Analysis of the Effectiveness of Janani Shishu Suraksha Karyakaram (JSSK) in Malappuram District of Kerala

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in

Economics

By

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Under the Supervision of

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Fasalurahman P K Patterkadavan

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Abbreviations

AAIR	Average Annual Increase Rate
AARR	Average Annual Reduction Rate
ANC	Antenatal Care
ASHA	Accredited Social Health Activist
AUC	Area Under the Curve
AWW	Anganawadi Worker
AYUSH	Ayurveda,Yoga and Naturopathy, Unani, Siddha and Homeopathy
BPL	Below Poverty Line
C-Section	Caesarian Section
CHC	Community Health Centre
CI	Concentration Index
COV	Covariance
CV	Coefficient of Variation
DH	District Hospital
DHS	Demographic Health Survey
DSF	Demand Side Financing
FEM	Fixed Effect Model
FRUs	First Referral Units
GEN	General Category
GHI	Government Health Institution
GLMM	Generalised Linear Mixed Model
HMIS	Health Management Information System
HPS	High Performing State
ID	Institutional Delivery
IEc	Information, Education, and communication
IFA	Iron Folic Acid
IMR	Infant Mortality Ratio
JSSK	Janani Shishu Suraksha Karyakaram
JSY	Janani Suraksha Yojana

LPS	Low Performing State
MC	Medical College
MCH	Mother and Child Healthcare
MDG	Millennium Development Goal
MMR	Maternal Mortality Ratio
MoHFW	Ministry of Health and Family Welfare
NFHS	National Family Health Survey
NRHM	National Rural Health Mission
OBC	Other Backward Catse
OoPE	Out of Pocket Expenditure
PHC	Primary Health Centre
PNC	Postnatal Care
PPU	Post-Partum Unit
REM	Random Effect Model
ROC	Receiver Operating Characteristics
SC	Scheduled Caste
SCs	Sub Centres
SDG	Sustainable Development Goal
SNCUs	Special Newborn Care Units
SRS	Sample Registration System
STs	Scheduled Tribes
THQH	Taluk Head Quarters Hospital
TT	Tetanus Toxoid
UNICEF	United Nations Children's Fund
VIF	Variance Inflation Factor
W&CH	Women and Children Hospital
WC	Wellness Centre

Chapter 1: Introduction

1.1 Introduction

Healthy inhabitants are one of the most crucial requirements for the social and economic development of the nation. This may be accomplished by making healthcare more accessible to everyone, especially the less fortunate. Health care refers to all the measures taken by the relevant authorities and the government to prevent and treat illnesses, as well as to encourage healthy lifestyle habits. It entails the diagnosis, treatment, and follow-up of all diseases as well as protecting the population from all types of illnesses by educating, immunising, and supplying them with the necessary medical infrastructure.

Both governmental and private organisations provide healthcare. A public health care system is one that is provided by the government. The Bhore Committee was established in 1943 to evaluate India's medical situation. It emphasised the necessity for both curative and preventative therapy. The Bhore Committee's proposals were adopted by the Indian government in 1952, and a public health care system was established. The Alma Ata Declaration's call for "health for all" in 1978 reinforced it. Therefore, the government, through several agencies, plays a critical role in the provision of services, equity in access to health care, and the growth and reinforcement of India's health system.

India needs a solid public health system in general, mother and child healthcare in special for a plethora of reasons. In India, one million newborns are discharged each year from Special Newborn Care Units (SNCUs), 1.7 million kids are born with birth defects, and over 3.5 million babies are born prematurely. The risks of mortality, malnutrition and developmental delay for these newborns remain quite high. UNICEF reports that India had

the greatest number of fatalities among children under the age of five in 2016, with a total of 1.08 million deaths. Sixty nine out of every thousand children die before they turn five. India is responsible for twenty-five percent of all child fatalities and twenty percent of all maternal deaths worldwide. Only thirty-nine percent of people in rural regions are immunised. In India, fifty-seven percent of women between the ages of 15 and 49 have anaemia.[1] Over time, the government created several healthcare programmes to address these issues. To unify various healthcare initiatives, the National Rural Health Mission (NRHM) was established in 2005.

1.2 Improving Healthcare in Rural India: The NRHM's Role

NRHM was a comprehensive and mission-based state involvement in the health sector. The primary purpose of this mission was to offer rural residents with accessible, inexpensive, and high-quality health care through enhancing the household health status. Involvement of Panchayati Raj Institutions further stresses community engagement. The National Rural Health Mission was created as a solution to several systemic flaws in the country's health system, including a lack of a comprehensive approach, a lack of human resources and infrastructure, a lack of community ownership and accountability, a lack of vertical disease management programmes integration, a lack of responsiveness, and a lack of financial resources. NRHM also targets health-related issues such as nutrition, sanitation, and access to safe drinking water. It enhanced equity and accountability, facilitated community ownership and, improved access, strengthened public health systems for efficient service delivery, and encouraged decentralisation to deliver efficient

[1] Levels and trends in child mortality, UNICEF report, 2017.

healthcare to the rural population, particularly the vulnerable groups like women and children. The National Health Mission's main goals were:

1. reduce newborn and maternal mortality rates.
2. ensuring that all citizens have access to public health services.
3. control and prevent communicable and noncommunicable diseases.
4. manage population growth and maintain gender and demographic balance.
5. promote alternative medical practices and a healthy way of life by AYUSH (Ayurveda,Yoga and Naturopathy, Unani, Siddha and Homeopathy)

The introduction of NRHM and NHM has made universal healthcare access equitable and inexpensive, and healthcare services are now responsible and responsive to the demands of the people. “According to a new UN research, India's child mortality and maternal mortality has decreased significantly from 1990, yet the nation, along with some African countries like Nigeria, still accounted for about a third of all under-five fatalities last year[2]. With the introduction of NRHM, India has achieved outstanding progress in giving the rural poor with accessible healthcare services, and the country's health system has gained additional physical and human capital. Most newborn children in all of India's states have received vaccinations, and institutional deliveries in nearly all the states have increased significantly during the NRHM period. However, there are also some issues and challenges, such as a lack of trained staff, participation by local self-governing bodies, use of United Funds, public-private partnerships, etc. Despite all these difficulties, NRHM has been successful in providing healthcare in rural regions. Sub Centers increased with an

[2]United Nations, WMR, 2019

average of 6.42 percent from 2005 to 2020. PHCs increased in the country with an average of 7.24 percent and CHCs with an average of 54.90 in the same period. Specialist doctors at CHCs increased at an average rate of 39.63 percent[3]. Total Fertility Rate decreased at a rate of 18.52 percent. MMR[4] decreased at a rate of 59.45 percent and IMR[5] at a rate of 47.37 percent during this period.

Services for maternal and child healthcare (MCH) are essential in reducing the dangers connected with pregnancy and delivery. Although there isn't a single intervention that will reduce mother and infant death rates, prior research has shown that skilled labour and delivery support, post-natal and antenatal care, and a robust healthcare system can all dramatically lower these rates. The healthcare of mothers and children greatly benefits from antenatal care (ANC). ANC supports health education, tetanus vaccination, vaccination against other diseases, taking of IFA tablets and other therapies in addition to assisting in the detection of pregnancy-related risks and consequences. WHO advocates professional care at every birth and claims that high-quality maternity care may save both the lives of mothers and their unborn children. Postnatal care is important for avoiding child and maternal death and can assist detect postpartum concerns. Total Fertility Rate fell from 2.7 percent (2005-06) to 2 percent (2019-21). During the time, the percentage of women receiving at least four ANC, rose from 37 percent in 2005-2006 to 58 percent in 2019-21. The percentage of births that occurred in institutions rose from 38.7 percent to 88.6 percent over time. The percentage of mothers who sought postpartum care within two

[3] Calculated from Rural Health Statistics, 2005 and 2020 data

[4] "By dividing the estimated number of maternal deaths by the estimated number of live births within the same period, then multiplying by 100,000, one may determine the maternal mortality ratio."

[5] "The number of infant deaths for every 1,000 live births is known as the infant mortality rate."

days of childbirth from a doctor, a nurse, or other skilled health professional increased from 34.6% to 78.2% during this time frame. The percentage of fully immunised youngsters also increased significantly, from 34.6% in 2005 to 78.2% in 2019-21. Consequently, it is evident from the data that the condition and status of mother and child healthcare in India has changed because of NRHM and its constituent aspects, notwithstanding regional disparities in NRHM's efficiency.

1.3 Role of NRHM in improving Mother and Child Healthcare

On the global, national, and local development agendas, improving mother and child health has been designated as a top priority. Maternal mortality reduction is linked to Goal four of the Millennium Development Goals (MDG), whereas infant mortality reduction is linked to Goal five. The key objective this is improving hospital delivery, which has been promoted as the most economical way to reduce mother and child mortality. Countries have used conditional money transfer scheme, often known as demand-side funding (DSF), to increase institution delivery[6]. In 2015, India had the highest rate of under-five mortality worldwide and was responsible for one-fifth of all maternal fatalities[7]. Although maternal and infant mortality rates have been dropping over time, their proportional share has remained constant. Two flagship programmes under NRHM, Janani Suraksha Yojana (2005) and Janani Shishu Suraksha Karyakram (2011) significantly changed the face of mother and child healthcare in India.

1.3.1 Janani Suraksha Yojana (2005)

The JSY was a modified version of the National Maternity Benefit Scheme and a

[6] Ensor T et al, 2107; Kuwawenaruwa A et al, 2016; Rahman M.M and Pallikadavath S, 2018
[7] Liu L et al, 2016

safe motherhood programme[8]. Under the National Rural Health Mission (NRHM), this Yojana was implemented across all states and UTs, with a concentration on those with low performance. Its goals were to decrease maternal, neonatal mortality, and morbidity by encouraging hospital delivery among the underprivileged women in all regions.[9] This scheme is hundred percent sponsored by central government and provides integrated financial assistance. "The Government of India launched the Janani Suraksha Yojana (JSY) in 2005, a conditional cash transfer initiative under the National Rural Health Mission that gives financial incentives to poor and marginalised women to deliver in a health facility. With a projected expenditure of 19.8 billion INR in 2009–10, the JSY is one of the world's largest conditional cash transfer programmes ever to be government sponsored. In 2016–17, one billion beneficiaries were covered by the JSY"[10]. The method divides the states into low and high performing states, LPS and HPS, based on the rate of hospital deliveries and prioritises mothers from LPS states. LPS paid women 1,000 INR in urban areas and 1,400 INR in rural areas for giving birth in public or authorised private health facilities. It costs 600 and 700 INR in high-performing states, respectively. In addition, the JSY has offered incentives to accredited social health activists, who are local health experts (ASHAs). In both high- and low-performing states, it is 400 INR in urban areas and 600 INR in rural regions.

All mothers who give birth in government or accredited private hospitals are eligible for the benefit in LPS, while in places with good performing state, all marginalised women (SCs, STs, special categories) who choose government facilities are eligible for

[8] Sharma, 2008
[9] Trivedi, 2014
[10] MoHFW, 2018

JSY incentives.

Several studies in India have examined the effect evaluation and benefits of the JSY programme on mother and child health care in India at the national, state, and local levels. The JSY has successfully increased institutional births and decreased maternal and child mortality out-of-pocket costs and catastrophic health expenditures[11]. ASHA workers worked incredibly hard to guarantee that the programme was used from the beginning. Despite the little and incentive, all the targeted pregnant women began using facility-based prenatal checkups preferred hospitals to homes for birth.

1.3.2 Janani Shishu Suraksha Karyakram (JSSK)

After the introduction of the Janani Suraksha Yojana (JSY), institutional births in India surged significantly. However, a good number of women were hesitated to visit health facilities for childbirth owing to out-of-pocket expenses incurred during hospital stays, for medicines, diet during hospital stay, diagnostics, blood arrangements, transport, user charges, etc. On this background, the health ministry, government of India has launched a significant endeavour to forge an agreement in all states to offer totally free and cashless maternal care to women, including normal delivery and c-sections, and free treatment to unwell newborns. JSSK was introduced in June 2011 to remove expenses for both pregnant women and sick newborns, building on the success of the JSY Scheme. The programme was intended to aid women who utilise government health facilities for childbirth. All states and territories have implemented the programme. All antenatal and postnatal checkups were also added to the programme in 2014, and free entitlements have been established for all sick newborns and babies (up to one year of age) who seek care at

[11] Lim S.S et al, 2010; Mohanty S.K and Srivastava A, 2012

government health facilities.

Certain benefits are available to pregnant women and sick infants. All women giving birth in government hospitals are entitled to entirely free delivery, including c-section, under JSSK entitlements. Among the rights are free medicine and consumables, free food (up to three days for normal delivery and up to seven days during c-section), free diagnostics, and free blood (if required) during the delivery. Furthermore, free transportation is provided from home to the institution, between institutions in the event of a referral, and drop back to the home. Similar rights have been granted to all unwell newborns who seek care in government health institutions up to the age of one. The initiative aims to eliminate all expenses for mothers and unwell babies who use government health facilities.

Since its inception, JSSK has made an impression on every Indian state. In rural areas, women giving birth in government facilities increased from 41 percent in 2014 to 68 percent in 2017–18, while women using public health facilities for ANC services increased from 28 percent in 2014 to 76 percent in 2017, and women using government facilities for PNC services increased from 40 percent in 2014 to 75 percent in 2017. While the proportion of women giving birth in government facilities in urban areas rose from 31 percent in 2014 to 48 percent in 2017–18, the proportion of women who used government health facilities for ANC services rose from 37 percent in 2014 to 53 percent in 2017, and the proportion of women who used government facilities for PNC services rose from 31 percent in 2014 to 51 percent in 2017–18[12].

[12] MoHFW, pib., 13th March 2020

All states have implemented the JSSK entitlements, which significantly reduce costs for pregnant women and ill newborns up to age one. There are policy articulations and informational campaigns about free entitlements in every state. The awareness level of women's rights under the JSSK programme has increased. The availability of free medicines, diagnostics, free diet, guaranteed home-to-facility transportation, and drop-off services has increased in all states. Pregnant women in all states are eligible for free outpatient (OPD) and inpatient (IPD) care. In most of the states, there are now much more free diagnostic services available, including simple blood testing to ultrasound scanning facilities. In most States, women receive a free diet during their hospital stay after delivery.

1.4 Theoretical foundation for the study

The theoretical context of the study is described in the second chapter.

1.5 Review of the Literature

Second chapter also provides a review of the literature pertinent to this study.

1.6 Significance of the study

After independence, India's government dutifully focused on the growth, improvement, and strengthening of its citizens' physical well-being. For this reason, several programmes and policies have been designed and implemented. The program's debut cannot guarantee that its very goals will be met. To enhance health services and to improve health indicators in India, the National Rural Health Mission was established in 2005. However, the Indian health sector has not performed in desirable way even after the introduction of NRHM. Equity in access, quality health care, chronic illness control, good sanitation, the availability of safe drinking water, etc. all need improvement even though important health statistics have improved. India ranks 154 out of 195 countries in a recent

research on the global burden of disease by the Institute of Health Metrics and Evaluation at Washington University, well below countries like China, Sri Lanka, and Bangladesh. Additionally, mothers and children in India are more at risk of not obtaining high-quality medical care. The quality of prenatal, neonatal, and postnatal care must be significantly improved. Most mothers and children experience iron and vitamin deficiencies. Vaccination programmes also fall short of expectations. More widespread adoption of programmes like JSY and JSSK is required, which necessitates more Information, Education, and communication (IEc) and higher awareness. There still exist out-of-pocket expenses for a range of maternity care services, including medicines, diagnostics, and transportation, all of which need to be verified and documented. With regards to the rights of babies with illnesses, the program's execution continues to be deficient.

Kerala is at the top of the list for Indian states when it comes to health. It has exceptionally low rates of maternal and infant morbidity and death. Institutional delivery is almost hundred percentage. But in Kerala, institutional delivery in public health facilities were only 34.1 percent in 2019–20 (NFHS–5), compared to 35.6 percent in 2005–2006. (NFHS-3). It only comes to 19.3 percent in Malappuram, in the study area. 34.1 percent of pregnant women utilise the public facility for prenatal care. In the Malappuram district, the rate is 32.7 percent. Pregnant women should prefer government health institutions to receive the benefits of JSSK, however despite the adoption of JSY and JSSK in Kerala, this is not happening. In addition, the out-of-pocket costs associated with childbirth in Kerala are among the highest in India. Malappuram district costs Rs.29,538 higher each delivery than the state average of Rs.28,358[13]. One might simply choose for the JSSK

[13] National Family Health Survey, 2019-21

scheme, which provides no out-of-pocket expenses, under these conditions, however evidence indicates that the population of Kerala and Malappuram has not responded well to this programme. Therefore, a study of the scheme's effectiveness, especially awareness and utilization, in Kerala and Malappuram is necessary.

1.7 Research Questions

1. Does NRHM and its constituent programmes, such as JSY and JSSK, have any influence on the mother and child healthcare in India and Kerala?
2. Why are pregnant women in Kerala and Malappuram less likely to use government health facilities for mother and child healthcare?
3. Are people aware of the various mother and child healthcare policies, such as JSY and JSSK?
4. What are the components of OoPE of delivery in Kerala?

1.8 Objectives of the study

1. To assess NRHM and its constituent programmes, such as JSY and JSSK, on mother and child healthcare in India and Kerala.
2. To examine people's awareness of Janani Shishu Suraksha Karyakram (JSSK) in Malappuram, Kerala, and the relationship between awareness and socioeconomic factors.
3. To know the extent of utilization of JSSK in Malappuram and to assess the association between socio-economic characteristics and utilissation of JSSK
4. To assess the relationship between awareness and utilisation of JSSK in Malappuram.

5. To examine OoPE incurred by JSSK beneficiaries and non-beneficiaries during delivery and to identify the components of OoPE.
6. To find out the role of ASHA volunteers in the awareness and utilization of JSSK
7. To identify the supply-demand gap in the utilisation of JSSK in Malappuram district of Kerala

1.9 Hypotheses of the study

1. There is no significant difference between different social groups and the awareness of JSSK in Malappuram district of Kerala
2. There is no significant difference between different social groups and the utilisation of JSSK in Malappuram district of Kerala
3. The mean expenditure on delivery is the same for JSSK beneficiaries and non-beneficiaries.
4. There is no supply-demand gap in mother and child healthcare in Malappuram district of Kerala

1.10 Methodology

Methodology of the research is described in the third chapter.

1.11 Limitations

1. Since the current study was conducted in a specific district in Kerala, it cannot be generalised. To have a representative population, the study region may have been expanded to a larger geographic area.
2. Respondents who had given birth within the preceding three years were the primary source of data.

3. Due to the exceptional health crisis caused by Covid-19, the response rate and accuracy of obtained data were lower than anticipated.
4. The JSSK scheme is the major topic of the study, and there aren't much accurate secondary data on JSSK.

1.12 Organisation of the study

The present study comprises seven chapters:

Chapter 1: Introduction, the significance of the study, research questions, objectives, hypotheses, and limitations are all covered in the first chapter.

Chapter 2: The theoretical background and literature review are discussed in the second chapter.

Chapter 3: The third chapter gives a detailed description of the methods, procedures, techniques and models used for the study

Chapter 4: The fourth chapter examines the state of mother and child healthcare in India, Kerala

Chapter 5: The fifth chapter examines the effectiveness of JSSK in Kerala's Malappuram district. This chapter also includes a brief description of the effectiveness of JSSK in India and Kerala.

Chapter 6: The sixth chapter investigates OoPE of delivery care in Kerala and Malappuram.

Chapter 7: The last chapter of the study includes a summary, suggestions and conclusion. This chapter also includes policy implications generated from the research.

Chapter 2: Theoretical Background of the Study and Review of Literature

2.1 Theoretical Background of the Study

Health is a key component in development theories. Good health boosts economic growth. Robert Fogel's long-term study of England proves this. More than a century of studies in industrialised nations corroborate this. In Latin America, life expectancy is linked to income. Similarly, in India labor productivity and illness costs impact economic growth directly. Child health influences future income through its impact on schooling. Healthy, well-nourished youngsters do better in school, which boosts their future income.

Macroeconomic research implies health boosts growth. A 40 percent rise in life expectancy from 50 to 70 years would boost growth by 1.4 percent per year14. The likelihood of surviving to the following age group has a significant long-term association with growth in Latin America and the Caribbean15. “Using life expectancy and death rates as health indicators for different age groups, an assessment of the direct link between health and growth in Mexico from 1970-1995 shows that health is responsible for one-third of long-term economic growth”.

Health is vital to human capital and economic growth. Healthy employees are more energetic and stronger. Productive and well-paid. They miss less work due to illness to them or their family. Health boosts economic growth statistically. A one-year rise in life expectancy increases productivity by four percent16.

[14] Barro, 1996
[15] Mayer, 2001
[16] David E. Bloom, David Canning, Jaypee Sevilla, 2001

Some objectives (Millennium Development Goals) were created by considering the significant association between health and economic growth on a global scale, and governments devised specialised strategies to meet these targets. India's response to achieving the MDGs was NRHM. The NRHM was primarily focused on gender-based aspects of health. Janani Shishu Suraksha Karyakram (2011) was one of the key elements of the NRHM. So, it seems sense to discuss about gender-related health theory.

This study is supported by the following theories:

1. Physical Quality of Life Index (PQLI)
2. Human Development Index (HDI)
3. Multidimensional Poverty Index (MPI)
4. Millennium Development Goals (MDG)
5. Sustainable Development Goals (SDGs)
6. Gender Development Index (GDI)
7. Gender Inequality Index (GII)
8. Grossman's Theory of the Demand for Health Care
9. Public Good Theory
10. Game Theory

We shall briefly address the following theories:

2.1.1 Physical Quality of Life Index (PQLI)[17]

In the middle of the 1970s, Morris David Morris created the PQLI for the Overseas Development Council. It is an effort to construct a useful social distribution indicator that

[17] Morris D. Morris, 1978

will get over the GNP's constraints as a development. It makes use of three indicators: life expectancy at one year old, infant mortality, and literacy. Each is given a predetermined score between 1 and 100. The best (100) is established in terms of what may be accomplished during the next 50 years, while the worst (1) is determined based on previous experience. The composite index is created by adding the three indicators together and weighting them equally.

2.1.2 Human Development Index[18]

In 1990, Pakistani economist Mahbub ul Haq developed the HDI, which the United Nations Development Program (UNDP) then utilised to assess the nation's development. Economic progress and economic welfare are measured by the HDI. "The Human Development Index calculates an overall score between 0 and 1 by looking at three key economic development indicators: life expectancy (Average life expectancy compared to a global expected life expectancy), educational attainment (mean years of schooling and expected years of schooling), and income levels (GNI at PPP). 0 denotes very little economic growth, whereas 1 denotes a high degree."

2.1.3 Multidimensional Poverty Index (MPI)[19]

The multidimensional Poverty Index (MPI) is a novel method of measuring poverty. The UNDP's HDR office and Oxford University's OPHI (Oxford Poverty and Human Development Initiative) jointly launched it in July 2010. Alkire-Foster (AF) methodology is the name given to MPI because it was established using the Sabina Alkire and James Foster, 2007 (AF) methodology. By providing a holistic picture of those who live in poverty, MPI helps the nation to even more efficiently allocate resources for

[18] https://hdr.undp.org
[19] https://hdr.undp.org

development. It finds overlapping deprivations across the three categories at the home level, including:

(1) Education- Years of education and Child enrollment are each weighted 1/6.

(2) Health-Nutrition and Child Mortality are weighed 1/6 and

(3) Standard of Living- Electricity, Sanitation, Water, Floor, Cooking Fuel, and Assets, with a weight of 1/18.

Thus, the MPI is assessed using ten equally weighted indicators per dimension.

2.1.4 Millennium Development Goals[20]

The MDGs were created during the 2000 UN Millennium Summit. MDGs seek to end extreme poverty, reduce child mortality, battle illnesses like AIDS, and build a global development partnership. MDGs include eight objectives, 21 targets, and tangible indicators by 2015. As a UNDP member, India has endorsed MDG objectives three, four and five, which deal with child health, maternal health, and illnesses. The government has made a great commitment to accomplish the universal targets.

2.1.5 Sustainable Development Goals[21]

The Sustainable Development Goals (SDGs) are a set of seventeen interconnected global objectives designed to alter our planet. As part of the United Nations 2030 Agenda for Sustainable Development, they were supposed to be a framework for achieving a better and more sustainable future for everyone. In September 2015, 193 nations agreed to them. Each of the 17 objective aims to reduce climate change, poverty, and increase education, health, and economic development. The UN says the SDGs aim to "defend the planet and enhance life worldwide." The SDGs give global guidelines for each objective. Goal three

[20] WHO, Newsroom, Fact Sheet, 2018

[21] https://sdgs.un.org/Goals

of the SDGs is to reduce MMR (70/100,000 live births), neonatal and infant mortality (12 and 25 per 1,000 live births, respectively), and manage epidemics such as AIDS by 2030.

2.1.6 Gender Development Index (GDI)[22]

The United Nations Development Programme (UNDP) uses this index, which was created by the UN, as one of five indicators in their yearly Human Development Report. GDI assesses three fundamental dimensions:

1. Health: Female and male life expectancy at birth is used to calculate this.
2. Education: Female and male predicted years of education for children and female and male mean years of schooling for people over 25.
3. Economic Resources: Estimated earned income for both men and women.

2.1.7 Gender Inequality Index (GII)[23]

The GII measures gender-based disadvantage in three areas: reproductive health (Maternal Mortality Ratio and Adolescent Birth Rate), empowerment (the proportion of women and men with at least a secondary education and a majority of seats in parliament), and the labour market (the ratio of women to men who are in the labour force). The scale varies from 0 (no inequality), to 1 (one gender performs badly as possible across the board).

2.1.8 Grossman's Theory of the Demand for Health Care[24]

Grossman (1881-1950) was interested in how people spend resources to generate health. The approach transcends typical demand analysis and has had a significant impact on health economics. The theory employs the concept of the person as a health producer by eliminating the artificial divide between consumption and production. It emphasises

[22] https://hdr.undp.org/ Gender Development Index (GDI), Human Development Reports
[23] https://hdr.undp.org/ Gender Inequality Index
[24] https://www.healthcare-economist.com/2019/12/04/the-grossman-model

investment in human capital, such as health and education, to enhance results in both the market (labor) and non-market sectors (household). The hypothesis was formulated based on the assumption that:

- Healthcare is an investment for a lifetime.
- Individuals prioritise health, but not above anything else.
- People have limited means with which to support their health and other activities, none of which are free.
- Because investment in human capital may impact consumer habits, health care use, and the environment, it has a relatively high degree of control over health.

The idea highlights that healthcare demand is derived from health demand, which is derived from the demand for utility. It refers to health as a capital good since it depreciates over time. In addition, it describes the correlation between the demand for health care and age, income, and education.

2.1.9 Public Good Theory[25]

A public good is one whose use does not diminish the quantity that is made accessible to other people; this is known as non-rival consumption. For instance, all individuals in the vicinity of the signal's range may be given access to a television channel that is now only accessible to one person. A dam that reduces floods, helps everyone in the affected area, and benefits one person without reducing the benefit to others. Therefore, public goods are not divisible. Institutions and services related to public health are excellent examples of public goods and have attributes such as non-rivalry and non-excludability.

[25] Tyagi, B.P, 2010

2.1.10 Game Theory[26]

Several major public health topics, including organ donation, vaccinations, ethics, and the patient-provider interaction, have been modelled using game theory. Game theory offers public health practitioners with a powerful modelling tool and highlights the necessity for public involvement when the motivations of individuals hamper collective growth. Implications for public health include the fact that the best techniques for individuals or groups are not always the greatest strategies for the whole population. Public health experts must pay close attention to these unique conditions and implement interventions to improve the incentive system.

In conclusion, we can state that all these theories see health as an essential measure of growth. Most of them are emphasising gender aspects of health and reaffirming the need of women's and children's empowerment as an indicator of development. Health is seen as a valuable public asset in developing nations like India, thus the government should make it available without charge and make sure that it is provided fairly with the necessary quality standards.

2.2 Review of related Literature

The existing literature reviews pertinent to this research may be categorised as follows:

1. Reviews regarding maternal and child health
2. Reviews relating to NRHM and JSY.
3. Studies on JSSK
4. Studies on ASHAs

[26] Malhotra, 2012

2.2.1 Reviews Regarding Maternal and Child Healthcare

Young, uneducated, socially isolated, and impoverished parents relate to poor child health, according to **Parul Puri et al. (2020)**. This research suggests that an intervention targeting poor families is needed to enhance child health in India.

Ranjan Singh et al. (2019) observed that women with more prenatal contact with health workers, media exposure, and general category were more likely to have more ANC visits in UP.

Nguyen, P H et al. (2018) discovered that children's Hb and anaemia improved between 2006 and 2016. Multiple factors like maternal schooling, NHIs coverages, sanitations, etc have led to change anaemia in Indian children and pregnant women.

Arnab Jana and Rounag Basu (2017) found that Rural and urban inhabitants choose nearby amenities to minimise travelling costs. Regional health policy efficacy varies. Literacy and health status are strongly correlated; hence Bihar falls bottom and Kerala in top in health care access.

Pappachan B (2017) concludes that despite economic advances, India maintains a high child mortality rate, with considerable disparities across and within states. Poverty, malnutrition, and inadequate sanitation cause child mortality in India.

Nearly 60 percent of pregnant women in India are anaemic and undernourished, according to **Divya (2014)**. Their mothers have underweighted, unhealthy kids. Iron deficiency, B12 insufficiency, and socioeconomic factors including illiteracy, lack of knowledge, and lack of transit facilities cause anaemia in pregnant women.

Institutional delivery service use was 72.9 percent, greater than the national average, according to **Damaru (2014)**. Ethnicity, husband's education, distance and availability of

health care, health professional conduct, husband's engagement in decision making, and perception of home birth as risk all impact institutional delivery.

Jothi (2014) found that most respondents did not get postnatal care in rural regions and had postpartum difficulties, hence most women chose private hospitals. According to the report, ASHA and ANM must work hard to provide PNC services and raise awareness about postnatal care and newborn risk indications.

Ravi Prakash and Abhishek Kumar (2013) studied urban poverty and maternal and child health in India. They discovered that urban poor persons had lower rates of ANC care, safe delivery, and children's vaccines. Particularly in poor states.

Basavaraja et al. (2012) found that prenatal care, safe delivery, and a hygienic environment reduce maternal mortality. ANC may be utilised as a preventative method and is related to decreased mother mortality and access to emergency obstetric services. Changing ANC procedures in rural and urban India may minimise maternal mortality.

Santhos Kumar et al. (2012) studied hospital births in India. For endogenous placement health facilities, they employed Two Stage Residual Inclusion (2SRI) and Probit models. The research found that women living near hospitals are more likely to give birth there. A one-kilometer increase in hospital distance reduces hospital births.

Carol Wanjira et al. (2011) studied delivery procedures and related characteristics among women seeking child welfare services in selected Kenyan health institutions. Mother's knowledge, education affected health.

Abhijeet Saha et al. (2009) researched gender bias in Chandigarh's healthcare. They detected gender bias in the use of free UIP vaccinations in the hospital, rejecting the idea that economic status may be a basis for female children's lower vaccine use.

Mostafa Kamal (2009) said women's education and wealth index influenced maternity care use.

Vora K S et al (2009) found that geographic and societal diversity make it impossible to execute health-sector changes uniformly across states. It advocates better reporting of maternal fatalities, evidence-based, targeted measures, and effective progress monitoring. It also fosters public-private collaborations and initiatives, strong political will, and enhanced managerial skills to improve maternal health.

Venkataramanappa and Smbashivarao (1998) in their study conducted in Anantapur District, Andhra Pradesh, India found that socioeconomic aspects of patients affected healthcare facility utilisation. The wealthier and more educated is, the more they utilise government hospitals. It impacted distance.

2.2.2 Reviews Relating to NRHM and JSY

The Arogyakeralam scheme's (NHM, Kerala) execution, funding flow, monitoring, recording, and reporting were well-structured, according to **Manju Madhavan et al. (2021)**. The programme protects beneficiaries' families. Lower public awareness of the programme, a need for an updated policy, a lack of financing, and a shortage of expertise and facilities were cited as problems. Complete electronic hospital records, a programme account, staff reorientation and training, extra evaluations, and assessments were emphasised.

Krishnakumari K (2020) observed that in Kerala, government registrants doubled the private sector. This is due to more government facilities and services, said 93.4 percent of respondents. ASHA workers informed most (84.7 percent) about government services. They promoted ward health nutrition days, lectures, and camps. Study says rural areas have

more services than metropolis. Possibly due to urban health personnel shortages. Ward Health Sanitation Day is attended by 78 percent of LSGI members. Pain and palliative treatment at NRHM are effective. Homecare, wheelchairs, and prescriptions are supplied. All PHCs have NCD clinics that assess BMI, BP, and BG. All components of the research show that NRHM goals were fulfilled.

Mohanty, S.K. (2020) found that public health centres in India are pro-poor and have a substantial economic gradient. 28percent of poor mothers did not pay for births at public health centres, compared to 16percent of rich mothers. Benefit incidence studies imply a pro-poor allocation of primary and subsequent institutional care.

Adya Gupta et al. (2018) conclude that the JSY has generated great progress on the Indian mother and child health sector, but there are various challenges to be tackled regarding quality treatment at health-facility, links between home and health-facility, and community/household context.

UNFPA (2016) commissioned a study on JSY in Bihar, Madhya Pradesh, Orissa, Rajasthan, and Uttar Pradesh. The study evaluated JSY coverage overall and for disadvantaged groups and reviewed the scheme's ANC registration, prenatal care, travel assistance, supervision, and monitoring. The analysis shows a large rise in institutional delivery in low-performing states due to the JSY plan. The research found that ASHAs aren't engaged optimally. There are differences in payment distribution throughout the state, and ASHAs require a universal performance-based reimbursement charter. A grievance cell should investigate ASHA and beneficiary nonpayment allegations.

Mukopadhyay et al (2016) research result showed that 74.7 percent of the sample population was JSY-eligible. 36.8 percent of JSY-ineligible mothers and 90.2 percent of

those who had three prenatal checkups (ANCs) got cash. All groups chose to give birth at government facilities, regardless of whether they qualified for the JSY, received money, or had a high number of antenatal visits.

Vikash Kumar et al (2015) study results from UP showed that prenatal registrations and postnatal checks rose across all socioeconomic categories, and the Government Health Facility became a more popular option for delivery among pregnant women; 96.34 percent of women acquired antenatal registration in the post-JSY implementation period. Educated women profited more than uneducated women after JSY implementation by delivering in a government health facility. More lower-class women gained than upper-class and higher-class women. Since the Janani Suraksha Yojana was implemented, prenatal registration, institutional deliveries, postnatal exams, and the socioeconomically destitute have benefitted.

Pritam (2014) found NRHM has had little impact after 5 years. Some development has been achieved in manpower like physicians, specialists, staff nurses, AYUSH medical workers, etc. but there has been no progress in creating new medical institutions and other amenities like beds, labs, and quarters.

Thimmaiah and Mamatha (2014) studied the NRHM and rural health in Karnataka. The goal was to analyse NRHM's influence on health infrastructure and health indicators including IMR, MMR, CDR, and TFR in Karnataka. The number of SCs, PHCs and CHCs expanded between 2005 and 2010. The National Rural Health Mission has reduced IMR, MMR, CDR, and TFR.

Sahu and Kumar (2014) performed their investigation in Meghalaya's West Khasi Hills District. The research evaluated National Rural Health Mission's historical performance.

Study found that only three villages had health institutions, whereas nine villages did not; five villages had metaled roads, four had Kutcha roads, and three had just walkable roads; free distribution of medicines was available in three villages.

Mardi (2014) said in "Overview of Nation Rural Health Mission" that the mission benefited rural communities. The focal states' health metrics have improved. Infant mortality dropped from 58 per 1,000 live births in 2005 to 53 in 2008 (All India) following NRHM implementation.

Marie Ng et al. (2014) couldn't find a link between JSY and maternal mortality in MP. The program's high institutional delivery rate hasn't reduced mortality. Supply-side restrictions may explain the lack of effect. JSY will have little impact if the supply side can't provide quality care.

Thimmalah and Mamatha (2014) conclude that with more JSY recipients, the incidence of institutional births has risen, lowering infant mortality. The research suggests that NRHM, introduced by the Indian government, shows significant potential for rural populations. If the government enhances NRHM awareness, Karnataka can decrease infant and maternal mortality to meet MDGs.

Rajesh (2013) studied NRHM's impact on IMR in rural and urban locations. IMR in rural India fell from 74 to 52 per 1000 live births between 2000 and 2009. IMR was 58 per 1000 live births before NRHM. After NRHM, IMR dropped from 58 percent to 42 percent in 2012.

Annam Patra and Rama Das (2013) study found that the appointments of Health Workers, Radiographers, and Pharmacists at Sub-centre and Primary Health Centre level increased from 2005-2009 after the implementation of NRHM in Odisha.

Pandian et al. (2013) conclude that women-centered policies, NRHM support, improving PHCs with suitable infrastructure, and offering 24/7 services have improved delivery care. Infrastructures and human resource don't guarantee utilisation. User-friendly services and creative marketing are needed. Good management, committed employees, and a skill-practicing environment are also crucial.

According to Suresh (2013), before the NRHM was implemented in the state of Odisha, there were few PHCs and CHCs and a high rate of IMR and MMR; however, when the NRHM was implemented, there were more PHCs and CHCs and the rate of IMR and MMR dropped.

Veena (2013) gives a clear picture of how NRHM has helped mothers and children in rural areas. The results showed that most women (91.3 percent of them) wanted to give birth in a hospital. 65.3 percent of rural women thought that the health of mothers and children would improve because of health care and extra supplements. Most of the people who responded agreed that one good thing about the programme was that IMR and MMR went down.

Patra S.K et al (2013) study found that the health status of the study area is very poor and is gradually improving because of NRHM. Low income, illiteracy, shortage of doctors, unwillingness of doctors to go to remote areas, lack of health care facilities, and lack of laboratory technicians and radiographers are the main reasons for this trend. They advised that government and nongovernment groups work together to revamp the health system in rural Odisha and offer SC and ST people free secondary education.

Modugu et.al (2012) analysis reveals the significant OOPE and impoverishing effect of institutional births in India. Increasing the share of institutional births requires supporting

families' financial preparation for maternity care, investing more in JSY, and increasing state-level planning.

Saji S Gopalan and Durairaj Varatharajan (2012) find that institutional deliveries, ante-natal and post-natal care visits increased with the implementation of JSY. The cash incentive barely covered 25.5 percent of rural users' maternity healthcare costs and 14.3 percent in urban regions.

Powell, J, and Timothy (2011) find that cash incentives to women boosted access to maternity services but did not reduce newborn or early neonatal death, even in high-quality care areas. Less educated, poorer, and ethnically disadvantaged women had higher usage. The financial incentive scheme reduced the use of private health providers, increased fertility, and improved nursing. These results show that financial incentives may have unintended health implications, which, in the case of fertility, may undercut the program's goal of lowering mortality.

Yeshwant Rao N et al. (2011) examined NRHM's role in delivering excellent health care to rural India and its influence on health infrastructure. Most individuals are ill owing to lack of illness knowledge, and starvation and undernutrition exacerbate the condition. The national and state governments' NRHM plans are a great move because they will lead to favourable outcomes if properly implemented.

Ratawa and Sharma (2010) concludes their study that Sewapuri block comprises one CHC, three PHCs, and 35 sub-centres. SCs, PHCs, and CHCs lack personnel, and CHCs have no residence space for physicians. Equipment, drugs, and immunizations were scarce. There is only one CHC in block, and it's in the east, so it can't provide service in the whole block due to wider area. They proposed a new health center on another block.

Lim SS et.al (2010) concludes that JSY increased prenatal care and hospital deliveries. JSY payments reduced perinatal fatalities by 3.7 (95 percent CI 2.2-5.2) per 1000 pregnancies and neonatal deaths by 2.3 (95 percent CI 0.9-3.7) per 1000 livebirths.

Khan et al. (2010) found that JSY and ASHAs boosted the proportion of women obtaining three ANC check-ups, and hospital delivery. Systematic efforts are needed to enhance counselling, offer integrated information to affect numerous health behaviours, and reinforce messages via multiple encounters between healthcare professionals and beneficiaries from ANC through postpartum.

Planning commission evaluate NRHM (2009). Their investigation found that NRHM programmes enhanced basic health care service delivery throughout India's three-tier health system. AYUSH isn't mainstream, although ASHA personnel do effectively. VHSC has improved.

Bajpai, N et.al (2009) study focused on ASHA, Panchayath Raj Institution's role in managing local health facilities. ASHA personnel perform effectively, says the report. In 4-5 years, if the state government takes remedial actions in health management, far-reaching improvements will be seen.

A Working paper by **Kaveri Gill** was published by **Planning Commission of India** in May **2009**. This report evaluates service delivery in NRHM rural public health institutions. Under NRHM, evaluable factors perform better. But assessment revealed there isn't enough physical infrastructure or human resources to fulfil the aim of NRHM in UP, Bihar, Rajasthan, and Andhra.

Abhijit Banerjee et al. (2004) studied healthcare services in rural Udaipur, Rajasthan. In their study report, they found that public service quality is inadequate at many levels. They argued that the state should be the supplier of quality service at health centres.

2.2.3 Reviews Regarding JSSK

Yangala,M et al (2020) concludes their study that in chitoor, Families used all JSSK components except transport. The mothers spent 250 INR on transit (from house to hospital and back). Except for transport, households use most of JSSK. During prenatal checks and home visits, family-centered counselling may prevent transport-related OOPE. **Rupani, M et al (2019)** study analysed post-natal mothers' knowledge of two national health programmes and revealed determinants of high knowledge. Multivariate analysis predicted awareness level. Only 24 percent knew about JSSK, 54 percent knew about free transport to the location of birth, 22 percent and 13 percent knew about free inter-facility transport for pregnant women and unwell newborns, and 96 percent knew about free drop-back. Only 14 percent of mothers knew about JSY benefits, yet 28 percent had received them. Antenatal care visits, employment, and Hinduism predict postnatal mothers' JSSK knowledge. Postnatal moms' knowledge of JSSK and JSY entitlements is low compared to published literature.

Mishra, S., & Mohanty, S. K. (2019) conducted a study in India and found that less educated, poorer, and in private health facilities were more likely to experience distress finance on delivery in hospitals. The amount of distress funding in India may be decreased by increasing the utilization of public health facilities, decreasing the number of caesarean deliveries, and enhancing access to drugs and diagnostic services.

Rout, S. K., and Mahapatra, S. (2019) concludes that even though 72 percent of women were covered by the JSY, and the majority of them use the government hospitals, the findings reveal that OOPE is significantly high for maternal and child health problems in Odisha and ranks fifth. The high OOPE on childbirth raises a lot of important concerns about how well the public health delivery system works, necessitating financial protection for the people who use the public health services in the state.

Chowdhury, D et.al (2018) found that in Kolkata's non-delta areas, 92.8 percent of respondents used only government facilities for diagnostic testing. Delta areas had the most home delivery (78.8 percent). Most mothers didn't obtain free drop-back after birth at a government/accredited facility. 18.4 percent of delta respondents used free diagnostic services, while 16.9 percent used free delivery. Non-delta respondents used free transit more to go home.

A study conducted by **Chandrakar (2017)** in the Raipur region of Chhattisgarh revealed that only 207 mothers (58.8 percent) have an adequate level of knowledge on JSSK. The greatest degree of entitlement awareness among mothers was for free transport from house to hospital (89.2 percent), followed by drop-back to home (85.2 percent). None of the mothers were aware of the free diagnostic services and blood supplies for babies who were ill. The degree of knowledge on JSSK eligibility for pregnant women and sick children was assessed to be inadequate. Beneficiaries must be made more aware of their JSSK rights if the programme is to be used more effectively.

Chaudhary, S et al (2017) conducted a study in Northern India which concludes that out of 200 pregnant women 134 delivered in government hospitals and eligible for JSSK. 29 percent of births were in private institutions, and 17 percent of neonates were unwell within

30 days. 83.5 percent of participants spent OoPE, with a median of Rs. 1100. Upgrading and ongoing oversight are needed to reduce OoPE expenditures and ensure service adequacy. More evaluations are needed to determine the JSSK use pattern to enhance coverage and remove bottlenecks.

Uvi Tyagi et al (2016) conducted study on Utilization of Services Under JSSK scheme in Sirmaur District, Himachal Pradesh, India. It concludes that JSSK benefitted the mothers utilizing the public sector facilities however drugs, consumables and transport contributed to the OOPE.

Sulkshana Nandi et al (2016) conducted a study on evaluation of the janani shishu suraksha karyakram: findings on inequity in access from chattisgarh, india and study result says coverage of antenatal care services was quite high, however, the quality of antenatal care services was better in the non-tribal district. Institutional delivery was 72 percent, but OoPE not eliminated fully because of limited transportation facility and drugs in hospital.

Barua, K et al (2016) found that in Assam, most rural mothers got free delivery services under JSSK in public health facilities. Not all mothers used the advantage. elder pregnant women in remote locations should be encouraged to use services to improve pregnancy outcome.

Deshpande, S et al (2016) conducted a study in Marathwada, Maharashtra concludes that, the pregnant women in the study area had poor levels of knowledge about their rights under the JSSK. Most people were aware of the free normal birth option, however very few people were aware of free caesarean sections, free drop-off services to homes, or free blood donations. To improve the use of the benefits of the programme and so indirectly contribute

to the reduction of MMR and IMR, more efforts are required to raise the general awareness of the different entitlements of JSSK among pregnant women.

Issac, A et al (2016) conducted a study in India on OoPE during delivery and found that the women in that research spent approximately half of their required monetary incentives to seek delivery care, even though services at public health facilities in India are meant to be offered without charge.

