
Percentage receiving two doses of tetanus toxoid	53.8	89.8	66.8	86.4
Percentage receiving iron/folic tablets	50.5	91.2	57.6	95.2
Percentage of birth delivered in medical institutions	25.5	87.8	33.6	93.0
Percentage of deliveries assisted by a health professional	34.2	89.7	65.4	98.8

Table 2: Indicators of maternity and delivery care in India and Kerala from NFHS 3to 5

INDICATORS	NFHS 3 (2005-2006)		NFHS 4 (2015-2016)		NFHS 5 (2019-2021)	
	INDIA	KERALA	INDIA	KERALA	INDIA	KERALA
MATERNITY CARE						
Mothers who had an antenatal check-up in the first trimester (%)	43.9	91.9	58.6	95.1	70	93.6
Mothers who had at least 4 antenatal care visits (%)	37.0	93	51.2	90.1	58.1	78.6
Mothers who had full antenatal care	11.6	66.7	21.0	61.2	NA	NA
Mothers whose last birth was protected against neonatal tetanus (%)	76.3	88.7	89.0	96.4	92	95.2
Mothers who consumed iron-folic acid for 100 days or more when they were pregnant (%)	15.2	70.1	30.3	67.1	44.1	80.0
Mothers who consumed iron-folic acid for 180 days or more when they were pregnant (%)	NA	NA	NA	47.4	26	67.0

Registered pregnancies for which the mother received a Mother and Child Protection (MCP) card (%)	NA	NA	89.3	84.2	95.9	91.3
Mothers who received postnatal care from a doctor/nurse/LHV/ANM/midwife/other health personnel within 2 days of delivery (%)	34.6	84.6	62.4	88.7	78	93.3
Mothers who received financial assistance under Janani Suraksha Yojana (JSY) for births delivered in an institution (%)	NA	NA	36.4	20.4	NA	NA
Average out-of-pocket expenditure per delivery in a public health facility (Rs.)	NA	NA	3,197	6,901	2916	6,710
DELIVERY CARE						
Institutional births (%)	38.7	99.3	78.9	99.8	88.6	99.8
Institutional births in a public facility (%)	18.0	35.6	52.1	38.3	61.9	34.1
Home births that were conducted by skilled health personnel (%)	8.2	0.1	4.3	0.1	3.2	0.2
Births attended by skilled health personnel (%)	46.6	NA	81.4	99.9	89.4	100
Births assisted by a doctor/nurse/LHV/ANM/other health personnel (%)		99.4		99.9	NA	
Births delivered by caesarean section (%)	8.5	30.1	17.2	35.8	21.5	38.9
Births in a private health facility that were delivered by caesarean section (%)	27.7	32.7	40.9	38.6	47.4	39.9
Births in a public health facility delivered by caesarean section (%)	15.2	26	11.9	31.4	14.3	37.2

Delivery Care

The percentage of birth delivered in medical institutions was less than 50% in NFHS 1 to 3 for India which showed an increase in NFHS 4 (78.9%) and NFHS 5 (88.6%). Kerala's percentage of birth delivered in medical institutions in NFHS 1 was 87.8% which became 99.3% in NFHS 3 and improved to 99.8% in NFHS 4 and 5. The percentage of deliveries assisted by a health professional in India and Kerala were 34.2% and 89.7% respectively in NFHS 1. These figures increased to 65.4% for India and 98.8% for Kerala in NFHS 2. (Table 1). Further indicators for skilled birth assistance were added from NFHS 3 onwards which are shown in table 2.

In NFHS 4 about 89.3% and 84.2% of pregnancies were registered in India and Kerala respectively and these figures improved in NFHS 5 (Table 2). With the Launch of JSY in 2005, overall, India had Rs 3,197 average out-of-pocket

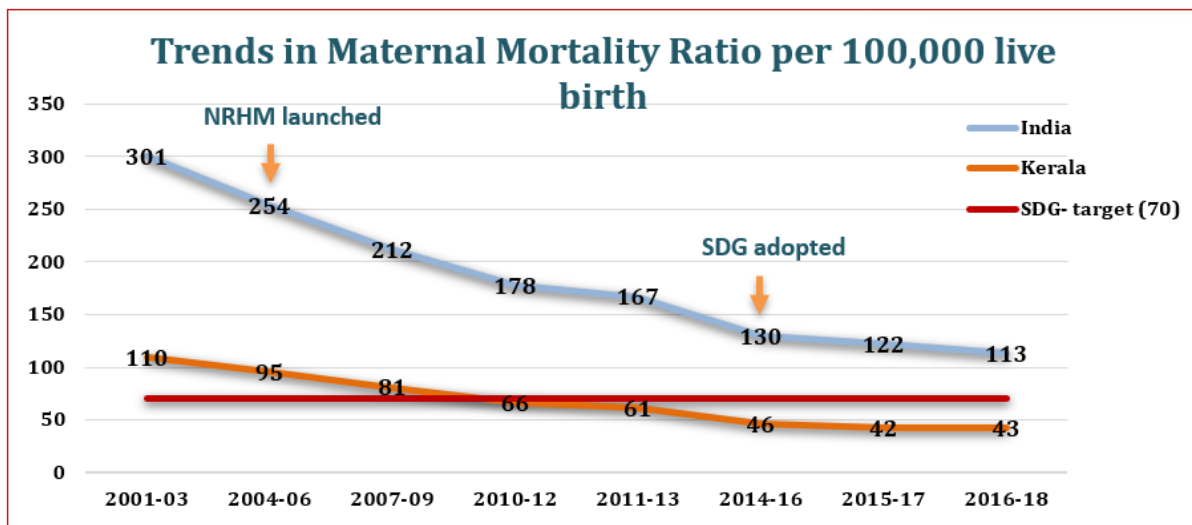
expenditure per delivery in a public health facility in NFHS 4. But compared to the national average, the state had an average out-of-pocket expenditure of Rs. 6,901 per delivery in a public health facility in 2015-2016 which reduced to Rs 6,710 in 2019-2020. The trend of Caesarean section increased over years both in national and state data. (Table 2). Other relevant maternity and delivery indicators included in NFHS 3, 4 and 5 are shown in Table 2.