Sharma, S and Bothra, M. (2016) analysed OoPE of institutional delivery under JSSK scheme found that the JSSK is unable to achieve its intended result of decreasing beneficiaries' OOPE. Even though the programme offers cashless services, recipients are forced to shoulder significant expenditures on their own due to a general lack of infrastructure, human resources, and medicine supplies. This suggests that the overall government investment in the programme is insufficient and that much more work needs to be done to increase its overall effectiveness. The government should concentrate on raising awareness of the JSSK programme and its advantages.

Janmenjoy Mondel et al (2015) conducted a study on Does Janani Shishu Suraksha Karyakram ensure cost-free institutional delivery? A cross-sectional study in rural Bankura of West Bengal, India. Study reveals that all components of JSSK were known to 12.9 percent women. The highest (77.1 percent) for free delivery and lowest (29.0 percent) for blood transfusion. Gaps existed in the awareness of beneficiaries regarding entitlement under JSSK. According to them drugs and transport were two major causes of out-of-pocket (OOP) expenditure in public health facilities.

Mangulikar, S K (2015) found that in Maharashtra participants' education level affected their knowledge of and use of JSSK's free transport service. General and OBC mothers are

more aware of and use JSSK's free transport service than SC/CT mothers. Anganwadi staff and ANMs are spreading the word about JSSK.

Tripathi,N et al (2014) conducted a study among slum dwellers in Northern India and concludes that between the pre-intervention and post-intervention periods, out-of-pocket delivery costs dropped from Rs. 5342 to Rs. 3565. There was no statistically significant difference in catastrophic health expenses in the pre-and post-JSSK periods (P=0.15). JSSK implementation must be strengthened to enable universal access to neo-natal care.

In West Bengal, 68.75 percent of mothers were unaware of JSSK's free benefits, according to **Chatterjee (2015)**. Only 18.75 percent of women knew about free vaginal delivery, medicines, and consumables. None of the respondents knew about free caesarean section and blood for mother and newborn. 10.42 percent of respondents knew about free newborn treatment, medicines, and consumables. 58.33 percent of mothers knew about free hospital food. Parity of mother influenced JSSK awareness. Given pregnant women's limited understanding of JSSK advantages, an awareness campaign is needed to maximise the scheme's benefits.

At the start of the 21st century, India had large rural-urban, inter-state, and inter-district health disparities, according to **Prasad et al (2013)**. In 2004, rural infant mortality was 24 points greater than urban

An Evaluation Study of National Rural Health Mission (NRHM) in 7 States by Programme Evaluation Organisation **Planning Commission (2011)** shows that 100 percent of ASHAs report helping ANM/AWW in health and nutrition-related programmes, 91percent maintain village health registers, and 76 percent organise Village Health and Nutrition Day.

2.2.4 ASHA Workers and their role in Maternity and Child Healthcare

Pal, J et.al (2019) a study on ASHA workers knowledge and skill level in West Bengal concludes that more than half of the study had good knowledge and awareness related to maternal-child health and family planning. Most of them know the vaccination schedule. Their knowledge IFA tablets intake, breast feeding techniques, and doses of children vaccines was inadequate. Less pay and work dissatisfaction hampered their performance. Frequent refresher courses, monitoring and supervisions by higher authority, and administrative actions to minimize dissatisfaction are crucial to improving their performance.

Panda M et al (2019) "found 49.4 percent of ASHA workers kept a medicines register, 50.3 percent a household survey register, 34 percent an ANC record, and 34 percent a meeting register. But only 18 percent of ASHA staff kept vaccination and family planning records".

Shet et al (2018) found that 80 percent of ASHA workers knew about ANC and PNC, which include vitamin and iron supplements throughout pregnancy. ASHA also aware about the minimal number of prenatal visits is four, according to **Charu et al (2015)**.

Karol and Pattanaik (2014) found that younger ASHAs know more than older ones. The ASHA performs better in child health care than maternal health care, according to their study. **Kochukuttan et al (2013)** found that ASHAs knowledge was low, yet they knew about postpartum haemorrhages.

Saxena and Ranjeeta (2014); Bhat (2013); Saroshe et al., (2013); Roy (2013); Joshi and Mathew (2012); Saxena et al., (2012); Bhatt (2012) have investigated the challenges and problems faced by ASHA. They found that the problems were related to transport, health centres, lack of facilities for institutional deliveries, lack of funds, and no fixed pay.

2.3 Conclusion

It is evident from a review of the current literature that most of the research have focused on the performance of NRHM in various Indian states. Few studies have been conducted to analyse the performance and implementation of the NRHM in Kerala. Very few research in India or Kerala have focused on JSSK awareness and utilisation. There are no studies that compare awareness and utilisation of JSSK in a high-priority district in Kerala, such as Malapparam. In the context of the implementation of JSSK, there is a paucity of research relevant to OoPE and mother and child healthcare in Kerala in general. Since Kerala is one of the states where OoPE is very high and JSSK is intended to eliminate OoPE during delivery, it is evident that there is a study gap, and so micro level studies are required.

Chapter 3: Methodology and Profile of the Study Area

The effectiveness of the JSSK in the Malappuram district of Kerala was analyzed using both primary and secondary data sources.

3.1 Sources of Secondary Data

Secondary data is gathered from several published and publicly accessible data sources by the government from time to time. The information on vital statistics, demographics, and important health indicators such as infant and maternal mortality, antenatal visits, IFA (Iron Folic Acid) consumption, number of pregnant women getting TT injections, percentage of institutional deliveries, OoPE, etc. were gathered from the secondary data sources listed below:

1. Sample Registration System, Office of the Registrar General and Census Commissioner, Government of India- Census-2011 and bulletin on IMR and MMR for different years.
2. Health Management Information System (HMIS), National Health Mission, Ministry of Health and Family Welfare, Government of India,
3. National Family Health Survey (NFHS-3,4&5) Report
4. The original data set of NFHS-4&5 extracted from Demographic and Household Survey (DHS-2015-16 and 2019-21) data set.
5. Rural Health Statistics (RHS-2005-06 to RHS-2019-20),
6. National Health Accounts (2013-14 and 2017-18), National Health System Resource Centre
7. Word Bank Report (2019-20) and Bulletin

8. Kerala State Economic Review report (2019-20), Economics and Statistics Department, Kerala
9. Directorate of Health Service (DHS-2019-20), Government of Kerala

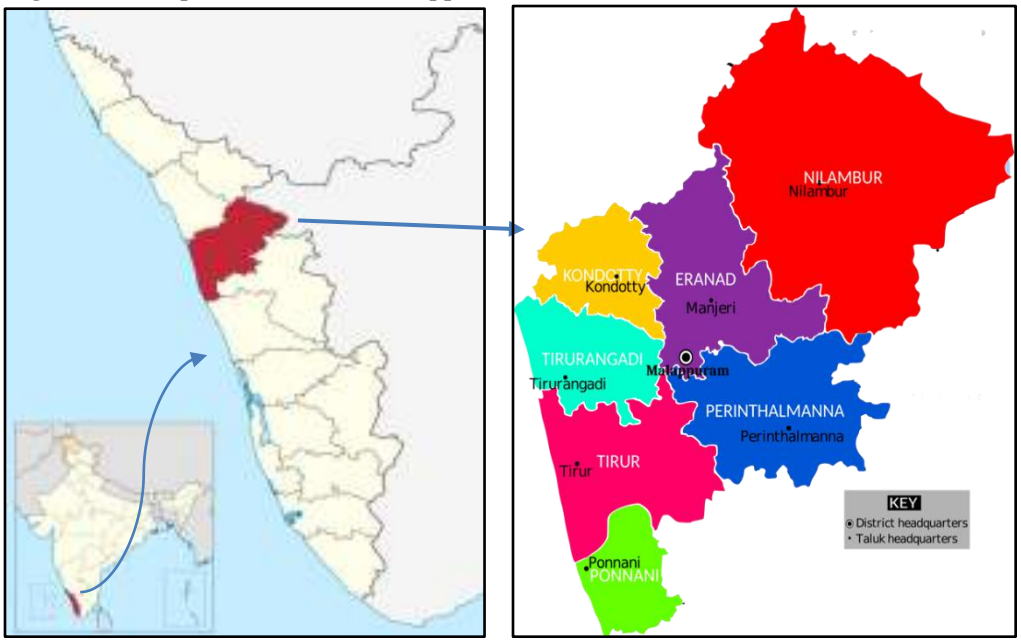
3.2 Sources of Primary Data

The effectiveness of JSSK in the Malappuram district of Kerala is the subject of the present study. The effectiveness of JSSK was determined by analysing the knowledge and utilisation of the scheme in the research region and its impact on OoPE of delivery. A cross-district analysis was done to get a better idea of the state of mother and child healthcare in Kerala.

3.2.1 Profile of the Study Area

Kerala, which is situated on India's Malabar Coast, is the 21st largest Indian state by land area. Its boarders are Karnataka, Tamil Nadu, and the Lakshadweep Sea (Figure 3.1).

Figure 3.1: Map of Kerala and Malappuram district



Source:https://en.wikipedia.org/wiki/Kerala#/media/File:IN-KL.svg

With 33 million people, Kerala is the thirteenth-largest Indian state by population in terms of size. The capital is Thiruvananthapuram, and there are 14 districts in the state. With the highest Human Development Index, the highest literacy rate, the highest life expectancy rate, the highest sex ratio, and the lowest incidence of poverty, Kerala is exemplary in many respects. According to the NITI Aayog's 2019 annual report, the state was ranked first in the nation for achieving the Sustainable Development Goals (NITI Ayog 2021)[27].

This research focused on Malappuram District, which was founded on 16 June 1969 and is bounded by the Tamil Nadu Nilgiris to the east, the Arabian Sea to the west, Kozhikode and Wayanad Districts to the north, and Palakkad and Thrissur Districts to the south. The District has a population of 4,494,998 (the highest in the state) and a land area of 3550 square kilometres, which accounts for 9.13 percent of the state's total land area and ranks third (Table 3-1). The administrative center of the district is located at Malappuram. The district is split into six taluks and 15 revenue blocks for administrative purposes. The population density of the city is 1,742 persons per square kilometre which consists of 135 revenue villages and 40 electoral wards.

Table 3-1: Key demographic features of Malappuram district, Kerala

Indicators	India	Kerala	Malappuram
Area*	3,287,263 (km^2)	38,863 (km^2) (1.18 percent)	3554 (km^2) (9.14 percent)
Population*	1,21,05,69,573	33,406,061 (2.76 percent)	4,494,998 (13.46 percent)
GDP Per capita Income!	82269	128347	105841
Life Expectancy*	69.4	75.3	-
Sex Ratio*	943	1084	1098
density of pop /km2*	382	860	1742
Female Literacy^	70.3	95.2	99.2
Urban Population (percent)*	31.14	47.7	47.6
Birth Rate#	17.23	12.77	19.61
Death Rate#	7.34	7.17	4.69
MMR#	103	29	26

[27] SDG India Index, NITI Ayog, March 2021

IMR#	28	5	5
TFR@	2.2	1.7	-
Mean age at marriage (W)#	20	21.4	17.7
SC*	16.6	9.10	7.50 percent
ST*	8.6	1.50	0.56 percent
Hindu*	79.8	54.73	27.6
Muslim*	14.23	26.56	70.24
Christian*	2.3	18.38	1.98

Source: *2011 census; #SRS Bulletin, 2017; ^ NSSO survey, 2017; ! Central Statistics Office and Department of Economics and Statistics, 2016-17; @ NFHS-5

With a total population of 1.7 million, the Malappuram metropolitan region ranks as India's 26th largest urban agglomeration and Kerala's fourth largest after the urban areas of Kochi, Calicut, and Thrissur. According to a poll by the Economist Intelligence Unit (EIU) based on the urban area growth in January 2020, it is the city with the highest rate of urban expansion in the world, rising by 44.1 percent between 2015 and 2020. In Malappuram, the average age of marriage is relatively low (17.7). In the district, sex ratio is 1098 (for every 1000 males). 99.2 percent of women are literate. Urban population is higher than the national average but lower than the state average (47.6 percent). Muslim (70.24 percent), Hindu (27.6 percent), and Christian (1.98 percent) are the three main religions in the area. In Malappuram, the SC population is 7.5 percent, and the ST population is 0.56 percent of the total state population.

3.2.2 District selection criteria

We used primary data analysis to examine the awareness and utilisation of the JSSK scheme for mother and child healthcare. The district, Malappuram was selected for the case study. Ministry of Health and Family Welfare (MoHFW) has chosen some districts as High Priority Districts (HPD), the lowest 25 percent of districts in each state according to the ranking of districts based on composite health index to promote equitable health care and bring about more rapid changes in health outcomes. The list had 184 districts, three of

which were from Kerala: Malappuram, Kasargod, and Palakkad[28]. The Central Government has designated 256 districts as High Priority Districts (HPDs) under the National Health Mission (NHM), including aspirational districts recognised by NITI Aayog. These are the districts with weak infrastructure. In this list, there are four districts in Kerala: Kasaragod, Malappuram, Alappuzha, and Wayanad[29]. Malappuram is there in both lists. Moreover, Malappuram is the state's most populated district (13.46 percent) and is home to all sections of society with different socioeconomic background. Malappuram, however, has the lowest rate of institutional births in public health facilities compared to other districts (19.3 percent), which is largely indicative of the lowest utilisation of JSSK in the states. Because for getting JSSK benefits, pregnant women should choose public health facilities.

3.2.3 Sampling Technique and Sample Design

There are seven delivery points under the public facility in Malappuram district (Table 3-2). Purposive random sampling was employed to gather data; samples were identified with the help of PROs and ASHA workers, and a subset of the identified mothers were selected at random for the survey. In addition, for the purposes of comparison, mothers who gave birth in private health facilities were also surveyed using the same questionnaire as part of the household survey conducted with the assistance of ASHA workers and Anganwadi workers.

[28] List of High Priority Districts (HPDs) in the country, Press Information Bureau, Government of India Ministry of Health and Family Welfare, 24 April 2015

[29] Districts having weak Health Infrastructure, Press Information Bureau, Government of India Ministry of Health and Family Welfare, 24 July 2018

3.2.4 Inclusion criteria:

For the goal of gathering data, mothers from the Malappuram district who had a baby during the last two years and were willing to participate in the research were included.

3.2.5 Exclusion criteria:

Mothers who had a baby more than two years ago, were unwilling to participate, and were unable to recall details, were excluded from the research.

3.2.6 Determination of the Sample Size:

Sample size was determined by using formula:

$n= Z^2pq/d^2$

where:

n = Minimum sample size

z = Standard score corresponding to a given confidence level. Here, at 95 percent Confidence Level (5 percent level of significance) Z = 1.96.

p = Utilization of JSSK in Malappuram District of Kerala (we used the percentage of deliveries in government hospitals in Kerala as a proxy for the proportion of mothers who used JSSK, since JSSK benefits are only available to women who use government health facilities). That was 32.7 percent (NFHS-4).

q = 1-p

d = Proportion of sampling error which is usually 5 percent confidence limit.

Thus, the sample size calculated based on this formula was

$n = (1.96)^2 (0.327 \text{ x } 1\text{-}0.327) / (0.05)^2$

n = 339

It would be at least 364 samples if we included an extra 25 samples as compensation for the no-response samples. However, to get more accuracy, we gathered information from

888 pregnant women who gave birth during the last two years from 2018-19 (Table 3-2 and Figure 3.2).

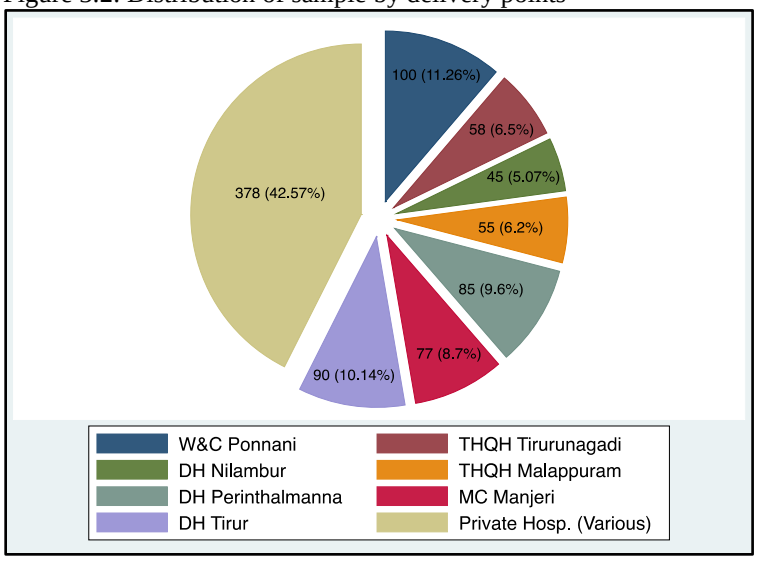
Table 3-2:Distribution of sample by delivery points

Delivery Points	Category	Freq.	Percent	Cum.
W&C Ponnani	Women and Children Hospital	100	11.26	11.26
THQH Tirurunagadi	Sub-District Hospital	58	6.53	17.79
DH Nilambur	District Hospital	45	5.07	22.86
THQH Malappuram	Sub-District Hospital	55	6.19	29.05
DH Perinthalmanna	District Hospital	85	9.57	38.63
MC Manjeri	Medical College	77	8.67	47.30
DH Tirur	District Hospital	90	10.14	57.43
Private Hospitals (Various)	Private Hospital	378	42.57	100.0
Total	-	888	100.00	-
Women & Children Hospital Ponnani; Taluk Head Quarters Hospital Tirurangadi and Malappuram; District Hospital Nilambur, Perinthalmanna and Tirur; Government Medical College Manjeri; Various Private Hospitals.				

Source: Primary Survey

This comprises 510 mothers from seven government health facilities and 378 mothers from various private hospitals. Women and Children's Hospital Ponnani (100) had the most data gathered at government delivery points, whereas District Hospital Nilambur had the least (45).

Figure 3.2: Distribution of sample by delivery points



The rural district is comprised of 15 revenue blocks and 94 Gram Panchayats. The data gathered at random from all 15 blocks (Table 3-3 and Figure 3.3).

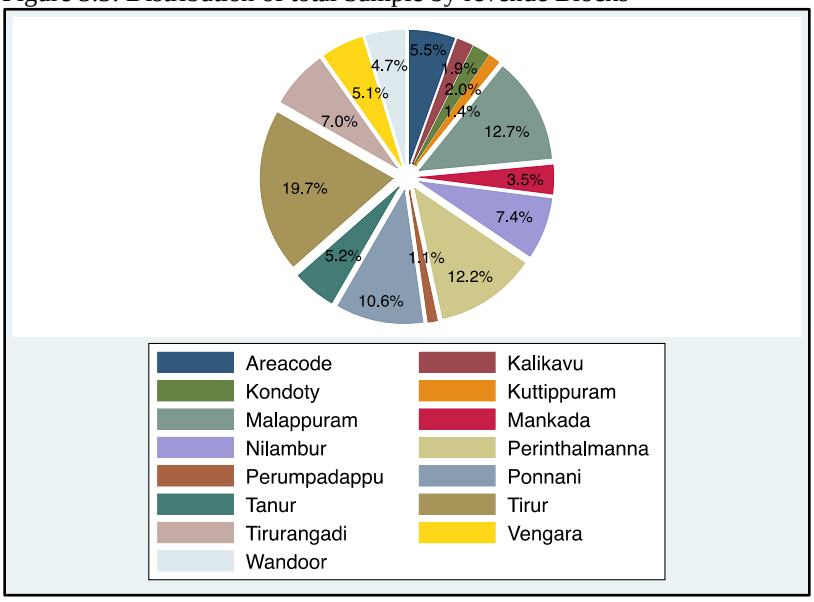
Table 3-3:Distribution of total Sample by revenue Blocks

Blocks	Freq.	Percent
Areacode	49	5.5
Kalikavu	17	1.9
Kondoty	18	2.0
Kuttippuram	12	1.4
Malappuram	113	12.7
Mankada	31	3.5
Nilambur	66	7.4
Perinthalmanna	108	12.2
Perumpadappu	10	1.1
Ponnani	94	10.6
Tanur	46	5.2
Tirur	175	19.7
Tirurangadi	62	7.0
Vengara	45	5.1
Wandoor	42	4.7
Total	888	100.0

Source: Primary Survey

Tirur had the most representation (19.7 percent), followed by Malappuram (12.7 percent), Perinthalmanna (12.2 percent), and Ponnani (10.6 percent). The least represented were Perumpadappu (1.1 percent), Kuttippuram (1.4 percent), Kalikavu (1.9 percent), and Kondotty (2 percent).

Figure 3.3: Distribution of total Sample by revenue Blocks



3.2.7 Tools and Techniques for Data Collection

i) The main data was gathered through a field visit, a semi-structured questionnaire, a schedule, and face-to-face interviews with various stakeholders. The District Programme Manager (NHM, Malappuram), Superintendents, Public Relations Officers (PROs), Junior Health Inspectors (JHIs), ASHA Workers, and ANMs of each hospital were interviewed.

ii) Schedule: A schedule has been created to collect data on infrastructure facilities available in government delivery points, such as the availability of beds in labour wards, the number of specialist doctors, labs, pharmacies, blood banks, operation theatres, number of ANMs, number of ASHA workers, and the availability of ambulance/vehicle. It is filled with the assistance of PROs at various delivery points.

iii) Questionnaire: The beneficiaries and non-beneficiaries of JSSK were surveyed using a semi-structured questionnaire. The questionnaire consists of the following templates:

A) Demographic Profile: Respondents' demographic profile, including village, area (urban or rural), age, religion, caste, family type (joint/nuclear), economic status, education, and occupation.

B) **Awareness on JSSK**- In this section, the questions regarding their awareness, time of awareness, sources of awareness, the extent of awareness regarding the entitlement of JSSK, and awareness among family members and neighbours were asked.

C) **Utilisation of JSSK**- Information on the date of registration, the location of registration, registration assistance, the time of use, the JSSK entitlements utilised, the reason for utilisation, any issues encountered during utilisation, and general feedback on the scheme and its use have all been asked.

D) **Out of Pocket Expenditure**- In this area, we asked if there was any OoPE during delivery and, if so, how much and in which items.

E) **ASHA Workers**- This part included questions regarding the accessibility of ASHA workers as well as their behaviour, quality of service, and general satisfaction with ASHAs.

Information on antenatal, postnatal, and child immunisation was explored during the interview. The individuals were asked to rate the JSSK scheme at the end of the questionnaire.

3.2.8 Statistical Analysis and Econometric Models used

The following statistical methods and econometric models were employed in the research to test the hypotheses based on the objectives. GRETL and STATA.16 statistical software were used for the analysis.

i) To determine changes and change percentages in important health outcomes in India, Kerala, and Malappuram, simple percentages, mean, and median are utilised.

ii) Coefficient of Variation (CV) is calculated to determine the extent of variation in the availability of infrastructural facilities and the supply-demand gap in mother and child healthcare between the districts of Kerala

iii) Deprivation index and development index have been created to determine regional disparity and development inequality in mother and child healthcare in Kerala.

iv) Concentration Index is used to identify the concentration and inequality of healthcare utilisation of mothers and children in a government health facility in Kerala.

v) The Chi-Square test was used to determine the relationship between respondents' awareness and utilisation of JSSK scheme and their socioeconomic variables.

Researchers use the Chi-Square test to analyse the differences between categorical variables within the same population.

vi) Fixed and Random Effect Model is used to identify the determinants of MMR and IMR in India

vii) The logit model is used to analyse the factors influencing the awareness of the JSSK scheme in the study area.

viii) A binary logistic model is used to identify the predictors of the utilisation of the JSSK scheme in the study area.

ix) The interquartile range (iqr) is used to comprehend the variation in OoPE throughout delivery amongst districts. The IQR indicates the difference between Q3 and Q1. Interquartile range is the most accurate measure of variability in data sets incorporating outliers or skewed distributions.

x) The Shapiro-Wilk, Shapiro-Francia, and Skewness/Kurtosis tests are used to ensure that the data is normal.

xi) We used an unpaired sample t-test on normally distributed data to find out if the differences in OoPE during delivery in Public and Private Health Institutions in Kerala are statistically significant or not (based on secondary data analysis).

xii) We used a Wilcoxon signed-rank test (for non-normally distributed data) for the empirical analysis of differences in OoPE during delivery in Malappuram's Public and Private Health Institutions (based on primary data analysis). The Wilcoxon Rank Sum (Mann-Whitney) test is sometimes referred to as the non-parametric counterpart of the two-sample t-test.

xiii) A two-part model (also known as the hurdle model) is used to determine the key determinants of OoPE. The first component of the two-part model is the probability of incurring OoPE of hospital delivery using multivariate logistic regression with a binary outcome variable, i.e., No out-of-pocket expenditure vs Any kind of out-of-pocket spending on births at hospital. Part two of the model is a Generalised Linear Regression Model with log link and gamma distribution (Deb and Norton, 2018) in which the outcome variable is a continuous non-zero positive variable.

Thus, appropriate techniques, tools, methods, and models were used in the study for data collection, analysis, and interpretation.

Chapter 4: Mother and Child Healthcare in India and Kerala

4.1 Introduction

Mother and child healthcare is the main indication of a nationa's well-being. India is one of the countries that has seen a deduction in in mother and child health. Beginning of 2000s the maternal deaths in India was quite high, around 254 per hundred thousand live births (SRS-2004-06), larger than the world average[30]. In 2017, there were almost 810 preventable deaths of women every day connected to pregnancy and delivery[31]. Millennium Development Goal No. 5 was intended to lower the MMR by three-quarters from 1990 to 2015. To achieve these objectives, the government set up the National Rural Health Mission (NRHM) in 2005 with the goal of providing good healthcare in the rural area and promoting high-quality infrastructure, particularly in backward areas, with a focus on improving infants, children, and maternal health.

India has made great progress toward the MDG, with several targets being met ahead of the 2015 deadline, but development has been uneven[32]. One of NRHM's flagship programmes, JSY, was introduced in 2005. The impact of JSY, the largest Conditional Cash Transfer Scheme (CCT), was impressive. It brought marginalised rural pregnant women to public health institutions for ANC and delivery. Another component of NRHM, ASHA, performed the duty of IEc (Information, Education, and communication). The result was highly impressive. Institutional delivery increased in most of the states, especially in backward states like UP, Bihar, MP, Rajasthan, Odisha, etc., and it directly

[30] Montgomery AL et.al, 2014

[31] WHO, 2019 (available at 9789241516488-eng.pdf)

[32] ESCAP, United Nations, 2015 (available from https://www.unescap.org/resources/india-and-mdgs-towards-sustainable-future-all)

worked as a catalyst for the reduction of maternal and child[33]. However, it was only available to a subset of the population. So, its impact was also limited, especially among urban and high-profile populations. Moreover, one of the causes of lower institutional deliveries was the high OoPE in private hospitals and the lack of infrastructure and human resources in government hospitals. NRHM, to some extent, was helpful to increase infrastructure and manpower in government hospitals but did not touch on the problem of high OoPE. By considering this fact, after five years of NRHM and JSY, the government of India implemented Janani Shishu Suraksha Karyakram (JSSK) to eliminate OoPE in government hospitals. Therefore, it is important to empirically analyse the factors that influence Maternal Mortality and Infant Mortality, 15 years after the introduction of the NRHM.

4.2 Objectives and methods of this section

This chapter has two sections. In the first section, we discussed the status and determinants of maternal and child healthcare in India. In the second part of this chapter, the supply and demand side factors of mother and child healthcare in Kerala were analysed. Among Indian states, those states that had more than two lakh pregnancies reported in the reference periods (2010-11 and 2019-20) were considered for the analysis. Based on these criteria, 17 states are included in this study and others are excluded. J&K and Tamil Nadu were also excluded due to a lack of sufficient data for some variables. Key health inputs, outcomes, and impacts related to mother and child healthcare are purposefully examined in this section. As inputs, we used variables such as total state NRHM expenditure, ASHA workers in position, and the total number of first referral units available. Whereas as

[33] Rai RK and Singh PK, 2012

outcome we used variables like the percentage of three or more Antenatal Care received, percentage of hospital delivery to total delivery, and OoPE in the public health facility. As the impact, we used the variables such as Maternal Mortality Ratio (MMR) and Infant Mortality Ratio (IMR). This study has the following methodological divisions for empirical analysis:

First, an average increasing rate or average reduction rate was calculated for all the health indicators mentioned above between the periods 2010-11 and 2019-20.

$$\text{Average Increasing Rate /Average Reduction Rate} = \frac{\text{Final Value - Initial Value}}{\text{Initial Value}} \times 100$$

Second, to examine the causation and determining factors of mother and child health care in India, say, MMR and IMR, the Fixed and Random Effect Model were used.

The model is:

$$Y_{it} = \beta_0 + \beta_k X_{it} + \beta_k Z_{it} + \upsilon_i + \varepsilon_{it}$$

where:

i – is the entity (17 Indian states) in the case of MMR, it is 16 states because MMR data of J&K is not available.

t – is time, 13 years (2007-08 to 2019-20)

β_0 – is the intercept

Y_{it} – is dependent variable (MMR and IMR here)

X_{it} – are the independent variables

Z_{it} – are other explanatory variables like Percentage of Female literacy and per capita net state domestic product (included for avoiding omitted variable bias)

β_k – is the coefficient for independent and other explanatory variables

υ_i – is the individual impact of i^{th} entity (respective states here).

ε_{it} – is the error term, represents unobserved elements that change over time and impact Y_{it}.

To identify whether there is a correlation between υ_i and X_{it}, ε_{it} and υ_i, Hausman test was applied, which accepted the null hypothesis (the H_o is "Random Effect Model is appropriate"). The Breusch and Pagan Lagrangian multiplier test was used to confirm the Random Effect and evidence of significant differences across states. To find out the causation and determining factors on health impact, say MMR and IMR in the panel fixed effect/random effect model we used the regressors as the total state NRHM expenditure, the number of first referral units, number of ASHA Workers in position (these three are from health inputs), the percentage of three or more Antenatal Care (ANC) received, Institutional Delivery to total reported Deliveries and OoPE during delivery in Public Health Facility (these three are from health outcomes). In addition to this percentage of Female Literacy and Per capita Net State Domestic Products at Constant Price are also used as social and economic factors which may affect the mother and child health care in India. The equations are in linear-log form, in which total NRHM state expenditure, ASHA Workers in Position, Out-of-Pocket Expenditure, and Per Capita Net State Domestic Product at Constant Price are transformed into a log form.

The following are the estimated panel random effect regression equations:

$$MMR_{it} = \beta_0 + \beta_1 SNRHMExp_{it} + \beta_2 TnFRUs_{it} + \beta_3 lnASHAWinP_{it} + \beta_4 PWr3ANC_{it} + \beta_5 InsDeltrDel_{it} + \beta_6 lnOoPE_{it} + \beta_7 FemLiteracy_{it} + \beta_8 lnPCNSDPatCP_{it} + \upsilon_{it} + \varepsilon_{it}$$

$$IMR_{it} = \beta_0 + \beta_1 SNRHMExp_{it} + \beta_2 TnFRUs_{it} + \beta_3 lnASHAWinP_{it} + \beta_4 PWr3ANC_{it} + \beta_5 InsDeltrDel_{it} + \beta_6 lnOoPE_{it} + \beta_7 CIMMU_{it} + \beta_8 FemLiteracy_{it} + \beta_9 lnPCNSDPatCP_{it} + \upsilon_{it} + \varepsilon_{it}$$

here: MMR_{it} – Maternal Mortality Ratio; IMR_{it}– Infant Mortality Ratio; $SNRHMExp_{it}$– total State NRHM expenditure; $TnFRUs_{it}$ – Total number of First Referral Units; $lnASHAWinP_{it}$- log of ASHA Workers in Position; $PWr3ANC_{it}$ – Pregnant Women received three or more Antenatal Care; $InsDeltrDel_{it}$- Institutional Deliveries to total reported Deliveries; $lnOoPE_{it}$- log of OoPE; CIMMU- the percent of child immunised at the age of 12 to 23 months; $FemLiteracy_{it}$- Female Literacy; and $lnPCNSDPatCP_{it}$- log of Per Capita Net State Domestic Product at Constant Price.

4.3 Health inputs and mother and child healthcare

For the improvement of the whole health system, the basic infrastructure and other inputs are very important. In this study, we considered total state NRHM expenditure, ASHA workers in position and the number of First Referral Units (FRUs) as health inputs or health infrastructure.

4.3.1 Total state NRHM Expenditure

In response to the achievement of the Millennium Development Goals, the government implemented the NRHM and other programmes, which resulted in an increase in public health expenditure across states over time (Table 4-1).

Table 4-1:Key Health Inputs in mother and child healthcare in India

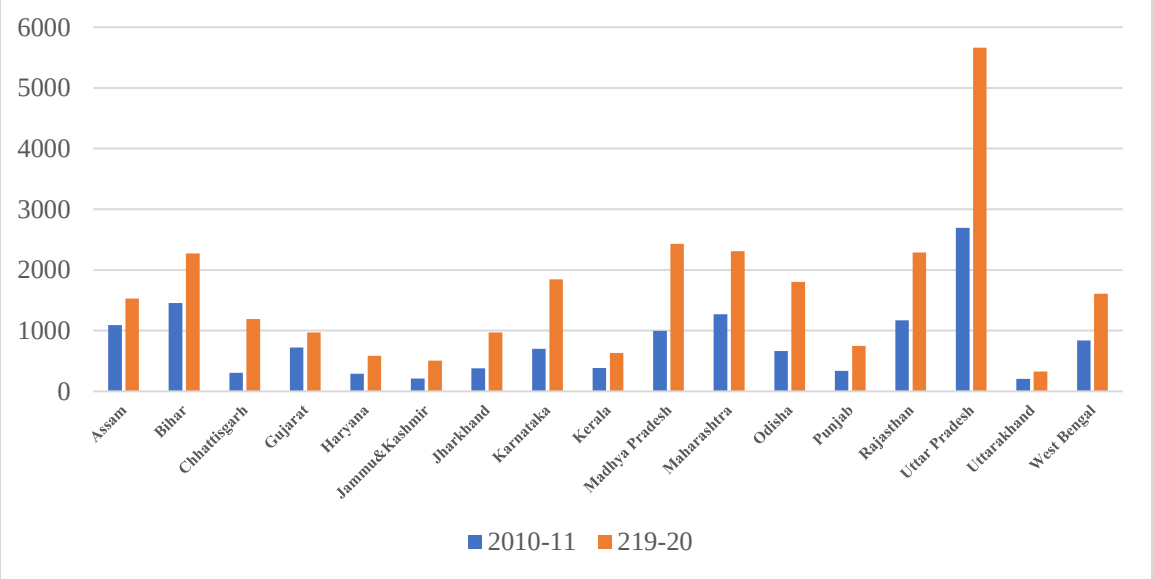
	NRHM Exp. (in crores)*		**FRU#**		**ASHAs#**	
State	**2010-11**	**2019-20**	**2010-11**	**2019-20**	**2010-11**	**2019-20**
Assam	1093.37	1527.89	61	73	29114	31334
Bihar	1454.98	2274.37	66	68	79808	89418
Chhattisgarh	308.6	1192.64	75	37	60092	67578
Guajrat	722.26	972.79	145	132	29508	41595
Haryana	287.78	583.38	38	39	12861	17699

Jammu & Kashmir	210.76	504.33	99	53	9500	12400
Jharkhand	381.09	970.65	46	59	40964	40964
Karnataka	700.62	1846.96	166	163	33105	38704
Kerala	385.95	634.89	65	87	31829	30113
Madhya Pradesh	996.8	2433.37	83	148	50113	73486
Maharashtra	1271.63	2310.23	157	268	58831	60894
Odisha	664.37	1803.73	73	77	40942	45497
Punjab	339.34	748.02	170	205	16597	18836
Rajastan	1172.06	2290.69	95	78	47209	60712
Uttar Pradesh	2693.3	5664.57	161	334	136094	156989
Uttarakhand	206.31	324.71	27	50	11086	11651
West Bengal	836.69	1607.02	94	143	42003	57222

Source: *National Health Accounts; #NHM, India.

During the reference period, NRHM expenditure grew in every state. In 2010-11, total NRHM expenditure was highest in Uttar Pradesh (2693.3 cr.) and Bihar (1,549.8 cr.), and lowest in Uttarakhand (206.31 cr.) and Jammu and Kashmir (210.76 cr.). In 2019-20, it was maximum for Uttar Pradesh (5664.57 cr.) and Madhya Pradesh (2433.3 cr.) and lowest for Uttarakhand (324.71 cr.) and Jammu and Kashmir (504.33 cr.).

Figure 4.1: Total state NRHM Expenditure

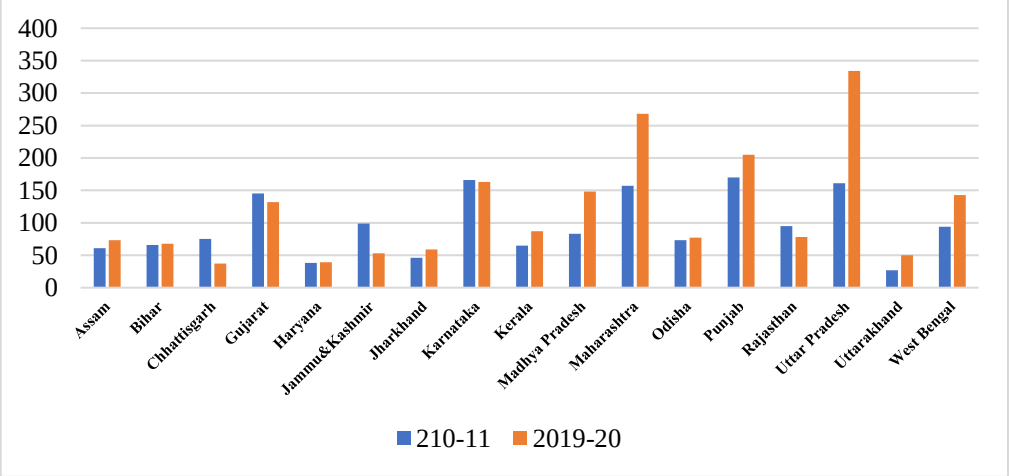


The average rate of growth was highest in Chhattisgarh (286.5%) and Odisha (171.5%) and lowest in Assam (39.7%) and Gujarat (34.7%).

4.3.2 Number of First Referral Units (FRUs)

Numerous national and international studies have demonstrated a significant relationship between health infrastructure and health outcomes. Improved access to health services, skilled health professionals, improved drug utilisation, and more investment for health in India can all contribute to better health outcomes[34]. This study examines the number of first referral units (FRU)[35], which are essential for providing care and treatment to pregnant women and infants. The number of FRUs has rapidly increased from 940 in 2005 to 2996 in 2020. We can see that the number of FRUs has not increased much between 2010-11 and 2019-20 in most of Indian states except a few states like UP, MP, Maharashtra, and West Bengal (Table 4-1 and Figure 4.2). In 2019-20, FRUs were highest in UP (334) and Maharashtra (268) and lowest in Chhattisgarh (37) and Haryana (39). The average increasing rate was highest in Uttar Pradesh (107.5%) and Uttarakhand (85.2%), whereas it was lowest in J&K (-46.5 percent) and Chhattisgarh (-50.7 percent).

Figure 4.2: Total number of First Referral Units (FRUs)



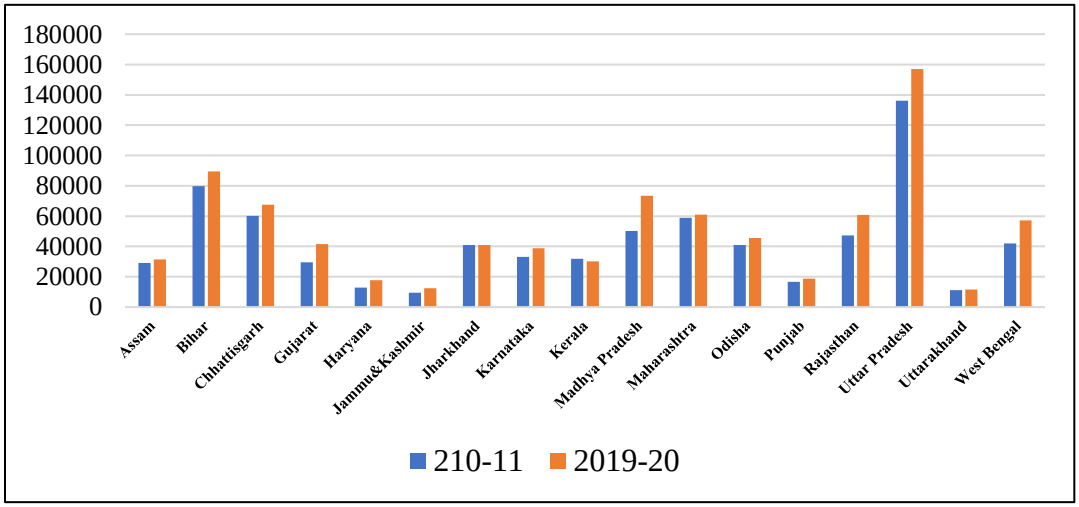
[34] Joumard, I., 2015

[35] First Referral Units (FRU) offer full obstetric care, such as delivery care, including caesarean section, care for newborns, emergency care for sick children, a full range of family planning options, safe abortion services, STI/RTI treatment, blood storage unit availability, referral transport, and more.

4.3.3 ASHA Workers in position

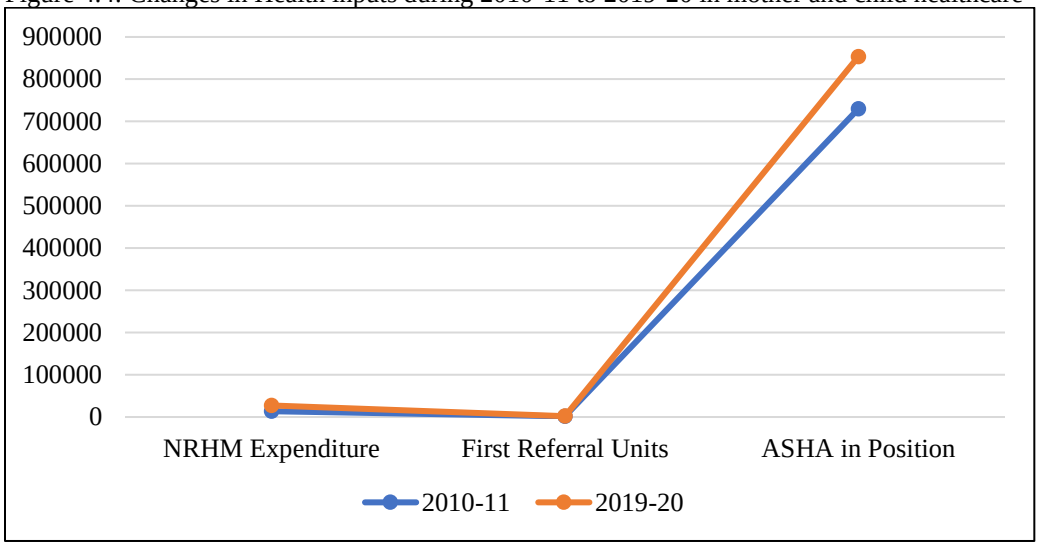
A trained female community health activist, also known as an ASHA or Accredited Social Health Activist, was sent to every village in the nation as part of the National Rural Health Mission. The ASHA, who will serve as liaison between the community and the public health system, will be selected from within the village. The community will be encouraged and inspired by ASHA, and it will be simpler for them to access health and health-related services like immunisation, antenatal and postnatal checkups, supplemental nutrition, sanitation, and other government-provided services that are offered at anganawadis, sub-centers, and primary health centres. The number of ASHA workers was highest in UP (156989) and Bihar (89418) in 2019-20, whereas it was lowest in Jammu & Kashmir (12400) and Uttarakhand (11651). The number of ASHA workers in positions has not increased that much between 2010–11 and 2019–20. The average increasing rate was higher for Madhya Pradesh (46.6 percent) and Gujarat (41 percent). For Jharkhand, there was no change in the position of ASHA, whereas, for Kerala, it decreased at an average decreasing rate of 5.4 percent (Figure 4.3).

Figure 4.3: ASHA workers in position



We can see that in the case of these three inputs, there was not that much improvement between the periods 2010–11 and 2019–20 (Figure 4.4) in the 17 states that we considered for this study. In the case of the number of First Referral Units (FRUs) and total NRHM state expenditure, there are no visible changes. On the other hand, the number of ASHA workers in position has increased slightly.

Figure 4.4: Changes in Health inputs during 2010-11 to 2019-20 in mother and child healthcare



4.4 Health Outcomes and Mother and child healthcare

When there is an increase in infrastructure and other inputs the health outcome also will improve. This study considered Pregnant Women receiving three or more Antenatal Care, the percentage of Institutional Delivery to total reported delivery and OoPE as our health outcomes related to mother and child healthcare. The changes in key health outcomes in India between 2010-11 and 2019-20 can be observed in Table 4-2.

Table 4-2:Key Health Outcomes in mother and child healthcare in India

	% of ANC		% of Institutional Delivery		OoPE (in Rs)	
State	2010-11	2019-20	2010-11	2019-20	2010-11	2019-20
Assam	64.1	85.3	77.6	91.2	1829	5415
Bihar	50.3	69.8	85.6	84.8	454	2848
Chhattisgarh	80.9	93.8	54.7	98.3	1070	1808
Guajrat	73	86.5	91.8	99.5	2685	1697

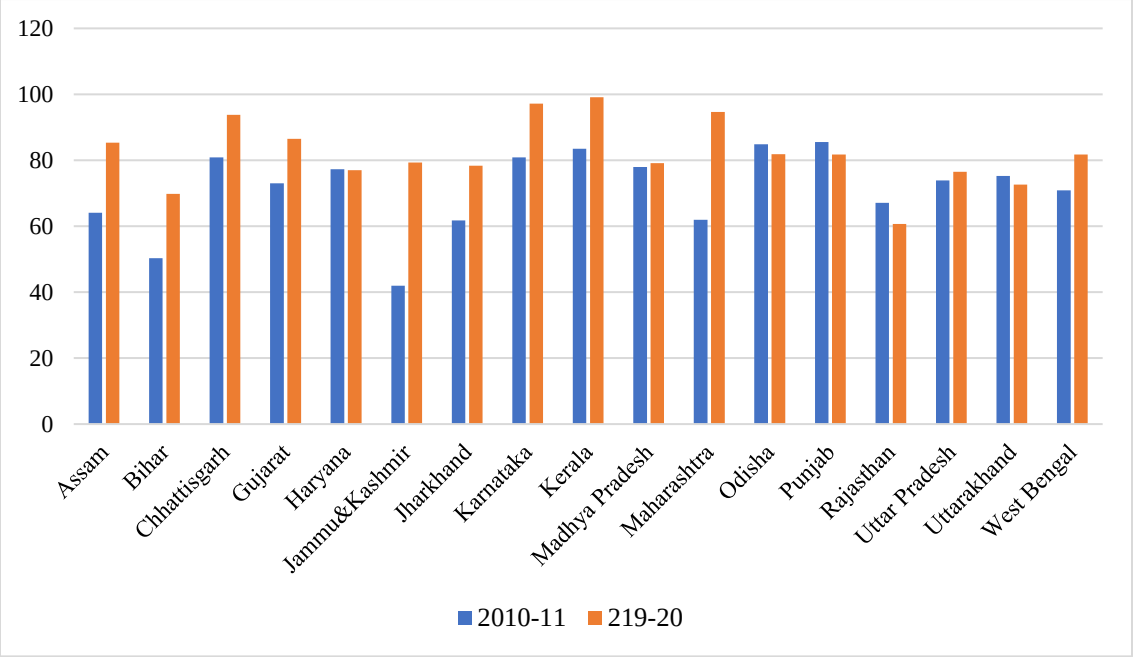
Haryana	77.3	77	80.3	95.9	1492	1631
Jammu & Kashmir	42	79.3	76.6	94.6	3075	5145
Jharkhand	61.8	78.4	58.8	96	10	3150
Karnataka	80.9	97.2	93.7	99.9	4662	4954
Kerala	83.5	99.1	99.8	99.9	7140	6710
Madhya Pradesh	78	79.1	83.9	95.7	10	2530
Maharashtra	62	94.7	91.3	99.4	4343	2966
Odisha	84.9	81.8	82.2	97.3	4592	3933
Punjab	85.5	81.7	68.5	98.6	10	3346
Rajastan	67.1	60.7	88.5	98.3	2463	3523
Uttar Pradesh	73.9	76.5	58.4	88	3627	5321
Uttarakhand	75.2	72.6	61.6	88.8	1714	4002
West Bengal	70.9	81.7	68.1	98.6	6278	10495

Source: HMIS, MoH&FW

4.4.1 Antenatal care (ANC)[36]

On the basis of the efficacy of the healthcare system, the World Health Organization advises at least four prenatal care visits. In India, the percentage of Antenatal check-ups (three or more) has risen from 71.3 percent to 82.1 percent in these 17 states altogether (Table 4-2 and Figure 4.5).

Figure 4.5: Percentage of Pregnant Women who had 3 or more ANC visits



[36] Antenatal care is regarded as a critical component of the healthcare system. It encourages institutional births, lower maternal mortality, and a higher likelihood of infant survival.

It is clear that the percentage of pregnant women who received three or more antenatal care has increased during this time for almost all states. It was highest in Kerala (99.1 percent) and Karnataka (97.2 percent) whereas it was lowest in Rajasthan (60.7 percent) and Bihar (69.8 percent). The highest positive change was marked by J&K (88.81 percent) and Maharashtra (52.74 percent), but the change percent was least in Rajasthan (-9.54 percent) and Punjab (-4.44 percent).

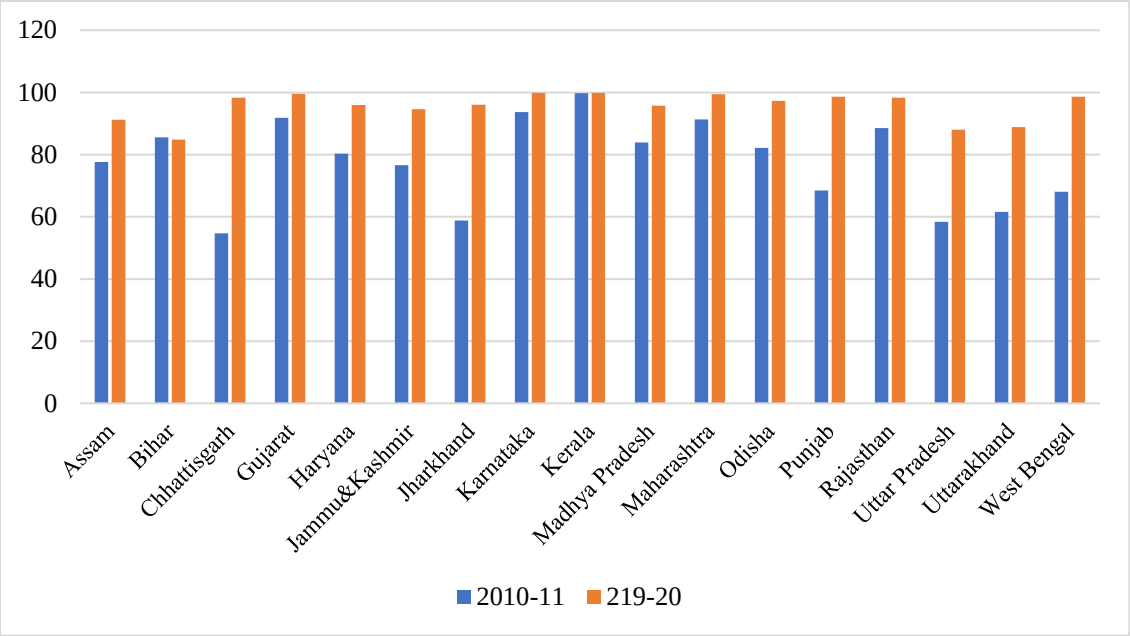
4.4.2 Institutional Delivery[37] and Mother and Child Healthcare

Skilled delivery attendance is a key metric for tracking progress toward Millennium Development Goal five. JSY and JSSK encourage institutional delivery to reduce maternal and infant deaths. After these programmes, delivery in hospitals in India has increased many folds[38]. Institutional delivery improved as a result of the JSSK initiative[39]. JSSK benefited women who used public services, however, medicines, consumables, and transportation added to out-of-pocket expenses[40].

Institutional delivery has grown in almost all states throughout this time span (Table 4-2 and Figure 4.6). It was highest in Kerala (99.9 percent) and Karnataka (99.9 percent) while lowest in Bihar (84.8 percent) and UP (88 percent). The average increase rate during the period was highest for Chhattisgarh (79.7 percent) and Jharkhand (63.3 percent) where least in Bihar (-0.9 percent) and Kerala (0.1 percent). Kerala was at its peak, so there was little scope for further improvement.

[37] It refers to the act of giving birth to a child at a medical facility under the care of qualified and competent medical experts. It also denotes the availability of resources to deal with the problem and save the mother and child's lives.
[38] Mishra, S., & Mohanty, S., 2019
[39] Salve, H., 2017
[40] Tyagi, U et.al., 2016

Figure 4.6: Percentage of hospital deliveries to total reported deliveries



Evidence from rural Haryana, North India, indicated that when the JSSK plan was implemented, the number of deliveries at the primary care level increased by more than double, despite no major changes in human resources or facilities at the study institution. Since its inception in 2006, the JSY programme has helped to develop demand in the community for institutional delivery. Services were given under JSSK that contributed to a further rise in institutional delivery in the study area's population that had previously been primed by the JSY programme[41].

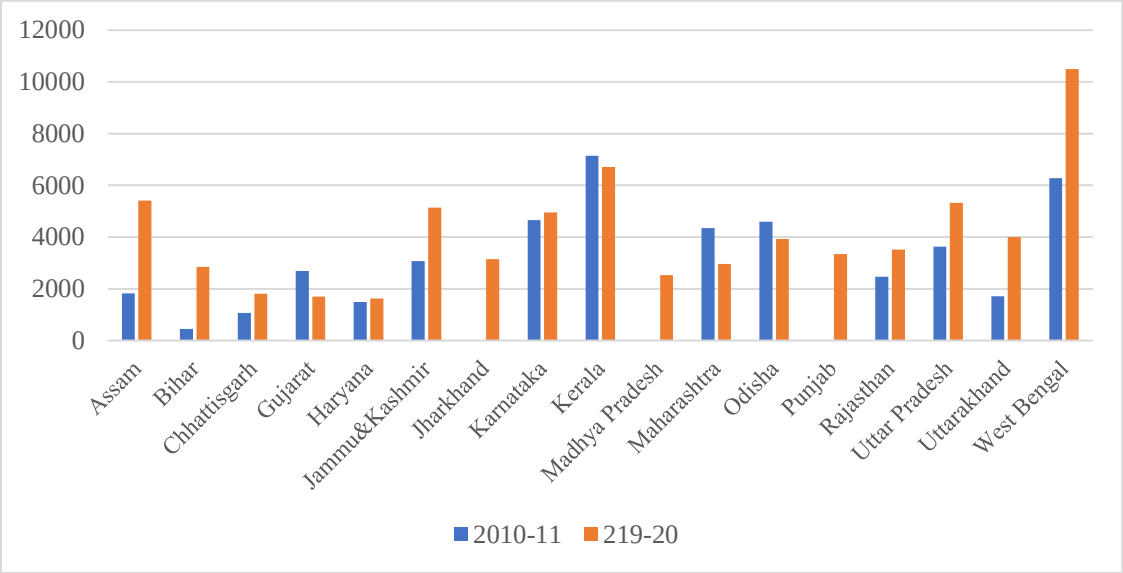
4.4.3 OoPE during delivery in Government health institutions.

OoPE, which accounts for more than 60 percent of overall health spending in India, is the primary source of funding[42]. Many services are focused on maternal health since they are the most vulnerable and majority group (2/3rd) of the population, and most diseases

[41] Salve, H., 2017
[42] Mishra, S., & Mohanty, S., 2019

and deaths among them were avoidable (Chandrakar, et al. 2017). To eliminate OoPE in mother and child healthcare, the government launched JSSK in 2011 under NRHM.

Figure 4.7: OoPE during delivery in public health institutions



Source: HMIS, NHM (2010-11 & 2019-20)

OoPE in government health facilities has grown in the majority of states (Table 4-2 and Figure 4.7). It was highest in West Bengal (Rs. 10495) and Kerala (Rs.6710) while it was lowest in Haryana (Rs.1631) and Gujarat (Rs.1697). The change percent was negative for only Gujarat, Maharashtra, Odisha and Kerala. However, even after the introduction of NRHM and JSSK in most of the states, there was no sign of elimination of OoPE, rather it was increased in 2019-20 when compared with the 2010-11.

Although OoPE decreased slightly after the implementation of JSSK, there was no discernible difference in household health expenses between the pre-JSSK (21.2 percent) and post-JSSK (15.6 percent) periods[43]. According to another research, 83.5 percent of the sample group who received JSSK benefits had OoPE. The computed average

[43] Tripathi, N., 2014

expenditure was INR 4289[44]. The median OOPE was INR 1100. Beneficiaries were still facing substantial health expenditures, according to a survey done in regions of Delhi. Diagnostics accounted for the largest percentage of spending, which may be ascribed to infrastructure bottlenecks; pharmaceuticals accounted for the second-largest share of spending, which can be linked to a lack of availability of drugs[45]. The JSSK initiative in Chhattisgarh has not been able to achieve its goal of decreasing the expenditure on pregnant women in public health facilities. Medicine, food, and transportation accounted for the majority of the costs. Due to a lack of human resources, poor health infrastructure, and irregular and insufficient pharmaceutical supplies, recipients are forced to pay exorbitant fees during institutional delivery. This demonstrates that government spending on the plan is insufficient, which should be addressed by wise resource allocation to increase JSSK efficacy[46]. More than 70 percent of pregnant women in West Bengal's Bankura area were aware of the programme, yet only 20 percent of them use it. Medicine, transportation, and diagnostics were the areas of expense[47]. According to this study, JSSK failed to meet its intended purpose of providing cost-free services to pregnant women and unwell babies due to shortcomings in its implementation, mostly at facility levels.

Immunisation coverage in India varies widely from state to state, with the lowest percentages seen in the country's big central regions. Large states like Bihar, Madhya Pradesh, Uttar Pradesh, and Rajasthan have the greatest numbers of partly vaccinated and non-immunized children. According to recent research, complete vaccination coverage in

[44] Chaudhary,et.al, 2017
[45] Sharma, S., & Bothra, M. 2016
[46] Chandrakar, 2017
[47] Mitra, 2016

India has increased by 2.65 percent and 0.82 percent annually in rural and urban regions, respectively, during the last two decades. In metropolitan regions, improvement is slow and insignificant[48]. Full vaccination rates were lower among females than males, lower-income families, and Muslims. Between 1992-93 and 2005-06, the gap in full vaccination shrank in the north but rose in parts of the country's western and southern states[49]. The effectiveness of the Universal Immunisation Program (UIP) depends on the mother's literacy. As a result, efforts should be taken to promote IEC (information, Education and Communication) to educate mothers, particularly in rural regions[50].

4.5 Health Impact analysis in the Indian States

The health impact analysis allows us to assess the potential health effects of a policy, programme, or initiative on a population, especially on those who are vulnerable or underprivileged. In this study, we considered the Maternal Mortality Ratio (MMR) and Infant Mortality Ratio (IMR) as health impacts.

4.5.1 Maternal Mortality Ratio (MMR)[51]

Maternal mortality, which reflects women's social and economic disadvantages, has been designated as a key concern in India's health strategy. The National Health Mission has made significant and planned investments to promote maternal health. In India, the MMR has dropped from 556 in 1990 to 174 in 2015, an average yearly reduction of 4.6 percent. The target for MMR was 109 per 1,000 live births by 2015. The SRS data clearly shows that all Indian states improved their MMR situation by significantly lowering

[48] Kulkarni et.al 2021
[49] Prusty and Kumar., 2014
[50] Yadav and Singh., 2004
[51] The Maternal Mortality Ratio (MMR) is defined as the number of maternal fatalities caused by pregnancy and childbirth problems per 100,000 live births within a certain period.

maternal fatalities (Table 4-3).

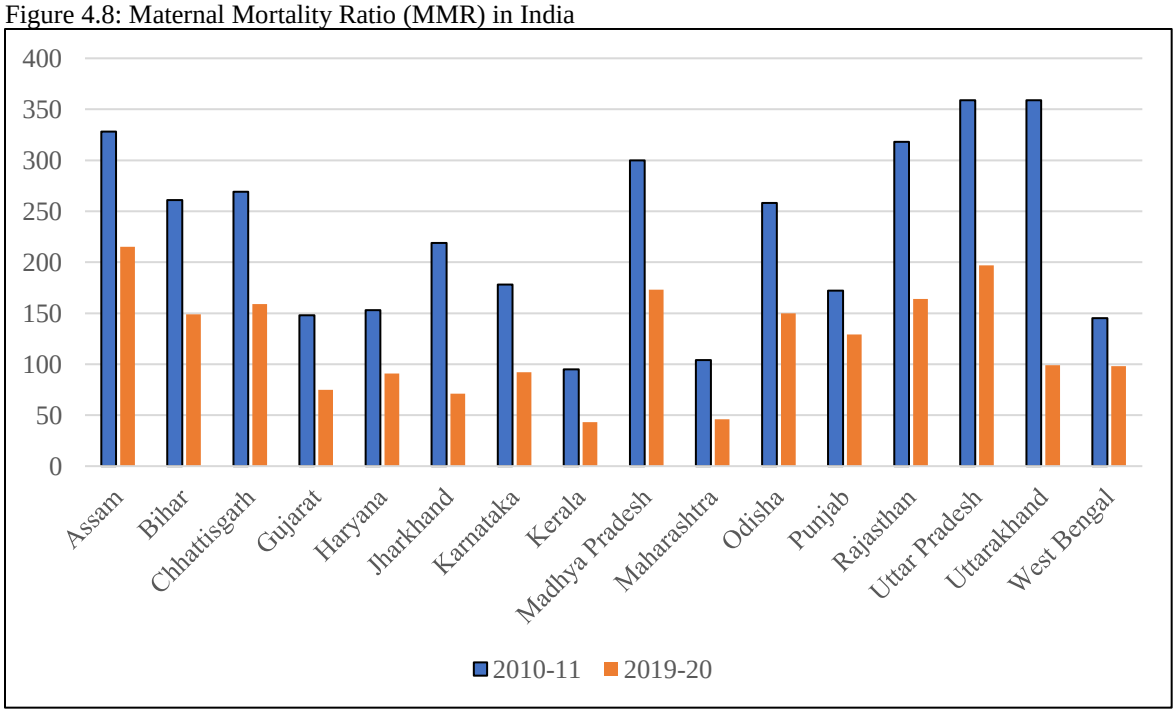
Table 4-3: Key health impact in mother and child healthcare in India

	MMR		IMR	
State	2010-11	2019-20	2010-11	2019-20
Assam	328	215	55	40
Bihar	261	149	44	29
Chhattisgarh	269	159	48	40
Guajrat	148	75	41	25
Haryana	153	91	44	27
Jammu & Kashmir	-	-	41	20
Jharkhand	219	71	39	27
Karnataka	178	92	35	21
Kerala	95	43	15	6
Madhya Pradesh	300	173	70	46
Maharashtra	104	46	25	17
Odisha	258	150	57	38
Punjab	172	129	30	19
Rajastan	318	164	52	35
Uttar Pradesh	359	197	57	41
Uttarakhand	359	99	43	27
West Bengal	145	98	32	20

Source: SRS, Office of the Registrar General, GoI

MMR has declined significantly in all states over the research period (Figure 4.8). MMR was lowest for Kerala (43) and Maharashtra (46) and highest for Assam (215) and UP (197). The Average Reduction Rate (ARR) from 2010-11 to 2019-20 was highest for

Figure 4.8: Maternal Mortality Ratio (MMR) in India



Uttarakhand (-72.4 percent) and Jharkhand (-67.6 percent) while it was lowest for Punjab (-25.0 percent) and Assam (-32.4 percent). We can detect large disparities in performance among Indian states even after the introduction of safe motherhood programmes. In India, the majority of maternal mortality is still linked to variables including nutrition, poverty, and social marginalisation, on which interventions have had little or no influence[52].

According to their findings, economic growth alone can cause changes in the MMR in India. They observed that MMR and PNSDP, TFR, and SC/ST populations had a strong relationship. Another study re-examined the causes of maternal mortality in India, using data from the SRS 2001-03, and concluded that direct obstetric factors account for over 80 percent of maternal fatalities in India. As a result, policymakers may employ these regions to achieve the MMR objective more effectively[53].

Despite the fact that India fell short of the MDG target, the country has made significant progress. This is due to four significant variables[54]. First, with the implementation of the NRHM, India has made a deliberate effort to enhance access to high-quality maternal health services. Since then, institutional delivery has grown from 38 percent to 79 percent. Second, state-subsidised demand-side financing programmes like the JSY and JSSK – which provides no-cost delivery, including C-sections, to all pregnant women giving birth in government hospitals – have minimised the traditional urban-rural divide in hospital births. In all, 75 percent of births in rural area are currently based on skilled attendance, compared to 89 percent of births in metropolitan area. "Third, India has

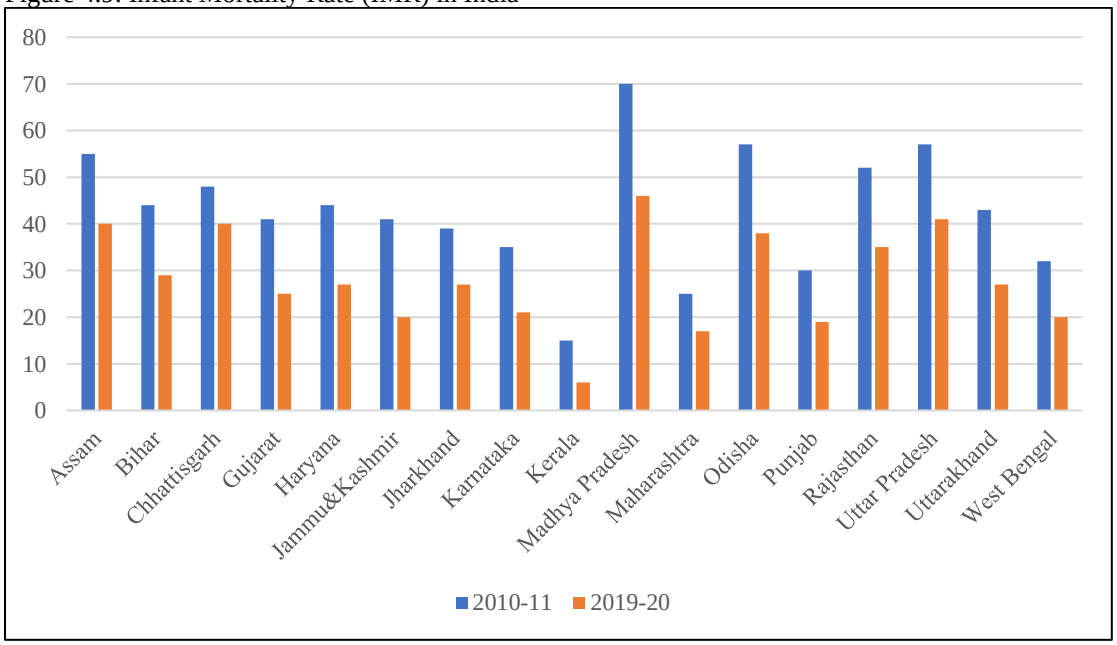
[52] William, et.al 2015.
[53] Montgomery, et.al 2014
[54] Poonam, 2018

placed a high priority on addressing the socioeconomic determinants of maternal health. India's women are more literate than ever before, with 68 percent able to read and write. They are also marrying later age, with only 27 percent of them marrying before the age of 18." Finally, the government has worked hard to foster effective cooperation between public and private healthcare providers. Due to initiatives like Pradhan Mantri Surakshit Matritva Abhiyan, women now have access to prenatal exams, and can monitor high-risk pregnancies.

4.5.2 Infant Mortality Rate (IMR)[55]

Efforts in India to lower newborn and child mortality rates are on the right track. India's infant mortality rate dropped from 89 in 1990 to 30 in 2019. MP (46), UP (41), Chhattisgarh (40), and Assam (40) had higher IMRs. Karnataka (21), West Bengal (20), J&K (20), Punjab (19), Maharashtra (17), and Kerala (6) had the lowest IMR (Table 4-3 and Figure 4.9).

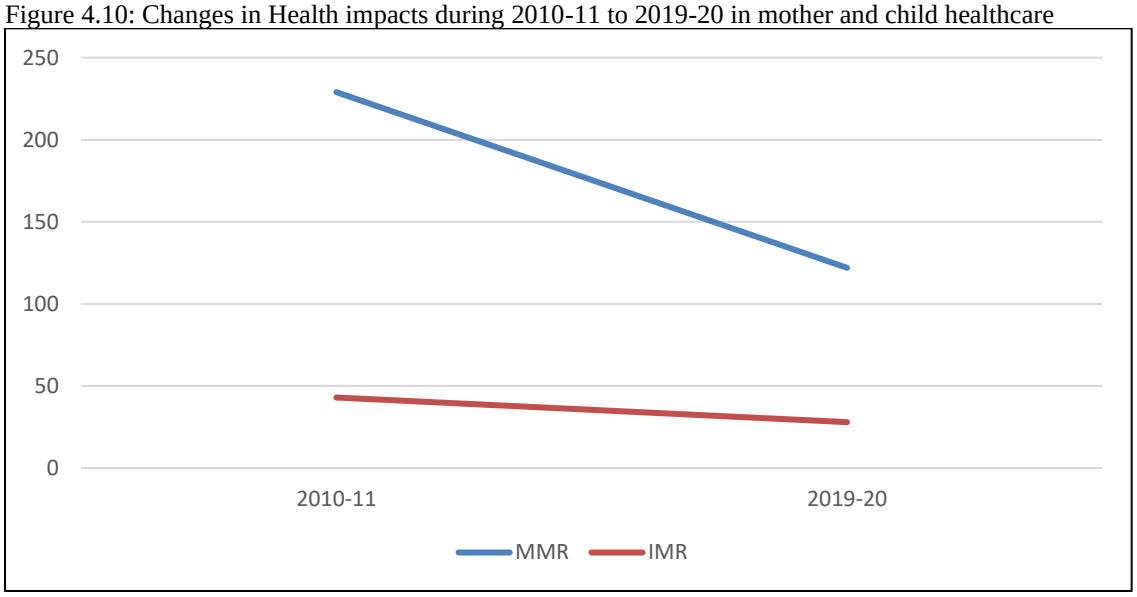
Figure 4.9: Infant Mortality Rate (IMR) in India



[55] The rate of the death of below one year age children per 1000 live births

Between 2010-11 (47) and 2019-20 (30) in India, the average reduction rate was 36.17 percent. All states reduced infant deaths significantly over this time period where Kerala (-60.0 percent), and J&K (-51.2 percent) had the highest reduction rates. The decline rate was lower in Chhattisgarh (-16.7 percent) and Assam (-27.3 percent). The MDG-4 objective for IMR was 27 by 2015, however, 16 states have yet to meet it, including MP, UP, Chattisgarh, Assam, Rajasthan, Bihar, and some north-eastern states. The average changes in MMR and IMR in the states taken into consideration for this study from 2010–11 to 2019–20 are shown in Figure 4.10. Compared to the IMR curve, the MMR curve is steeper. Thus, we can conclude that over the aforementioned time, maternal mortality rates significantly decreased in the majority of the states.

Figure 4.10: Changes in Health impacts during 2010-11 to 2019-20 in mother and child healthcare



4.6 Empirical Analysis

For finding out the effectiveness of NRHM and its constituent elements like JSY and JSSK on mother and child healthcare (on specific health outcomes, say, MMR and IMR), the “fixed and random effect model” is used. The Hausman test is used to ascertain

which model is more fit, in which the null hypothesis (H_0) is *the random effect is more appropriate*. Here we used the following variables for the empirical analysis (Table 4-4).

Table 4-4: Attributes of Variables

Name of Variables	Label of Variables	Units	Stationarity
MMR	Maternal Mortality Ratio	Ratio	Level (IPS[56]&LLC[57])
IMR	Infant Mortality Ratio	Ratio	Level (LLC)
LnNRHMExp	Total State NRHM Expenditure	Natural Log	Level (IPS&LLC)
LnTnFRUs	Total number of First Referral Units	Natural Log	Level (IPS&LLC)
LnASHAs	ASHA Workers in position	Natural Log	Level (IPS&LLC)
PWr3ANC	Pregnant Women received three or more Ante-Natal Care	Percentage	Level (IPS&LLC)
InsDeltrDel	Institutional Delivery to reported deliveries	Percentage	Level (IPS&LLC)
LnOoPE	OoPE during delivery in public health facilities	Natural Log	Level (IPS&LLC)
CIMMU	Child Immunisation	Percentage	Level (IPS&LLC)
FemLiteracy	Female Literacy	Percentage	IInd difference
LnPCNSDPatCP	Percapita Net State Domestic Product at Constant Price	Natural Log	Level (IPS&LLC)

Because all variables, with the exception of maternal mortality ratio (MMR) and female literacy rate (FemLiteracy), are stationary at their current levels, a correlation matrix is used to determine the relationship between these variables, particularly among independent variables, rather than the Pedroni cointegration test.If independent variables are correlated with each other by more than 0.80 (80 percent), any one of them may be dropped from the variables list. From the correlation matrix table (Table 4-5), it is found that the independent variables are not correlated with each other by more than 0.80 (80 percent), so there is no problem with serial correlation.

Table 4-5: Matrix of Correlation

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) MMR	1.00									
(2) IMR	0.81	1.00								
(3) LnNRHMExp	-0.02	0.04	1.00							
(4) LnTnFRUs	-0.29	-0.24	0.57	1.00						
(5) LnASHAs	0.17	0.24	0.73	0.35	1.00					
(6) PWr3ANC	-0.32	-0.29	0.01	0.23	-0.01	1.00				

[56] Im-Pesaran-Shin unit-root test

[57] Levin-Lin-Chu unit-root test

(7) InsDeltrDel	-0.48	-0.34	0.06	0.13	-0.21	0.22	1.00			
(8) LnOoPE	-0.28	-0.34	0.35	0.17	0.02	0.21	0.38	1.00		
(9) FemLiteracy	-0.64	-0.75	-0.16	0.14	-0.43	0.40	0.43	0.45	1.00	
(10)LnPCNSDPatCP	-0.65	-0.68	-0.01	0.16	-0.30	0.46	0.45	0.41	0.66	1.00

Source: Author's calculation based on Table 4.1 to 4.13

After applying the fixed effect and random effect models separately and using the Hausman test to determine which one is the best fit, it is determined that the random effect model is the best fit. Breusch and Pagan Lagrangian multiplier test confirms the random effect ($p<0.01$) and evidence of significant difference across states.

4.6.1 Determinants of Maternal Mortality Ratio (MMR) in India

The result of the random effect model is given below (Table 4-6)

Table 4-6: Results of Random Effect Model (Dependent Variable-MMR)

MMR	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
LnNRHMExp	-10.61	7.23	-1.47	0.14	-24.78	3.56	
LnTnFRUs	-11.61	5.70	-2.04	0.04	-22.79	-0.43	**
LnASHAs	-1.95	5.76	-0.34	0.74	-13.23	9.33	
PWr3ANC	0.72	0.20	3.64	0.00	0.33	1.11	***
InsDeltrDel	-0.33	0.19	-1.76	0.08	-0.69	0.04	*
LnOoPE	4.11	2.07	1.99	0.05	0.06	8.16	**
FemLiteracy	-9.30	1.09	-8.56	0.00	-11.43	-7.17	***
LnPCNSDPatCP	-18.45	8.36	-2.21	0.03	-34.84	-2.05	**
Constant	1119.93	64.91	17.25	0.00	992.71	1247.15	***

Mean dependent var	203.452	SD dependent var	90.963
Overall r-squared	0.476	Number of obs	208
Chi-square	496.499	Prob > chi2	0.000
R-squared within	0.729	R-squared between	0.427

**** p<.01, ** p<.05, * p<.1*

The result of the random effect model says that there is negative and significant relation between First Referral Units (FRUs), Institutional Delivery, Female literacy, and PNSDP on Maternal Mortality Ratio (MMR). With one unit increase in female literacy and institutional delivery, the MMR can be reduced to 9.30 and 0.33 units respectively while one unit increase in number of first referral units and PNSDP can reduce MMR by 0.11 and 0.18 units respectively according to this model. Increasing Institutional delivery is one of the main proximal objectives of NRHM and its components to reduce MMR. Female

Literacy is also plays vital role in India in reducing MMR. Similar to this, the model's findings indicate that there is a statistically significant positive link between out-of-pocket payments for MMR and the number of antenatal visits a pregnant woman received—three or more. It indicates that if prenatal care for pregnant women is increased by one unit, the MMR will rise by 0.72 units, and if OoPE rises by one unit, the MMR will rise by 0.04 units. This has conflicting and abnormal.

Thus the model can be written as:

$MMR_{it} = 1120 – 0.11TnFRUs_{it} + 0.72PWr3ANC_{it} + 0.04OoPE_{it}$

$– 9.30FemLiteracy_{it} – 0.18PCNSDPatCP_{it}$

However, the model is only explaining 48 percent of the variability in MMR due to the independent variables in question.

4.6.2 Determinants of Infant Mortality Ratio (IMR) in India

In the case of the infant mortality ratio, the random effect model says that there is a significant negative relation between IMR and the NRHM State Expenditure, Child Immunisation, female literacy and PNSDP (Table 4-7).

Table 4-7: Results of Random Effect Model (Dependent Variable-IMR)

IMR	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
LnNRHMExp	-4.026	1.08	-3.75	0.00	-6.13	-1.92	***
LnFRUs	0.412	0.86	0.48	0.63	-1.30	2.09	
LnASHAs	0.064	0.87	0.07	0.94	-1.63	1.76	
PWr3ANC	0.079	0.03	2.65	0.01	0.02	0.14	***
InsDeltrDel	0.049	0.03	1.75	0.10	-0.01	0.10	*
LnOoPE	-0.201	0.31	-0.65	0.52	-0.81	0.41	
CIMMU	-0.260	0.18	-3.83	0.03	-1.71	0.03	**
FemLiteracy	-0.922	0.16	-5.89	0.00	-1.23	-0.615	***
LnPCNSDPatCP	-5.948	1.24	-4.79	0.00	-8.38	-3.52	***
Constant	183.42	9.65	19.01	0.00	164.52	202.33	***

Mean dependent var	40.505	SD dependent var	14.411
Overall r-squared	0.605	Number of obs	208
Chi-square	589.677	Prob > chi2	0.000
R-squared within	0.756	R-squared between	0.551

**** p<.01, ** p<.05, * p<.1*

However, the relationship between Antenatal care with IMR is statistically significant but positive. The empirical study result says that a one-unit increase in the state NRHM expenditure can reduce IMR by 0.04 units. A one-unit increase in child immunisation and female literacy can minimise infant mortality by 0.26 and 0.92 units respectively. and one unit increase in per capita net state domestic product can reduce IMR by 0.05 units.

Accordingly, the model can be written as:

$IMR_{it} = 183 - 0.04NRHMExp + 0.08\ PWr3ANC - 0.26CIMMU - 0.92FemLiteracy_{it\ it} - 0.05PCNSDP_{it}$

However, the model is predicting 60.5 percent of the variability in IMR due to the independent variables we have considered.

4.6.3 Discussion

The study found an increasing trend in the case of Per capita Government Health Expenditure in all states from 2010-11 to 2019-20. Chhattisgarh, Haryana, Kerala, Odisha and West Bengal improved their health accessibility by reducing the average population covered by SCs, PHCs and CHCs. The percentage of Antenatal Care increased in most of the states except Goa, Mizoram, Nagaland, Odisha, Punjab, Rajasthan, Sikkim Uttarakhand and UP. Institutional delivery in public health institutions has increased in all states except Goa, Karnataka and Rajasthan. OoPE still exists in public health institutions during delivery. In Kerala, Goa, Gujarat, Maharashtra, Meghalaya, Nagaland, Telangana, and West Bengal OoPE is decreased. Post-Partum checkups (48 hours to 14 days) has increased in all states except Madhya Pradesh, Rajasthan, Tamilnadu and Mizoram. Children vaccination (12-23 months) increased in all states except Goa, Manipur, Sikkim and

Kerala. Maternal Mortality is decreased in all states between 2010-11 and 2019-20. IMR decreased in all states except Arunachal Pradesh. Under Five Mortality is decreased in all the states. JSY registration has increased in all states except Goa, Delhi, and Gujarat between 2010-11 and 2016-17. States not achieved MMR target in compliance with MDG-5 (109 or less by 2015) are Bihar, Madhya Pradesh, Odisha, Rajasthan, Uttar Pradesh, Assam, Chhattisgarh, Jharkhand and Uttarakhand. Kerala, Goa, Tamil Nadu, Manipur, Arunachal Pradesh and Maharashtra achieved the target of MDG-4 IMR (26.7 or less by 2015). Kerala, Goa, Manipur, Tamil Nadu, Maharashtra, Karnataka, Sikkim, West Bengal, Arunachal Pradesh, Punjab, Tripura, Nagaland, Himachal Pradesh and Jammu & Kashmir achieved the MDG-4 target of U5MR (38 or less by 2015)within the time frame. There exist interstate variations in the performance of maternal and child healthcare mainly because of demographic, educational, social, cultural, geographical and economic factors. NRHM and its constituents like JSY/JSSK were primarily to eliminate Out-of-Pocket Expenditure (OoPE) in maternal and child healthcare. However, research shows that they failed to eliminate OoPE in maternity and child healthcare across the country. Even after the establishment of JSSK, out-of-pocket expenditure in government health facilities has grown rather than decreased. Ultrasound scans, pharmaceuticals, food and consumables, and transportation are the key areas of spending. The mission's failure is due to a lack of infrastructure, human resources, proper governance, implementation lags, budget constraints, and inadequate services. Another proximate goal of the NRHM and its constituents like JSY and JSSK was to enhance institutional delivery in public health facilities, which has risen significantly in all states since 2010-11. The number of institutional delivery has grown dramatically since the implementation of these schemes.

This is due to increased public knowledge, the elimination of cost for normal births, caesarean sections, and the transit of a woman from her house to a health care facility, primary health care to tertiary health care, and hospital to home. Among the determinants of MMR and IMR, institutional delivery, percentage of 3 or more ANC, OoPE, female literacy and per capita net state domestic products are statistically significant. Among these the percentage of ANC and OoPE are positively associated with MMR and IMR. This is odd and contradictory. This is mainly because of supply side factors, which means government health facilities lack human and physical infrastructure, and the quality of the service provided is substandard and has less impact. In rural India, most people are still depending on government health facilities for mother and child health care. Other studies also support this. Marie Ng et al. (2014) couldn't find a link between JSY and maternal mortality in MP. The program's high institutional delivery rate hasn't reduced mortality. Supply-side restrictions may explain the lack of impact. JSY will have little impact if the supply side can't provide quality care[58]. In their study, Singh, L., et al. (2019), found that a sizeable percentage of women in India do not obtain quality ANC; just 23.5% of women obtained adequate and quality ANC. Regarding the accessibility and supply of high-quality ANC among women, stark socio-economic and geographical disparities were visible. Women in the youngest age bracket or those from the poorest wealth quintile, as well as those who are illiterate and live in the central and eastern parts of the nation, did not receive adequate ANC[59]. In this study, in states like Rajasthan, Uttarakhand, Odisha, Punjab, Haryana, and Madhya Pradesh, the percentage of women receiving antenatal care

[58] Marie Ng et al 2014
[59] Singh, L et al 2019

decreased in 2019–20 when compared to 2010–11. Moreover, in rural areas, pregnant women frequently visit hospitals for prenatal care and usually have pregnancy-related complications. Most of these cases also lead to maternal or infant death due to quality and supply-related constraints in government hospitals. Frequent visits to hospitals also cause an increase in out-of-pocket expenses (OoPE). The quality of prenatal care and its linkage with MMR and IMR at the local, state, and national levels in India, needs further research.

4.6.4 Conclusion

To conclude we can say that, NRHM and its constituents like JSY and JSSK policy articulations and information distribution are present in all states, resulting in increased understanding of pregnant women's and sick new born's entitlements. For JSY/JSSK registered pregnant women, almost all entitlements are being received, although out-of-pocket expenses for medicines, diagnostics, and referral transportation for pick-up and drop-off remain[60]. After the program's implementation, maternal and child health indicators such as prenatal care, postnatal care, institutional delivery, vaccination, and many have moved in the right direction.

ASHA workers, who are one of the most important components of the National Health Mission, excel in all states when it comes to improving access to maternity, neonatal, and child healthcare. However, the goal of entirely eliminating out-of-pocket expenditure remains unachieved. Providing continuous access to essential medicines and diagnostic services continues to be a difficulty, and it is an area where states should focus if the aim of Universal Health Coverage is to be met. Human resources are an essential component of every healthcare system. In the majority of states, sanctioned postings do not

[60] 13th Common Review Mission (CRM), NHM., 2019

meet IPHS standards, resulting in severe shortages or unreasonable deployment. Deficiencies in service delivery reflect the effects of shortages. To summarize, policies alone are ineffective in improving maternal and child health. To get better results from these policies, we must also improve the socioeconomic conditions of people in society, particularly women.

4.7 Mother and Child healthcare in Kerala

This section of the chapter examines the status of key health indicators relevant to maternal and neonatal care in Kerala. It aims:

1. To understand the state of mother and child healthcare in Kerala and the variables linked with IMR and MMR.
2. To determine if there is a supply-demand mismatch in Malappuram's public health facilities for delivery care and examine the district-wise development level of public health infrastructure.

Promotion and prevention are the primary objectives of maternity and infant health care (MCH). They enable the early identification of infants and pregnant mothers with a high risk of morbidity and death. The health of the mother and child is an essential aspect of community health, particularly in poor nations. Depending on the needs of the community, maternal and child health have evolved in several ways over time.

4.8 An inter-district analysis of Kerala's key Health Infrastructure

In many areas, Kerala's health standards are comparable to those of advanced economies. The state has decreased neonatal and maternal mortality rates and increased life expectancy. As land reforms were implemented, the rural poor's standard of living improved. Kerala, an Indian state, has demonstrated that low levels of per capita income,

industrialisation, and agricultural production do not have to impede the growth of social sectors. Literacy rates are almost equally split between men and women, and healthcare statistics are on pace with those of countries with more advanced economies.

The concept of health infrastructure is an important subject to emphasise, especially when making improvements to medical and healthcare institutions. The idea of healthcare infrastructure includes the people, places, and buildings required to provide best healthcare. The health care infrastructure is only useful if current facilities are kept in good shape and new technology is implemented to give high-quality treatment to patients and staff.

Three fundamental indicators, namely (i) Promotive Health Infrastructure, (ii) Preventive Health Infrastructure, and (iii) Curative Health Infrastructure, are said to constitute health infrastructure.

i. Promotive Health Infrastructure: This element is meant to shed light on the significance of different social awareness campaigns and nutrition programmes launched to offer adequate nutrition and health services to rural residents, particularly children and women. Additionally, the primary goal of these programmes is to increase public knowledge of various diseases and methods for preventing them.

ii. Preventive health infrastructure: preventing illness is always preferable to treating it. However, in order for prevention to be effective, certain health-friendly factors must be met. For example, safe drinking water availability, electricity, toilet facilities available at home, etc.

iii. Curative Health Infrastructure: If illnesses can be prevented from impairing a person's immunity by enacting some preventive actions, then the curative health

system's importance is seriously reduced. However, the demand for curative health care is at its peak in underdeveloped nations due to the relatively weak infrastructure for promotion and prevention. It is related to the accessibility and availability of medical institutions at all levels.

Maternal health is an essential part of any country's growth in terms of enhancing equity and lowering poverty. Maternal healthcare has been improved, and maternal mortality has reduced significantly since the implementation of the NRHM. A good number of women die in India due to complications of pregnancy, delivery, and the post-partum period. Maternal and child health (MCH) services are generally preventive and promotional in nature. They facilitate the early diagnosis of pregnant women and neonates at high risk of morbidity and mortality. The health of the mother and child is an essential facet of community health, particularly in impoverished countries. Maternal and child health have changed over time in a variety of ways depending on the needs of the community.

We have already discussed in the third chapter that Kerala ranks highest among Indian states in the majority of the health metrics. Kerala has the lowest MMR, IMR, U5MR, and TFR when compared to other Indian states with the highest life expectancy, sex ratio, and female literacy. This "health development" is generally attributed to cross-sectoral factors such as increased education, political awareness, the road network and transportation, buildings, and social movements.

4.8.1 Inter-district analysis of healthcare infrastructure in Kerala

In this part, we analysed Kerala's healthcare infrastructure facilities according to district. To identify the magnitude of variation, Coefficient of Variation (CV) is calculated.

Coefficient of Variation (CV) = Standard deviation/Mean × 100

Then, various key health indicator ratios are computed to compare the district's health infrastructure.

For each particular district, the deprivation and development indices of the health infrastructure were created using the procedures described below:

$$Deprivation\ index, d_{ij} = \frac{X_{ij} - Min_i}{Max_i - Min_i} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where, d_{ij} is the i^{th} variable's (health infrastructure indicator) deprivation index for the j^{th} area; Maxi and Mini stand for the i^{th} variable's maximum and minimum values, respectively; Its exact value for the j^{th} area is represented by X^{ij}. Equation (1) is used to calculate the development index (D) of the i^{th} variable for the j^{th} region in terms of the absence of deprivation. It may be said in the following way:

$D_{ij} = 1 - d_{ij}$……..(2)

Additionally, the average deprivation index and the average development index were computed.

Average Deprivation Index = $\sum_{i=1}^{n} \frac{d_{ij}}{n}$ ……(3)

Average Development Index = $\sum_{i=1}^{n} \frac{D_{ij}}{n}$ ..……...(4)

Deprivation and development indices, however, have values that range from zero to one. Since they show a high level of development, a low deprivation index score or a high development index are favoured.

An inter-district comparison of the accessibility of health infrastructure was conducted in light of the objective of identifying if there any supply-demand gap in the utilisation of mother and child healthcare in the Malappuram district of Kerala by determining the

Coefficient of Variation (CV) for the nine variables as indicated in Table 4-8. In Kerala, there are 6694 modern medical institutes under DHS, with Malappuram (714) having the most and Wayanad (245) having the fewest. The coefficient of variation is 28 percent. Kerala has 98 delivery points, ranging from three in Kasaragod to twelve in Thiruvananthapuram. The Coefficient of Variation is 32.1 percent. Total beds available in modern medical facilities under DHS in Kerala were 38085, with the most beds available in Thiruvananthapuram (4914) and the fewest beds available in Kasaragod (1087). Coefficient of variation is 42 percent. In Kerala, there were 6016 doctors in modern medical institutions under DHS, Kerala. Thiruvananthapuram has the highest (638), while Wayanad has the lowest (223). There were 66 ultrasound facilities across Kerala, ranging from one in Kasaragod to eight in Kollam, with a coefficient of variation of 44.7 percent.