Discussion

India is second only to Nigeria among developing countries that bear the brunt of maternal mortality.⁷ Because India accounts for 15% of all maternal deaths, its progress toward universal access to reproductive health is of global relevance. The neonatal period accounts for 47 percent of all deaths in children under the age of five worldwide and about a third of all newborn deaths occurred in India (22 percent) and Pakistan

(10 percent).⁸ WHO has lauded India for its remarkable achievement in lowering maternal mortality by 80%, from 556 per 100 000 live births in 1990 to 113 per 100 000 live births in

2018 as shown in figure 3. With its current MMR, India is on course to meet the Sustainable Development Goal (SDG) of an MMR of less than 70 by 2030.⁹



Source: Bulletins SRS, Registrar General, India¹⁷

Figure 3: Trends in maternal mortality ratio per 100,000 live births in India and Kerala

The National Family Health Survey reports show an improving trend in accessing antenatal care at the national level. Registration of pregnancy and availing of Maternal and Child Protection (MCP) card and protection against neonatal tetanus by two doses of Tetanus toxoid injection were the areas where the country performed best. The maximum improvement, almost 45% from 2005 to 2021, was seen in the provision of postnatal care within two days of delivery. The out-of-pocket expenditure per delivery has marginally decreased both in India and Kerala, which is a testament to the success of schemes like JSY, JSSK, Pradhan Mantri Jan Arogya Yojana towards the achievement of universal health coverage and reduction in catastrophic health expenditure. Even in 2021, less than half the pregnant women consume the recommended Iron and Folic acid tablets and this trend is reflected in the persistently high levels of anemia among pregnant women (50% according to NFHS-5).¹⁰ Kerala has always maintained a high coverage (above 80%) of almost all antenatal indicators in all the rounds of NFHS. There has been a fall in the proportion of women accessing 4 antenatal

visits by almost 12% from 2016 to 2020 which may be attributed to a decrease in healthcare utilization during the floods of 2018 and 2019 and the Nipah outbreak in the state in 2018. Another reason could be a possible increase in the number of migrants, as indicated by an increase from 2001 to 2011, whose health-seeking behaviour is worse than that of the native Kerala population.¹¹

The delivery indicators also have shown an improvement in India and Kerala over the years. Kerala maintains its high level of institutional deliveries with the rest of India almost doubling between NFHS 3 and 4, due to the introduction of schemes to increase institutional deliveries like JSY, JSSK during this period. However, the public health facility utilization in Kerala is only half of that of India, with studies suggesting the reason for private preference to be better household income in Kerala as the cost of medical care is considerable, which is beyond the capacity of most people in other parts of the country.¹²

The reasons for achieving this success in India are multi-dimensional. A strong political will as demonstrated by the manifold programs for maternal and child health; addressing of social

determinants of maternal mortality like improvement of female literacy, raising the minimum age of marriage thus enabling the women to have greater control over their reproductive health; and public-private partnership through programs like Pradhan Mantri Surakshit Matritva Abhiyan are some of them.⁹ Challenges faced by the country in achieving the SDG target include poor managerial capacity and governance, lack of adequate infrastructure and trained human resources, and lack of accurate and complete data on maternal health.

Lessons can be learned from Kerala, a high-performing state as compared to its northern counterparts.¹³ The essential elements for its success- high community awareness (e.g., the majority of women have a higher education), largely an urban and semi-urban population¹⁴, and roads in good condition resulting in easy access to health facilities, higher number and better quality of public and private health care institutions- all leading to increased utilization and improved health outcomes.^{15,16}

Over the years, there have been slight revisions and additions in the indicators under the domains of maternity and delivery care. Newer indicators are evidence of better health programs with robust evaluation systems. However, for this study, it is difficult to define the trend of these new indicators. This study has only analyzed the published factsheets of the National Family Health Surveys. Further studies are required to identify the reasons for the observed trends. District-level data analysis can be done to further refine the interventions to maximize the districts' potential in order to attain the global targets.

Conclusion

A healthy population is a nation's best asset. Lower IMR and MMR are always associated with the development of a country. The success of India's maternal health care programs can be directly visualized through the improvement in the various maternity and delivery care indicators which in turn gets reflected in the lowering trends

of MMR and other mortality ratios. The state of Kerala stays ahead with the lowest MMR (43) in India and has also attained the Target of SDG 3 but the thrive for further decrease should continue to reach a trend of developed nations. There remains an urgent need to identify the underperforming states and implement strategies to make SDG a reality.

No funding

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