Table 4-8: District Wise Availability of Health Infrastructure in Kerala 2019-20

Districts	Modern medins (1)	Delivery points (2)	Beds (3)	Doctors (4)	Ultrasound in del points (5)	Blood transfusion and storage in dp (6)	New born care units in dp (7)	Blood banks in dp (8)	Total Ambulance in dp (9)
Alappuzha	456	7	3424	456	5	5	9	3	21
Ernakulam	525	9	4518	558	6	7	8	4	33
Idukki	370	4	1120	259	2	1	4	1	23
Kannur	526	7	2966	517	4	6	5	7	33
Kasaragod	304	3	1087	265	1	2	2	2	8
Kollam	509	8	2290	409	8	3	7	4	34
Kottayam	417	7	2823	420	2	5	3	2	25
Kozhikode	494	8	2816	429	5	7	5	6	40
Malappuram	714	8	2546	563	6	6	12	3	17
Palakkad	617	7	2819	453	7	4	5	3	26
Pathanamthitta	325	5	1960	334	5	4	3	2	44
Trivandrum	603	12	4914	638	4	8	10	7	60
Thrissur	589	8	3435	492	7	8	8	2	44
Wayanad	245	5	1367	223	4	3	4	2	25
Kerala	6694	98	38085	6016	66	69	85	48	433
Min	245	3	1087	223	1	1	2	1	8
Max	714	12	4914	638	8	8	12	7	60
Mean	478.1	7	2720.4	429.7	4.7	4.9	6.1	3.4	30.9
SD	133.7	2.3	1143.3	123.7	2.1	2.2	3.0	1.9	13.2
CV	28.0	32.1	42.0	28.8	44.7	44.9	49.2	55.9	42.7

Source : Directorate of Health Services, Kerala (2019-20)

The total number of blood transfusions and storage facilities in Kerala was 69, with Thiruvananthapuram and Thrissur (8 each) having the largest number and Idukki having the lowest (1). The coefficient of variation is 44.9 percent. The DHS operates 85 new born care units in Kerala, ranging from two in Kasaragod to twelve in Malappuram, with a coefficient of variation of 49.2 percent. There were 48 blood banks in Kerala, with the largest concentrations in Thiruvananthapuram and Kannur (7) and the lowest in Idukki (1). There is a 55.9 percent coefficient of variation. There were 433 ambulances overall in government hospitals, with the majority (60) located in Thiruvananthapuram and the least (10) in Kasaragod (8). 42.7 percent makes up the coefficient of variation. We may infer that there is inter-district inequality in Kerala's health infrastructure because the majority of the variables surpass the tolerable standard of a 30 percent coefficient of variation.

However, the absolute figure has little relevance until we examine it in terms of the headcount ratio. We utilised a ratio, the number of pregnant women to infrastructure in public facilities, to understand district-level imbalances and the supply-demand gap. In order to analyse the district-level disparities in healthcare infrastructure for maternal and newborn care, we used the ratio of a specific public health facility, such as delivery points, beds, doctors, ultrasound machines, blood transfusion and storage units, newborn care units, blood banks, and ambulances, to the number of pregnant women registered for ANC (Table 4-9). From this, we may determine if there is an excess of supply or demand for maternal care under public health facility.

Table 4-9: District-wise pregnant women registered for ANC-public facility ratio in Malappuram

Districts	PW/Del.point ratio (1)	PW/Bed ratio (2)	PW/Doctor ratio (3)	PW/ Ultrsnd ratio (4)	PW/Bloodtrans ratio (5)	PW/NBCU ratio (6)	PW/Bloodbank ratio (7)	PW/Amb. ratio (8)
Alappuzha	3381	7	5190	4733	4733	2630	7889	1127
Ernakulam	4175	8	6735	6263	5368	4697	9395	1139
Idukki	3284	12	5072	6568	13136	3284	13136	571
Kannur	5761	14	7800	10081	6721	8065	5761	1222
Kasaragod	8528	24	9654	25583	12792	12792	12792	3198
Kollam	3987	14	7799	3987	10633	4557	7975	938
Kottayam	2862	7	4770	10018	4007	6679	10018	801
Kozhikode	6163	18	11493	9861	7044	9861	8218	1233
Malappuram	12593	40	17894	16791	16791	8396	33582	5926
Palakkad	6156	15	9513	6156	10773	8619	14364	1657
Pathanamthitta	2412	6	3610	2412	3015	4019	6029	274
Trivandrum	6226	15	11711	18679	9339	7472	10674	1245
Thrissur	5184	12	8428	5924	5184	5184	20734	942
Wayanad	2803	10	6285	3504	4672	3504	7008	561
Kerala	5384	14	8770	7994	7647	6207	10992	1219

Source: Authors calculation based on DHS, Kerala 2019-20

Note: 1. Pregnant Women (PW) - Delivery point ratio; 2. PW -Bed ratio; 3. PW - Doctor ratio; 4. PW - Ultrasounds in delivery points ratio; 5. PW - Blood transfusion and storage ratio; 6. PW - Newborn Care units ratio; 7. PW - Blood banks in public facilities ratio; 8. PW - Total ambulances in public facility ratio.

The ratio of pregnant women registered to delivery points is lower in Pathanamthitta (1:2412) but higher in Malappuram; 12593 pregnant women were relying on one delivery point (1:12593). Pregnant women- Bed ratio was again in a good position in Pathanamthitta (1:6) and worse in Malappuram (1:40). In case of the pregnant women-doctor ratio we can see that the situation was better for Pathanamthitta (1:3610) and worse for Malappuram (1:17894). If we see the ratio of pregnant women-ultrasound facility in government health institutions, it was better in Pathanamthitta (1: 2412) and worse for Kasaragod (1:25583). For Malappuram also it was overcrowded (1:16791). In case of pregnant women-blood transfusion and storage units in public facility ratio again it was better for Pathanamthitta (1:3015) and worse for Malappuram (1:16791). Ratio of pregnant

women-new-born care units, the proportion was best for Alappuzha (1:2630) and worse for Kasaragod (1:12792). If we analyse based on pregnant women-number of blood bank number ratio, the situation was better for Kannur (1:5761) and worse for Malappuram (1:33582). The ratio of the number of pregnant women-ambulances in public facility, comparatively it was best in Pathanamthitta (1:274) and worse in Malappuram (1:5926). Based on the analysis, we can say that infrastructure in public health facility is not proportionately distributed among districts in Kerala and there is wide discrepancy. The situation of Malappuram is one of the worst in almost all indicators with huge supply-demand gap.

Deprivation and development indices were created and displayed in Tables 4-10 and 4-11, respectively, to help identify the disparities in the overall performance of all districts with regard to the availability of health infrastructure. Further, table 4-11 presents the classification of the districts according to the level of health infrastructure development. The score of deprivation index and development index clearly exhibits that average deprivation index is least (0.02) and development index is highest (0.98) for Pathanamthitta and it is just opposite in the case of Malappuram. Average deprivation index for Malappuram is 0.90 and development index is 0.10.

Table 4-10: District wise deprivation index for health infrastructure in Kerala, 2019-20

Districts	Del.point (1)	Hos. Bed (2)	Doctor (3)	Ultrasounds (4)	Blood transfus. (5)	NBCU (6)	Blood bank (7)	Ambulances (8)	Average Deprivation Index
Alappuzha	0.10	0.03	0.11	0.10	0.12	0.00	0.08	0.15	0.09
Ernakulam	0.17	0.06	0.22	0.17	0.17	0.20	0.13	0.15	0.16
Idukki	0.09	0.18	0.10	0.18	0.73	0.06	0.27	0.05	0.21
Kannur	0.33	0.24	0.29	0.33	0.27	0.53	0.00	0.17	0.27
Kasaragod	0.60	0.53	0.42	1.00	0.71	1.00	0.25	0.52	0.63
Kollam	0.15	0.24	0.29	0.07	0.55	0.19	0.08	0.12	0.21
Kottayam	0.04	0.03	0.08	0.33	0.07	0.40	0.15	0.09	0.15

Kozhikode	0.37	0.35	0.55	0.32	0.29	0.71	0.09	0.17	0.36
Malappuram	1.00	1.00	1.00	0.62	1.00	0.57	1.00	1.00	0.90
Palakkad	0.37	0.26	0.41	0.16	0.56	0.59	0.31	0.24	0.36
Pathanamthitta	0.00	0.00	0.00	0.00	0.00	0.14	0.01	0.00	0.02
Trivandrum	0.37	0.26	0.57	0.70	0.46	0.48	0.18	0.17	0.40
Thrissur	0.27	0.18	0.34	0.15	0.16	0.25	0.54	0.12	0.25
Wayanad	0.04	0.12	0.19	0.05	0.12	0.09	0.04	0.05	0.09

Source: Author's calculation based on the data in table 2

Note: 1. Number of delivery points; 2. Number of beds in modern medical institutions under DHS; 3. Total number of doctors available in modern medical institutions under DHS; 4. Ultrasounds in delivery points; 5. Blood Transfusion and Storage; 6. New-born Care Units; 7. Blood Banks in Public Facility; 8. Total number of Ambulance in Government Hospitals.

In case of delivery point, hospital beds, doctor, Blood transfusion and storage, Blood bank and Ambulances to pregnant women ratio district Malappuram is the most deprived and least developed one. The development index for Malappuram is 0.10 only. Kasaragod is another district which is lagging. Its deprivation and development indices are 0.63 and 0.37 respectively. From these two indices we can understand that the development in terms of public health infrastructure pertaining to mother and child healthcare is uneven in Kerala.

Table 4-11: District wise development index for health infrastructure in Kerala, 2019-20

Districts	Del.point (1)	Hos. Bed (2)	Doctor (3)	Ultrasounds (4)	Blood transf. (5)	NBCU (6)	Blood bank (7)	Ambulances (8)	Avge. Devp. Index
Alappuzha	0.9	0.97	0.89	0.9	0.88	1	0.92	0.85	0.91
Ernakulam	0.83	0.94	0.78	0.83	0.83	0.8	0.87	0.85	0.84
Idukki	0.91	0.82	0.9	0.82	0.27	0.94	0.73	0.95	0.79
Kannur	0.67	0.76	0.71	0.67	0.73	0.47	1	0.83	0.73
Kasaragod	0.4	0.47	0.58	0	0.29	0	0.75	0.48	0.37
Kollam	0.85	0.76	0.71	0.93	0.45	0.81	0.92	0.88	0.79
Kottayam	0.96	0.97	0.92	0.67	0.93	0.6	0.85	0.91	0.85
Kozhikode	0.63	0.65	0.45	0.68	0.71	0.29	0.91	0.83	0.64
Malappuram	0	0	0	0.38	0	0.43	0	0	0.10
Palakkad	0.63	0.74	0.59	0.84	0.44	0.41	0.69	0.76	0.64
Pathanamthitta	1	1	1	1	1	0.86	0.99	1	0.98
Trivandrum	0.63	0.74	0.43	0.3	0.54	0.52	0.82	0.83	0.60
Thrissur	0.73	0.82	0.66	0.85	0.84	0.75	0.46	0.88	0.75
Wayanad	0.96	0.88	0.81	0.95	0.88	0.91	0.96	0.95	0.91

Source: Author's calculation based on the data in table 3

Based on deprivation and development we classified the districts in three way, the development level high, moderate, and poor (Table 4-12). Malappuram and Kasaragod come under poor development level category where Thiruvananthapuram under moderate development category and all other districts in developed category.

Table 4-12: Classification of districts as per the development of Health Infrastructure

Districts	Development Level	Average deprivation index	Average development index
Pathanamthitta, Alappuzha, Wayanad, Kottayam, Ernakulam, Idukki, Kollam,Thrissur, Kannur, Kozhikode, Palakkad	High	<0.40	>0.60
Trivandrum	Moderate	0.40 – 0.60	
Kasaragod and Malappuram	Poor	>0.60	<0.40

Source: Table 4 and 5

4.8.2 Inter-district analysis of key health outcomes in Kerala

If we analyse important health effects and outcomes in Kerala with respect to mother and child healthcare, we can find that Mothers who consumed IFA (full course) was highest in Kasaragod (84.8%) where it was lowest in Kottayam (46.6%). In Malappuram it was 71.9 percent more than the state (68.4%) and national (26%) average (Table 4-13).

Table 4-13: Inter-district analysis of mother and childcare in Kerala, 2019-20

Districts	%IFA 180 > (1)	% TT2 Inject. (2)	%ANC 4 plus (3)	% Del. at Public Inst.(4)	%PNC for mother within 2 days (5)	Children fully immunised% (6)	IMR (7)	MMR (8)
Alappuzha	52.4	84.5	66.7	53.9	89.2	95	8	25
Ernakulam	69.2	93.9	72.8	22.5	96.1	95	3	28
Idukki	64.2	94.0	69.8	39.2	94.0	97	8	57
Kannur	61.6	97.1	74.3	23.2	93.4	92	5	14
Kasaragod	84.8	98.8	94.3	26	95.0	88	9	55
Kollam	82.0	97.9	80.0	39.8	91.4	90	7	40
Kottayam	46.6	79.3	49.6	39.6	85.0	95	4	53
Kozhikode	77.1	95.7	91.4	43.1	91.0	87	4	25
Malappuram	71.9	98.5	91.1	19.3	96.9	83	5	26
Palakkad	61.9	85.6	82.9	25.7	97.5	90	6	36
Pathanamthitta	60.8	92.3	80.8	30.6	95.2	98	4	7
Trivandrum	58.2	86.6	51.7	52	86.2	95	6	29
Thrissur	71.4	94.6	82.2	28.4	95.2	93	4	14
Wayanad	76.9	96.9	95.7	37.2	95.9	96	7	48
Kerala	68.4	93.4	79.4	31.8	93.3	90	5	29

India	26.0	92.0	58.1	61.9	78.0	84	28	103

Source: DHS, Kerala 2019-20 & NFHS-5 (2019-21)

In case of Mothers who had at least two TT injection during pregnancy, it was highest for Kasaragod (98.8 %) and Malappuram (98.5 %) but lowest in Kottayam (79.3). state and national averages are 93.4 and 92 percent respectively. Mothers who had more than four antenatal care visits (%), again Kottayam was in bottom side (49.6%) and Wayanad on the upper side (95.7%). In Malappuram it was 91.1 percent which was higher than state (79.4%) and national (58.1%) averages. If we analyse the health inputs based on the percentage of delivery at public health institutions in Kerala, it was least in Malappuram (19.3%) and highest in Alappuzha (53.9%). The state and national averages were 31.8 and 61.9 precents. This indicator is specifically connected with government health facility which is already proven least developed, highly deprived and a subject of high population pressure in Malappuram. If we analyse the healthcare based on the percentage of mothers who received postnatal care within 2 days of delivery, it is high in Palakkad (97.5%) and Malappuram (96.9%) where lower in Kottayam (85%) and Thiruvananthapuram (86.2%). The state and national average was 93.3 and 78 percentage. Malappuram is lagging in case of children's vaccinations. It was least in Malappuram (83%) and less than the state (90%) and national (84%) averages. While it was highest in Pathanamthitta (98%). If we analyse the health outcome based on IMR and MMR, the IMR was lower in Ernakulam (3) and high in Kasaragod (9). In Malappuram it was five (5) which was equivalent to state average and less than national (28) average. In case of MMR, it was lowest in Pathanamthitta and highest in Idukki (57). It was 26 for Malappuram which was near to state's ratio (29) but less than national ratio (103).

4.8.3 Concentration of Service Utilisation Based on Income

To identify the inequality in service utilization like antenatal care and delivery in government health facility, OoPE incurred during delivery, financial assistance received for delivery, and health insurance status, the concentration index was employed. "The Concentration Index (C) curve illustrates the cumulative percentage of the health outcome variable (y-axis) for the cumulative percentage of the sample population by socioeconomic status (x-axis)". These curves may be used to determine whether there is socioeconomic disparity in the outcome variable. When the curve is above the line of equality, it shows how the outcome variable is disproportionately concentrated among the poor, and when it is below the line of equality, it shows how the outcome variable is disproportionately concentrated among the rich. "The concentration index has a value ranging from -1 to +1, with a value of 0 (Zero) representing no socioeconomic disparity. A positive C value represents pro-rich inequality and vice versa. The C value quantifies the degree of socioeconomic disparity. The bigger the absolute value, the more inequities there are.

The following equation can be used to represent, C:

$$C = \frac{2}{\mu} COV\ (y_i, R_i)$$

Where, C is the concentration index,

y_i, - is the outcome variable index,

R_i - is the fractional rank of person 'i' in the distribution of socioeconomic position,

μ - is the mean of the outcome variable of the sample, and

COV - signifies covariance."

For the analysis NFHS-5 (Demographic and Health Surveys) data was used.

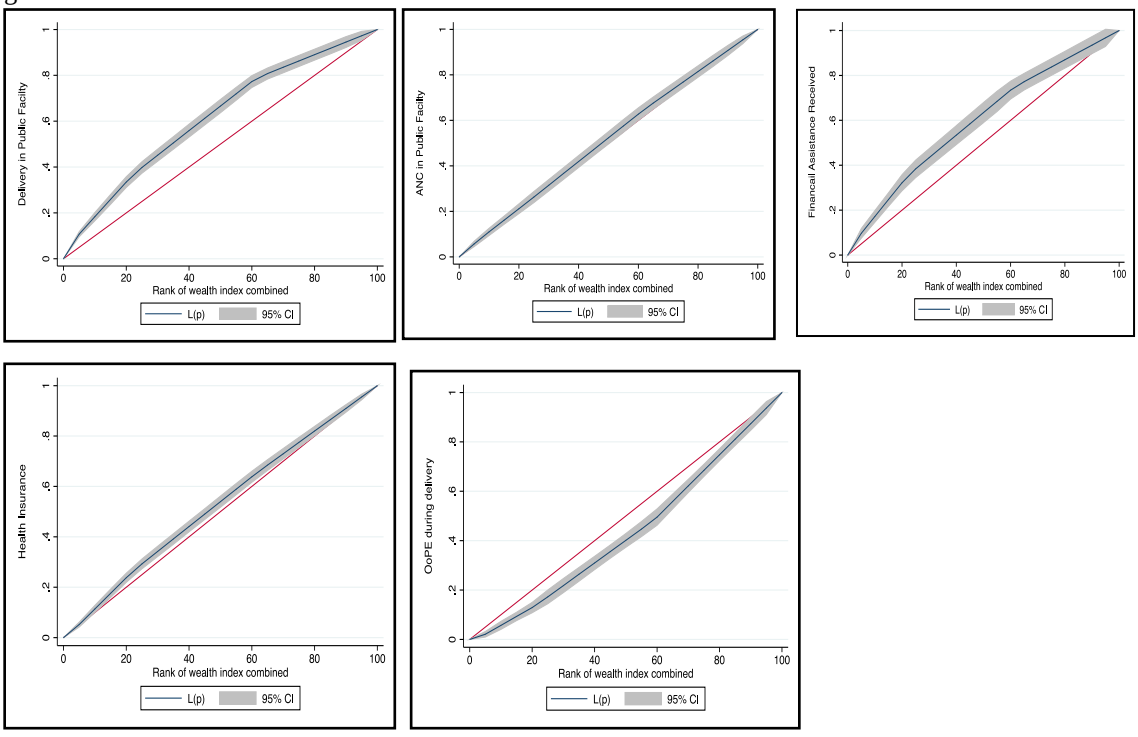
Result of the concentration indices shows that in Kerala there are a pro-poor bias in all the variables of interests except for OoPE during delivery (Table 4-14). In case of service utilization under government health facility for ANC and Delivery care, the concentration index is -0.032 and -0.231 units respectively (Figure 4.11). In case of financial assistance received for delivery, the distribution is unequal (CI: -0.191) and pro-poor again. The concentration index for health insurance is also negative (-0.054) but marginal. However, OoPE is unevenly distributed (0.130) among the high-income group during delivery.

Table 4-14: Result of Concentration Index for selected health outcomes

Health Outcomes	Concentration Index	Std.Error	P value
ANC in Public Facility	-0.032	0.016	0.049
Ins.Del in Public Facility	-0.231	0.014	0.000
Financial Assistance	-0.191	0.022	0.000
Health Insurance	-0.054	0.012	0.000
OoPE	0.130	0.018	0.000

Source: Author's calculation using NFHS-5 (2019-21) data

Figure 4.11: Result of Concentration Index



4.8.4 Discussion

Since the beginning of the planning process in India, planners have always been interested in regional development differences. Policy and planning documents were developed and implemented to improve people's quality of life by providing essential goods, improving social and economic well-being and narrowing development gaps. Our findings are supported by other studies around the world. A study attempts to evaluate the development of healthcare infrastructure and facilities, the state of the labour force, and the standard of healthcare services in rural regions throughout the north-eastern States[61]. The results show that even though the rural health infrastructure has significantly improved since the implementation of NRHM in 2005, particularly with regard to the health centres in the area, the condition of the region has been appalling in terms of other components of the health care infrastructure, particularly with regard to the quality of health services and the availability of specialists and well-trained personnel. However the study constrained at state level. "A study related with spatial distribution of the Health index across the village of different districts, the highest mean value (0.90) was found in the villages of the Pathanamthitta district, whereas the lowest mean value (0.19) is found in the villages of Malappuram district[62]. Another study concludes that Malappuram was the most backward district in terms of development in education and health. Studies suggest that Since Malappuram district is a highly populated district, the provision of education and health care services should be on the basis of population proportion".

Despite having lot of infrastructure constraints in public facility, the inputs (such as the intake of iron folic acid, tetanus toxoid injection), effects (such as number of

[61] Saikia, D and Das, KK. (2012)
[62] Das, A et.al.,2021

antenatal care visits, percentage of institutional delivery in public facility, percentage of postnatal care within 48 hours) and outcomes (such as infant mortality rate and maternal mortality ratio) in healthcare especially for maternal and child healthcare in Malappuram is not too bad while comparing with other districts. This is because of the result of strong support from private sector by providing health service with par excellence in quality and least cost. But the facilities in government health institutions are not in compliance with the population pressure so that from the service providers end the required level has not been maintained and that is the main reason for the low percentage of institutional delivery in public facility.

4.8.5 Conclusion

Overall, it can be concluded from the present study that there is substantial gap in the availability of health infrastructure in some districts of Kerala. Based on the findings of the present study, it can be implicated that the State of Kerala needs balanced and unbiased development of health infrastructural facilities. The only way to get rid of backwardness is to reduce the high population pressure on various public health infrastructure facilities. To support it, the government should increase budgetary allocations for health infrastructure in each district every year. Moreover, the state needs to enhance the proportions of its gross state domestic product in the health sector to attain efficiency, sufficiency, and equity in this sector. Besides, there is an urgent need to plug financial leakages and corrupt practices. With the adoption of good governance, the state should establish a statutory body to oversee the policy, programme, and process of reducing inter-district disparities in health infrastructure. On the demand side, we have seen that government health facilities for mother and child healthcare are mostly utilised by low-

income groups. They are mainly depending on government health facilities for maternity care because of the high costs in private facilities. If the quality of services and infrastructure facilities in government hospitals improve, demand from other income groups will also increase, and the services provided by public health facilities will become more universal. It will contribute to lowering the high catastrophic healthcare costs among the poor and middle-income groups. Further, it may also protect the population from the exploitation and unethical practices of private hospitals and their undesirable outcomes.

Chapter 5: Effectiveness of JSSK in Malappuram District of Kerala

5.1 Introduction

This chapter comprises following sections:

1. Analysis of the utilisation of JSSK scheme in India and Kerala
2. Analysis of the awareness of JSSK scheme in Malappuram district of Kerala
3. Analysis of the utilisation of the JSSK scheme in Malappuram district of Kerala

Section one was based on secondary data analysis. It enables us to get an idea of the utilization of JSSK among Indian states and districts in Kerala based on recent data. Section two and three were based on primary data.

5.2 Analysis of the utilisation of JSSK scheme in India: An interstate analysis

For analysing the utilisation of JSSK among selected Indian states, data from HMIS (2020–21) has been used. States which have more than two lack pregnant women registered for ANC have been selected for the analysis.

5.2.1 Utilisation of JSSK scheme for Pregnant Women in India

Utilization of the scheme by pregnant women and Sick infant in India can be traced form the table 5.1 and Table 5.3. They are in absolute number and varied from state to state. For a better understanding of utilization and for proper interstate comparison, we presented it as a percentage of total number of pregnant women registered for ANC (Table 5.2 and Table 5.4).

Table 5-1: Utilisation of the JSSK scheme for pregnant women in India, 2020-21

	Pregnant Women registered for ANC	Free Medicine	Free Diet	Free Diagnostics	Free Home to facility transport	Inter facility Transfer	Free Drop Back home
All India	27591287	15033749	8571426	14509235	5442079	1177852	5346898
Andhra Pradesh	898478	272922	269543	270101	137363	34718	223432
Assam	658145	591248	212733	716863	46553	13996	124668
Bihar	3147963	377326	234843	334018	97603	9378	113189
Chhattisgarh	613979	356085	233762	345292	156708	20701	152451

Gujarat	1275709	826051	411707	712045	261892	23674	377020
Haryana	558728	388198	261366	359590	111776	61440	96758
J & K	381587	123340	114930	408974	14057	28691	31591
Jharkhand	946963	396461	329152	334511	206914	13040	140556
Karnataka	1132856	129054	72118	98534	23640	16118	17520
Kerala	427749	237377	63437	274923	10913	2702	27013
Madhya Pradesh	1906200	1193124	957279	1147035	606713	95357	520627
Maharashtra	2048040	1902311	633221	1905722	441356	161398	460847
Odisha	714791	478277	467804	453750	375653	106234	273876
Punjab	438766	173477	162962	409383	47406	13249	53557
Rajasthan	1697020	1524940	536088	788919	381737	34023	418051
Tamil Nadu	1005569	533348	532956	531074	202786	102641	256567
Telangana	711150	66400	86795	49732	32701	2684	15004
Uttarakhand	203021	180110	95110	198768	28000	2191	6945
Uttar Pradesh	6131032	3842866	1723616	3682555	1714788	219918	1511136
West Bengal	1596872	928115	890328	884195	457463	174879	432540

Source: HMIS, NHM, 2020-21

From table 5.1 we can understand that the total number of women registered for ANC was 27591287. It was highest in Uttar Pradesh (6131032) and lowest in Uttarakhand (203021). Women received the entitlement of free medicine, diet, diagnostics, and transportation under JSSK scheme was highest in UP during 2020-21. Whereas the number of women received the entitlement of free medicine and diagnostics were lowest in Telangana. Women received the entitlement of free diet under JSSK and free home to facility transport were lowest in Kerala. Whereas women provided interfacility transfers and free drop back home were lowest in Uttarakhand. All these are in absolute numbers. In proportion to the number of pregnant women registered for ANC, if we analyse the extent of utilisation of JSSK entitlements, that will give a better comparison. Table 5.2 give that.

Table 5-2: Utilisation of JSSK programme as a percentage of pregnant women registered for ANC

	Free Medicine	Free Diet	Free Diagnostics	Free Home to facility transport	Inter facility Transfer	Free Drop Back home
All India	54.5	31.1	52.6	19.7	4.3	19.4
Andhra Pradesh	30.4	30.0	30.1	15.3	3.9	24.9
Assam	89.8	32.3	108.9	7.1	2.1	18.9
Bihar	12.0	7.5	10.6	3.1	0.3	3.6
Chhattisgarh	58.0	38.1	56.2	25.5	3.4	24.8

Gujarat	64.8	32.3	55.8	20.5	1.9	29.6
Haryana	69.5	46.8	64.4	20.0	11.0	17.3
J & K	32.3	30.1	107.2	3.7	7.5	8.3
Jharkhand	41.9	34.8	35.3	21.9	1.4	14.8
Karnataka	11.4	6.4	8.7	2.1	1.4	1.5
Kerala	55.5	14.8	64.3	2.6	0.6	6.3
Madhya Pradesh	62.6	50.2	60.2	31.8	5.0	27.3
Maharashtra	92.9	30.9	93.1	21.6	7.9	22.5
Odisha	66.9	65.4	63.5	52.6	14.9	38.3
Punjab	39.5	37.1	93.3	10.8	3.0	12.2
Rajasthan	89.9	31.6	46.5	22.5	2.0	24.6
Tamil Nadu	53.0	53.0	52.8	20.2	10.2	25.5
Telangana	9.3	12.2	7.0	4.6	0.4	2.1
Uttarakhand	88.7	46.8	97.9	13.8	1.1	3.4
Uttar Pradesh	62.7	28.1	60.1	28.0	3.6	24.6
West Bengal	58.1	55.8	55.4	28.6	11.0	27.1

Source: Table 5.1

Percentage of women received free Medicine under JSSK was highest in Maharashtra (92.9%), Rajasthan (89.9%), Assam (89.8%) and Uttarakhand (88.7%) whereas it was lowest in Telangana (9.3%), Karnataka (11.4%) and Bihar (12.0%). In Kerala it was 55.5 percent, just above the national average of 54.5 percent. In case of diet during the stay in hospital, the percentage was highest in Odisha (65.4%), West Bengal (55.8%) Tamilnadu (53.0%) and Madhya Pradesh (50.2%) while it was lowest in Karnataka (6.4%), Bihar (7.5%), Telengana (12.2%) and Kerala (14.8%). The national average was 31.1 percent. The entitlement to a free diagnostic was highest in Assam (108.9%) and Jammu and Kashmir (107.2%), where it was lowest in Telangana (7.0%) and Karnataka (8.7%). In the case of free home-to-facility transfers, Odisha and Madhya Pradesh stood first, whereas Karnataka and Kerala were last in the row. In terms of free entitlement to interfacility transfer when needed, Odisha and Haryana were highest, while Bihar, Telangana, and Kerala were lowest. However, in terms of free dropback to home, Odisha and Gujarat were the best providers, while Karnataka and Telangana were the worst.

5.2.2 Utilisation of JSSK scheme for Sick Infants in India

In absolute terms, the number of sick infants who received free medicine under JSSK was highest in UP and Maharashtra where it was lowest in Telangana and Uttarakhand. In the case of free diagnostics for sick infants, it was highest in UP and Madhya Pradesh, while it was lowest in Telangana and Uttarakhand. The free entitlement of home to facility transport was highest in UP and lowest in J & K. In interfacility transfers, UP was the highest provider, whereas Telangana was the lowest provider. In terms of drop back home, UP provided the most services, while Uttarakhand provided the least.

Table 5-3: Utilisation of the JSSK scheme for sick infants in India, 2020-21

	Free Medicines	Free Diagnostics	Free Home to facility transport	Interfacility transfers	Free Drop Back home
All India	2443696	2088488	573566	267534	793398
Andhra Pradesh	34513	29726	5355	4666	5473
Assam	74406	56624	3383	3609	36427
Bihar	14279	11735	2090	1575	7865
Chhattisgarh	58263	45758	18700	11652	20254
Gujarat	159963	103208	56437	10592	114752
Haryana	34957	34026	15382	9698	19446
J & K	29528	262892	178	5144	3519
Jharkhand	75178	52325	13360	2232	10252
Karnataka	59986	50244	24383	3697	6487
Kerala	29429	37587	1194	1545	2474
Madhya Pradesh	301166	294407	102864	22852	83998
Maharashtra	328617	236258	67785	29806	81204
Odisha	119603	92184	59695	33582	16357
Punjab	54633	35079	2038	2547	3593
Rajasthan	263261	64690	15627	7143	27716
Tamil Nadu	124045	123702	23481	16457	21902
Telangana	3729	4534	1317	156	1639
Uttarakhand	9515	8318	252	347	315
Uttar Pradesh	334209	314082	107295	67131	263764
West Bengal	240567	178887	42406	21629	52972

Source: HMIS, NHM, 2020-21

The above table only gives the number in absolute terms. For better understanding, we must consider it in proportion to the total number of pregnant women registered for ANC. It is depicted in Table 5.4.

Table 5-4: Utilisation of JSSK by Sick Infants as a percentage of women registered for ANC

	Free Medicines	Free Diagnostics	Free Home to facility transport	Interfacility transfers	Free Drop Back home
All India	8.9	7.6	2.1	1.0	2.9
Andhra Pradesh	3.8	3.3	0.6	0.5	0.6
Assam	11.3	8.6	0.5	0.5	5.5
Bihar	0.5	0.4	0.1	0.1	0.2
Chhattisgarh	9.5	7.5	3.0	1.9	3.3
Gujarat	12.5	8.1	4.4	0.8	9.0
Haryana	6.3	6.1	2.8	1.7	3.5
J & K	7.7	68.9	0.0	1.3	0.9
Jharkhand	7.9	5.5	1.4	0.2	1.1
Karnataka	5.3	4.4	2.2	0.3	0.6
Kerala	6.9	8.8	0.3	0.4	0.6
Madhya Pradesh	15.8	15.4	5.4	1.2	4.4
Maharashtra	16.0	11.5	3.3	1.5	4.0
Odisha	16.7	12.9	8.4	4.7	2.3
Punjab	12.5	8.0	0.5	0.6	0.8
Rajasthan	15.5	3.8	0.9	0.4	1.6
Tamil Nadu	12.3	12.3	2.3	1.6	2.2
Telangana	0.5	0.6	0.2	0.0	0.2
Uttarakhand	4.7	4.1	0.1	0.2	0.2
Uttar Pradesh	5.5	5.1	1.8	1.1	4.3
West Bengal	15.1	11.2	2.7	1.4	3.3

Source: HMIS, NHM, 2020-21

If we analyse the utilisation of the JSSK scheme for the treatment of sick infants as a percentage of total women registered for ANC, overall, it was very low in India. The percentage of sick infants provided free medicine was highest in Odisha and Maharashtra, while it was lowest in Bihar and Telangana. Similarly, free diagnostics for sick infants had the highest utilisation in J&K and MP, while it was lowest in Telangana and Bihar. Transport facility from home to hospital, inter-transfer, and drop-back It was highest in Odisha and lowest in Bihar, Telangana, and Uttarakhand.

5.2.3 Utilisation of JSSK scheme for pregnant women in Kerala

Pregnant women registered for ANC were highest in Malappuram and lowest in Pathanamthitta in 2020–21 (Table 5.5). If we analyse the utilisation of the JSSK scheme in Kerala district-wise, in absolute terms, the number of women receiving free medicine under JSSK was highest in Ernakulam and lowest in Idukki. Pregnant women were given free

food during their hospital stay; the rate was highest in Malappuram and lowest in Kottayam.

Table 5-5: Utilisation of JSSK scheme for Pregnant Women in Kerala, 2020-21

	ANC Registration	Free Medicine	Free Diet	Free Diagnostics	Free Home to facility transport	Inter facility Transfer	Free Drop Back home
Kerala	427749	237377	63437	274923	10913	2702	27013
Alappuzha	20265	34218	6513	34841	0	320	0
Ernakulam	33453	40551	3343	36304	850	91	269
Idukki	12613	2787	4018	4030	0	4	1366
Kannur	34321	10371	1953	13613	1023	11	2611
Kasaragod	21581	10987	4307	20048	0	54	1577
Kollam	27240	30220	0	36907	194	501	3529
Kottayam	18387	5121	133	10428	0	190	3098
Kozhikode	41133	7074	0	2126	0	0	5378
Malappuram	85714	18988	16176	28614	6450	0	0
Palakkad	39020	10260	10252	10260	993	37	2544
Pathanamthitta	10537	3333	920	3205	0		0
TVM	34824	31600	504	38645	84	257	553
Thrissur	35975	14265	9438	14644	1300	839	4341
Wayanad	12686	17602	5880	21258	19	398	1747

Source: HMIS, NHM, 2020-21

In terms of free diagnostics under JSSK, it was highest in Thiruvananthapuram and lowest in Kozhikode. In the case of home-to-facility transport, it was higher in Malappuram, where it was least in Wayanad. Thrissur had the highest interfacility transfer rate and Idukki had the lowest.drop-back facility was highest in Kozhikode and lowest in Ernakulam. While discussing the utilisation of JSSK as a percentage of the total number of women registered for ANC, free medicine under JSSK was highest in Alappuzha, Wayanad, and Ernakulam, where it was lowest in Kozhikode, Idukki, and Malappuram (Table 5.6).

Table 5-6: Utilisation of JSSK as a percentage of women registered for ANC in Kerala

	Free Medicine	Free Diet	Free Diagnostics	Free Home to facility transport	Inter facility Transfer	Free Drop Back home
Kerala	55.5	14.8	64.3	2.6	0.6	6.3
Alappuzha	168.9	32.1	171.9	0.0	1.6	0.0
Ernakulam	121.2	10.0	108.5	2.5	0.3	0.8
Idukki	22.1	31.9	32.0	0.0	0.0	10.8
Kannur	30.2	5.7	39.7	3.0	0.0	7.6
Kasaragod	50.9	20.0	92.9	0.0	0.3	7.3
Kollam	110.9	0.0	135.5	0.7	1.8	13.0
Kottayam	27.9	0.7	56.7	0.0	1.0	16.8
Kozhikode	17.2	0.0	5.2	0.0	0.0	13.1
Malappuram	22.2	18.9	33.4	7.5	0.0	0.0
Palakkad	26.3	26.3	26.3	2.5	0.1	6.5
Pathanamthitta	31.6	8.7	30.4	0.0	0.0	0.0
Thiruvananthapuram	90.7	1.4	111.0	0.2	0.7	1.6
Thrissur	39.7	26.2	40.7	3.6	2.3	12.1
Wayanad	138.8	46.4	167.6	0.1	3.1	13.8

Source: HMIS, NHM, 2020-21

In case of free diet, it was highest in Wayanad, Alappuzha, and Idukki, where it was lowest in Kozhikode, Kollam, and Kottayam. The percentage of pregnant women utilising free diagnostics was highest in Alappuzha and Wayanad, where it was lowest in Kozhikode and Palakkad. Transport facilities were very rarely utilised by the beneficiaries. The utilisation of home-to-facility, interfacility, and drop-back-home transport was only 2.6, 0.6, and 6.3 percent, respectively.

5.2.4 Utilisation of JSSK for Sick Infants in Kerala

In Kerala, JSSK service delivery to sick infants is comparatively underutilized.In absolute numbers, the sick infants provided with free medicine were highest in Palakkad and lowest in Idukki. Utilization of free diagnostics was highest in Wayanad and lowest in Kozhikode (Table 5.7). Free home-to-facility, interfacility transfer, and drop-back home transport were highest in Palakkad, where they were lowest in Kottayam.

Table 5-7: Sick Infants utilized JSSK scheme in Kerala, 2020-21

	Free Medicines under JSSK	Free Diagnostics under JSSK	Free Home to facility transport under JSSK	Interfacility transfers when needed under JSSK	Free Drop Back home under JSSK
Kerala	29429	37587	1194	1545	2474
Alappuzha	2815	3031	0	96	0
Ernakulam	5529	2716	20	347	213
Idukki	7	76	0	29	244
Kannur	1779	2787	238	6	526
Kasaragod	3108	2774	0	21	0
Kollam	733	2622	148	247	525
Kottayam	91	91	6	0	14
Kozhikode	15	30	0	0	25
Malappuram	4218	2308	44	0	0
Palakkad	5771	7684	642	627	685
Pathanamthitta	0	0	0	0	0
Thiruvananthapuram	4787	4691	96	128	242
Thrissur	0	0	0	0	0
Wayanad	576	8777	0	44	0

Source: HMIS, NHM, 2020-21

If we analyse the utilisation of free JSSK entitlements as a percentage of total women registered for ANC, the percentage of free medicine provided to sick infants was high in Ernakulam and low in Idukki (Table 5.8).

Table 5-8: Utilisation of JSSK as a percentage of pregnant women registered for ANC in Kerala

	Free Medicines under JSSK	Free Diagnostics under JSSK	Free Home to facility transport under JSSK	Interfacility transfers when needed under JSSK	Free Drop Back home under JSSK
Kerala	6.9	8.8	0.28	0.36	0.58
Alappuzha	13.9	15.0	0.00	0.47	0.00
Ernakulam	16.5	8.1	0.06	1.04	0.64
Idukki	0.1	0.6	0.00	0.23	1.93
Kannur	5.2	8.1	0.69	0.02	1.53
Kasaragod	14.4	12.9	0.00	0.10	0.00
Kollam	2.7	9.6	0.54	0.91	1.93
Kottayam	0.5	0.5	0.03	0.00	0.08
Kozhikode	0.0	0.1	0.00	0.00	0.06
Malappuram	4.9	2.7	0.05	0.00	0.00
Palakkad	14.8	19.7	1.65	1.61	1.76
Pathanamthitta	0.0	0.0	0.00	0.00	0.00
Thiruvananthapuram	13.7	13.5	0.28	0.37	0.69
Thrissur	0.0	0.0	0.00	0.00	0.00
Wayanad	4.5	69.2	0.00	0.35	0.00

Source: HMIS, NHM, 2020-21

The percentage of free diagnostics utilised by sick infants was high in Wayanad, whereas it was low in Kozhikode. Home to facility, interfacility transfer, and drop-back home transport were high in Palakkad, Ernakulam, Kannur, and Idukki, where they were low in Kozhikode, Kottayam, and Kasaragod.

5.3 Utilisation of JSSK scheme in Malappuram district of Kerala

Based on the above discussion (Tables 5.6 and 5.8), service utilisation under JSSK, both in the case of pregnant women and sick infants, Malappuram was at the bottom line when compared with other districts in Kerala. For the two main entitlements of JSSK, free medicine and free diagnostics, the percentage of women receiving the benefits as per HMIS data in 2020–21 was 22.2 and 33.4 percent, which is comparatively very low when compared with other districts. From the seven delivery points in Malappuram, the information from five delivery points related to the number of women who received free entitlements under the JSSK scheme from 2015–16 to 2020–21, as displayed below (Table 5.9). The district hospital, Perinthalamanna, and Nilambur were not provided with the required data at the time of the field visit due to unknown reasons.

Table 5-9: Utilisation of JSSK scheme for Pregnant Women in Malappuram (2015-16 to 2020-21)

	Free Delivery	Free Caesarean	Free Medicine	Free Diagnostics	Free Diet	Free Blood	Free Transport Facility
Medical College, Manjeri							
2015-16	3333	750	4083	9527	4083	325	4083
2016-17	3052	693	3745	7584	3745	361	3745
2017-18	2984	860	3844	9584	3844	301	3844
2018-19	3587	2718	6305	11201	6305	322	6305
2019-20	3841	1866	5707	8965	5707	368	5707
2020-21	3827	1318	5145	9749	5145	258	5145
Total	20624	8205	28829	56610	28829	1935	28829
Mean	3437	1368	4805	9435	4805	323	4805
District Hospital, Tirur							
2015-16	426	156	8457	986	426	41	405
2016-17	482	157	8819	1237	482	53	450
2017-18	817	304	9132	1890	817	79	761

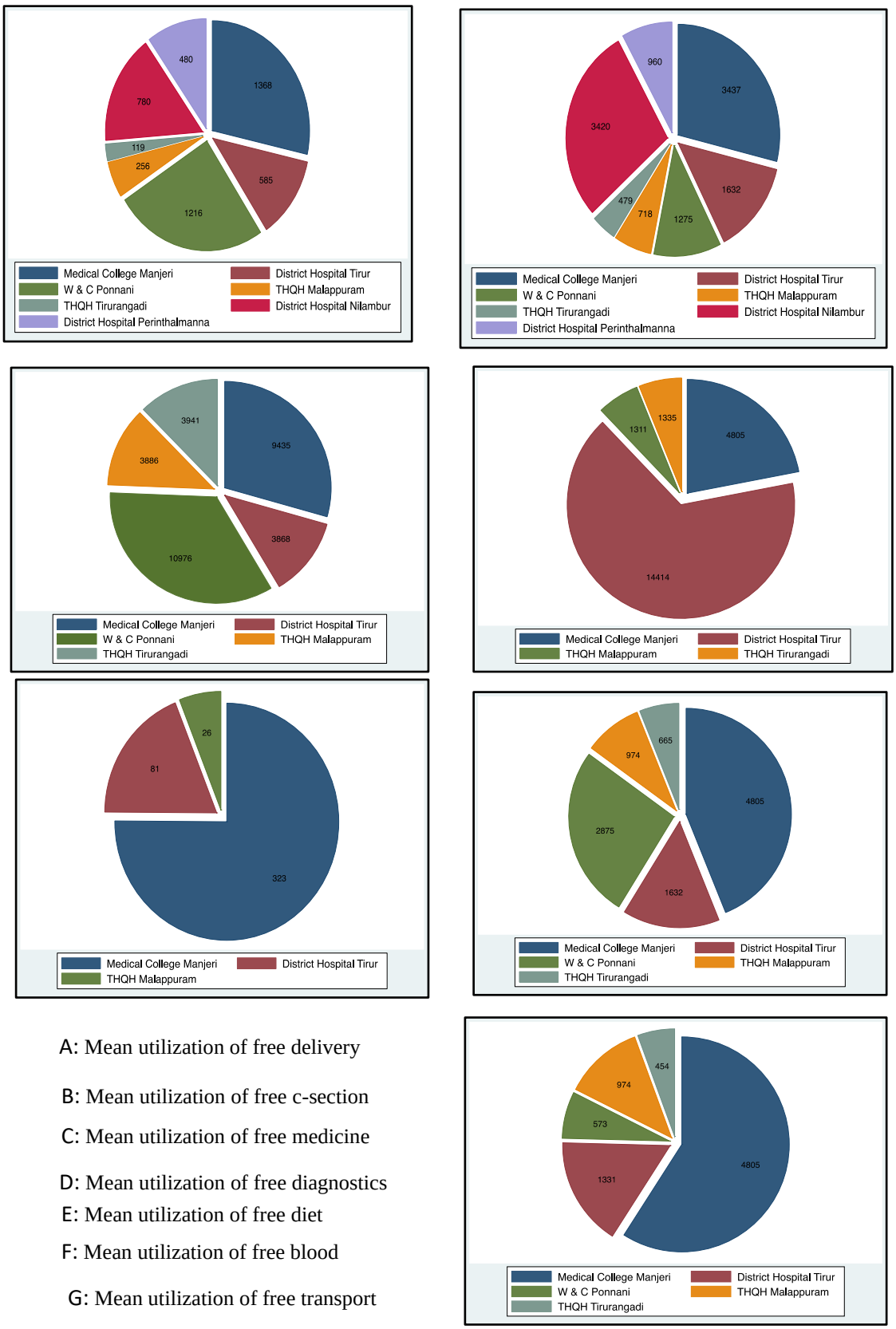
2018-19	1276	471	13126	2757	1276	56	919
2019-20	2377	847	17408	4975	2377	74	1960
2020-21	2518	893	18214	5710	2518	103	2263
Total	9794	3511	86483	23207	9794	488	7987
Mean	1632	585	14414	3868	1632	81	1331
W&C, Ponnani							
2019-20	1290	1187	NA	10057	1290	NA	619
2020-21	1259	1245	NA	11895	4460	NA	526
Total	2549	2432	NA	21952	5750	NA	1145
Mean	1275	1216	NA	10976	2875	NA	573
THQH, Malapppuram							
2015-16	613	366	450	2596	979	NA	979
2016-17	452	165	404	2754	617	NA	617
2017-18	651	187	172	2937	838	NA	838
2018-19	526	178	1818	3370	704	NA	704
2019-20	912	363	2836	5258	1275	17	1275
2020-21	1156	274	2184	6401	1430	34	1430
Total	4310	1533	7864	23316	5843	51	5843
Mean	718	256	1311	3886	974	26	974
THQH, Tirurangadi							
2015-16	77	10	1014	5104	361	NA	361
2016-17	223	63	845	6122	286	NA	286
2017-18	387	90	1278	5144	566	NA	566
2018-19	854	189	1907	2523	1044	NA	1040
2019-20	698	186	1751	2431	934	NA	320
2020-21	635	178	1217	2319	796	NA	150
Total	2874	716	8012	23643	3987	NA	2723
Mean	479	119	1335	3941	665	NA	454
District Hospital, Nilambur							
Mean	3420	780	NA	NA	NA	NA	NA
District Hospital, Perinthalmanna							
Mean	960	480	NA	NA	NA	NA	NA

Source: collected from respective Hospital records

The mean utilisation of free delivery under JSSK (Figure 5.1A) was highest in Medical College, Manjeri (3437) and lowest in THQH, Tirurangadi (479), from 2015-16 to 2020-21. Under JSSK, the most caesareans (Figure 5.1B) were performed on pregnant women at Medical College Manjeri (mean = 1368) and W & C Ponnani (mean = 1216).The entitlement of free medicine (Figure 5.1C) was highest in Tirur district hospital (mean = 14414) and lowest in Malappuram Taluk Head Quarters Hospital (THQH) (mean = 1311).The mean number of pregnant women who obtained free diagnostics under JSSK

from 2015-16 to 2020-21 was (Figure 5.1D) highest in W&C Ponnani (10976) and lowest in DH Tirur (3868). Pregnant women, receiving free diet, were (Figure 5.1E) most common at Medical College, Manjeri (mean=4805) and least common in THQH, Tirurangadi (mean=665). Medical College, Manjeri provided (Figure 5.1F) the highest free blood (Mean=576), whereas THQH Malappuram provided the least (Mean=26). Under JSSK, pregnant women are entitled to free transportation from home to facility, inter-facility transfer, and return home.

On average, Medical College, Manjeri (4805), offered the highest service regarding free transport (Figure 5.1G), while THQH Tirurangadi provided the least (454). This was the extent to which the JSSK entitlements were used by pregnant women in Malappuram.



A: Mean utilization of free delivery

B: Mean utilization of free c-section

C: Mean utilization of free medicine

D: Mean utilization of free diagnostics

E: Mean utilization of free diet

F: Mean utilization of free blood

G: Mean utilization of free transport

Figure 5.1: Utilisation of JSSK scheme for Pregnant Women in Malappuram (2015-16 to 2020-21

It is also critical to explain the infrastructure facilities available at these delivery points so that we may analyse both supply and demand relationships. It is important to note that the effectiveness of such programmes is subject to the quality and sufficiency of services supplied at these public health facilities, like the availability of beds, specialised doctors, pharmacies, labs, etc. (Table 5.10).

Table 5-10: Infrastructure facilities available at delivery points in Malappuram (as of November 1, 2021)

Facilities	MC, Manjeri	DH*, Pmna	DH Nilambur	DH Tirur	W&C Ponnani	THQH Mlp	THQH Tgdi*	Total
No.of OTs	12	1	2	1	4	1	2	12
No. of Gynec Beds	90	40	41	30	135	35	33	404
No. of Gynaecologists	21	3	4	4	6	2	3	43
No.of Paediatricians	17	3	4	4	6	2	3	39
No. of anaesthetist	14	1	3	3	4	1	1	27
No. of Ambulances	2	1	4	1	0	1	1	10
No. of ANMs/Equivalent	111	1	1	3	0	8	1	125
No. of ASHA Workers	36	3	3	40	0	4	4	90
Blood Bank	7	1	1	1	0	1	0	11
Pharmacy	30	1	1	1	1	1	1	36
Lab	36	1	1	1	1	1	1	42

*District Hospital Perinthalmanna and Tirurangadi

When we see the number of operation theatres (OT), it is highest in the Medical College, Manjeri (12), and W&C Ponnani (4). The average number of C-sections per year is also high in these two delivery points. 1368 and 1216, respectively. W&C Ponnani and Medical College, Manjeri have a greater number of beds. However, the number of deliveries, including C-sections, was higher in Medical College Manjeri (4855) and District Hospital Nilambur (4200). The number of gynaecologists, paediatricians, and anaesthetists is also higher in Medical College, Manjeri, and W&C Ponnani. Except for Medical College Manjeri, each delivery point has one pharmacy and one laboratory. There are no blood banks in W&C Ponnani and THQH Tirurangadi. The average number of beneficiaries registered under JSSK in Malappuram was 23709 between the periods 2015–16 and 2020–

21. If we compare the utilisation of the scheme for deliveries including c-sections based on the number of beneficiaries registered, it was 100 percent in MC, Manjeri, and only 17.7 percent in DH, Tirur (Table 5.11).

Table 5-11: Percentage of JSSK Utilisation based on delivery points

Delivery Points	Average JSSK registered beneficiaries*	Pregnant Women utilised free delivery including C-sections	% of utilisation	Average beneficiaries registered/bed ratio
District Hospital, Nilambur	NA	4200	-	-
District Hospital, Perinthalmanna	NA	1440	-	-
District Hospital, Tirur	12526	2217	17.7	418
Medical College, Manjeri	4805	4805	100.0	53
THQH, Malappuram	1244	974	78.3	36
THQH, Tirurangadi	1327	598	45.1	40
W & C Ponnani	3807	2491	65.4	28
Total	23709	11085	46.8	73

Source: Hospital Records

Similarly, the average beneficiaries' registered-bed ratio was highest in DH, Tirur (1:418) and least in W&C Ponnani (1:28). For Malappuram, it was 1:73. Because delivery, including c-sections, is a key component of OoPE and is critical for reducing maternal and child mortality, its utilisation must be ensured.

The mere launch and funding of such programmes will not suffice. If the common people are not aware of the scheme, their benefits, and information regarding the time, place, and entitlements of the scheme, then the facilities and institutions will fail to deliver it. So, this section provides an account of awareness and utilisation of the JSSK scheme, including OoPE during delivery in the Malappuram district of Kerala. This analysis was based on primary data. The data was collected from all six delivery points under public health institutions using a semi-structured questionnaire. In addition to that, women who delivered babies in private health institutions were also interviewed using the same questionnaire through a household survey with the help of ASHA and Anganawadi

workers. This was done to compare household costs of delivery in public and private hospitals.

5.4 Descriptive analysis

Descriptive analysis explains the essential characteristics of data in research. Table 5.12 provides a full summary of the primary data acquired for our investigation. It describes the socioeconomic and demographic characteristics of the respondents in the study area.

Table 5-12: Demographic profile and socio-economic characteristics of the respondents

	Rural	Urban	Total
	502 (56.5%)	386 (43.5%)	888 (100.0)
Type of Institution			
Government	287 (57.2%)	223 (57.8%)	510 (57.4%)
Private	215 (42.8%)	163 (42.2%)	378 (42.6%)
Age group			
18-25	202 (40.2%)	170 (44.0%)	372 (41.9%)
26-35	268 (53.4%)	202 (52.3%)	470 (52.9%)
36-45	32 (6.4%)	14 (3.6%)	46 (5.2%)
Religion			
Hindu	118 (23.5%)	61 (15.8%)	179 (20.2%)
Muslim	379 (75.5%)	320 (82.9%)	699 (78.7%)
Christian	5 (1.0%)	5 (1.3.0%)	10 (1.13%)
Caste			
Gen	30 (6.0%)	24 (6.2%)	54 (6.1%)
SC	72 (14.3%)	34 (8.8%)	106 (11.9%)
ST	21 (4.2%)	7 (1.8%)	28 (3.2%)
OBC	379 (75.5%)	321 (83.2%	700 (78.8%)
Wealth			
BPL	261 (52.0%)	223 (57.8%)	484 (54.5%)
APL	241 (48.0%)	163 (42.2%)	404 (45.5%)
Family Type			
Joint Family	279 (55.6%)	238 (61.7%)	517 (58.2%)
Nuclear Family	223 (44.4%)	148 (38.3%)	371 (41.8%)
Nature of Delivery			
Normal	401 (79.9%)	319 (82.64%)	720 (81.1%)
Caesarian	101 (20.1%)	67 (17.4%)	168 (18.9%)
Education			
≤10th	122 (24.3%)	124 (32.1%	246 (27.7%)
12th	204 (40.6%)	146 (37.8%)	350 (39.4%)
≥Graduation	176 (35.0%)	116 (30.0%)	292 (32.9%)
JSSK Beneficiary			
No	215 (42.8%)	163 (42.2%)	378 (42.6%)

Yes	287 (57.2%)	223 (57.8%)	510 (57.4%)
Occupation			
No	420 (83.7%)	327 (84.7%)	747 (84.1%)
Yes	82 (16.3%)	59 (15.3%)	141 (15.9%)

Source: Primary Survey

Respondents from rural areas were 502 (56.5%), while 386 (43.5%) were from urban areas. 510 respondents were from government health institutions, whereas 378 respondents chose private hospitals for their deliveries. There was not much difference in the type of institution between urban and rural areas. Most of the respondents belong to the age group of 26-35 (52.9%). Among these, 53.4 percent were from rural areas. Only 5.2 percent of women were between the ages of 36 and 45. Most of the respondents belong to the Muslim ethnic group (78.7%). The other major religions among respondents were Hindus (20.2%) and Christians (1.13%). Most of the respondents belong to other backward castes (78.8%). Women from SCs and STs were 11.9 percent and 3.2 percent, respectively. 54.5 percent of the respondents belong to BPL families. Likewise, 58.2% of women come from joint families. Most of the respondents (39.4%) had completed 12th class, while 27.7 percent of women had completed 10th class or less. 81.1 percent of the deliveries were normal deliveries. 84.1 percent of the respondents were unemployed, and 57.4 percent of them were JSSK beneficiaries.

5.5 Awareness of the JSSK scheme

One of the major objectives of the study was to examine the level of awareness about JSSK scheme in the study area. For effective utilisation of any scheme, awareness among the beneficiaries regarding the programme is an essential prerequisite.

5.5.1 Awareness and Socio-economic characteristics

In this section, it was attempted to analyse respondents' awareness of the scheme based on their demographic and socioeconomic profiles. The sample information sheds

light on this aspect. The demographic profile of those who aware about JSSK scheme in Malappuram district is presented in Table 5.13.

Table 5-13:Socio-economic characteristics and awareness of the JSSK scheme

	Rural	Urban	Total
	374 (74.5%)	294 (76.2%)	668 (75.2%)
Type of Institution			
Government	287 (76.7%)	223 (75.9%)	510 (76.4%)
Private	87 (23.3%)	71 (24.2%)	158 (23.7%)
Age group			
18-25	153 (40.9%)	137 (46.6%)	290 (43.4%)
26-35	198 (52.9%)	148 (50.3%)	346 (51.8%)
36-45	23 (6.2%)	9 (3.1%)	32 (4.8%)
Religion			
Hindu	106 (28.3%)	47 (16.0%)	153 (22.9%)
Muslim	264 (70.6%)	244 (83.0%)	508 (76.1%)
Christian	4 (1.1%)	3 (1.0%)	7 (1.1%)
Caste			
Gen	25 (6.7%)	17 (5.8%)	42 (6.3%)
SC	64 (17.1%)	27 (9.2%)	91 (13.6%)
ST	21 (5.6%)	5 (1.7%)	26 (3.9%)
OBC	264 (70.6%)	245 (83.3%)	509 (76.2%)
Wealth			
BPL	224 (59.9%)	194 (66.0%)	418 (62.6%)
APL	150 (40.1%)	100 (34.0%)	250 (37.4%)
Family Type			
Joint Family	220 (58.8%)	182 (61.9%)	402 (60.2%)
Nuclear Family	154 (41.2%)	112 (38.1%)	266 (39.8%)
Nature of Delivery			
Normal	290 (77.5%)	235 (79.9%)	525 (78.6%)
Caesarian	84 (22.5%)	59 (20.1%)	143 (21.4%)
Education			
≤10th	117 (31.3%)	107 (36.4%)	224 (33.5%)
12th	158 (42.3%)	116 (39.5%)	274 (41.0%)
≥Graduation	99 (26.5%)	71 (24.2%)	170 (25.5%)
JSSK Beneficiary			
No	87 (23.3%)	71 (24.2%)	158 (23.7%)
Yes	287 (76.7%)	223 (75.9%)	510 (76.4%)
Occupation			
No	320 (85.6%)	255 (86.7%)	575 (86.1%)
Yes	54 (14.4%)	39 (13.3%)	93 (13.9%)

Source: Primary Survey

Out of the total 888 respondents, 668 were aware of the JSSK scheme (75.2%). Of this, 374 (74.5%) were from rural areas, and 294 (76.2%) were from urban areas. 287 (76.7%) of the respondents who were aware of JSSK had chosen government hospitals for delivery and were from rural areas. 198 (52.9%) women who were aware of JSSK scheme were between the ages of 26 and 35 and live in rural areas. 83 percent of respondents who know about JSSK were Muslims and OBCs from urban areas. The BPL and urban areas were represented by 194 (66%) of the women who were aware of JSSK. 182 respondents (61.9%) who know about JSSK were from joint families and urban areas. 79.9% of women whose delivery was normal were aware of JSSK. 158 (42.3%) women who know about JSSK were 12th completed and from rural areas. 287 respondents (76.7%) from rural areas who availed of JSSK were aware of it prior to its utilisation. 86.7% of women from urban areas with no occupation were aware of the scheme. A detailed analysis of women who were aware of JSSK is given below.

5.5.2 Block-wise analysis of JSSK awareness

There are 15 revenue blocks in Malappuram district. When we analyse JSSK awareness among these blocks, it was highest in the Ponnani block (98.6%), Kondotty block (91.3%), and Perinthalmanna block (91.2%). It was lowest in Kuttippuram (41.5%) and Tanur (50.0%) blocks (Table 5.14 and Figure 5.2).

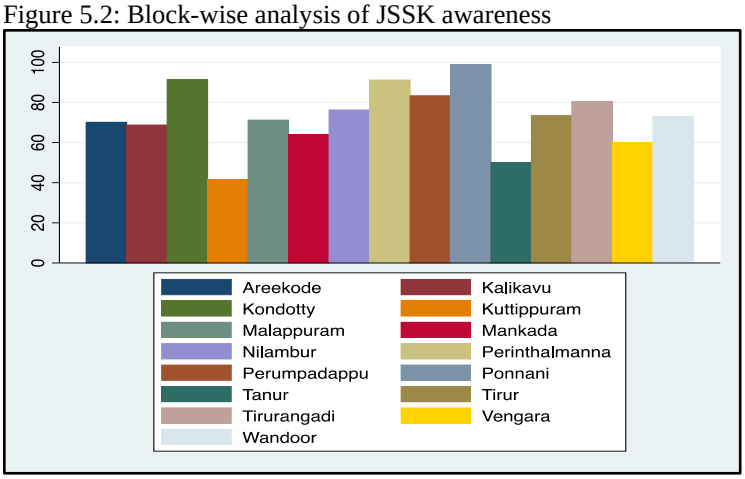
Table 5-14: Block-wise analysis of JSSK awareness

Blocks	Freq.	Percentage
Areekode	54	70.13
Kalikavu	11	68.75
Kondotty	21	91.3
Kuttippuram	17	41.46
Malappuram	84	71.19
Mankada	23	63.89
Nilambur	45	76.27

Perinthalmanna	93	91.18
Perumpadappu	15	83.33
Ponnani	87	98.86
Tanur	18	50
Tirur	111	73.51
Tirurangadi	41	80.39
Vengara	21	60
Wandoor	27	72.97
Total	668	75.23

Source: Primary survey

Figure 5.2: Block-wise analysis of JSSK awareness



5.5.3 JSSK Awareness and Area

The present study shows that awareness about JSSK was almost the same among women from urban and rural areas. In urban areas, it was 76.2 percent, whereas it was 74.5 percent in rural areas. With the help of the chi2[63] test, we can test whether the difference is statistically significant or not (Table 5.15). Here, the null hypothesis (H_0) was that there are no significant differences between the area (rural/urban) and the awareness level of women.

Table 5-15: Awareness and Area

	JSSK Awareness		
Area	Not aware	Aware	Total

[63] The Chi-Square test is a statistical procedure used by researchers to examine the differences between categorical variables in the same population.

Rural	128 25.50	374 74.50	502 100.00
Urban	92 23.83	294 76.17	386 100.00
Total	220 24.77	668 75.23	888 100.00
Pearson Chi2 = 0.32 Prob = 0.5691			

Chi2 test result shows that there is no evidence to reject the null hypothesis, at 5 percent confidence level.

5.5.4 JSSK Awareness and type of institution

If we see the level of awareness among women based on the institution, they selected for their pregnancy care and delivery, we can see a significant difference between the type of institution and awareness. The women who preferred government health institutions are aware of JSSK and its entitlement (Table 5.16). All of them are aware of JSSK (100%) compared with an awareness level of 41.8 % among women who preferred private hospitals. The distinction is also statistically significant ($p<0.01$).

Table 5-16: Type of Institution and awareness about JSSK.

Type of Institution	JSSK Awareness		
	Not aware	Aware	Total
Government	0	510	510
	0.00	100.00	100.00
Private	220	158	378
	58.20	41.80	100.0
Total	220	668	888
	24.77	75.23	100.0
Pearson Chi2 = 394.58 Prob = 0.0000			

5.5.5 JSSK Awareness and age group

When we see the difference in awareness based on age group, women in the 18–25 age group were more aware of JSSK. But the Pearson Chi square ($\chi2=2.93$) statistic (Table

5.17) was found to be insignificant, indicating no significant association between age group and awareness of JSSK.

Table 5-17: Age group and awareness about JSSK.

	JSSK Awareness		
agegroup	Not aware	Aware	Total
18-25	82	290	372
	22.04	77.96	100.00
26-35	124	346	470
	26.38	73.62	100.00
36-45	14	32	46
	30.43	69.57	100.00
Total	220	668	888
	24.77	75.23	100.00
Pearson Chi2 = 2.93 Prob = 0.2308			

5.5.6 JSSK Awareness and Religion

While comparing with Muslim and Christian women, women from the Hindu religion were more aware of JSSK (Table 5.18). 85.5 percent of them were aware of JSSK, compared with 72.7% of Muslims and 70.0% of Christian women. The distinction is also statistically significant ($p<0.01$).

Table 5-18: Religion and JSSK Awareness

	JSSK Awareness		
Religion	Not aware	Aware	Total
Hindu	26	153	179
	14.53	85.47	100.00
Muslim	191	508	699
	27.32	72.68	100.00
Christian	3	7	10
	30.00	70.00	100.00
Total	220	668	888
	24.77	75.23	100.00
Pearson Chi2 = 12.68 Prob = 0.0018			

5.5.7 JSSK Awareness and Caste

When we compare awareness across castes (Table 5.19), it was highest among STs (92.9%) and SCs (85.9%) and lowest among OBCs (72.7%). The difference is also statistically significant ($p<0.05$).

Table 5-19: Awareness and Caste

	JSSK awareness		
caste	Not aware	Aware	Total
General	12	42	54
	22.22	77.78	100.00
SC	15	91	106
	14.15	85.85	100.00
ST	2	26	28
	7.14	92.86	100.00
OBC	191	509	700
	27.29	72.71	100.00
Total	220	668	888
	24.77	75.23	100.00
Pearson Chi2 = 13.65 Prob = 0.0034			

5.5.8 JSSK Awareness and Wealth

In case of economic status or wealth, women from the BPL category were more aware (Table 5.20) of the JSSK scheme (86.36%). Out of 404 women from APL, only 250 (61.9%) know about JSSK. The difference is statistically significant ($p<0.01$).

Table 5-20: Wealth and JSSK Awareness

Wealth	JSSK Awareness		
	Not aware	Aware	Total
BPL	66	418	484
	13.64	86.36	100.00
APL	154	250	404
	38.12	61.88	100.00
Total	220	668	888
	24.77	75.23	100.00
Pearson Chi2 = 70.82 Prob = 0.0000			

5.5.9 JSSK Awareness and Family Type

Based on family type, women from joint families were more aware (77.8%) of the JSSK scheme (Table 5.21) than women from nuclear families (71.7%). The link between the two is statistically significant ($p<0.05$).

Table 5-21: Family type and JSSK Awareness

	JSSK Awareness		
Family type	Not aware	Aware	Total
Joint Family	115	402	517
	22.24	77.76	100.00
Nuclear Family	105	266	371
	28.30	71.70	100.00
Total	220	668	888

	24.77	75.23	100.00
Pearson Chi2 = 4.25 Prob = 0.0392			

5.5.10 JSSK Awareness and Education

The results of the analysis of awareness among more educated and less educated women reveal that those who were less educated were more aware of JSSK (Table 5.22). Women educated up to the 10th were more aware in the study area (91.1%), and women who had the education of graduation and above were less aware (58.2%) about the JSSK scheme. The difference is statistically significant ($p<0.01$).

Table 5-22: Education and JSSK Awareness

	JSSK Awareness		
Education	Not aware	Aware	Total
≤ 10th	22	224	246
	8.94	91.06	100.00
12th	76	274	350
	21.71	78.29	100.00
≥ Graduation	122	170	292
	41.78	58.22	100.00
Total	220	668	888
	24.77	75.23	100.00
Pearson Chi2 = 80.16 Prob = 0.0000			

5.5.11 JSSK Awareness and Occupation

When we compare awareness based on occupation (Table 5.23), employed women (66.0%) were less aware than unemployed women (77.0%), and the result is also statistically significant ($p<0.01$).

Table 5-23: Occupation and JSSK Awareness

	JSSK Awareness		
Occupation	Not aware	Aware	Total
no	172	575	747
	23.03	76.97	100.00
yes	48	93	141
	34.04	65.96	100.00
Total	220	668	888
	24.77	75.23	100.00
Pearson Chi2 = 7.72 Prob = 0.0054			

5.5.12 JSSK Awareness and Nature of delivery

The awareness of the JSSK scheme was high among those mothers who underwent thorough c-sections (85.1%), compared with the mothers who had normal deliveries (72.9%). The difference is statistically significant ($p<0.01$). Table 5.24 shows it.

Table 5-24: Nature of delivery and JSSK Awareness

	JSSK Awareness		
Nature of Delivery	Not aware	Aware	Total
Normal delivery	195	525	720
	27.08	72.92	100.00
C-section	25	143	168
	14.88	85.12	100.00
Total	220	668	888
	24.77	75.23	100.00
Pearson Chi2 = 10.88 Prob = 0.0010			

5.5.13 JSSK Awareness among JSSK Beneficiaries

JSSK awareness was high among JSSK beneficiaries. All the women who utilised JSSK were also aware of the JSSK scheme (100.0%). Only 41.8 percent of women who haven't utilised the scheme were aware of JSSK (Table 5.25). The result is also statistically significant ($p<0.01$).

Table 5-25: JSSK Beneficiaries and JSSK Awareness

	JSSK Awareness		
JSSK Beneficiary	Not aware	Aware	Total
Non-Beneficiary	220	158	378
	58.20	41.80	100.00
Beneficiary	0	510	510
	0.00	100.00	100.00
Total	220	668	888
	24.77	75.23	100.00

Pearson Chi2 = 394.58 Prob = 0.0000

5.5.14 Sources of Awareness about JSSK

Table 5.26 and Figure 5.3 give sources of awareness about the JSSK scheme in the Malappuram district of Kerala. Out of 668 respondents who were aware of JSSK, 333 (or 49.9%) learned about it from ASHA workers, followed by 143 (or 21.4%) from Anganawadi Workers (AWW), and 62 (or 9.3%) from Auxiliary Nurse Midwives (ANM).

Other main sources of information were government publicity (6.4%), electronic media (6.4%), and doctors (5.8%).

Table 5-26: Sources of JSSK Awareness

Sources of Awareness	Freq.	Percent	Cum.
ANM	62	9.28	9.28
Anganwadi Workers	143	21.41	30.69
Doctors	39	5.84	36.53
ASHA Workers	333	49.85	86.38
Government Publicity	43	6.44	92.81
Electronic Media	43	6.44	99.25
Print Media	1	0.15	99.40
Others	4	0.60	100.00
Total	668	100.00	

Source: Primary Survey

Figure 5.3: Sources of JSSK Awareness

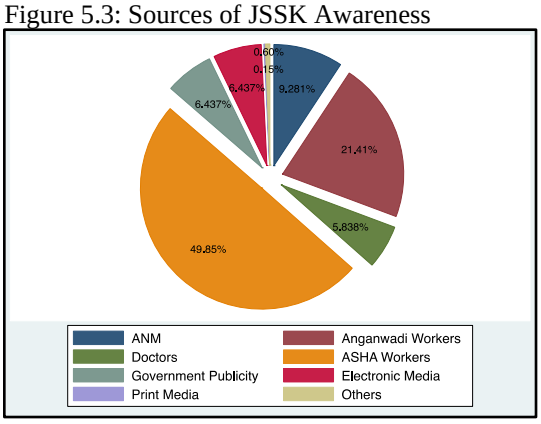
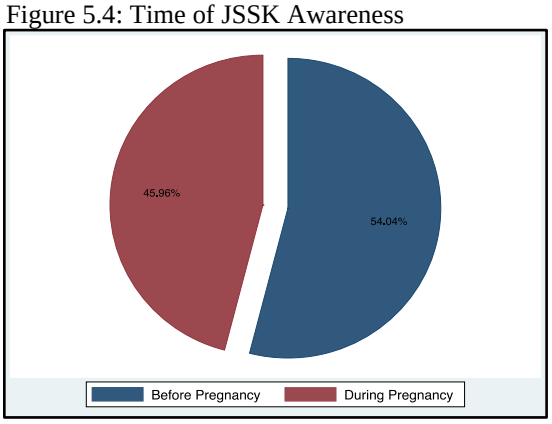


Figure 5.4: Time of JSSK Awareness



5.5.15 Time of JSSK Awareness

According to Table 5.27 and Figure 5.4, most of the women (54.0%) were aware of JSSK prior to their pregnancies. The rest of them learned about JSSK during their pregnancies (46.0%).

Table 5-27: Time of JSSK awareness

Time of Awareness	Freq.	Percent	Cum.
Before Pregnancy	361	54.04	54.04
During Pregnancy	307	45.96	100.00
Total	668	100.00	

Source: Primary Survey

5.5.16 Awareness about JSSK free entitlements for pregnant women

Out of 888 respondents, 668 (75.2%) of the pregnant women know about their entitlement to free delivery (Table 5.28 and Figure 5.5). 528 pregnant women (59.46% of them) know about their entitlement to free drugs and consumables. 501 (56.42%) women were aware of their entitlement to a free caesarian under the JSSK scheme. More than half of the respondents (51.58%) aware about the free diagnostics offered under the scheme.

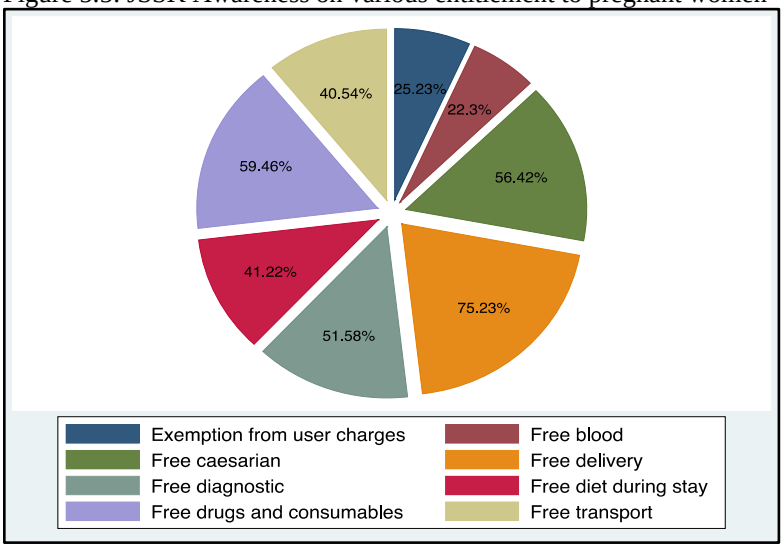
Table 5-28: Awareness on various entitlement to pregnant women under JSSK

Entitlement	Freq. (N=888)	Percentage
Free delivery	668	75.23
Free caesarian	501	56.42
Free drugs and consumables	528	59.46
Free diagnostic	458	51.58
Free diet during stay	366	41.22
Free blood	198	22.30
Free transport	360	40.54
Exemption from user charges	224	25.23

Source: Primary Survey

Provision of free blood (22.3%) and exemption from all kinds of user charges (25.23%) were the two entitlements of which the respondents were least aware.

Figure 5.5: JSSK Awareness on various entitlement to pregnant women



5.5.17 JSSK Awareness on various entitlements for sick new-born

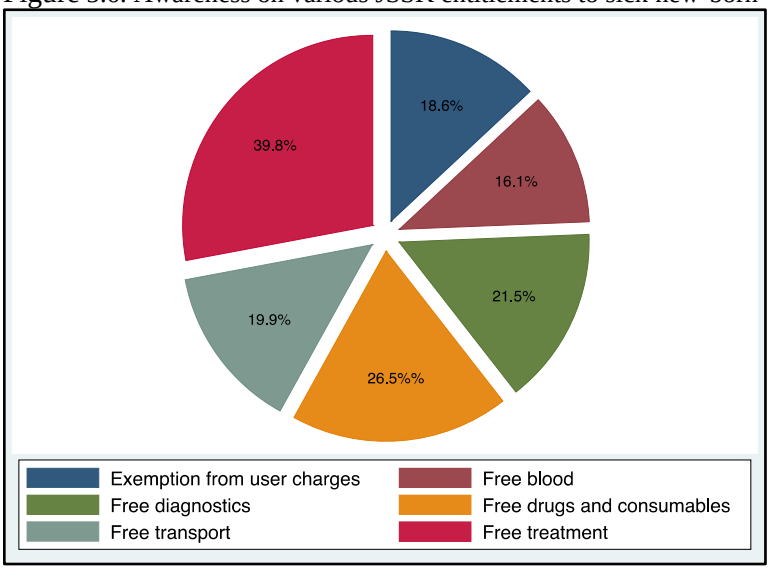
The JSSK scheme includes certain free entitlements for sick newborns. They are free treatment, free drugs and consumables, free diagnostics, free blood, free transport facility, and exemption from all kinds of user charges. Table 5.29 and Figure 5.6 show awareness among respondents of free entitlements under JSSK for sick new-borns. Awareness ranges from a high of 39.8 percent regarding free treatment for sick newborns to a low of 16.1 percent regarding the free provision of blood to sick newborns. When compared with awareness of entitlement to pregnant women, awareness of entitlement to sick infants was low.

Table 5-29: Awareness on various JSSK entitlements to sick new-born

Entitlements	Freq. (N=888)	Percentage
Free treatment	354	39.8
Free drugs and consumables	235	26.46
Free diagnostics	191	21.51
Free blood	143	16.10
Free transport	177	19.93
Exemption from user charges	165	18.58

Source: Primary Survey

Figure 5.6: Awareness on various JSSK entitlements to sick new-born



The provision of free blood was the least known free entitlement of JSSK by respondents, while free treatment for sick newborns was the most known free entitlement of JSSK. As far as awareness among family members (Figure 5.7) was concerned, the study found that most of them were unaware (39.6%) and became aware only after the utilisation of the scheme (23.7%).

Figure 5.7: Awareness among Family members

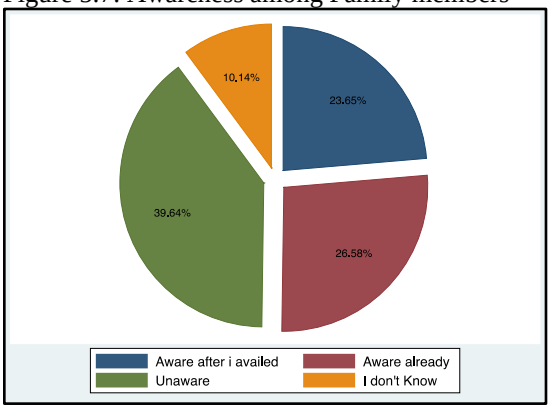
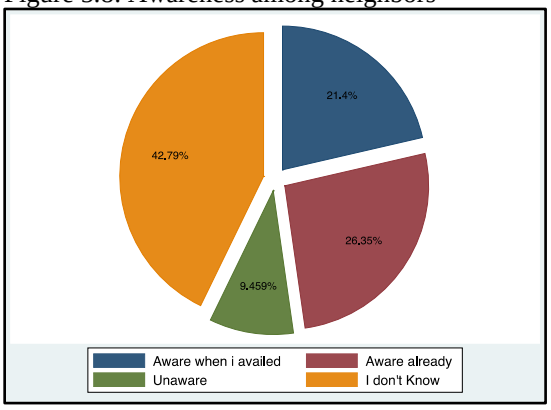


Figure 5.8: Awareness among neighbors



Similarly, 26.4 percent (Figure 5.8) of the respondents' neighbours were already aware of the scheme, while 21.4 percent became aware after the respondents used it.

5.5.18 Factors affecting awareness about JSSK in Malappuram:

To analyse the factors influencing on the awareness of JSSK scheme in study area, logit model is used. Logistic regression is a way to model a nominal variable as a probabilistic outcome of one or more other variables. But the χ^2 test of independence is a specific significance test that tests the null hypothesis that two nominal variables are independent. For example, a χ^2 test could check whether it is unreasonable to believe that a woman's awareness on JSSK was independent of their area, family type, economic status, caste etc. In contrast, logistic regression determines the likelihood that a woman will be aware of the JSSK scheme depending on her age, religion, caste, economic position, and other factors.

Here the outcome variable is whether respondents are aware of JSSK or not (dichotomous, "Yes" or "No"). It is regressed against demographic and socio-economic factors such as the age of mothers (trichotomous-age groups 18-25, 26–35, and 36-45); area of residence (dichotomous-urban/rural); family type (Joint or Nuclear); education (trichotomous- ≤ 10th, 12th, and ≥ Graduation); economic status (dichotomous-BPL or APL); nature of delivery (dichotomous-normal/caesarian); and caste (polychotomous-General, SC, ST and OBC). Mathematically, the regression model has the following form:

$ln\ (\frac{p}{1-p}) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8$

Where:

β_0 = Constant

$\beta_1 - \beta_8$ = Coefficients

$X_1 - X_8$ = Explanatory variables

p = Probability of happening an event

$1 - p$ = Probability of not happening an event

$\frac{p}{1-p}$ = Odd ratio

The probabilities of the event of interest are given by the following logistic regression equation:

$$E(pi) = \frac{exp^{\beta 0 + \beta iXi}}{1 + exp^{\beta 0 + \beta iXi}} \qquad 0 < p < 1$$

5.5.19 Result of the logit model

It is simpler and more sensible to interpret an odd ratio than a beta coefficient in logistic regression to identify the predictive factors of awareness of the JSSK in

Malappuram district of Kerala. Table 5.30 shows the odd ratios, confidence intervals, and p values. Among the predicting variables, economic status, age, nature of delivery, education, and caste are statistically significant. Type of family, area, and occupation have no statistically significant association with JSSK awareness.

Table 5-30: Result of the logit model on awareness of JSSK and its predictors

JSSKAwareness	Odd ratio	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Family type:							
:base Joint Family	1						
Nuclear Family	0.835	0.143	-1.05	0.295	0.597	1.17	
Economic status							
:base BPL	1						
APL	0.394	0.075	-4.88	0.000	0.271	0.573	***
Area							
:base Rural	1						
Urban	0.95	0.165	-0.30	0.766	0.675	1.335	
:base 18-25	1						
26-35	0.684	0.124	-2.09	0.037	0.479	0.977	**
36-45	0.614	0.236	-1.27	0.205	0.289	1.306	
Nature of delivery							
:base Normal del.	1						
C-section	1.979	0.492	2.75	0.006	1.216	3.22	***
Employed							
:base no	1						
yes	1.142	0.263	0.58	0.564	0.727	1.794	
Education							
:base ≤10th	1						
12th	0.308	0.084	-4.34	0.000	0.181	0.524	***
≥ Graduation	0.168	0.047	-6.39	0.000	0.097	0.29	***
Caste							
:base General	1						
SC	0.835	0.385	-0.39	0.696	0.338	2.062	
ST	1.072	0.897	0.08	0.934	0.208	5.523	
OBC	0.462	0.165	-2.16	0.031	0.229	0.93	**
Constant	38.306	18.405	7.59	0.000	14.938	98.23	***

Mean dependent var	0.752	SD dependent var	0.432
Pseudo r-squared	0.142	Number of obs	888
Chi-square	141.143	Prob > chi2	0.000
Akaike crit. (AIC)	879.146	Bayesian crit. (BIC)	941.403

*** p<.01, ** p<.05, * p<.1

When compared to joint families, respondents from nuclear families were less aware of JSSK (16.5%). Women from the APL family were 60.6 percent less aware ($p<0.01$) than women from the BPL family (OR-0.39; 95% CI 0.271-0.573). There is no evidence of significant association between the area and awareness in JSSK. Women from the age groups 26-35 and 36-45 were less aware when compared with women from the 18–25 age group. Women from the age group 26-35 were 32 percent ($p<0.05$) less aware, and the association is statistically significant (OR-0.68; 95% CI 0.479-0.977). Women who had c-sections were 98 percent more aware ($p<0.01$) of JSSK than women who had normal deliveries (OR-1.98; 95% CI 1.216-3.22). There was no clear and statistically significant association between occupation and awareness based on this model, in the study area. Women with a 12th class education or higher were less aware of JSSK than women with a 10th class education or less. Women with a 12th grade education were 69 percent ($p<0.01$) less aware of JSSK, while women with a bachelor's degree or higher were 83 percent ($p<0.01$) less aware. When compared to different castes, OBCs, were less aware (54%, $p<0.05$) of the JSSK scheme in the study area (OR = 0.46; 95% CI = 0.229-0.93).

The equation formed can be written as:

$$ln\left(\frac{p}{1-p}\right)=5.99-0.18\,FamType-0.92\text{Economicstatus}-0.057Area-0.28\,age\ group+$$

$$0.69\,natureofdel.-0.84\,edu+0.16\,Occupation-0.27Caste$$

5.5.20 Assessing the model fit:

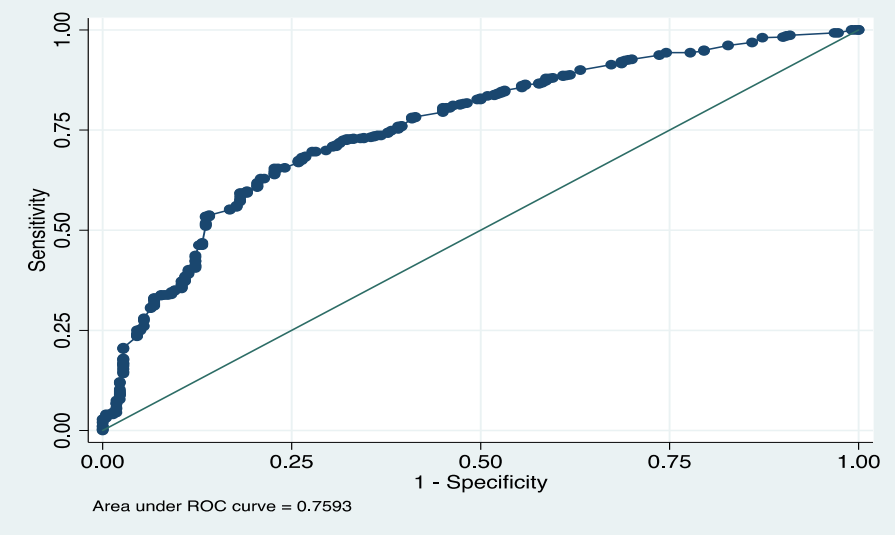
The logistic model's fitness can be determined in many ways. The first way is to check the predictive power of the model (R2). McFadden's R2 is a better choice here (Hosmer, D.W. and N.L. Hjort (2002); Paul D. Allison, Statistical Horizons). Then the classic test for goodness of fit is the chi2 test. If the chi2 test is insignificant, then the model

is good. Here, the Hosmer-Lemeshow chi2 goodness of fit test is used. Similarly, The AUC (area under the curve)-ROC (receiver operating characteristics) curve also can be used for identifying model fitness.

Table 5-31: Result of the model fitness

McFadden's R2:	0.142	AIC	1.008
Maximum Likelihood R2:	0.147	Correctly classified	77.14%
McKelvey and Zavoina's R2:	0.253	Hosmer-Lemeshow chi2(8)	9.11 (p = 0.3332)
Cragg & Uhler's R2:	0.218	Area under ROC curve	0.76

Figure 5.9: The area under the ROC curve (AUC)



The area under the ROC curve (AUC) results are considered excellent for AUC values between 0.9 and 1, good for AUC values between 0.8 and 0.9, and fair for AUC values between 0.7 and 0.8. Our value is 0.76, which is the characteristic of a good model. From tables 5.31 and Figure 5.9, it can be concluded that the model is a good fit to predict the association between explanatory variables and the outcome variable.

5.6 Utilisation of the JSSK Scheme in Malappuram

The second main objective of the study was to identify the extent of utilisation of the JSSK scheme in the Malappuram district of Kerala. Those who opt for government

health institutions for their delivery are eligible to get the benefits of JSSK. Out of 888 respondents, 510 (57.43%) registered to get JSSK scheme benefits (Table 5.32 and Figure 5.10).

Table 5-32: Details of JSSK registration.

	Freq. (N=888)	%
No. of women registered under JSSK scheme	510	57.4
Time of Registration	(N=510)	
1st trimester	275	53.9
2nd trimester	87	17.1
3rd trimester	106	20.8
During Delivery	42	8.2
Registration agent/assistance	(N=510)	
ANM or AWW	206	40.4
ASHA Worker	304	59.6
Place of Registration	(N=510)	
Anganawadis	59	11.5
SCs/PHCs	237	46.5
District/Sub-District Hospital	214	42.0
Time of utilisation	(N=510)	
1st trimester	253	49.6
2nd trimester	92	18.1
3rd trimester	94	18.4
During Delivery	71	13.9

Source: Primary

Out of 510 registered women, 275 (53.9%) registered during 1st trimester of their pregnancy itself. 8.2 percent of women registered during delivery (Table 5.32 & Figure 5.17).

Figure 5.10: % of women registered under JSSK

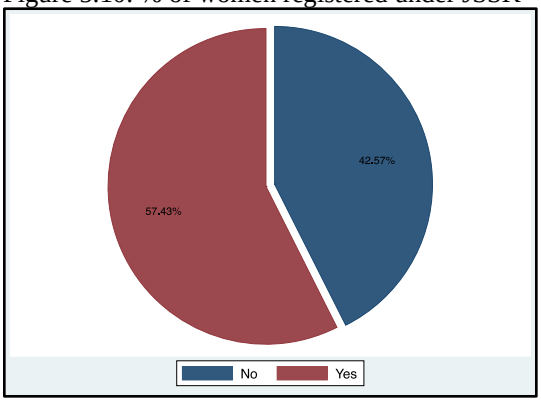
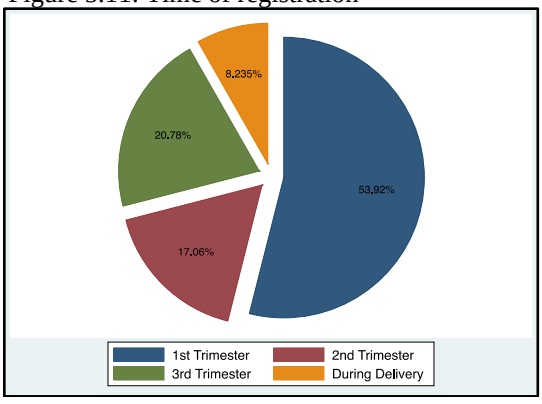


Figure 5.11: Time of registration



Most women (59.6%) received registration support from ASHA workers (Table 5.32 & Chart 5.12). Others (40.4%) received assistance from ANM and AWW.

Many respondents registered from sub centres and public health centres (46.5%), while 42.0% got registered from sub-district hospitals and district hospitals (Table 5.32 and Chart 5.13). Most of the registered women started to utilise the benefits of the programme during the first trimester itself. 13.9 percent of respondents revealed that they utilised the programme at the time of delivery (Table 5.32 and Chart 5.14).

Figure 5.12: Registration assistance

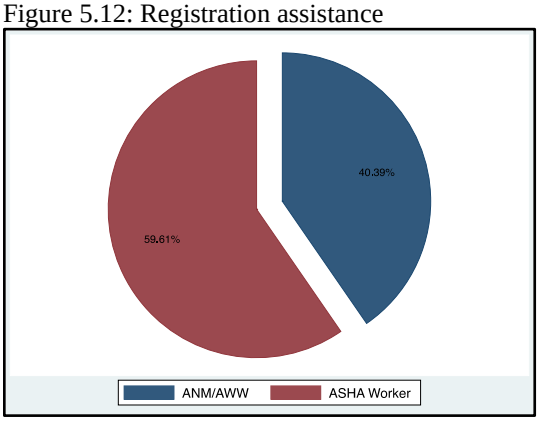


Figure 5.13: Registration place

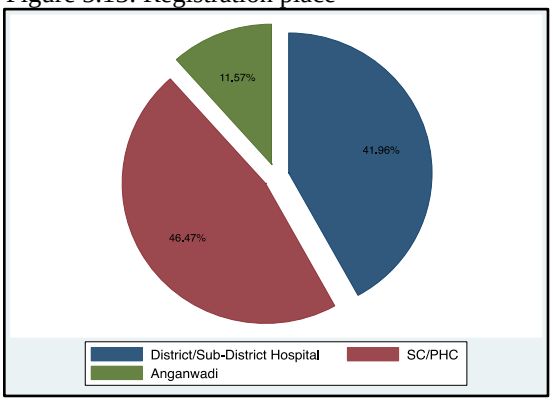
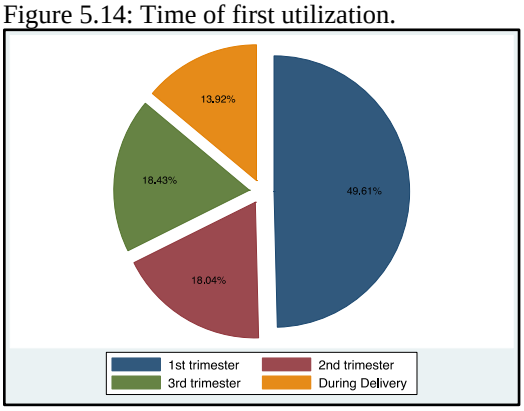


Figure 5.14: Time of first utilization.



5.6.1 Utilisation of the JSSK entitlements by pregnant women

Out of a total of 888 respondents, 510 (57.4%) utilised the scheme, of which 287 (57.2%) were from rural areas and 223 (57.8%) were from urban areas. In case of age groups, 162 (56.5%) were in the 26–35 age group and from rural areas. Based on religion,

185 (83.0%) of the respondents were Muslims from urban areas (Table 5.33). Among the different castes, 186 (83.4%) were from the OBC and urban areas.

Table 5-33: Utilisation of JSSK scheme and profile of the respondents

	Rural	Urban	Total
	287 (57.2%)	223 (57.8%)	510 (57.4%)
Type of Institution			
Government	287 (57.2%)	223 (57.8%)	510 (57.4%)
Private	00 (0.0%)	00 (0.0%)	00 (0.0%)
Age group			
18-25	111 (38.7%)	103 (46.2%)	214 (42.0%)
26-35	162 (56.5%)	122 (50.2%)	274 (53.7%)
36-45	14 (4.9%)	8 (3.6%)	22 (4.3%)
Religion			
Hindu	90 (28.3%)	35 (16.0%)	125 (22.9%)
Muslim	193 (67.3%)	185 (83.0%)	378 (74.1%)
Christian	4 (1.4%)	3 (1.4%)	7 (1.4%)
Caste			
Gen	14 (4.9%)	11 (4.9%)	25 (4.9%)
SC	59 (20.6%)	21 (9.4%)	80 (15.7%)
ST	21 (7.3%)	5 (2.2%)	26 (5.1%)
OBC	193 (67.3%)	186 (83.4%)	379 (74.3%)
Wealth			
BPL	203 (70.7%)	166 (74.4%)	369 (72.4%)
APL	84 (40.1%)	57 (34.0%)	141 (37.4%)
Family Type			
Joint Family	178 (62.0%)	143 (64.1%)	321 (62.9%)
Nuclear Family	109 (38.0%)	80 (35.9%)	189 (37.1%)
Nature of Delivery			
Normal	210 (73.2%)	167 (74.9%)	377 (73.9%)
Caesarian	77 (26.8%)	56 (25.1%)	133 (26.1%)
Education			
≤10th	106 (36.9%)	98 (44.0%)	204 (40.0%)
12th	130 (45.3%)	99 (44.4%)	229 (44.9%)
≥Graduation	51 (17.8%)	26 (11.7%)	77 (15.1%)
Occupation			
No	264 (92.0%)	210 (94.2%)	474 (92.9%)
Yes	23 (8.0%)	13 (5.8%)	36 (7.1%)

Source: Primary Survey

According to their economic situation, 166 (74.4%) of them were below the poverty line and from urban areas. 143 (64.1%) of those who used the plan were from joint families and lived in urban regions. The deliveries of 167 (74.9%) of the respondents were normal

and from urban areas. 130 (45.3%) of those who used the plan had finished the 12th class and were from rural locations. According to the job status of those who used the scheme, 210 (94.2%) were unemployed and from urban areas. A detailed study of those who used the programme is provided below.

5.6.2 Utlisation of JSSK scheme and Area

The present study showed that utlisation of JSSK was almost the same in rural (57.2%) and urban areas (57.8%). With the help of the chi2 test, we can test whether the difference is statistically significant or not (Table 5.34). Here the null hypothesis (H_0) was that there were no significant differences between rural and urban women and the utilisation of JSSK at a 5% confidence interval. The Chi2 test result accepts the null hypothesis that there are no differences in utilisation of JSSK services between rural and urban women.

Table 5-34: Utilisation of JSSK scheme and Area

	JSSK Utilisation		
Area	Not Utilised	Utilised	Total
Rural	215	287	502
	(42.8)	(57.2)	(100.0)
Urban	163	223	386
	(42.2)	(57.8)	(100.0)
Total	378	510	888
	100.00	100.00	100.00
Pearson chi2(1) = 0.0322 Pr = 0.858			

5.6.3 Type of Institution and utilization

Since the benefits of JSSK will only go to those who prefer government hospitals for their deliveries, all the 510 respondents who preferred government hospitals (Table 5.35) received the benefits (100.0%) of JSSK, and all the 378 respondents who preferred private hospitals for their deliveries were not entitled to receive the benefits (0.0%) of

JSSK. The Chi2 test confirms that the differences in type of institution and utilisation are statistically significant.

Table 5-35: Utlisation of JSSK scheme and Types of Institution

	JSSK Utilisation		
Type of Institution	Not Utilised	Utilised	Total
Government	0	510	510
	0.00	100.00	100.00
Private	378	0	378
	100.00	0.00	100.00
Total	378	510	888
	42.57	57.43	100.00
Pearson Chi2 = 888.00 Prob = 0.0000			

5.6.4 Age of the respondents and utilization of JSSK scheme

In comparison to the 18–25 and 26–35 age groups of women, respondents aged 36–45 used the scheme less (47.8%) in the study area (Table 5.36). The scheme was utilised more by the women in the age group 26–35 (58.3%). However, based on the result of the chi2 test, the differences in age and JSSK utilisation are not statistically significant.

Table 5-36: Age of the respondents and utilization of JSSK

	JSSK Utilisation		
Age group	Not Utilised	Utilised	Total
18-25	158	214	372
	42.47	57.53	100.00
26-35	196	274	470
	41.70	58.30	100.00
36-45	24	22	46
	52.17	47.83	100.00
Total	378	510	888
	42.57	57.43	100.00
Pearson Chi2 = 1.88 Prob = 0.3903			

5.6.5 Religion and utilisation of the JSSK scheme

When we look at the relationship between religion and the use of the JSSK scheme in the study area (Table 5.37), we see that Muslims (54.1%) utilised the scheme less than Hindus (69.8%) and Christians (70.0%). Based on the chi2 test, the difference in religion and utilization of JSSK is statistically significant too ($p<0.001$).

Table 5-37: Religion and utilisation of the scheme

	JSSK Utilisation		
Religion	Not Utilised	Utilised	Total

Hindu	54	125	179
	30.17	69.83	100.00
Muslim	321	378	699
	45.92	54.08	100.00
Christian	3	7	10
	30.00	70.00	100.00
Total	378	510	888
	42.57	57.43	100.00
Pearson Chi2 = 15.12 Prob = 0.0005			

5.6.6 Caste and JSSK Utilization

If we examine the utilisation of the JSSK scheme by caste, we find that it was lowest among women (Table 5.38) who belong to general (46.3%) and OBCs (54.1%) as compared to SCs (75.5%) and STs (92.9%). Disparities in utilisation by caste are statistically significant ($p<0.01$).

Table 5-38: Caste and utlisation of JSSK scheme

	JSSK Utilisation		
Caste	Not Utilised	Utilised	Total
General	29	25	54
	53.70	46.30	100.00
SC	26	80	106
	24.53	75.47	100.00
ST	2	26	28
	7.14	92.86	100.00
OBC	321	379	700
	45.86	54.14	100.00
Total	378	510	888
	42.57	57.43	100.00
Pearson Chi2 = 34.32 Prob = 0.0000			

5.6.7 Wealth and utilisation

When compared to women in the BPL category (Table 5.39), women in the APL category used the JSSK scheme the least (34.9%), and the difference is statistically significant ($p<0.01$).

Table 5-39: Wealth and utlisation of JSSK

	JSSK Utilisation		
Wealth	Not Utilised	Utilised	Total
BPL	115	369	484
	23.76	76.24	100.00
APL	263	141	404

	65.10	34.90	100.00
Total	378	510	888
	42.57	57.43	100.00
Pearson Chi2 = 153.92 Prob = 0.0000			

5.6.8 Family Type and utilization of JSSK scheme

Based on the type of family, when compared with women from joint families (62.0%), those from nuclear families were less utilised (50.9%) the scheme (Table 5.40). The chi2 test results show that the difference in utilisation based on family type is statistically significant ($p<0.01$).

Table 5-40: Family type and Utilisation of JSSK scheme

	JSSK Utilisation		
Family type	Not Utilised	Utilised	Total
Joint Family	196	321	517
	37.91	62.09	100.00
Nuclear Family	182	189	371
	49.06	50.94	100.00
Total	378	510	888
	42.57	57.43	100.00
Pearson Chi2 = 10.98 Prob = 0.0009			

5.6.9 Education and Utilisation of JSSK

When the utilisation of JSSK scheme in the study area was compared based on respondents' education, it was found that less educated women utilized the scheme more (Table 5.41). The utilisation rate among women with a high school or less was 82.9 percent, while it was only 26.4 percent for women with a bachelor's degree or higher. According to the chi2 test, the difference is also statistically significant ($p<0.01$).

Table 5-41: Education and Utilisation of JSSK scheme

	JSSK Utilisation		
Education	Not Utilised	Utilised	Total
≤10th	42	204	246
	17.07	82.93	100.00
12th	121	229	350
	34.57	65.43	100.00
≥ Graduation	215	77	292
	73.63	26.37	100.00
Total	378	510	888
	42.57	57.43	100.00

Pearson Chi2 = 189.80 Prob = 0.0000

5.6.10 Occupation and Utilisation of JSSK scheme

When compared to unemployed women, employed women used the JSSK at a much lower rate (Table 5.42). Only 25.5 percent of the working women utilised the programme. However, among the beneficiaries of JSSK, 63.4 percent were not working. The chi2 result also confirms this that the difference in utilisation based on occupation is statistically significant ($p<0.01$).

Table 5-42:Occupation and Utilisation of JSSK scheme

	JSSK Utilisation		
employed	Not Utilised	Utilised	Total
no	273	474	747
	36.55	63.45	100.00
yes	105	36	141
	74.47	25.53	100.00
Total	378	510	888
	42.57	57.43	100.00
Pearson Chi2 = 69.77 Prob = 0.0000			

5.6.11 Nature of delivery and Utilisation of JSSK scheme

When examined the JSSK utilisation status in the Malappuram district of Kerala based on the nature of delivery, it is found that the utilisation was very high among women who had C-sections (79.2%), compared to 52.4% in cases of normal delivery (Table 5.43). The distinction is also statistically significant ($p<0.01$).

Table 5-43: Nature of delivery and Utilisation of JSSK scheme

	JSSK Utilisation		
Nature of delivery	Not Utilised	Utilised	Total
Normal del	343	377	720
	47.64	52.36	100.00
C-section	35	133	168
	20.83	79.17	100.00
Total	378	510	888
	42.57	57.43	100.00
Pearson Chi2 = 40.04 Prob = 0.0000			

5.6.12 Predictors of utilisation of JSSK scheme in Malappuram

To identify the predictors of utlisation of JSSK scheme in the Malappuram district of Kerala, binary logit model is used. The model has already described in the previous section. Here the outcome variable is whether respondents had utlised JSSK scheme or not (dichotomous-Yes/No). The predictors are the demographic and socio-economic factors like the age of mothers (trichotomous-age group 18-25, 26-35 and 36-45), area of residence (dichotomous-urban/rural), family type (Joint/Nuclear), education (trichotomous- $\leq 10^{th}$, 12^{th} and $\geq$ Graduation), economic status (dichotomous-BPL/APL), nature of delivery (dichotomous-normal/caesarian), and religion (trichotomous- Hindu, Muslim and Christian).

Mathematically the regression model has the following form:

$$ln\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8$$

Where:

β_0 = Constant

$\beta_1 - \beta_8$ = Coefficients

$X_1 - X_8$ = Explanatory variables

p = Probability of happening an event

$1 - p$ = Probability of not happening an event

$\frac{p}{1-p}$ = Odd ratio

The probabilities of the event of interest are given by the following logistic regression equation:

$E(pi) = \frac{exp^{\beta 0+\beta iXi}}{1+exp^{\beta 0+\beta iXi}}$ 0<p<1

Table 5-44: Result of the binary logistic model for the predictors of JSSK utilisation

JSSK Utilisation	Odd Ratio	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Family type							
: base Joint Family	1						
Nuclear Family	0.676	0.116	-2.27	0.023	0.482	0.947	**
Economic Status							
: base BPL	1						
APL	0.244	0.043	-7.96	0.000	0.172	0.345	***
Area							
: base Rural	1						
Urban	0.821	0.142	-1.14	0.255	0.584	1.153	
Age group							
: base 18-25	1						
26-35	1.022	0.184	0.12	0.906	0.718	1.453	
36-45	0.651	0.261	-1.07	0.285	0.297	1.429	
Nature of delivery							
: base Normal del.	1						
C-section	3.995	0.986	5.61	0.000	2.463	6.481	***
Education							
: base ≤10th	1						
12th	0.368	0.085	-4.35	0.000	0.234	0.577	***
≥ Graduation	0.116	0.029	-8.56	0.000	0.071	0.190	***
Occupation							
: base no	1						
yes	0.331	0.085	-4.29	0.000	0.200	0.548	***
Religion							
: base Hindu	1						
Muslim	0.466	0.106	-3.37	0.001	0.299	0.727	***
Christian	2.119	1.916	0.83	0.407	0.360	12.475	
Constant	18.805	6.325	8.72	0.000	9.727	36.355	***

Mean dependent var	0.574	SD dependent var	0.495
Pseudo r-squared	0.292	Number of obs	888
Chi-square	354.049	Prob > chi2	0.000
Akaike crit. (AIC)	881.286	Bayesian crit. (BIC)	938.754

**** p<.01, ** p<.05, * p<.1*

5.6.13 Result of the logistic regression model

Here the result of logistic regression given odd ratio which gives a clear idea of association between the utilisation and demographic and socio-economic characteristics of respondents (Table 5.44). When compared with the age group of 18-25 and 26-35 of respondents, women from the age group 36-45 were 35.0 percent lesser utilised the scheme.

But there is no statistical evidence for this association. Similarly, respondents from urban areas were lesser utilised (18%) the scheme when compared with their rural counterparts. Here also no statistical significance found.

The type of family is a significant predictor of the utilisation of the JSSK scheme in the study area. Women from nuclear families were 32 percent ($p<0.05$) less likely to use the scheme than women from joint families (OR: 0.68; 95% CI: 0.482-0.947). Education is a strong predictor of JSSK utilisation in the study area. When compared to respondents with a 10th or lower education level, women who completed a 12th class were 63 percent ($p<0.01$) less likely to use the scheme (OR-0.37; 95% CI 0.234-0.577), whereas respondents with a graduation or higher education level were 88 percent ($p<0.01$) less likely to use the scheme (OR-0.12; 95% CI 0.071-0.190). Economic status is also a strong predictor of utlisation of the scheme in the study area. In which case, if the respondent is from the APL family, they are 76% (p 0.01) less likely to use the scheme (OR = 0.24, 95% CI = 0.172-0.345). The nature of delivery is another strong predictor of JSSK scheme utlisation in the study area. If the nature of delivery is C-section when compared with normal delivery, the chances of utilising the scheme were four times or 300% higher (OR-3.99; 95% CI 2.463-6.481; $p<0.01$). There is a strong association between the occupation of the respondents and the utilisation of the scheme. If the respondents were employed, then 67% ($p<0.01$) less likely to utilise the scheme (OR-0.33; 95% CI 0.200-0.548). If we examine the use of the scheme in Malappuram based on religion, it also strongly associates. When compared to Hindu respondents, Muslims are 53 percent ($p<0.01$) less likely to use the scheme (OR = 0.47; 95% CI = 0.299-0.727).

5.6.14 The model fit:

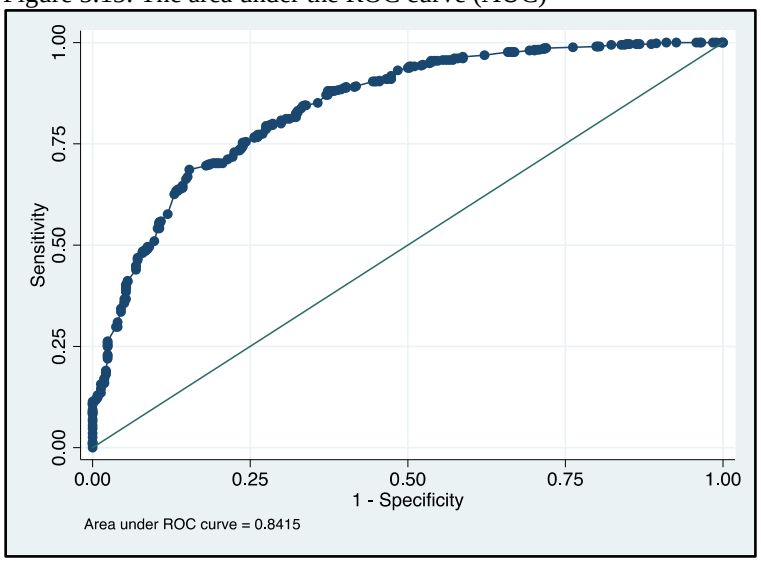
For assessing the model fitness, we used the same method that we used in the previous session, i.e, R2, Hosmer-Lemeshow chi2, and area under the ROC curve. The values of the pseudo-R squares range from 0.29 to 0.45, indicating that the model correctly explains variation in the outcome variable from 29 percent (McFadden's R2) to 45 percent (McKelvey and Zavoina's R2). It is also worth noting here that in logistic regression, the values of R2 don't make much sense. Another characteristic of a good model is an insignificant chi2 test. Hosmer-Lemeshow chi2 test is insignificant here (p=0.62). In 75.9 percent of cases, the model correctly classified positive and negative predictive values.

Table 5-45: Result of the model fitness

McFadden's R2:	0.292	AIC	1.010
Maximum Likelihood R2:	0.329	Correctly classified	75.90%
McKelvey and Zavoina's R2:	0.456	Hosmer-Lemeshow chi2(8)	6.24 (p = 0.6208)
Cragg & Uhler's R2:	0.442	Area under ROC curve	0.84

The value of area under the ROC curve (AUC) is 0.84, which is characteristic of a good model. Thus, from Table 5.45 and Figure 5.15, we can conclude that the model is a good fit to predict the association between explanatory variables and the outcome variable.

Figure 5.15: The area under the ROC curve (AUC)



5.6.15 Relation between Awareness and Utilisation of JSSK

The χ^2 test of independence was used to examine the association between awareness and utilisation of JSSK. The hypotheses are:

H_0: There is no association between awareness and utilisation of JSSK services.

H_A: There is an association between awareness and utilisation of JSSK services.

If the χ^2 test is significant, then the H_0 is not accepted and H_A is accepted, suggesting a significant association between awareness and utilization of JSSK services.

Table 5-46: Relation between awareness and utilization of JSSK

	JSSK Utilisation		
JSSK Awareness	Not Utilised	Utilised	Total
Not aware	220	0	220
	100.00	0.00	100.00
Aware	158	510	668
	23.65	76.35	100.00
Total	378	510	888
	42.57	57.43	100.00
Pearson Chi2 = 394.58 Prob = 0.0000			

Sample information on awareness and utilisation of the JSSK scheme is presented in Table 5.46. Out of 888 respondents, 668 (75.2%) were aware of the JSSK scheme, and 220 (24.8%) were not aware of the JSSK scheme. Out of 668 respondents who were aware of JSSK, 510 (76.4%) utilised the scheme. 158 people (23.6 percent) were aware of JSSK but did not use their free JSSK entitlements. The scheme was unknown to 220 respondents, who did not take advantage of it. The chi-square (χ2=394.6) statistic was found to be significant at 1 percent, meaning there is a statistically significant association between awareness and utilisation of the JSSK scheme in the study area.

5.6.16 Free entitlements to pregnant women under JSSK and their utilization

There are certain free entitlements for pregnant women under JSSK. Every woman who chooses a government health facility for her maternal care is eligible. Out of 888

respondents, 510 (57.43%) of the pregnant women utilised any of the free entitlements under the JSSK scheme (Table 5.47 and Figure 5.16). Free delivery was used by 494 pregnant women (55.63%).C-sections made up 133 of these (26.9%). 435 respondents (49.0%) utilised the entitlement to free drugs and consumables. 378 (42.57%) women utilised free diagnostics under the scheme.

Table 5-47: Utilisation of various free entitlements under JSSK to pregnant women

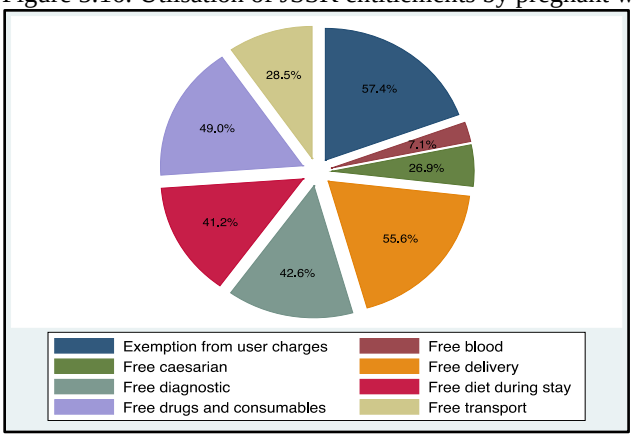
Entitlements	Freq. (N=888)	Percentage
Free delivery	494	55.6
Free caesarian	133	26.9
Free drugs and consumables	435	49.0
Free diagnostic	378	42.6
Free diet during stay	366	41.2
Free blood	63	7.1
Free transport	253	28.5
Exemption from user charges	510	57.4

Source: Primary

366 (41.22%) women received free diet during stay in the hospital at the time of delivery. 63 respondents (7.1%) utilised the provision of free blood. 510 women (57.4%) received exemption from all kinds of user charges. 253 women (28.5%) utilised the provision of free transport.

Provision of free blood (22.3%) and exemption from all kinds of user charges (25.23%) were the two entitlements about which the respondent is least aware.

Figure 5.16: Utlisation of JSSK entitlements by pregnant women



From the chart, we can easily identify that exemption from user charges, free delivery, and free drugs and consumables were the major free entitlements that most of the respondents utilised.

5.6.17 Free entitlements to sick new-born and their utilization:

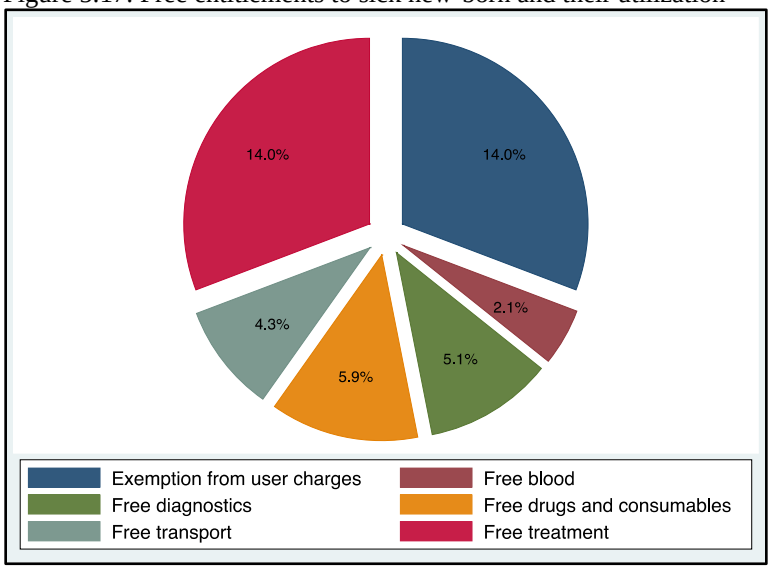
In the study area, use of the free entitlement for sick newborns is extremely low. 124 (14%) sick newborns received free treatment under the JSSK scheme (Table 5.48 and Figure 5.17). 52 children accessed (5.9%) free drugs and consumables, whereas only 45 children accessed free diagnostics. 38 sick newborns received free transport facilities, while only 20 sick newborns took advantage of the provision of free blood. All children who used any free entitlement were exempted from all kinds of user fees.

Table 5-48: Free entitlements to sick new-born and their utilisation

Entitlements	Freq. (N=888)	Percentage
Free treatment	124	14.0
Free drugs and consumables	52	5.9
Free diagnostics	45	5.1
Free blood	20	2.1
Free transport	38	4.3
Exemption from user charges	124	14.0

Source: Primary

Figure 5.17: Free entitlements to sick new-born and their utilization



5.6.18 Block-wise utilisation of the JSSK scheme in the study area

There are 15 administrative blocks in Malappuram district of Kerala. If we analyse the utilisation of JSSK scheme based on administrative blocks (Table 5.49) it was highest in Ponnani (97.73%), Perumpadappu (77.78%) and Perinthalmanna (77.45%) blocks whereas it was lowest in Tanur (19.4%) and Kuttippuram (17.1%).

Table 5-49: Block-wise analysis of JSSK Utilisation

Blocks	Freq.(N=888)	Percentage
Areekode	36	46.75
Kalikavu	8	50.00
Kondotty	16	69.57
Kuttippuram	7	17.07
Malappuram	57	48.31
Mankada	15	41.67
Nilambur	40	67.80
Perinthalmanna	79	77.45
Perumpadappu	14	77.78
Ponnani	86	97.73
Tanur	7	19.44
Tirur	82	54.30
Tirurangadi	35	68.63
Vengara	10	28.57
Wandoor	18	48.65
Total	510	57.43

Source: Primary survey

5.6.19 JSSK Utilization and Motivation

According to the survey results, the biggest motivating factors for the utilisation of the JSSK scheme were ASHA and Anganawadi workers (42.0%) and family members (39.6%). Friends, ANMs, and doctors were also motivated to utilise the scheme (Figure 5.18).

Figure 5.18: Motivation for the utilization of JSSK

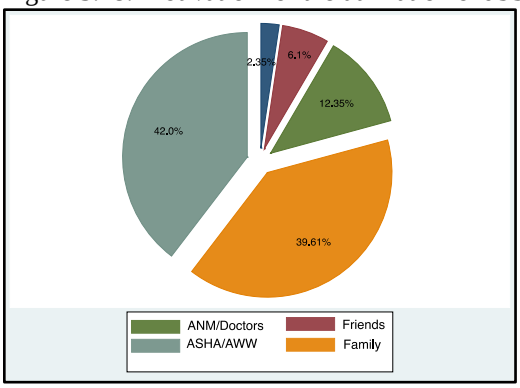
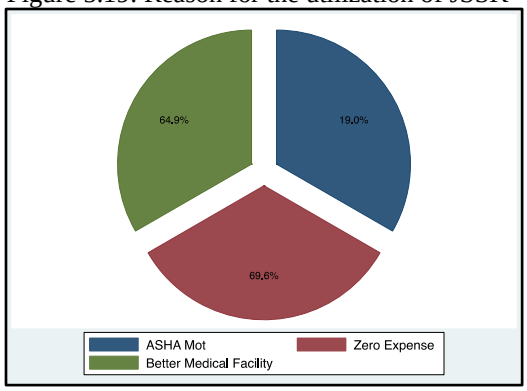


Figure 5.19: Reason for the utilization of JSSK



If we analyse the reason for utlisation of JSSK (Figure 5.19), most of the respondent's opinion was zero expenditure during delivery (69.6%). 64.9% of women believed that better medical facilities were the reason behind the utilisation of the programme. 19% women said that ASHA workers motivated them to avail the benefits under the JSSK scheme.

5.6.20 ASHA Workers and JSSK utilization

ASHA workers' services and roles were evaluated through a series of opinion polls conducted among all respondents. Out of a total of 888 respondents, 674 women (75.9%) stated that they were always available (Figure 5.20). While 201 (22.64%) respondents said that they were often available. 13 respondents (1.5%) said ASHAs were seldom available.

Figure 5.20: Availability of ASHA

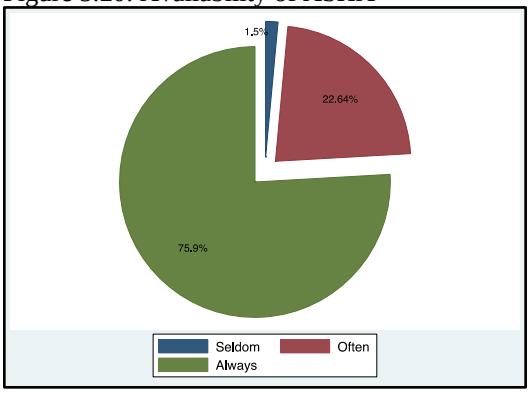


Figure 5.21: Behaviour of ASHA

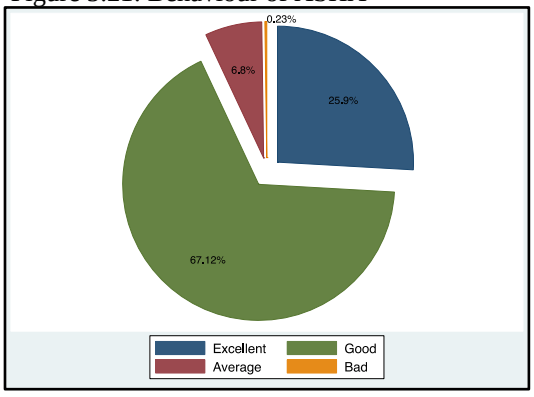


Figure 5.22: ASHA service satisfaction

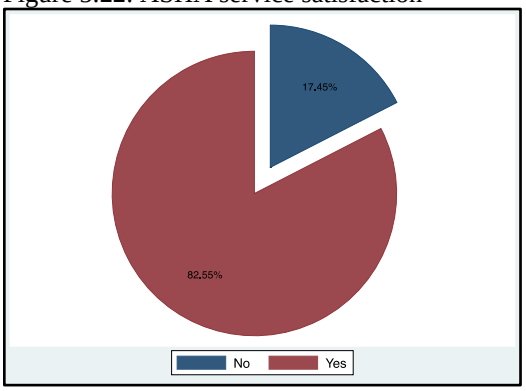
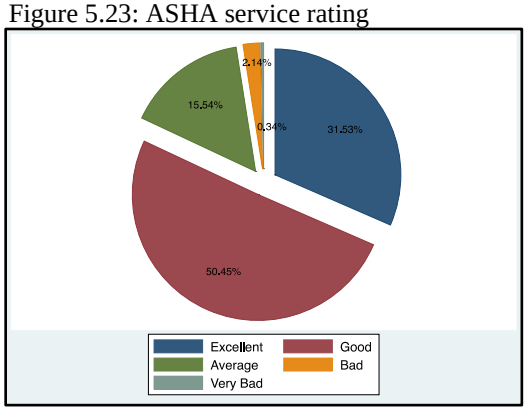


Figure 5.23: ASHA service rating

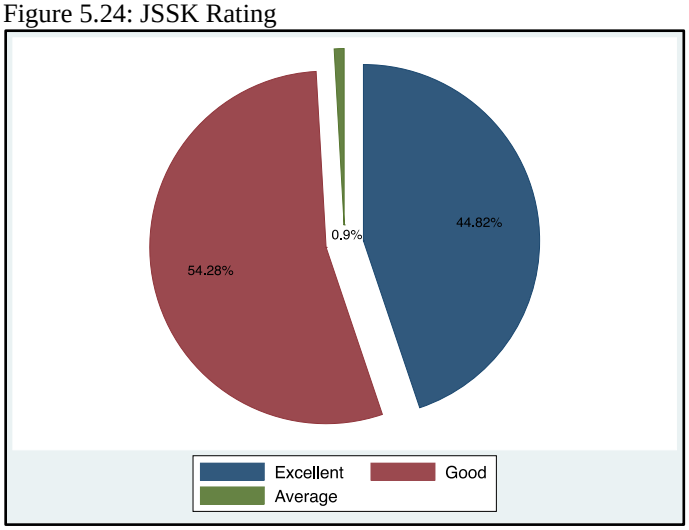


230 out of 888 respondents said the behaviour of ASHA workers was excellent (Figure 5.21), while 596 (67.12%) marked it as 'good'. 733 (82.55%) opined that the services of ASHA workers were satisfactory, while 155 (17.45%) were not satisfied with the services of ASHA workers (Figure 5.22). The overall rating of ASHA workers depicts 31.5% as excellent, 50.5% as good, and 15.5% as average (Figure 5.23).

5.6.21 Rating of JSSK scheme

398 respondents (44.8%) had given an overall rating of 'excellent' to the JSSK scheme (Figure 5.24). 482 (54.3%) gave a rating of 'good'. The average was given to 8 (0.9%) of the respondents.

Figure 5.24: JSSK Rating



5.6.22 Discussion

Out of 888 respondents, 668 (75.2%) were aware of the JSSK scheme, implying that most of the population in the study area is aware of the scheme. In rural areas, awareness is 74.5 percent, and in urban areas, it is 76.2 percent. The respondents who were aware of the JSSK scheme, mostly selected a government hospital for delivery. Respondents between the ages of 26 and 35; Hindus, SC/STs, and BPLs; joint families; those who had completed their 12th grade; were unemployed; were JSSK beneficiaries; or preferred government health institutions for delivery were more aware of the JSSK scheme in the study area.

At block levels, respondents from Ponnani blocks were more aware, while those from Kuttippuram blocks were least aware. The high awareness among those who preferred government health institutions for their delivery, Hindus, SC/STs, BPL, from joint families, whose education was 10th or less, not employed, who had normal deliveries, and JSSK beneficiaries is statistically significant too, based on chi2 statistics. ASHA workers are the main source of awareness in the study area. Most women know about JSSK prior to their pregnancies. In case of JSSK free entitlements, awareness was highest about free delivery and lowest about the provision of free blood.

Regarding the awareness of free entitlement to sick newborns, it is highest for free treatment and lowest for free blood. Most of the family members and neighbours are still unaware of the scheme. ASHA workers and Anganawadi Workers mainly focused on poor rural women who were mostly unemployed and less educated so that the awareness was well among them.

Binomial logistic regression revealed that respondents from the APL family, the 26-35 age group, those with a high school or higher, and those with normal delivery were

less aware of the scheme, whereas respondents who had a c-section were more aware of it and are statistically significant predictors of the JSSK scheme's awareness in the study area.

Most of the women registered under the JSSK scheme in the first trimester itself. Mainly, ASHA workers helped them to get registered. Most of them registered at Sub Centres and Primary Health Centres. Most of them started utilising the JSSK benefits during the first trimester itself.

Out of total 888 respondents 510 (57.4%) utilised the scheme, JSSK for mother and child healthcare. The utilization among those respondents who belongs to Muslim, caste general and OBC, APL category, nuclear family, had graduation and above, employed and had normal delivery were less utilised the scheme and the difference is statistically significant at 5 percent significance level based on chi2 test.

Based on binomial logistic regression model respondents belongs to nuclear family, APL category, had 12^{th} or more education, employed, and Muslim were less utilized and respondent who had c-section were more utilised the scheme, and all these are the statistically significant predictors of the utilisation of JSSK scheme in the study area.

Based on chi2 test, the study concludes that there is statistically significant positive association between awareness and utilization of the scheme, when the awareness is higher utilization also will be higher.

In terms of use of the JSSK scheme available to pregnant women, the entitlement to free delivery received the most attention, while the entitlement to free blood received the least. In terms of entitlements for sick newborns, the most used entitlement was free treatment, while the least frequently used entitlement was the provision of free blood. In

case of administrative blocks, it is widely used by the Ponnani block and least utilised by the Kuttippuram block.

The main source of motivation for the utilisation of the scheme is ASHA workers, and the reasons for utilisation are zero expense and better medical facilities. Most of the respondents acknowledged the services of ASHA workers and accorded ‘excellent’ grade. Similarly, most of the respondents accorded the JSSK scheme an "excellent" rating.

5.6.23 Conclusion

Even though ASHA and Anganawadi workers have made every effort to ensure that all socioeconomic groups are aware of the scheme and utilise its benefits, the study's findings show that not all facets of society have taken advantage of it. Poor rural women who were less educated and unemployed benefited more from the programme due to the high OoPE for delivery in private health facilities. The main reason for this is the overcrowding of government hospitals and the supply-demand mismatch. Government health facilities are not able to provide all services in response to public demand regarding maternal and child health. This causes unnecessary inconvenience to the beneficiaries in the form of delays in getting quality services. In government hospitals, there is a lag as well as uncertainty in receiving services. So those who can bear the cost of healthcare in private hospitals go there for maternal and child healthcare, especially for delivery care. This is the primary reason for the low utilisation of the JSSK scheme in the Malappuram district of Kerala

Chapter 6: OoPE of Hospital Delivery in Kerala and Malappuram

6.1 Introduction

Developing nations account for 98 percent of worldwide maternal fatalities[64]. This is mostly due to a shortage of safe delivery options, especially among the poor, where healthcare costs can be unaffordable for many families[65]. Maternal deaths in India is still very high. Maternal deaths from state to state, with Kerala having the lowest rate at 95 maternal deaths per one million live births and Assam having the highest rate at 480 maternal deaths per one million live births. In 2017, India had 130 maternal fatalities per 100,000 live births, ranging from 46 in Kerala to 237 in Assam[66].

Literature suggests that increasing access to maternal health care could save more than 75 percent of maternal deaths[67]. "A significant proportion of women in India give birth at home without professional assistance, and one in six women cites hefty Out-of-Pocket Expenditure (OoOPE) as a rationale for choosing home delivery over hospital birth. In 1993, 74 percent of births in India occurred at home without professional help (NFHS-1, 1993)". 61 percent of Indian women delivered at home without professional help in 2005-2006. In 2015-2016, 21 percent of births in India occurred at home without professional help. JSY implementation has improved hospital delivery, according to research[68]. According to the latest NHM quarterly progress reports, deliveries in hospital have only slightly improved from 2013 to 2018[69]. Despite reductions in MMR, OoPE for

[64] World Health Organization, 2012.
65 United Nations Children's Fund, 2008
66 NITI, 2017
67 Tellis et al., 2018
[68] Lim et al., 2010
[69] Shukla and Kapur, 2019

hospital deliveries and maternity care remain substantial, even catastrophic for certain rural Indian households[70]. 18 percent of Indian households had catastrophic health costs in 2012, according to the Consumer Expenditure Survey[71]. A good number of Indians are poor due to health care costs[72]. Kerala has the highest rate of institutional births (99.9%), while Nagaland has the lowest (32.8%), according to the 4th National Family Health Survey, 2015-16.

In developing countries, one of the greatest problems facing public health is the rising expense of health care. Even while the home continues to be the major source of funding for health care, the amount of poverty, suffering, and debt as a result of high OOPE is rising[73]. In addition to making already poor families poorer, OOPE on medical care causes non-poor households to become more poorer. Women may choose not to have ANCs, deliveries, or PNCs in medical facilities due to excessive out-of-pocket expenses, or they may be compelled to seek distress finance to pay for the procedures.

The prevalence of both public and private healthcare facilities, poor public health infrastructure, high costs of care, and limited insurance coverage set India's healthcare system apart. In India, the rising usage of private health facilities and high OOPE are caused by the poor quality of treatments at public health centres and the lack of insurance coverage. The proportion of overall health expenditures attributable to OOPE has remained high over time: 69.4 percent in 2004, 64.2 percent in 2014, and 62.5% in 2015[74]. The CHS

[70] Bonu et al., 2009; Mohanty and Kastor, 2017; Shukla et al., 2015
[71] NHSRC, 2017
[72] The Commonwealth Fund, 2017
[73] Garge, CC et al., 2009
[74] Ministry of Health and Family Welfare, Government of India. National Health Accounts, India., 2009; 2016; 2017

was highest in Kerala (37.2%) and lowest in Assam (8.9%) among the main Indian states[75].

Since one of the goals of JSSK was to eliminate OoPE during childbirth in order to boost institutional births and reduce MMR and IMR, our research intends to examine the out-of-pocket expenses incurred by individuals who choose government health institutions for delivery versus those who prefer private health institutions for delivery.

We used unit data from the National Family Health Survey 2019-21 (NFHS-5), which offers data on the population, health, and nutrition of India and each state/union territory (UT). NFHS-5, like NFHS-4, gives estimates at the district level for several crucial parameters. Key trends and data for India are included in this official document. 17 Field Agencies conducted the NFHS-5 fieldwork in India in two phases, from 17 June 2019 to 30 January 2020 and from 2 January 2020 to 30 April 2021. They gathered information from 636,699 households, 724,115 women, and 101,011 men. There are separate data files available for each Indian State/UT and District (NFHS-5, 2019-21). In addition to the NFHS-5 data analysis, an analysis of primary data collected from Malappuram district through pre-structured questions was also done.

6.1.1 OoPE during delivery in Kerala

According to NFHS-4 data (Table 6.1), OoPE during delivery in Kerala was higher than the national average (Rs. 3197) for all districts, and it was also higher than the state average (6901) for Kannur, Pathanamthitta, Thiruvananthapuram, Alappuzha, and Kollam. When we come to the NFHS-5 data, OoPE is higher for all the districts than the national average (2916). Kasaragod has the lowest rate (Rs.3778) and Alappuzha has the highest

[75] Mohanty, SK et al., 2018

rate (10,557). In Malappuram, it was Rs. 6760 higher than the state average (Rs. 6710) and NFHS-4 period (Rs. 6202).

Table 6-1: OoPE in Government Health Institutions

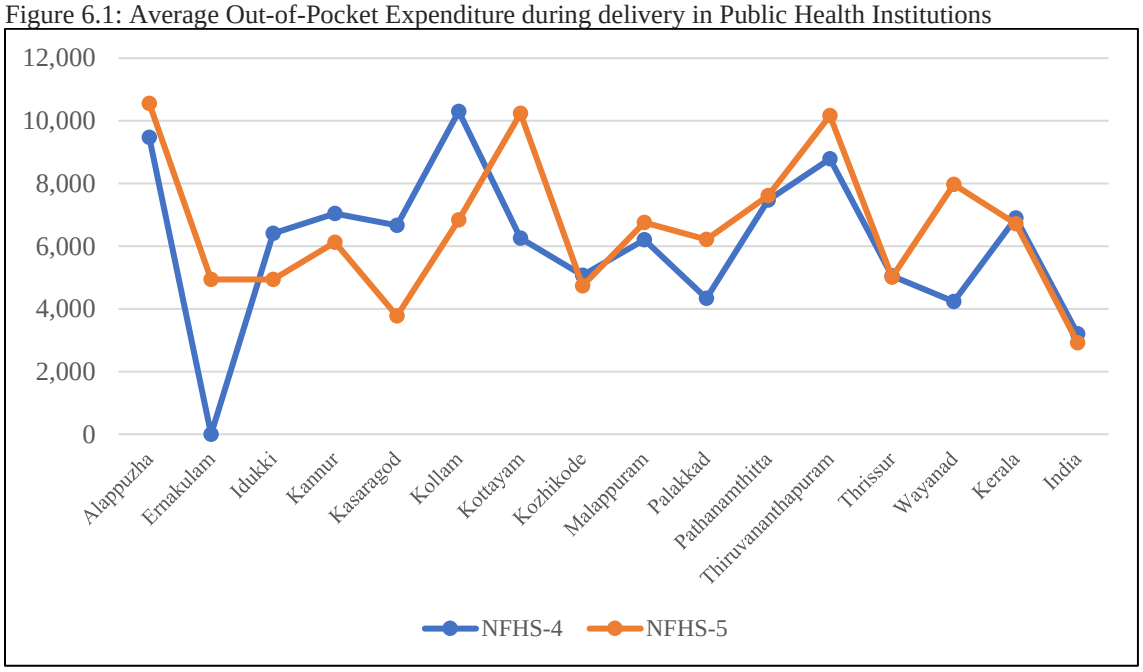
	Indicator	NFHS-4 (2015-16)			NFHS-5 (2019-21)		
		Mean	Median	IQR	Mean	Median	IQR
India	OoPEGHI	3,197	1500	2500	2,916	1500	3500
	OoPEPHI	17879.3	13000	19000	25380.25	20000	25000
Kerala	OoPEGHI	6,901	5000	7000	6,710	5000	7500
	OoPEPHI	25991.8	25000	23500	35390.1	30000	30000
Kasaragod	OoPEGHI	6,659	5000	3000	3,778	6000	14000
	OoPEPHI	25991.8	25000	21500	29316.7	25000	15000
Kannur	OoPEGHI	7,044	2000	1500	6,125	6500	7500
	OoPEPHI	31196.4	30000	18000	39466.7	35000	25000
Wayanad	OoPEGHI	4,232	2000	1000	7,967	10000	18000
	OoPEPHI	22444.4	15500	19000	36325.6	36000	30000
Kozhikode	OoPEGHI	5,068	5000	7000	4,734	4000	4000
	OoPEPHI	24477.8	16000	20000	32400	30000	21000
Malappuram	OoPEGHI	6,202	8500	10000	6,760	8000	12500
	OoPEPHI	16148.2	12000	10000	32676.5	30000	20000
Palakkad	OoPEGHI	4337	5000	7500	6211	5000	7000
	OoPEPHI	22085.4	18000	16000	26300.0	25000	10000
Thrissur	OoPEGHI	5,053	5000	3000	5,007	5000	14000
	OoPEPHI	23939.4	20000	15000	30681.8	28000	10000
Ernakulam	OoPEGHI	--	15000	8500	4,940	7000	7000
	OoPEPHI	29780.4	25000	15000	35030.3	30000	25000
Idukki	OoPEGHI	6,411	6000	6000	4,942	5000	2000
	OoPEPHI	33142.9	30000	23000	31100	28000	20000
Kottayam	OoPEGHI	6,260	5000	1000	10,236	5000	17000
	OoPEPHI	21153.9	20000	18000	35000	30000	34000
Alappuzha	OoPEGHI	9,472	10000	4000	10,557	6250	10000
	OoPEPHI	28152	25000	16000	36625	30000	37000
Pathanamthitta	OoPEGHI	7,467	5000	13000	7,608	5175	9650
	OoPEPHI	38187.5	36500	25000	44095.2	40000	20000
Kollam	OoPEGHI	10,299	5000	11000	6,836	5000	8000
	OoPEPHI	30363.5	30000	20000	50333.3	50000	20000
Thiruvananthapuram	OoPEGHI	8,788	15000	25000	10,165	3500	17000
	OoPEPHI	28095.2	25000	15000	40484.6	31000	23000

Source: Demographic and Health Survey, USAID, 2019-21

The out-of-pocket expenditure has not been eliminated even after the implementation of JSSSK. From the data, we can see that it is slightly declining when compared with NFHS-4 and NFHS-5 data for India and Kerala. When it comes to districts,

we can see a mixed picture in Kerala, where Kasaragod, Kannur, Kozhikode, Idukki, and Kollam have seen a slight decrease, while the rest of the districts have seen an increase. The median out-of-pocket expenditure in public health institutions in India was Rs.1500 whereas it was quite high in Kerala (Rs. 5000). It was higher than the national and state average for Malappuram district (Rs. 8000) based on NFHS-5 data. The Inter Quartile Range[76] is also higher in Malappuram (Rs.12,500) than the state (Rs.7500) and national (Rs.3500) averages (Figure 6.1).

Figure 6.1: Average Out-of-Pocket Expenditure during delivery in Public Health Institutions



When compared the out-of-pocket expenditure in private and public health institutions, it was much higher in private health institutions. On the basis of NFHS-4, it was quite clear that mean and median OoPE during delivery in private health institutions were lowest in Malappuram (Rs. 16148 and Rs. 12000), lower than the national (Rs. 17879

[76] The IQR represents the variation between Q3 and Q1. In data sets containing outliers or skewed distributions, the interquartile range is the most reliable measure of variability. It's based on values from the middle half of the distribution, so it's not likely to be affected by outliers.

and Rs. 13000) and state (Rs. 25992 and Rs. 25,000) averages. Pathanamthitta had the highest (Rs. 38188 and Rs. 36500). In the case of NFHS-5 data, the mean and median OoPE during delivery in private health institutions in Malappuram were Rs. 32676 and Rs. 30000, which were higher than the national average (Rs. 25380 and Rs. 20000) but less than the state average (Rs. 35390 and Rs. 30000). Palakkad has the lowest (Rs. 26300 and Rs. 25000) and Kollam has the highest (Rs. 50333 and Rs. 50000) mean and median OoPE in private health institutions respectively.

6.1.2 Empirical Analysis

For empirically testing whether the differences in OoPE in Government Health institutions and Private Health Institutions are statistically significant, first we have to check for the normality of the data. For this, the Shapiro-Wilk, Shapiro-Francia, and Skewness/Kurtosis tests are used. The result of all three tests says that both variables are normally distributed (Table 6.2).

Table 6-2: Shapiro-Wilk test for normal data

Variable	Obs	W	V	z	Prob>z
mOoPEGHI	14	0.909	1.679	1.020	0.154
mOoPEPHI	14	0.952	0.895	-0.219	0.587

Note: mOoPGHI-mean OoPE in government health institutions; mOoPEPHI-mean OoPE in Private health institutions

This simply means that we have to use a parametric hypothesis testing tool to check whether the differences in mean OoPE in government and private health institutions are statistically significant. At a 5% significance level, we used a paired t-test to test the hypothesis that there is any significant difference between the means of two samples.

Table 6-3: The result of Paired t test : mOoPEPHI mOoPEGHI

	obs	Mean1	Mean2	dif	St Err	t value	p value
mOoPEPHI-mOoPEGHI	14	35702.571	6847.572	28855	1548.601	18.65	0.0021

The result of the paired t-test shows that (Table 6.3) the difference between mean out-of-pocket expenditure during delivery in government health institutions and private health institutions is statistically significant at the one percent significance level and is very high in private health institutions.

6.1.3 Components of OoPE during delivery in Public Health Facilities in Kerala

When we examine the components of cost during delivery in government hospitals, we find that they are mostly made up of the cost of the hospital stay, diagnostic tests, medicines, and other items (Table 6.4). There is a wide discrepancy in costs among districts.

Table 6-4: Out-of-Pocket expenditure during delivery in government health institutions, 2019-21

Districts	OoPE-during Hospital Stay)	OoPE-for Diagnostic Tests	OoPE-for Medicines	OoPE-other costs
Kasaragod	1833	2222	1682	2697
Kannur	4147	2333	2275	2622
Wayanad	3200	3700	3688	2338
Kozhikode	5750	3333	4167	4237
Malappuram	1907	2455	2038	3279
Palakkad	5622	2587	3419	3036
Thrissur	2455	2800	4056	1625
Ernakulam	2933	2286	2136	2573
Idukki	5145	1471	1760	1676
Kottayam	4667	6667	3350	4950
Alappuzha	6814	4747	2747	5017
Pathanamthitta	4208	2684	2453	4000
Kollam	3920	2320	2302	2592
Thiruvananthapuram	10962	5460	1878	3508
Kerala	4541	3117	2587	3124
India	2733	1848	1923	2208

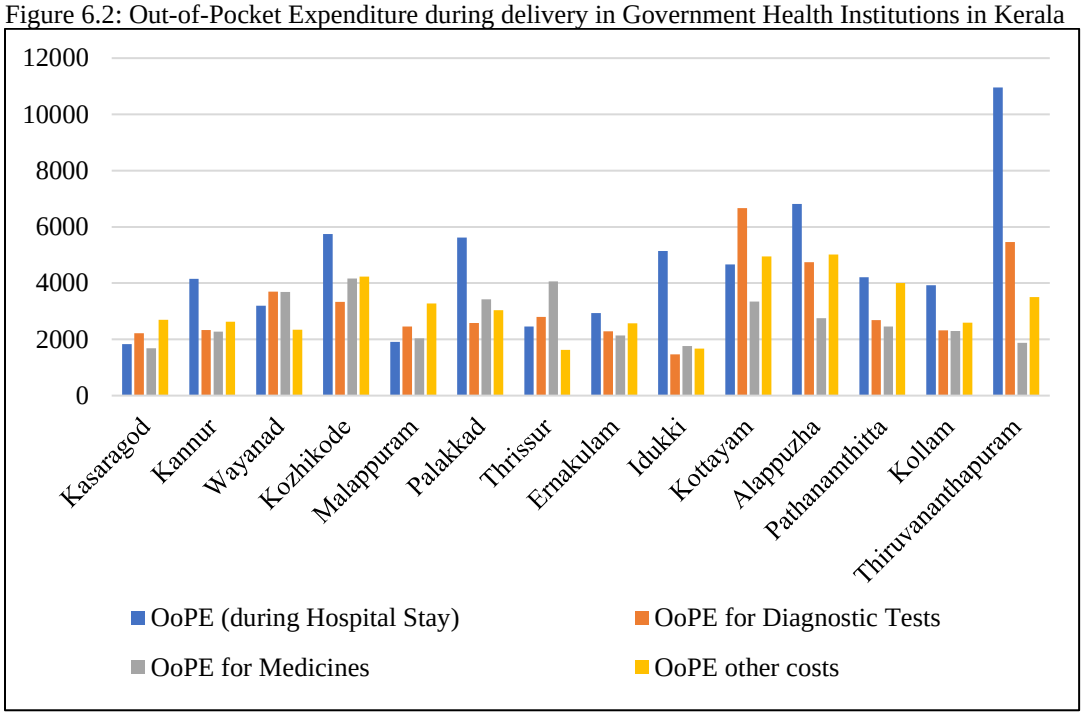
Source: DHS,USAID, 2019-21 (NFHS-5)

Thiruvananthapuram (Rs. 10962) had the highest expenditure in case of hospital stay, while Kasaragod (Rs. 1833) and Malappuram (Rs. 1907) had the lowest.

The national and state averages were Rs. 2733 and Rs. 4541, respectively. In the case of the average cost of diagnostic tests, it was least in Idukki (Rs. 1471) and highest in Kottayam (Rs. 6667). It was Rs. 2455 for Malappuram, which was less than the state

average (Rs. 3117) but more than the national average (Rs. 1848). The average cost of medicine was least in Kasaragod (Rs. 1682) and highest in Kozhikode (Rs. 4167), which was Rs. 2038 in Malappuram, which was just higher than the national average (Rs. 1923) but less than the state average (Rs. 2587). There were additional expenses such as transportation, food, and other consumables. It was highest in Alappuzha (Rs. 5017) and lowest in Thrissur (Rs. 1625). The average other costs for Malappuram were Rs. 3279, higher than the national (Rs. 2208) and state (Rs. 3124) averages.

Figure 6.2: Out-of-Pocket Expenditure during delivery in Government Health Institutions in Kerala



This is evident from the figure, which shows that even after the implementation of JSSK, there is still OoPE during delivery in India and Kerala, with expenditure exceeding the national average in all districts in Kerala.

6.1.4 Socio-economic characteristics and OoPE in Kerala

It is also necessary to identify the factors that influence out-of-pocket spending during delivery at government health facilities in Kerala and the Malappuram district. Both

secondary and primary data were analysed for this. For secondary data analysis, the NFHS-5 dataset was used. 2,357 women who gave birth in a hospital in the five years before the poll were included in the sample from the state of Kerala, and 95.6% of them had to pay for their deliveries.

Table 6-5: Average OoPE during delivery in Kerala

Average OOPE (in INR)	Public Facility (32.7%)	Private Facility (67.2%)	Any Facility
Area			
Rural	7080 (37.8%)	34435 (62.2%)	24639
Urban	4683 (30.6%)	33586 (69.6%)	25723
Total	6093 (34.3%)	34002 (65.6%)	25159
Age group			
15-24	4678 (37.5%)	28446 (62.5%)	20401
25-34	7520 (32.4%)	33702 (67.5%)	25539
35-49	3329 (37.3%)	40506 (62.5%)	29016
Religion			
Hindu	6760 (43.7%)	34130 (56.2%)	23639
Muslim	4708 (23.9%)	34155 (75.9%)	27054
Christian	7091 (32.0%)	32515 (67.9%)	25730
Caste			
Gen	6258 (23.5%)	40887 (76.5%)	31927
SC	5000 (34.9%)	33849 (64.9%)	24934
ST	2962 (59.4%)	26614 (40.6%)	21755
OBC	-	-	-
Wealth			
Poor	3134 (71.1%)	30827 (28.9%)	12741
Middle	4763 (53.3%)	31065 (46.7%)	18525
Rich	7075 (28.7%)	34760 (71.2%)	27069
Nature of Delivery			
Normal	4993 (35.2%)	28319 (64.7%)	20594
Caesarian	7774 (33.1%)	41896 (67%)	31814
Education			
No Education	0	-	0
Primary	3809 (80.3%)	13308 (19.7%)	6506
Secondary	4890 (44.6%)	31597 (55.3%)	20361
Higher	9898 (22.1%)	36686 (77.8%)	31948
Financial Assistance			
No	6210 (25.4%)	34780 (74.7%)	28391

Yes	5925 (74.4%)	24858 (25.6%)	10168
Birth Order			
1	6734 (32.0%)	34054 (68.0%)	25906
2	5419 (38.2%)	34059 (61.8%)	23713
3	7468 (30.8%)	33330 (68.9%)	25820
4>	4411 (27.8%)	37915 (72.2%)	33258

Source: Demographic and Household Survey, USAID, 2019-21 (NHFS-5)

In the urban area, 30.6 percent of the pregnant women consulted a government hospital for delivery, and 69.2 percent consulted private hospitals. In rural areas, public facilities accounted for 37.8 percent of institutional births and private facilities accounted for 62.2 percent. In public health facilities, overall delivery was 34.2 percent. Average OoPE in public facilities in rural areas (Rs. 6447) was higher than in urban areas (Rs. 4851) in Kerala. In private facilities, too, it is higher in rural areas. Based on the age group, the average cost was higher for the age group 25–34 (Rs. 7520) in a public facility, but in a private facility it was higher for the age group 35–49 (Rs. 40506). When compared to the other two age groups, the 25–34 age group used government facilities less (32.4%). If we compare the average cost based on religion, it was higher for Christians (Rs. 7091) in public facilities, while it was almost the same for all religious groups in private facilities. Public facilities for delivery were used more by Hindus (43.7%) than by Muslims (23.9%). When compared to the SC and General categories, the ST community in Kerala had a low average cost during delivery in a public facility (Rs. 2962), and their utilisation was also high (59.4%). General category, only 23.5 percent utilised public facilities for delivery, and their OoPE was also high (Rs. 6258) when compared with SC and ST. The data for OBC is not available in the NFHS-5 dataset. 71.1 percent of the poor people used public facilities for delivery, and the OoPE was also the lowest (Rs. 3134) for them, whereas only 28.7 percent

of the people in the rich quintile used public facilities, and their average OoPE was also very high (Rs. 7075).

The average cost for delivery is higher both in public and private facilities, where the frequency of caesarian sections was lower (33.1%) and its average cost also was lower (Rs. 7774), while in private facilities it was as high as Rs. 41896 and 39.5 percent of caesarean deliveries were performed. When we compare based on education, 80.3 percent of those with primary education used public facilities at a low cost (Rs. 3809), whereas 22.1 percent of those with higher education qualifications used public facilities at a higher cost (Rs. 9898).

As far as financial assistance for delivery is concerned, only 18.4 percent received financial assistance, including JSY and JSSK, in which most of the women who preferred a public facility (74.4%) got financial assistance for their delivery while 25.6% of the women who delivered their babies in a private facility also received financial assistance. It is important to note that financial assistance under JSSK will only be provided to those who gave birth in a public facility. The average cost for those who received financial assistance was the same as for those who used public facilities, but there was a significant difference among private hospital participants, where it was Rs. 24858 compared to Rs. 34780 for those who did not receive financial assistance. The difference was nearly Rs. 10,000, but it was only Rs. 285 for those who preferred public facilities. Women who had delivered their second baby used government health facilities more (38.2%), while those who had delivered their fourth or more babies used them less (27.8%). The average cost in a public facility was low (Rs. 4411) for those who delivered their 4th or higher-order babies, while for them, it was high in private facilities (Rs. 37915).

6.1.5 Determinants of OoPE during delivery in Kerala

To identify the significant predictors of out-of-pocket expenditure, a two-part model (also known as the hurdle model) is used. It is one of the best econometric models when the distribution is skewed and dichotomous, such as expenditure incurred during delivery, which is either yes or no. "The first part of the two-part model is the probability of incurring OoPE during hospital delivery using multivariate logistic regression where the outcome variable is binary, i.e., *no OoPE* versus *yes, any kind of OoPE* on institutional delivery. The second part of the two-part model is a generalised linear regression model with log link and gamma distribution (Deb and Norton, 2018), in which the outcome variable is a continuous non-zero positive variable". The regressors are the Age of mothers (categorical-age group 15-24, 25-34 and 35-49); Area of residence (dichotomous-urban/rural); Sex of child (dichotomous-male/female); Education (dichotomous-secondary and less than, higher education); Type of institution (dichotomous-public/private); Nature of delivery (dichotomous-normal/caesarian); Wealth index (trichotomous-poor, middle and rich); JSY beneficiary (dichotomous-yes/no); Birth order (trichotomous-1^{st},2^{nd},3^{rd} or above); Religion (trichotomous-Hindu, Muslim and Christian); and Caste (trichotomous-General, SC and ST). It is to be noted that the proper weights, primary sampling units, and strata must be given as per the guidelines given in the 2019–21 demographic and health survey before going into the complex regression analysis. To select the significant predictors, univariate logistic regression was conducted for all the selected variables. Based on the result of the univariate logistic model, all significant variables were selected for the multivariate logistic regression model ($p<0.05$). The same procedure was followed in the second part of regression analysis, i.e., the generalised linear regression model too; univariate regression was run against the continuous outcome variable for all the same

regressors, and based on the result, significant ($p<0.05$) predictor variables were included in the study. Since the logit model and generalised multivariate linear model do not need to hold the assumptions of linearity, normality, and homoscedasticity other than the model requiring a large number of samples to calculate the model, we do not need to go through all these tests. However, multicollinearity should not be there among the explanatory variables, so it has been checked using the variance inflation factor (VIF). Table 6.6 gives the result of the multicollinearity test.

Table 6-6: Variance inflation factor

	VIF	1/VIF
birthorder	1.396	0.717
placeofdel	1.383	0.723
Wealthind	1.379	0.725
Education	1.310	0.763
Financ.assi	1.299	0.770
agegroup	1.271	0.787
Areaofresi	1.109	0.902
Religion	1.105	0.905
natureofdel	1.079	0.927
caste	1.056	0.947
Mean VIF	1.239	

The mean of the vif (variance inflation factor) is 1.24, which indicates that there is no problem of multicollinearity among independent variables. The result of logistic regression explains the odds of OoPE during delivery in a health institution in Kerala (Table 6.7).

Table 6-7: Result of multivariable logistic regression between OoPE on hospital delivery and its predictors

OoPE01	Odd R.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Age Group		.	.	.	.	.	
: base 15-24	1						
25-34	1.105	0.345	0.32	0.749	0.599	2.039	
35-49	1.125	0.504	0.26	0.793	0.467	2.712	
Area of residence							
: base urban	1						
rural	1.162	0.351	0.50	0.620	0.642	2.105	
Sex of child							
: base male	1						
female	0.832	0.216	-0.71	0.479	0.499	1.386	

Type of Institution							
: base Public	1						
Private	7.186	3.269	4.34	0.000	2.940	17.563	***
Nature of delivery							
: base normal	1						
caesarian	0.902	0.246	-0.38	0.707	0.528	1.543	
Birth order							
: base 1st	1						
2nd	0.821	0.210	-0.77	0.443	0.497	1.358	
3rd or above	1.334	0.615	0.63	0.532	0.539	3.301	
JSY beneficiary							
: base no	1						
yes	0.619	0.160	-1.85	0.065	0.372	1.03	*
Wealth index							
: base poor	1						
middle	0.562	0.294	-1.10	0.271	0.201	1.57	
rich	0.829	0.440	-0.35	0.724	0.292	2.35	
Religion							
: base Hindu	1						
Muslim	1.015	0.392	0.04	0.969	0.475	2.17	
Christian	2.677	1.316	2.00	0.046	1.019	7.033	**
Caste							
: base SC	1						
ST	2.781	2.979	0.95	0.340	0.339	22.813	
Gen	0.503	0.262	-1.32	0.187	0.181	1.397	
Education							
: base ≤secondary	1						
higher	1.367	0.412	1.04	0.300	0.756	2.472	
Constant	16.214	9.852	4.59	0.000	4.915	53.495	***
Mean dependent var		0.963	SD dependent var			0.188	
Number of obs		2342	F-test			4.599	

*** p<0.01, ** p<0.05, * p<0.1

When compared with the age group 15-24, the likelihood of OoPE is slightly higher (OR 1.13; 95% CI 0.467-2.712) for the age group 30-49 (not statistically significant). The odds of 1.16 times (95% CI 0.642-2.105) OoPE can be seen among rural women when compared with urban women, but they are also not statistically significant. No clear association has been observed between the likelihood of OoPE and the female sex of the child (OR-0.8; 95% CI 0.499-1.386). There is a strong statistically significant (p<0.01)

association between the odds of OoPE and the type of institution, with a private health institution having 7.19 times the odds of incurring OoPE (OR-7.186; 95% CI 2.940-17.563). Surprisingly, no clear relationship has been found between the type of caesarian delivery and the likelihood of OoPE (OR-0.902; 95% CI 0.528-1.543). The odds of OoPE are slightly higher if the child's position is 3rd or above (OR-1.33; 95% CI 0.539-3.301). There is a strong statistically significant association between JSY beneficiaries and OoPE, in which the odds of incurring OoPE during hospital delivery are 0.619 times lower if the mother is a JSY beneficiary (OR-0.62; 95% CI 0.372-1.03). Strangely, there is no statistically significant association between the wealth index and OoPE during delivery. However, the result says the odds of incurring expenditure are 0.56 times lower for middle income groups (OR-0.56; 95% CI 0.201-1.57; There is a statistically significant association between religion and OoPE, in which, compared with Hindus, the odds of OoPE are 2.68 times higher among Christians (OR-2.68; 95% CI 1.019-7.033).When compared to SC, the odds of incurring OoPE are higher among STs (OR-2.78; 95% CI 0.34-22.81) and lower among the general category (OR-0.503; 95% CI 0.181-1.397), but the association is not statistically significant. Higher educated mothers have 1.38 times the odds of incurring expenditure (OR-1.38; 95% CI 0.756-2.472), but this is not statistically significant based on this logit model approach.

When we analyse the result of the generalised linear model, we can have a better understanding of the association between OoPE during delivery and its predictors in Kerala (Table 6.11). If we compare the probability of having a high mean of OoPE during delivery based on age group, compared with the 15–24 age group, there are 25 percent chances of having a high mean OoPE ($p<0.05$) among the mothers of the 35–49 age group (ep =1.25;

95% CI 1.011-1.548). On hospital delivery, rural women have a 11 percent higher mean OoPE ($p<0.10$) than urban women (eb = 1.11; 95% CI 0.985-1.245). There is a strong positive association between the OoPE and the place of delivery. Women who gave birth in a private hospital had a substantially higher mean OoPE by 248.6% ($p<0.01$). The exponentiated coefficient is 348.6 with a 95% CI 3.019-4.026. Women who had a Caesarean delivery had a 43% higher mean out-of-pocket expenditure ($p<0.01$) as compared to women who had a normal delivery (ep=1.43; 95% 1.275-1.605).

Table 6-8: Result of Mixed-effects GLM on non-zero positive OoPE

OoPE1	exp(p)	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Age group							
: base 15-24	1						
25-34	1.132	0.099	1.41	0.157	0.953	1.345	
35-49	1.251	0.136	2.06	0.039	1.011	1.548	**
Area of residence							
: base urban	1						
rural	1.107	0.066	1.71	0.088	0.985	1.245	*
Place of delivery							
: base Public	1						
Private	3.486	0.256	17.01	0.000	3.019	4.026	***
Nature of delivery							
: base normal	1						
C-section	1.43	0.084	6.09	0.000	1.275	1.605	***
Birth order							
: base 1	1						
2	0.919	0.065	-1.20	0.232	0.800	1.056	
3	0.982	0.094	-0.19	0.851	0.813	1.186	
JSY beneficiary							
: base no	1						
yes	0.802	0.082	-2.15	0.032	0.656	0.981	**
Wealth index							
: base poor	1						
middle	1.18	0.19	1.03	0.304	0.861	1.617	
rich	1.364	0.201	2.11	0.035	1.022	1.82	**
Religion							
: base Hindu	1						
Muslim	1.074	0.077	0.99	0.322	0.933	1.237	
Christian	0.97	0.086	-0.34	0.733	0.816	1.153	

Education							
: base ≤secondary	1						
higher	1.237	0.078	3.37	0.001	1.093	1.399	***
Constant	4812.562	824.233	49.51	0.000	3440.278	6732.233	***
Logs	-0.426	0.028	-14.99	0.000	-0.481	-0.37	***

Mean dependent var	28281.286	SD dependent var	19899.391
Number of obs	545	Chi-square	558.449
Prob > chi2	0.000	Akaike crit. (AIC)	11923.808

*** p<0.01, ** p<0.05, * p<0.1

No clear association was observed between the birth order of the child and OoPE on hospital delivery. The mean OoPE during hospital delivery is 20 percent lower among JSY beneficiaries (p<0.05) compared to non-beneficiaries (ep=0.80; 95% 0.656-0.981). As compared to women who belong to the poor wealth index, women who belong to the rich wealth index had 36 percent higher mean OoPE (p<0.05) on hospital delivery (ep=1.364; 95% 1.022-1.82). There is no discernible relationship between religion and mean OoPE. The mean OoPE on hospital delivery was 24 percent higher (p<0.01) among higher educated women (ep=1.1.237; 95% CI 1.093-1.399).

6.2 OoPE during delivery in Malappuram

If we analyse the OoPE on the basis of the primary data collected from the district of Malappuram, the mean and median expenditure during delivery in government hospital were Rs. 3405 and Rs. 4000, respectively (Table 6.9). The interquartile range is Rs. 2500. whereas the mean and median OoPE during delivery in private health institutions are Rs. 27,420 and Rs. 22,000, respectively, which are quite higher than the expenditure incurred in public health institutions. The inter quartile range is Rs. 11,500.

Table 6-9: Mean and Median OoPE in Malappuram

Delivery Points (N=888)	Mean (In INR)	Median (In INR)	IQR (In INR)
W & C Ponnani	3548	4000	1500
THQH Tirurangadi	3511	3750	1200

DH Nilambur	3108	3900	2200
THQH Malappuram	3040	3000	2350
DH Perintalmanna	3174	3750	2500
MC Manjeri	3776	4000	1000
DH Tirur	3665	4000	1500
Total (GHI) N=577	3405	4000	2500
Private Hospitals (N=311)	27420	22000	11500
Total (Overall) N=888	19137	18000	20500

Source: Primary

If we analyse the OoPE incurred based on government delivery points in Malappuram district, the highest percentage of mothers who incurred costs during delivery (Table 6.10) was in District Hospital Nilambur (57.8%) and District Hospital Perintalmanna (54.1%) and the lowest in Ponnani (23.0%).

Table 6-10: Percentage of mothers incurred OoPE during delivery

	OoPE during Delivery (%)		
Delivery Points	No	Yes	Total
W&C Ponnani	77	23	100
	77.00	23.00	100.00
THQH Tirurunagadi	40	18	58
	68.97	31.03	100.00
DH Nilambur	19	26	45
	42.22	57.78	100.00
THQH Malappuram	35	20	55
	63.64	36.36	100.00
DH Perinthalmanna	39	46	85
	45.88	54.12	100.00
MC Manjeri	48	29	77
	62.34	37.66	100.00
DH Tirur	53	37	90
	58.89	41.11	100.00
Private Hospitals	0	378	378
	0.00	100.00	100.00
Total	311	577	888
	35.02	64.98	100.00

Source: Primary

6.2.1 Empirical Analysis:

For testing the hypothesis of whether the differences in OoPE at government and private health institutions are statistically significant, we used an unpaired sample t-test for normally distributed data and a Wilcoxon signed-rank test for non-normally distributed

data. For the normality test, the Shapiro-Wilk test is used, in which the null hypothesis states that the variables are normally distributed (Table 6.11).

Table 6-11: Shapiro-Wilk test for normal data

Variable	Obs	W	V	z	Prob>z
OoPEinGHI	199	0.93	10.30	5.36	0.000
OoPEinPHI	378	0.81	49.31	9.25	0.000

Note: OoPEinGHI-OoPE in Government Health Institutions; OoPEinPHI- OoPE in Private Health Institutions

The result of the Shapiro-Wilk test says that both variables are not normally distributed, so we have to apply a non-parametric test, the Wilcoxon rank-sum (Mann-Whitney) test, as the counter part of a two-sample t-test, for testing the hypothesis. Here in this test, the null hypothesis is that there is no significant difference between OoPE in Government Health Institutions and Private Health Institutions at a 5 percent significance level (Table 6.12).

Table 6-12: Two-sample Wilcoxon rank-sum (Mann-Whitney) test

Type of Inst.	Obs.	Rank-Sum	Expected
Government Hosp.	199	19900	57511
Private Hosp.	378	146853	109242
Combined	577	166753	166753
unadjusted variance	-3623193.00		
adjustment for ties	-11672.86		
adjusted variance	3611520.14		
Ho: OoPE Government Hospital = OoPE Private Hospital			
z = -19.791			
Prob > Z = 0.001			

The result of the empirical analysis says that the differences in the mean of OoPE during delivery in government and private health institutions in Malappuram are statistically significant at a one percent significant level ($p<01$). The result of the empirical analysis says that the differences in the mean of OoPE during delivery in government and

private health institutions in Malappuram are statistically significant at a one percent significant level ($p<0.01$).

That means there is high OoPE during delivery in private health institutions compared with government health institutions, and this difference is statistically significant. It also proves that the implementation of JSSK has neither eliminated nor reduced the OoPE during delivery in Malappuram and Kerala. Most of the respondents (90%) admitted that due to the lack of sufficient test facilities and technicians in most of the government hospitals, they must depend on private clinics, which charge high prices for ultrasounds and other blood tests. During delivery, they must purchase drugs and pharmaceuticals from outside; this also adds to the cost. And another major item of cost is transportation. For most of the government health institutions, there is only one ambulance, and mostly it will be unavailable, so they must depend on private taxis. It is also worth noting that the average OoPE for a c-section is very much higher (Rs. 11225) when compared with a normal delivery (Rs. 7182) in Kerala. Similarly, the average total OoPE during delivery in rural areas is higher (Rs.9852) when compared with urban areas (Rs.7047) in Kerala. A similar trend can be seen in the case of Malappuram, where the rural and urban rates are Rs. 12375 and Rs. 10500, respectively[77].

6.2.2 Socio-economic characteristics and OoPE in Malappuram

The primary data sample from the district of Malappuram consisted of 888 mothers, of whom 578 (65.09%) incurred OoPE during hospital delivery. Those who incurred costs during delivery in institutions included 200 (34.6%) from government health institutions and 378 (65.4%) from private health institutions. The average age of mothers was 28. Most

[77] Demographic and Household Survey (DHS), 2019-21

of them completed secondary education (39.4%) and graduated (32.9%). 517 (58.2%) respondents came from joint families, while 484 (54.5%) came from BPL families (Table 6.13).

Table 6-13: Average OoPE during delivery in Kerala

Average OOPE (in INR)	Public Facility (34.6%)	Private Facility 65.4%)	Any Facility (100%)
Area			
Rural	3274 (57.2%)	27964 (42.8%)	12779 (56.5%)
Urban	3614 (57.8%)	26701 (42.2%)	11987 (43.5%)
Total	3405 (57.4%)	27420 (42.6%)	12435 (100%)
Age group			
18-25	3454 (40.2%)	25274 (44.0%)	18314 (41.9%)
26-35	3371 (53.4%)	28893 (52.3%)	19559 (52.9%)
36-45	3417 (6.4%)	29520 (3.6%)	20819 (5.2%)
Religion			
Hindu	3145 (69.8%)	24228 (30.2%)	13401 (20.2%)
Muslim	3494 (54.1%)	27933 (45.9%)	20511 (78.7%)
Christian	4500 (70%)	33500 (30.0%)	19000 (1.13%)
Caste			
Gen	3136 (46.3%)	27872 (53.7%)	21070 (6.1%)
SC	3161 (75.5%)	21173 (24.5%)	10714 (11.9%)
ST	3333 (92.9%)	26614 (7.14%)	5678 (3.2%)
OBC	3494 (54.0%)	27933 (45.9%	20511 (78.8%)
Wealth			
BPL	3426 (76.2%)	22965 (23.8%)	12169 (54.5%)
APL	3350 (34.9%)	29368 (65.1%)	24733 (45.5%)
Nature of Delivery			
Normal	1817 (52.4%)	26136 (47.6%)	22211 (81.1%)
Caesarian	4192 (79.2%)	40000 (20.8%)	11652 (18.9%)
Education			
≤10th	3663 (82.0%)	21857 (17.1%)	9978 (27.7%)
12th	3243 (65.4%)	25489 (34.6%)	16122 (39.4%)
≥Graduation	3209 (26.4%)	29593 (73.6%)	26175 (32.9%)
JSSK Beneficiary			
No	- (0.0%)	27420 (100%)	27420 (42.6%)
Yes	3404 (100%)	- (0.0%)	3404 (57.4%)
Occupation			
No	3456 (63.5%)	27409 (36.5%)	17859 (42.6%)

Yes	2889 (25.5%)	27447 (74.5%)	23853 (57.4%)

To find out the determining demographic factors and predictors, the same two-part method was applied to the primary data collected from the district of Malappuram. Here, the outcome variable for the logit and generalised linear models was the same, i.e., OoPE (0/1 for the logit model, non-zero positive continuous for the generalised linear model), but the explanatory variables had been rearranged based on the collected data.

They are: type of institution (dichotomous-government/private); education (trichotomous-10th or below/12th and graduation and above); area (dichotomous-rural/urban); family type (dichotomous-joint family/nuclear family); religion (trichotomous-Hindu/Muslim/Christian); caste (categorical- general/SC/ST/OBC); occupation (dichotomous-not employed/employed); age group (trichotomous-18-25/26-35/36-45); nature of delivery (dichotomous-normal/caesarian); and JSSK beneficiary (dichotomous-beneficiary /non-beneficiary).

Before running the Logit and GLM models, all variables were tested for individual association and multicollinearity. Since all those who preferred government hospitals for their deliveries got registered and benefited from JSSK entitlements, in the VIF multicollinearity test, “the JSSK beneficiary” variable gets automatically omitted from the list (Table 6.14).

Table 6-14: Result of Variance Inflation Factor (VIF)

	VIF	1/VIF
Religion	3.229	0.31
Caste	3.101	0.32
Type of Institution	2.012	0.49
Nature of delivery	1.614	0.62
Education	1.435	0.69
Economic status	1.335	0.74
Employed	1.165	0.85
Age group	1.038	0.96
Family Type	1.027	0.97

Area	1.017	0.98
Mean VIF	1.697	

The result of VIF says that the average VIF is 1.70, which is less than the preferable value of 10, so there is no problem of multicollinearity among the explanatory variables. Before running multivariate logit or GLM model regression analysis, all variables are tested individually (univariate logit or GLMM regression). While running univariate logistic regression, the variables "type of institution" (public/private) and "nature of delivery" (normal/caesarian) were detected as having collinearity and so were omitted from the main variable list. Variable "religion" is also dropped based on the VIF and univariate logistic regression results.

The association between OoPE and family type is such that there were 1.34 ($p<0.10$) times higher odds of incurring OoPE (OR-1.34; CI 0.982-1.822) among mothers who belong to a nuclear family (Table 6.15). When compared to mothers in the 18-25 age group, the odds of having OoPE during hospital deliveryare higher among mothers in the older age group.

Table 6-15: Result of the multivariate logistic regression between OoPE & its predictors

OoPE	Odd Ratio	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Family type							
: base Joint Family	1						
Nuclear Family	1.338	0.211	1.85	0.065	0.982	1.822	*
Age Group							
: base 18-25	1						
26-35	1.146	0.185	0.84	0.399	0.835	1.572	
36-45	1.976	0.799	1.68	0.092	0.894	4.365	*
Caste							
: base General	1						
SC	0.965	0.39	-0.09	0.931	0.437	2.133	
ST	1.099	0.574	0.18	0.856	0.395	3.058	
OBC	1.183	0.411	0.48	0.629	0.598	2.338	
Education							
: base ≤10th	1						

12th	1.505	0.271	2.27	0.023	1.057	2.143	**
≥Graduation	3.427	0.786	5.37	0.000	2.187	5.371	***
Area							
: base Rural	1						
Urban	0.899	0.14	-0.68	0.494	0.663	1.22	
Economic Status							
: base BPL	1						
APL	2.286	0.392	4.82	0.000	1.633	3.199	***
Occupation							
: base no	1						
yes	2.691	0.766	3.48	0.001	1.541	4.7	***
Constant	0.527	0.212	-1.59	0.111	0.239	1.159	

Mean dependent var	0.650	SD dependent var	0.477
Pseudo r-squared	0.121	Number of obs	888
Chi-square	139.121	Prob > chi2	0.000
Akaike crit. (AIC)	1034.992	Bayesian crit. (BIC)	1092.459

*** p<0.01, ** p<0.05, * p<0.10

It is 1.98 (p<0.10) times higher (198%) among mothers between the ages of 36 and 45 (OR-1.98; 95% CI 0.894-4.365). Among different castes, no significant association has been observed. In case of education, compared to 10th-grade mothers, the OoPE is 1.51 (p 0.05) times higher among 12th-grade mothers (OR-1.51; 95% CI 1.057-2.143) and 3.43 times (95% CI 2.187-5.371) higher among mothers who completed graduation and above. There is no meaningful evidence of association found between area (rural or urban) and OoPE in hospital delivery. Based on education, the odds of incurring OoPE were 2.29 (p<0.01) times higher among the mothers who belong to the APL family (OR-2.29; 95% CI 1.633-3.199). Employed mothers are 2.7 (p<0.01) times more likely than unemployed mothers to experience OoPE during hospital delivery (OR-2.7; 95% CI 1.541-4.7).

6.2.3 Generalized Linear Model (GLM) analysis for the district Malappuram

In GLM model analysis, we regressed the same explanatory variables, except in place of caste we used religion, and one more variable, type of institution, was added with

the non-zero positive continuous outcome variable, i.e., OoPE in hospital delivery (Table 6-16).

Table 6-16: Result of Generalized Linear Model analysis between OoPE and its predictors in Malappuram district

OoPE	Exp(b)	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Type of institution							
: base Government	1						
private	11.484	0.528	53.12	0.000	10.495	12.566	***
Area							
: base Rural	1						
Urban	1.012	0.03	0.40	0.693	0.955	1.072	
Age Group							
: base 18-25	1						
26-35	1.099	0.033	3.11	0.002	1.035	1.166	***
36-45	1.114	0.071	1.71	0.087	0.984	1.262	*
Family type							
: base Joint family	1						
Nuclear Family	1.009	0.029	0.31	0.759	0.953	1.068	
Religion							
: base Hindu	1						
Muslim	1.07	0.041	1.77	0.076	0.993	1.153	*
Christian	1.233	0.217	1.19	0.234	0.873	1.742	
Others	0.875	0.304	-0.39	0.700	0.443	1.727	
Education							
: base ≤10th	1						
12th	0.988	0.041	-0.30	0.763	0.911	1.071	
≥ Graduation	1.096	0.051	1.98	0.047	1.001	1.200	**
Economic Status							
: base BPL	1						
APL	1.085	0.037	2.38	0.017	1.014	1.160	**
Occupation							
: base no	1						
yes	0.975	0.037	-0.65	0.515	0.905	1.051	
Nature of delivery							
: base normal	1						
C-section	1.933	0.082	15.52	0.000	1.779	2.101	***
Constant	1775.8	104.691	126.91	0.000	1582.008	1993.303	***
logs	-1.069	0.029	-37.03	0.000	-1.126	-1.013	***

Mean dependent var	19137.435	SD dependent var	15630.431
Number of obs	577	Chi-square	5212.564
Prob > chi2	0.000	Akaike crit. (AIC)	11313.751

*** *p<.01, ** p<.05, * p<.1*

According to the results of the Generalized Linear Model (GLM), when compared to public health institutions, the mean cost of hospital delivery in private health institutions was 1048% ($p<0.01$) higher (eb = 11.48; 95% CI: 10.495-12.566). No evidence for rural-urban differences in delivery costs is found (Table 6.16). While comparing with the 18–25 age group, the mothers from the age groups 26-35 and 36-45 had slightly more OoPE (statistically significant at 1% and 10% percent, respectively), but a very weak association was found (OR-1.1 in both cases). There is no association found between out-of-pocket expenditure and mothers who belong to different family types (joint family/nuclear family), religions (Hindu and Muslim), and occupations (employed vs. unemployed). However, the mean OoPE of mothers of Christian faith was 23% higher when compared with that of Hindus. Higher educated women have about 10% ($p<0.05$) higher mean OoPE during delivery than 10th-level educated mothers. Similarly, compared with mothers from BPL families, women from APL families spent 8.5% ($p<0.05$) more OoPE during hospital delivery. There is no clear association found between OoPE in hospital delivery and employed and unemployed mothers. While comparing with normal delivery, the mean OoPE of C-section deliveries was 93% ($p<0.01$) higher (OR-1.93; 95% CI 1.779-2.101).

6.2.4 Discussion

The study found some similar and some different patterns for socio-demographic and obstetric predictors of OoPE on hospital delivery in the states of Kerala. It is realised that though hospital delivery has increased significantly, the OoPE being incurred are significantly high. Due to the lack of access to health facilities, this frequently presents a

hurdle for both unwell newborns and pregnant women who choose to give birth at home[78]. Insurance against potential health risk is one of the key areas to achieve universal health coverage under the sustainable development goals[79]. OOPE is often considered a financial risk that poses families with a financial burden, which in turn becomes a major obstacle to utilising health services[80]. OOPE is a significant public health issue that causes family debt, poverty, and other negative consequences[81].

Numerous studies conducted in low and middle-income nations have demonstrated that the cost of care is a major concern of maternal care and birth in hospitals. Studies in Nigeria, Zambia, Kenya, Egypt, India, Gambia, and Ghana identified significant relationships between the cost or affordability of care, maternal satisfaction, and the use of care during institutional births[82]. JSY and JSSK were the two major programmes implemented in India to reduce OoPE. As a result, births at hospital in India have improved from 40.7 percent in 2005-06 to 78.9 percent in 2015-16 and 88.6 percent in 2019-21[83]. The high OoPE is particularly devastating for low-income households, which are typically pushed deeper into poverty and debt as a result. Cost is a major impediment to hospital delivery, according to various studies[84]. Even at public hospitals, women pay for births.

6.2.5 Conclusion

To summarise, despite the adoption of JSSK, OoPE during delivery in India, Kerala, and the study region Malappuram has not been eradicated for a variety of reasons, mainly

[78] MoHFW, 2011
[79] Department of Economic and Social Affairs, 2020
[80] Roy, K et al., 2007; van Doorslaer E, et al., 2007
[81] Wagstaff A, et al., 2018
[82] Ohagwu CC, 2002; Bazant ES & Koenig MA, 2009; Bazant ES & Koenig MA,2011; Tripathi N, et al., 2014
[83] NFHS-3,4, and 5
[84] Garg and Karan, 2009; Mohanty and Kastor, 2017; Mishra and Mohanty, 2019

because of the lack of essential infrastructure facilities. When we analyse the programme in terms of eliminating OoPE, we can easily claim that it failed to fulfil its very goal. What is required is the identification and elimination of all barriers to the elimination of OoPE in government health facilities for maternity and child healthcare, so that both OoPE can be eliminated, and the proportion of hospital delivery can be increased dramatically.

Chapter 7: Summary of Findings, Suggestions and Policy Recommendations

7.1 Introduction

One of the most important conditions for a country's social and economic success is a healthy populace. Making healthcare more accessible to everyone, especially the poor, might achieve this. According to UNICEF, India recorded the highest number of deaths among children under the age of five in 2016. According to UNICEF, 1.08 million children under the age of five died in India in 2016, making it the country with the highest number of such deaths. 69 out of every 1,000 kids die before they turn five. 25 percent of all child deaths and 20 percent of all maternal deaths globally occur in India[85]. To address these concerns, the government established many healthcare programmes. The NRHM (2005) initiative was started to bring together numerous health-related initiatives in India.

A key goal on the global, national, and local development agendas is to improve mother and child health. Two of the eight Millennium Development Goals are to reduce maternal and newborn mortality (MDG, Goals 4 and 5). "One of the key monitoring criteria in the MDGs and SDGs is improving facility-based delivery, which has been promoted as the most economical way to reduce maternal and child mortality. Several welfare governments, non-governmental organisations, and international organisations in developing countries have used conditional cash transfer programmes, often known as demand-side funding (DSF), to increase facility-based delivery". The JSY (2005) and

[85] Levels and trends in child mortality report 2017, UNICEF (2017).

JSSK (2011), two flagship programmes under NRHM, profoundly affected mother and child healthcare in India.

Considering this, a research was undertaken to evaluate the effectiveness of Janani Shishu Suraksha Karyakaram in Malappuram district of Kerala. The study attempted to examine the scheme's awareness and utilisation in the Malappuram district of Kerala, as well as its impact in eliminating OoPE during delivery there. The report also included a brief overview of the state of mother and child healthcare in India and Kerala, as well as an inter-district analysis of Kerala's health profile. According to a study of related literature, research on mother and child healthcare in Malappuram and Kerala is extremely rare, particularly studies on the effectiveness of the JSSK plan in Kerala and Malappuram, where there are nearly none. Therefore, this study was important.

Appropriate statistical and econometric techniques like the mean, median, interquartile range, coefficient of variation, t-test, Mann Whitney test, chi-square test, fixed and random effect models, logit model, generalised linear model, concentration index, deprivation index, and development index were used for analysing the data.

7.2 Summary of the Findings:

The summary of findings is generated separately for primary and secondary data since the study is based on both primary and secondary data sources.

7.2.1 Secondary data-based findings:

- In India, state NRHM expenditure has increased between 2010-11 and 2019-20. It was highest for Uttar Pradesh and lowest for Uttarakhand. The NRHM expenditure growth rate was highest in Chhattisgarh and lowest in Assam between 2010-11 and 2019-20.

- The number of FRUs has not increased much between 2010-11 and 2019-20 in most Indian states. The average increase rate was highest in Uttar Pradesh, whereas it was lowest in Chhattisgarh.
- The number of ASHA workers in positions was highest in UP and lowest in Uttarakhand. The change percentage was higher for Madhya Pradesh and lower for Kerala.
- In the case of these three inputs, there were not that many changes between 2010-11 and 2019-20 in the 17 states that we considered for this study. In the case of ASHA workers, it has increased slightly.
- During the study period, the number of pregnant women receiving three or more rounds of ANC increased in most states. hospital delivery was highest for Kerala and lowest for Rajasthan in 2019-20.
- hospital delivery to total reported deliveries increased in all states except Bihar during the study period. For Bihar, the change percentage was -0.9.
- Out-of-pocket spending in government health facilities was highest in West Bengal and Kerala, and lowest in Haryana and Gujarat. The change percent is negative for only Gujarat, Maharashtra, Odisha, and Kerala. However, even after the introduction of NRHM and JSSK in most of the states, there is no sign of the elimination of OoPE, rather, it increased in 2019-20 when compared with the 2010-11 data.
- Child immunisation has increased in India in the last two decades.
- It is very evident that MMR has declined in all states considerably during the study period. MMR was lowest in Kerala and highest in Assam. The average reduction rate

(ARR) from 2010-11 to 2019-20 was highest for Uttarakhand, while it was lowest for Punjab.

- Between 2010-11 and 2019-20 in India, the average reduction rate in the IMR was 63.8 percent. All states reduced infant deaths significantly over this period, where Kerala (-60.0 percent) had the highest reduction rates and Chhattisgarh had the lowest.
- The MDG-4 target for IMR was 27 by 2015; However, 16 states have yet to meet it, including MP, UP, Chattisgarh, Assam, Rajasthan, and Bihar.
- According to the study, there is a negative and significant relationship between Maternal Mortality Ratio (MMR) and First Referral Units (FRUs), Institutional Delivery, Female Literacy, and PNSDP in India.
- In India, there is a statistically significant and inverse relationship between IMR and NRHM State Expenditure, Child Immunization, Female Literacy, and PNSDP.
- There is inter-district inequality in Kerala's health infrastructure because most of the variables surpass the tolerable standard of a 30 percent coefficient of variation.
- Infrastructure in public health facilities is not proportionately distributed among districts in Kerala, and there is a wide discrepancy. The situation in Malappuram is one of the worst in most of the indicators, with a huge supply-demand gap.
- Pathanamthitta has the lowest average deprivation index (0.02) and the highest average development index (0.98). The average deprivation index is the highest (0.90), and the average development index is the lowest (0.10), for Malappuram.
- In the classification of districts in Kerala based on the health infrastructure development index, Malappuram and Kasaragod come under the "poor" category,

Thiruvananthapuram in the "moderate" category, and all other districts in the "high" category.

- In Kerala there is a pro-poor bias in service utilization of mother and child healthcare in government health facilities.
- In absolute terms, during 2020–21, the number of pregnant women who received the entitlement to free medicine, diet, diagnostics, and transportation under the JSSK scheme was highest in UP and lowest in Telangana, except for free diet and transportation, which were lowest in Kerala.
- The percentage of pregnant women receiving free medicine under JSSK was highest in Maharashtra and lowest in Telangana. The percentage of free diet during the stay in the hospital and free transport were highest in Odisha and lowest in Karnataka. The percentage of free diagnostics was highest in Assam and lowest in Telangana.
- The utilisation of the JSSK scheme for the treatment of sick infants was very low in India.
- The percentage of the number of sick infants provided free medicine was highest in Odisha and Maharashtra and lowest in Bihar and Telangana. Similarly, the percentage of free diagnostics provided to sick infants was highest in J&K and Madhya Pradesh, and lowest in Telangana and Bihar. Transport facility from home to hospital, inter-transfer, and drop-back was highest in Odisha and lowest in Bihar and Telangana.
- In Kerala, the percentage of pregnant women who utilised different entitlements was higher in Alappuzha and Wayanad.
- In Kerala, free entitlements under the JSSK for sick infants were comparatively very less utilized.

- OoPE was higher for all the districts than the national average (2916). Kasaragod has the lowest rate (Rs. 3778), and Alappuzha has the highest rate (Rs. 10,557). In Malappuram, it is Rs. 6760, higher than the state average (Rs. 6710) and NFHS-4 period (Rs. 6202). Based on NFHS-5 data, the mean and median OoPE during delivery in government health facilities for Malappuram were higher (Rs. 6760 and 8000) than the national (Rs. 2916 and 1500) and state (Rs. 6710 and 5000) averages. The mean and median OoPE during delivery in private health institutions in Malappuram were Rs. 32676 and Rs. 30000, which were higher than the national average (Rs. 25380 and Rs. 20000) but less than the state average (Rs. 35390 and Rs. 30000). It was low in Palakkad (Rs. 26300 and Rs. 25000) and high in Kollam (Rs. 50333 and Rs. 50000).
- OoPE was higher during hospital stays in public health facilities in Kerala, followed by costs for diagnostic tests. Costs during a hospital stay were highest in Thiruvananthapuram and lowest in Kasaragod and Malappuram. A diagnostic test costs the least in Idukki and the most in Kottayam. The average cost of medicine is lowest in Kasaragod and highest in Kozhikode.
- The statistically significant predictors of high OoPE during delivery are associated with the age group 35–49; rural areas; private health facilities; C-sections; being rich; and being more educated.
- The mean OoPE during institutional delivery is 20 percent lower among JSY beneficiaries ($p<0.05$) compared to non-beneficiaries (ep = 0.80; 95% CI: 0.656-0.981).

7.2.2 Primary data-based findings

- The mean utilisation of free delivery under JSSK was highest in Medical College, Manjeri, and lowest in THQH, Tirurangadi from 2015-16 to 2020-21.

- The free c-sections performed under JSSK from 2015-16 to 2020-21were comparatively high at Medical College Manjeri and W & C Ponnani.
- The number of pregnant women who received free medicine was highest in the District Hospital, Tirur, and lowest in the Taluk Head Quarters Hospital (THQH), Malappuram, between 2015-16 and 2020-21.
- The mean number of pregnant women who obtained free diagnostics under JSSK from 2015-16 to 2020-21 was highest at W&C Ponnani and lowest at District Hospital, Tirur.
- Pregnant women receiving free diets were most common at Manjeri Medical College and least common at Tirurangadi THQH.
- Under the JSSK entitlement of providing free blood, Medical College, Manjeri provided the most free blood, while THQH Malappuram provided the least.
- On average, Medical College, Manjeri, offered the highest service regarding free transport, while THQH Tirurangadi provided the least.
- The Medical College, Manjeri, and W&C Ponnani have more operation theatres (OT), gynaecology beds, gynecologists, pediatricians, and anesthetists. At these delivery points, the overall utilisation of JSSK was also higher.
- The average number of beneficiaries registered under JSSK in Malappuram was 23709 between the periods 2015-16 and 2020-21. If we compare the utilisation of the scheme for deliveries, including c-sections, based on the number of beneficiaries registered, it was 100 percent in MC, Manjeri, and only 17.7 percent in DH, Tirur.
- The average beneficiary-to-bed ratio in DH, Tirur, is 1:418; the lowest is in W&C Ponnani (1:28). It is 1:73 for the entire Malappuram.

- Out of a total of 888 respondents, 668 were aware of the JSSK scheme (75.2%) in the Malappuram district of Kerala.
- There is no significant difference between rural and urban women in their awareness of JSSK.
- 76.7 percent of the respondents who aware about JSSK had chosen a government hospital for delivery.
- 66 percent of the women who aware about JSSK were from BPL families.
- Joint families accounted for 61.9 percent of those who were aware of JSSK.
- JSSK awareness among revenue blocks in Malappuram was highest in the Ponnani (98.6%), Kondotty (91.3%), and Perinthalmanna (91.2%) blocks. And the lowest in the block of Kuttippuram (41.5%) and Tanur (50.0%).
- Women from the Hindu community, SCs, and STs were comparatively more aware of the JSSK scheme.
- Women from the BPL category and joint families were more aware of the JSSK scheme. Similarly, less educated and unemployed women were more aware of the scheme.
- The awareness of the JSSK scheme was high among those mothers who underwent thorough c-sections, compared with the mothers who had normal deliveries.
- Main source of JSSK awareness was ASHA workers followed by Anganawadi Workers (AWW) and Auxiliary Nurse Midwives (ANM).
- The most known entitlement to pregnant women under the JSSK scheme was free delivery, whereas the least known was the provision of free blood.
- Similarly, under the entitlement to sick newborns under the JSSK scheme, the provision of free blood was the least commonly known free entitlement of JSSK, while free

treatment for sick newborns was the most known free entitlement of JSSK by the respondents.

- The statistically significant predictors of JSSK awareness in Malappuram district are economic status, age group, nature of delivery, education, and caste.
- Respondents from nuclear families, the APL category, older age group, and those with a higher level of education were less aware of JSSK scheme in study area.
- Out of a total of 888 respondents, 510 (57.4%) utilised the scheme, of which 287 (57.2%) were from rural areas and 223 (57.8%) from urban areas.
- When compared with Muslims, utilisation was higher among Hindus and Christians.
- Women from general and OBC backgrounds were the least likely to use the JSSK scheme, compared to SCs and STs.
- When compared to women in the BPL category, women in the APL category used the JSSK scheme at a much lower rate.
- Women from nuclear families were less likely to participate in the scheme than women from joint families.
- The utilisation of the JSSK scheme was higher among less educated women. Similarly, those who were unemployed used the scheme more frequently.
- The JSSK scheme was comparatively used more frequently by women who had a C-section than by women who had a normal delivery in Malappuram district.
- The predictors of JSSK utilisation in Malappuram district of Kerala are family type, economic status, nature of delivery, education, occupation, and religion. Where the women from nuclear family; high economic status; had normal delivery; highly educated; employed; and Muslim community less utilized the scheme.

- The study found that there is a statistically significant association between awareness and utilisation of the JSSK scheme. Out of 668 respondents who knew about JSSK, 510 (76.4%) utilised the scheme.
- The most used JSSK entitlements were free delivery and free medicine, while the least commonly used entitlements were provision of blood, and transportation facility.
- The utilisation of the JSSK scheme for sick infants was only 14.0 percent in the study area.
- JSSK usage was higher in Ponnani block and lower in Kuttippuram block.
- ASHA workers were the biggest motivating factor for the use of the scheme.
- The reason for the utilisation of the scheme was zero expenditure.
- Most of the respondents rated the services of ASHA workers as good or excellent. Similarly, most of them rated the JSSK scheme as excellent and good.
- The mean and median expenditure during delivery in a public health institution in Malappuram were Rs. 3405 and Rs. 4000, respectively. The interquartile range was Rs. 2500. whereas the mean and median OoPE during delivery in private health institutions were Rs. 27,420 and Rs. 22,000, respectively. The interquartile range was Rs. 11,500.
- The highest percentage of mothers who incurred costs during delivery was in District Hospital Nilambur and District Hospital Perintalmanna, and the lowest was in Ponnani, which means the implementation of JSSK has not eliminated the Out-of-Pocket Expenditure during delivery in Malappuram and Kerala.
- Type of health institution, family type, religion, age group, education, economic status, and occupation were statistically significant predictors of OoPE during delivery in the Malappuram district of Kerala. Respondents from private health facilities, nuclear

families, older age, Christian, more educated, higher economic status, employed, and c-section deliveries were more likely to have OoPE during delivery.

7.3 Suggestions and Policy Recommendations

7.3.1 Health Infrastructure

- It is very necessary to reduce the population pressure on the public health facility in Malappuram. When compared with other districts, the population pressure on public health institutions is high in Malappuram. All the first referral units in Malappuram are in urban areas. At all seven delivery points, the availability of beds is very limited. Single or double rooms are not available. So, they lack privacy. Washrooms are shared by the wardmates. because of collective use there are issues related with cleanliness and water availability. It is also difficult to remain bystanders. So, if these situations are not addressed immediately, it is not possible to promote institutional delivery in a public facility.
- Instead of multiple bedded labour wards, there should be single and double rooms so that their privacy can be protected, and hygiene can be assured.
- If possible, upgrade the PHCs and CHCs to accommodate delivery care by establishing the required infrastructure and human resources. This will reduce the high population pressure on district and subdistrict hospitals.

7.3.2 Establishment of women and children's hospitals

- Even though it was only established in December of this year, the Women and Children Hospital in Ponnani is performing admirably. The success of W&C Ponnani in rendering delivery care suggests that similar types of special hospitals should be established more often in Malappuram districts. Mother and child healthcare should be separated from district and sub-district hospitals, and district

and sub-district hospitals should have separate buildings, at least for mother and child healthcare.

- Most of the delivery points run with one pharmacy and one lab, which is very limited in an overcrowded district like Malappuram. It should be expanded. It is also welcome if the government establishes separate diagnostic centres and pharmacies in each medical block for JSSK beneficiaries.

7.3.3 Public-private partnership

- There can be public-private partnerships for providing JSSK services. Without paying any cash, beneficiaries should be allowed to use the facilities of private hospitals for deliveries, c-sections, medicines, and diagnostics.

7.3.4 Increasing awareness on JSSK scheme

- Since there is a statistically significant relationship between JSSK awareness and utilization, there should be a wide and extensive awareness campaign in the district so that people might be aware of the scheme. For this, social media can be used as the main medium. Furthermore, larger banners and flex boards should be placed in areas where women and families congregate. Similarly, in government and private health institutions and educational institutions, informational bulletin boards and banners should be placed.
- Panchayath members, ASHA workers, and Anganawadi workers should be guided to conduct face-to-face meetings to raise awareness among people in this regard. A regular monthly survey should be conducted to ensure at least one person in a household knows about the scheme.

7.3.5 Role of ASHA Workers

- ASHA workers might be trained with the required skills and information pertaining to antenatal care, delivery care, postnatal care, and paediatric care. Their salaries should be increased, and more incentives should be offered to them.

7.3.6 Staff Monitoring

- There should be a proper monitoring mechanism to check the attitude, behaviour, and work habits of staff, including doctors at delivery points, while they perform their duties. There should be a proper grievance redressal system in the hospital so that the beneficiaries can approach immediately if there is any kind of misbehaviour, corruption, or unethical practice by the hospital administration or staff.

7.3.7 Enhance people's participation

- There is a general mentality that government facilities are only used by the poor. It must be changed. For this, special initiatives can be introduced so that elite people from society, public servants, and elected representatives, may come and use government health facilities, especially for mother and child healthcare. This will be a motivation for all sections of society to use government health institutions, and ultimately the infrastructure and service quality will increase incredibly.

7.3.8 Women empowerment and education

- Because education and women's empowerment are strong predictors of mother and child healthcare such as ANC, institutional delivery, PNC, and immunization, deliberate efforts should be made to increase education and empower women.

7.4 Scope for further study

- To identify efficiency in fund utilization, an inter-district study of detailed financial allocation and expenditure under the JSSK heading can be conducted.
- This study can be extended to other districts in Kerala. i.e., the awareness and utilisation of the JSSK scheme in other districts in Kerala can be assessed to identify the general awareness and extent of utilisation of the scheme in other parts of Kerala.
- Detailed research should be undertaken separately to know the supply-demand gap in mother and child healthcare in all the districts of Kerala.

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Appendix 1

Analysis of the effectiveness of Janani Shishu Suraksha Karyakram (JSSK) in Malappuram District of Kerala
(കേരളത്തിലെ മലപ്പുറം ജില്ലയിൽ അമ്മയും കുഞ്ഞും (JSSK) പദ്ധതിയുടെ ഫലപ്രാപ്തിയുടെ വിശകലനം)

Questionnaire (ചോദ്യാവലി)

Please put a tick mark on appropriate items (ദയവായി ഉചിതമായ ഇനങ്ങൾക്ക് ഒരു ടിക്ക് അടയാളം ഇടുക)p

1. Demographic Profile (ജനസംഖ്യാ സംബന്ധമായ സ്ഥിതി വിവരങ്ങൾ)

1.1 Name of the Medical Block (മെഡിക്കൽ ബ്ലോക്കിന്റെ പേര്)	
1.2 Name of the Village (ഗ്രാമത്തിന്റെ പേര്)	
1.3 Name of the Beneficiary (ഗുണഭോക്താവിന്റെ പേര്)	
1.4 Rural/Urban (ഗ്രാമം / നഗരം)	Rural (ഗ്രാമം) / Urban (നഗരം)
1.5 Age (Yrs.) (വയസ്സ്)	
1.6 Age at Marriage (വിവാഹ സമയത്ത് പ്രായം)	
1.7 Education Status (വിദ്യാഭ്യാസ നില)	No literacy(വിദ്യാഭ്യാസമില്ല) / Primary (പ്രൈമറി)/ /10th (പത്താം ക്ലാസ്) / 12th (പന്ത്രണ്ടാം ക്ലാസ്)/ /Graduation and above (ബിരുദവും അതിനുമുകളിലും)
1.8 Economic Status (സാമ്പത്തിക നില)	APL / BPL
1.9 Type of Family (കുടുംബ തരം)	Joint (കൂട്ടുകുടുംബം) / Nuclear (അണുകുടുംബം)
1.10 Religion (മതം)	Hindu (ഹിന്ദു) / Muslim (മുസ്ലീം)/ Christian (ക്രിസ്ത്യൻ) / /Other-specify (മറ്റുള്ളവർ-വ്യക്തമാക്കുക)
1.11 Caste (ജാതി)	GEN / SC / ST / OBC
1.12 Occupation (തൊഴിൽ)	Nil (ജോലിയില്ല) / Self Employed (സ്വയം തൊഴിൽ)/ /Govt. (സർക്കാർ ജോലി) / Private (സ്വകാര്യ മേഖലയിൽ)

2. Awareness on JSSK (അമ്മയും കുഞ്ഞും പദ്ധതിയേ കുറിച്ചുള്ള അവബോധം)

Awareness (അവബോധം)	
2.1 Do you know about JSSK? (നിങ്ങൾക്ക് JSSK യെക്കുറിച്ച് അറിയാമോ?)	Yes(അതെ) / No (ഇല്ല)
2.1.1 If yes, how did you come to know? (നിങ്ങൾക്ക് അറിയാമെങ്കിൽ, നിങ്ങൾ എങ്ങനെ അറിഞ്ഞു?)	ANM (നഴ്സ്) /AWW (അങ്കണവാടി worker) / Doctor (ഡോക്ടർ)/ ASHA (ആശ worker) / Govt. publicity (സർക്കാർ പബ്ലിസിറ്റി) / Electronic Media (ഇലക്ട്രോണിക് മീഡിയ) / Print Media (പ്രിന്റ് മീഡിയ) / Any other source (Specify) മറ്റേതെങ്കിലും ഉറവിടം (വ്യക്തമാക്കുക)
2.1.2 When did you come to know about JSSK? (നിങ്ങൾ എപ്പോഴാണ് JSSK യെ കുറിച്ച് അറിഞ്ഞത്?)	Before pregnancy/ (ഗർഭധാരണത്തിന് മുമ്പ്)/ /During pregnancy (ഗർഭകാലത്ത്) / /After delivery പ്രസവശേഷം)/
2.2 What do you know about JSSK? (JSSK യെക്കുറിച്ച് നിങ്ങൾക്ക് എന്തറിയാം?)	>Entitlements for pregnant women Related: (ഗർഭിണികൾക്കുള്ള അവകാശങ്ങൾ:)
	2.2.1 Free Delivery (സൗജന്യ പ്രസവം)
	2.2.2 Free Caesarean section (സൗജന്യ സിസേറിയൻ)
	2.2.3 Free drugs and consumables (സൗജന്യ മരുന്നുകളും ഉപഭോഗവസ്തുക്കളും)

	2.2.4 Free diagnostics (Blood, Urine tests and USG) (സൗജന്യ ഡയഗ്നോസ്റ്റിക്സ് (രക്തം, മൂത്ര പരിശോധനകൾ, USG))
	2.2.5 Free Diet during stay in health institution (up to 3 days for normal delivery and 7 days for C-Section) (ആരോഗ്യ സ്ഥാപനത്തിൽ താമസിക്കുമ്പോൾ സൗജന്യ ഭക്ഷണം (സാധാരണ പ്രസവത്തിന് 3 ദിവസം വരെയും സി-വിഭാഗത്തിന് 7 ദിവസവും)
	2.2.6 Free provision of blood (സൗജന്യ രക്ത വിതരണം)
	2.2.7 Free transport from home to health institution, between health institutions in case of referrals and drop back home (സൗജന്യ ഗതാഗതം)
	2.2.8 Exemption from all kinds of user charges (എല്ലാത്തരം ഉപയോക്തൃ നിരക്കുകളിൽ നിന്നും ഇളവ്)
	>Entitlements for Sick Children up to one year after birth Related: (പ്രസവശേഷം, ഒരു വർഷം വരെ രോഗമുള്ള കുട്ടികൾക്കുള്ള അവകാശങ്ങൾ:)
	2.2.9 Free and zero expense treatment (സൗജന്യ ചികിത്സ)
	2.2.10 Free drugs and consumables (സൗജന്യ മരുന്നുകളും ഉപഭോഗവസ്തുക്കളും)
	2.2.11 Free diagnostics (സൗജന്യ ഡയഗ്നോസ്റ്റിക്സ്)
	2.2.12 Free provision of blood (സൗജന്യ രക്ത വിതരണം)
	2.2.13 Exemption from all kinds of user charges (എല്ലാത്തരം ഉപയോക്തൃ നിരക്കുകളിൽ നിന്നും ഇളവ്)
	2.2.14 Free transport from home to health institution, between health institutions in case of referrals and drop back home (സൗജന്യ ഗതാഗതം)
2.3 What about the awareness on JSSK among other members in your family? (നിങ്ങളുടെ കുടുംബത്തിലെ മറ്റ് അംഗങ്ങൾക്കിടയിൽ JSSK-നെക്കുറിച്ചുള്ള അവബോധം?)	2.3.1 They came to know after I availed the benefits (ഞാൻ ആനുകൂല്യങ്ങൾ പ്രയോജനപ്പെടുത്തിയ ശേഷമാണ് അവർ അറിഞ്ഞത്). 2.3.2 They were already aware (അവർ നേരത്തെ തന്നെ ബോധവാന്മാരായിരുന്നു) 2.3.3 They are still unaware (അവർ ഇപ്പോഴും അജ്ഞരാണ്)
2.4 What about the awareness on JSSK among your neighbors? (നിങ്ങളുടെ അയൽക്കാർക്കിടയിൽ JSSK-നെക്കുറിച്ചുള്ള അവബോധം?)	2.4.1 They came to know after I availed the benefits (ഞാൻ ആനുകൂല്യങ്ങൾ പ്രയോജനപ്പെടുത്തിയ ശേഷമാണ് അവർ അറിഞ്ഞത്). 2.4.2 They were already aware (അവർ നേരത്തെ തന്നെ ബോധവാന്മാരായിരുന്നു) 2.4.3 They are still unaware (അവർ ഇപ്പോഴും അജ്ഞരാണ്)

3. Utlisation of JSSK (JSSK പദ്ധതിയുടെ ഉപയോഗം)

Utilisation (ഉപയോഗം)	
3.1 Are you registered with JSSK? (നിങ്ങൾ JSSK- ൽ രജിസ്റ്റർ ചെയ്തിട്ടുണ്ടോ?)	/Yes (അതെ) / /No (ഇല്ല)/
3.1.1 If yes, when did you get registered? (ഉണ്ടെങ്കിൽ, നിങ്ങൾ എപ്പോഴാണ് രജിസ്റ്റർ ചെയ്തത്?)	Ist trimester of pregnancy (ഗർഭത്തിൻറെ ആദ്യ ത്രിമാസത്തിൽ) IInd trimester of pregnancy (ഗർഭത്തിൻറെ രണ്ടാം ത്രിമാസത്തിൽ)

	IIIrd trimester of pregnancy (ഗർഭത്തിൻറെ മൂന്നാമത്തെ ത്രിമാസത്തിൽ) During Delivery (ഡെലിവറി സമയത്ത്)
3.1.2 Who did register you? (ആരാണ് നിങ്ങളെ രജിസ്റ്റർ ചെയ്തത്?)	/ANM/AWW (നഴ്സ് / അങ്കണവാടി തൊഴിലാളി)/ /ASHA (ആശ പ്രവർത്തകൻ)/ /Consultant Doctor (കൺസൾട്ടന്റ് ഡോക്ടർ)/ /Any other (മറ്റാരെങ്കിലും)/
3.1.3 Place of Registration (രജിസ്ട്രേഷൻ സ്ഥലം)	/District / Sub-District Hospital (ജില്ല / ഉപജില്ലാ ആശുപത്രി)/ /PHC / CHC / Sub Centre/ /AWC (അങ്കണവാടി കേന്ദ്രങ്ങൾ)/ /Others (മറ്റേതെങ്കിലും സ്ഥലം)/
3.1.4 Did you confront any problems registering? (രജിസ്റ്റർ ചെയ്യുന്നതിൽ എന്തെങ്കിലും പ്രശ്നങ്ങൾ നിങ്ങൾ നേരിട്ടിട്ടുണ്ടോ?) If yes, please specify. (ഉണ്ടെങ്കിൽ, ദയവായി വ്യക്തമാക്കുക)	
3.1.5 When did you first utilize the programme? (നിങ്ങൾ എപ്പോഴാണ് പ്രോഗ്രാം ആദ്യമായി ഉപയോഗിച്ചത്?)	/Ist trimester of pregnancy (ഗർഭത്തിൻറെ ആദ്യ ത്രിമാസത്തിൽ)/ /IInd trimester of pregnancy (ഗർഭത്തിൻറെ രണ്ടാം ത്രിമാസത്തിൽ)/ /IIIrd trimester of pregnancy (ഗർഭത്തിൻറെ മൂന്നാമത്തെ ത്രിമാസത്തിൽ)/ /During Delivery (ഡെലിവറി സമയത്ത്)/ /After Delivery (ഡെലിവറിക്ക് ശേഷം)/
3.2 The entitlements you have got or getting under JSSK (ജെഎസ്എസ്കെക്ക് കീഴിൽ നിങ്ങൾക്ക് ലഭിച്ച അവകാശങ്ങൾ)	>Entitlements for pregnant women Related: (ഗർഭിണികൾക്കുള്ള അവകാശങ്ങൾ:)
	2.2.1 Free Delivery (സൗജന്യ പ്രസവം)
	2.2.2 Free Caesarean section (സൗജന്യ സിസേറിയൻ)
	2.2.3 Free drugs and consumables (സൗജന്യ മരുന്നുകളും ഉപഭോഗവസ്തുക്കളും)
	2.2.4 Free diagnostics (Blood, Urine tests and USG) (സൗജന്യ ഡയഗ്നോസ്റ്റിക്സ് (രക്തം, മൂത്ര പരിശോധനകൾ, USG))
	2.2.5 Free Diet during stay in health institution (up to 3 days for normal delivery and 7 days for C-Section) (ആരോഗ്യ സ്ഥാപനത്തിൽ താമസിക്കുമ്പോൾ സൗജന്യ ഭക്ഷണം (സാധാരണ പ്രസവത്തിന് 3 ദിവസം വരെയും സി-വിഭാഗത്തിന് 7 ദിവസവും)
	2.2.6 Free provision of blood (സൗജന്യ രക്ത വിതരണം)
	2.2.7 Free transport from home to health institution, between health institutions in case of referrals and drop back home (സൗജന്യ ഗതാഗതം)
	2.2.8 Exemption from all kinds of user charges (എല്ലാത്തരം ഉപയോക്തൃ നിരക്കുകളിൽ നിന്നും ഇളവ്)
	>Entitlements for Sick Children up to one year after birth Related:

	(പ്രസവശേഷം ഒരു വർഷം വരെ രോഗമുള്ള കുട്ടികൾക്കുള്ള അവകാശങ്ങൾ:)
	2.2.9 Free and zero expense treatment (സൗജന്യ ചികിത്സ)
	2.2.10 Free drugs and consumables (സൗജന്യ മരുന്നുകളും ഉപഭോഗവസ്തുക്കളും)
	2.2.11 Free diagnostics (സൗജന്യ ഡയഗ്നോസ്റ്റിക്സ്)
	2.2.12 Free provision of blood (സൗജന്യ രക്ത വിതരണം)
	2.2.13 Exemption from all kinds of user charges (എല്ലാത്തരം ഉപയോക്തൃ നിരക്കുകളിൽ നിന്നും ഇളവ്)
	2.2.14 Free transport from home to health institution, between health institutions in case of referrals and drop back home (സൗജന്യ ഗതാഗതം)
3.3 Who motivated you to avail JSSK? (JSSK പ്രയോജനപ്പെടുത്താൻ ആരാണ് നിങ്ങളെ പ്രേരിപ്പിച്ചത്?)	/Husband / Family Members (ഭർത്താവ്/കുടുംബാംഗങ്ങൾ)/ /Friends / relatives / neighbors (സുഹൃത്തുക്കൾ/ബന്ധുക്കൾ/അയൽക്കാർ)/ /ANM / Doctor (നഴ്സ് / ഡോക്ടർ)/ /ASHA/AWW (ആശാ വർക്കർ / അങ്കണവാടി വർക്കർ)/ /Any other (മറ്റാരെങ്കിലും)/
3.4 The reason for utilizing JSSK (JSSK ഉപയോഗിക്കാനുള്ള കാരണം)	/Better medical care (മെച്ചപ്പെട്ട വൈദ്യ പരിചരണം)/ /Zero/least Expenditure (പൂജ്യം/കുറഞ്ഞ ചെലവ്)/ /Family/ASHAs/ANMs/AWW motivation (കുടുംബം/ആശ/നഴ്സ്/അങ്കണവാടി തൊഴിലാളികളുടെ പ്രചോദനം)/ /Any others (മറ്റേതെങ്കിലും)/
3.5 Are you satisfied with the facilities and quality of services provided under JSSK? If not, please specify (JSSK- യുടെ കീഴിൽ നൽകുന്ന സേവനങ്ങളുടെ സൗകര്യങ്ങളിലും ഗുണനിലവാരത്തിലും നിങ്ങൾ സംതൃപ്തനാണോ? ഇല്ലെങ്കിൽ, ദയവായി വ്യക്തമാക്കുക)	
3.6 Did you face any problem to avail JSSK If yes, please specify (JSSK ഉപയോഗിക്കുന്നതിന് നിങ്ങൾക്ക് എന്തെങ്കിലും പ്രശ്നം നേരിടേണ്ടി വന്നിട്ടുണ്ടോ ഉണ്ടെങ്കിൽ, ദയവായി വ്യക്തമാക്കുക)	

4. Out of Pocket Expenditure (OOPE) (പോക്കറ്റിൽ നിന്നുള്ള ചെലവ്)

4.1 Have you incurred any cost during delivery? If yes, how much total expenditure have you made from pocket during delivery and in which items? (ഡെലിവറി സമയത്ത് നിങ്ങൾക്ക് എന്തെങ്കിലും ചിലവ് വന്നിട്ടുണ്ടോ? ഉണ്ടെങ്കിൽ, ഡെലിവറി സമയത്ത് പോക്കറ്റിൽ നിന്ന് നിങ്ങൾ എത്ര തുക ചെലവഴിച്ചു?, ഏത് ഇനങ്ങളിൽ?)	
4.2 After registering under JSSK, any of the free entitlement has not been received? If yes, which one and how much expenditure incurred for that? (JSSK- ന് കീഴിൽ രജിസ്റ്റർ ചെയ്തതിന് ശേഷം, ഏതെങ്കിലും സൗജന്യ അവകാശം ലഭിച്ചിട്ടില്ലേ? ഇല്ലെങ്കിൽ, ഏതാണ്? അതിനായി എത്ര തുക ചെലവഴിച്ചു?)	

5. Postnatal Care (പ്രസവാനന്തര പരിചരണം)

5.1 Have you received any postnatal check-up? If yes, how many? (നിങ്ങൾക്ക് എന്തെങ്കിലും പ്രസവാനന്തര പരിശോധന ലഭിച്ചിട്ടുണ്ടോ? ഉണ്ടെങ്കിൽ, എത്ര?)	/ /2/ /3/ />3/
5.2 Duration between delivery and first postnatal check-up? (പ്രസവത്തിനും ആദ്യത്തെ പ്രസവാനന്തര പരിശോധനയ്ക്കും ഇടയിലുള്ള കാലാവധി?)	/1-2 days (1-2 ദിവസം) / /3-41 days (3-41 ദിവസം) / /More than 41 days (41 ദിവസത്തിൽ കൂടുതൽ)/
5.3 Who performed First postnatal check-up? (ആരാണ് പ്രസവത്തിനു ശേഷമുള്ള ആദ്യ പരിശോധന നടത്തിയത്?)	/Doctor (ഡോക്ടർ)/ /ANM (നഴ്സ്)/ /Other health personnel (മറ്റ് ആരോഗ്യ പ്രവർത്തകർ)/
5.4 Where did you receive PNC? (പ്രസവാനന്തര പരിചരണം നിങ്ങൾക്ക് എവിടെ നിന്ന് ലഭിച്ചു?)	Govt. Hospital (ഗവ. ആശുപത്രി)/ /PHC/CHC/Sub-Center (PHC/CHC/സബ് സെന്റർ)/ /Others (Specify) (മറ്റുള്ളവ (വ്യക്തമാക്കുക))/

6. Child Immunization (കുട്ടികളുടെ പ്രതിരോധ കുത്തിവയ്പ്പ്)

6.1 Do you have Child Immunization Card? (നിങ്ങളുടെ പക്കൽ ചൈൽഡ് ഇമ്മ്യൂണൈസേഷൻ കാർഡ് ഉണ്ടോ?)	Yes (അതെ) / No (ഇല്ല)
6.2 Vaccines, taken from birth till 1 year age (ജനനം മുതൽ 1 വയസ്സ് വരെ എടുത്ത വാക്സിനുകൾ)	BCG/OPV-0/Hepatitis B1
	Pentavalent-1 / OPV-1
	Pentavalent -II / OPV-II
	Pentavalent -III / OPV-III
	Measles-I / MMR

7. Role of ASHA Workers (ആശ പ്രവർത്തകരുടെ പങ്ക്)

7.1 Availability of ASHA Workers (ആശ പ്രവർത്തകരുടെ ലഭ്യത)	/Often (പലപ്പോഴും)/ /Seldom (അപൂർവ്വമായി)/ /Never (ഒരിക്കലും)/
7.2 Behaviour of ASHA Workers (ആശ പ്രവർത്തകരുടെ പെരുമാറ്റം)	/Excellent (മികച്ചത്) / Good(നല്ലത്) / /Average (ശരാശരി) / Bad (മോശം) / Very bad (വളരെ മോശം)
7.3 Quality of Services of ASHA (ആശ പ്രവർത്തകരുടെ സേവനങ്ങളുടെ നിലവാരം)	Excellent (മികച്ചത്) / Good(നല്ലത്) / /Average (ശരാശരി) / Bad (മോശം) / Very bad (വളരെ മോശം)
7.4 Are you satisfied with the services provided by ASHA? If No, State reasons (ആശ നൽകുന്ന സേവനങ്ങളിൽ നിങ്ങൾ സംതൃപ്തനാണോ? ഇല്ലെങ്കിൽ, കാരണം വ്യക്തമാക്കുക)	/Yes (അതെ)/ /No (അല്ല)/
7.5 How you will rate Overall services of ASHA (ആഷയുടെ മൊത്തത്തിലുള്ള സേവനങ്ങളെ നിങ്ങൾ എങ്ങനെ വിലയിരുത്തും)	Excellent (മികച്ചത്) / Good(നല്ലത്) /

	/Average (ശരാശരി) / Bad (മോശം) / Very bad (വളരെ മോശം)

8. Suggestions (നിർദ്ദേശങ്ങൾ)

8.1 Do you want to give your valuable suggestions for improving this scheme? Regarding: (ഈ സ്കീം മെച്ചപ്പെടുത്തുന്നതിന് നിങ്ങളുടെ വിലയേറിയ നിർദ്ദേശങ്ങൾ നൽകാൻ നിങ്ങൾ ആഗ്രഹിക്കുന്നുണ്ടോ?

a) ASHA / AWW (ആശാ വർക്കർ/ അങ്കണവാടി വർക്കർ)

_____
_____

b) ANM/Doctors/Medical Staff (നഴ്സുമാർ/ഡോക്ടർമാർ/മെഡിക്കൽ സ്റ്റാഫ്)

_____
_____

d) Healthcare Infrastructure (Beds,OTs/Lab,Pharmacy,etc) (ആരോഗ്യ പരിപാലന മേഖലയിൽ അടിസ്ഥാന സൗകര്യങ്ങൾ)

_____

_____

e) Entitlements for Pregnant Women (ഗർഭിണികൾക്കുള്ള അവകാശങ്ങൾ)

_____
_____

f) Entitlements for sick children up to one year after birth (രോഗികളായ കുട്ടികൾക്കുള്ള, ജനിച്ച് ഒരു വർഷം വരെ, അവകാശങ്ങൾ)

_____
_____

g) Any other suggestions? (മറ്റേതെങ്കിലും നിർദ്ദേശങ്ങൾ?)

_____
_____

9. What is your overall assessment about the JSSK scheme? (JSSK സ്കീമിനെക്കുറിച്ചുള്ള നിങ്ങളുടെ മൊത്തത്തിലുള്ള വിലയിരുത്തൽ എന്താണ്?)

a) Very Good (വളരെ നല്ലത്) b) Good (നല്ലത്) c) Neutral (ന്യൂട്രൽ) d) Bad (മോശം) e) Very Bad (വളരെ മോശമാണ്)

Signature of the Beneficiary

Signature of the Research Scholar

Appendix 2

മലപ്പുറം ജില്ലാ മെഡിക്കൽ ഓഫീസ്(ആരോഗ്യം)റുടെ നടപടിക്രമങ്ങൾ

വിഷയം:- പി.എച്ച്.ഡി തീസിസ് ചെയ്യുന്നതിന് ഡാറ്റ ശേഖരണത്തിന് അനുമതി നൽകി ഉത്തരവാകുന്നത്.

വായന:- 1. മൗലാന ആസാദ് നാഷണൽ ഉർദു യൂണിവേഴ്സിറ്റി എക്കണോമിസ്റ്റ് വിഭാഗം മേധാവിയുടെ 26.03.2021 ലെ കത്ത് നമ്പർ MANUU/ECO/1124.
2. ശ്രീ. ഫസലുറഹ്മാൻ.പി.കെ, അസിസ്റ്റന്റ് പ്രൊഫസർ, മൗലാന ആസാദ് നാഷണൽ ഉർദു യൂണിവേഴ്സിറ്റി, ഹൈദരാബാദ് നൽകിയ അപേക്ഷ.

ഉത്തരവ് നമ്പർ ബി3/6321/2021/ജി.മെ.ഒ(ആ) മലപ്പുറം/തീയ്യതി 16.04.2021.

"Analysis of the Effectiveness of Janani Shishu Suraksha Karyakram (JSSK) in Malappuram District of Kerala" എന്ന വിഷയത്തിൽ പി.എച്ച്.ഡി തീസിസിന്റെ ഭാഗമായി ഡാറ്റ ശേഖരിക്കുന്നതിന് ഹൈദരാബാദ് മൗലാന ആസാദ് നാഷണൽ ഉർദു യൂണിവേഴിസിറ്റിയിലെ അസിസ്റ്റന്റ് പ്രൊഫസർ ആയ ശ്രീ.ഫസലുറഹ്മാൻ.പി.കെ എന്നവർക്ക് താഴെ പറയുന്ന നിബന്ധനകളോടെ അനുമതി നൽകി ഉത്തരവാകുന്നു.

1. ശേഖരിക്കുന്ന ഡാറ്റകൾ പഠനാവശ്യത്തിനല്ലാതെ മറ്റ് യാതൊരുവിധ ആവശ്യങ്ങൾക്കും ദുരുപയോഗം ചെയ്യാൻ പാടുള്ളതല്ല.
2. പഠനത്തിൽ പങ്കെടുക്കുന്നതിന് ആളുകളെ നിർബന്ധിക്കുകയോ പങ്കെടുക്കുന്നവർക്ക് എന്തെങ്കിലും ബുദ്ധിമുട്ടുകൾ ഉണ്ടാകുവാനോ പാടുള്ളതല്ല.
3. ആരോഗ്യവകുപ്പ് അധികൃതരുടെ സമ്മതമില്ലാതെ വിവരങ്ങൾ പ്രസിദ്ധീകരിക്കാൻ പാടുള്ളതല്ല.

(ഒപ്പ്)
ഡോ.സക്കീന.കെ
ജില്ലാ മെഡിക്കൽ ഓഫീസർ(ആരോഗ്യം)
മലപ്പുറം.

ഗ്രാഹകർ:- വ്യക്തിക്ക്.

പകർപ്പ്:-

1. ജില്ലാ പ്രോഗ്രാം മാനേജർ, ആരോഗ്യകേരളം. (ആവശ്യപ്പെട്ട വിവരങ്ങൾ വ്യക്തിക്ക് നേരിട്ട് നൽകേണ്ടതാണ്)
2. ഫയൽ.

ജില്ലാ മെഡിക്കൽ ഓഫീസ് (ആരോഗ്യം) പിൻ: 676 505 സിവിൽ സ്റ്റേഷൻ, മലപ്പുറം

//ഉത്തരവിൻ പ്രകാരം//

സൂപ്രണ്ട്

എസ്.എ 16.04.2021.

Appendix 3

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Determinants of Maternal Mortality: An Empirical Study of Indian States Based on the Random Effect Model Analysis

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ABSTRACT

Background: Healthcare for mothers and children is a significant indicator of a country's well-being. India is one of the nations that were experiencing a rather slow improvement in maternal and child health.

Aims: The objective of this study is to analyse the changes in health infrastructure, government health expenditure, antenatal care, postnatal care, institutional delivery, Maternal Mortality Ratio (MMR) and the determinants of MMR in India.

Methodology: The study is based on secondary data. It employs an Average Increasing Rate (AIR) and Average Reduction Rate (ARR), as well as a panel data random effect model.

Results: Empirical results say MMR has a statistically significant inverse relationship with female literacy, Per capita Net State Domestic Product (PNSDP), and institutional delivery. The study concludes that after the introduction of NRHM and its constituent elements like JSY and JSSK, government expenditure on health, health infrastructure, the percentage of antenatal care, post-natal care, and institutional delivery increased in most of the Indian states, thus helping to increase the pace of the reduction of MMR. However, state performance varies greatly.

Conclusions: Policy alone will not provide the desired results; it is also critical to focus on education, particularly female literacy, and economic empowerment.

Keywords: Maternal Mortality Ratio, Per capita Government Health Expenditure, Antenatal Care, Out-of-Pocket Expenditure, Institutional delivery, Postnatal Care

INTRODUCTION

Mother and child healthcare is an important indication of a country's well-being. India is one of the countries that has seen a modest improvement in maternal and child health. During the early 21st century, the country was victim to high rates of maternal deaths, around 254 per hundred thousand live births (SRS-2004-06), larger than the world average.[1] In 2017, there were almost 810 preventable deaths of women every day connected to pregnancy and delivery.[2] Millennium Development Goal number five intended to lower the MMR by three-quarters from 1990 to 2015. India has made great progress toward the Millennium Development Goals, with several targets being met ahead of the 2015 deadline, but development has been uneven.[3] To achieve these objectives, the government set up National Rural Health Mission (NRHM) in 2005, with the goal of providing good healthcare in the rural area and promoting high-quality infrastructure, particularly in backward areas, with a focus on improving infants, children, and maternal health.

One of NRHM's flagship programmes, Janani Suraksha Yojana (JSY) has introduced in 2005. The im-

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INFLATION AND INFANT MORTALITY IN INDIA: BASED ON ARDL MODEL ANALYSIS

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Abstract
The health of mothers and children is a crucial sign of a nation's prosperity. India is one of the countries where improvements in mother and child health have been sluggish to come about. The level of mother and child health is affected by several factors, including the Gross Domestic Product (GDP), unemployment, income, education, healthcare spending, and ethnic differences. Discovering the relationship between inflation and infant mortality in India is the goal of this study. The analysis is based on secondary data, where information on the outcomes and explanatory factors is gathered from data sources maintained by the World Bank and the Reserve Bank of India for the years 1980 to 2020. To analyse the effect of inflation on IMR, it used the ARDL-Error Correction Model. In this case, inflation is represented by the consumer price index. According to empirical findings, there is a strong long-term cointegration between inflation and IMR, even though in the short run, cointegration shows some variation owing to a variety of other factors, including policy interventions, demographic, and other socio-cultural determinants. Both an income and a substitution effect result from inflation. The quality of healthcare services declines because of inflation because its negative income effect outweighs its positive substitution effect. The study reiterates the notion that macroeconomic stability and growth are necessary to meet the aims of the health sector more effectively in general and maternal and child healthcare in particular.
Keywords: Consumer Price Index, Inflation, Infant Mortality Rate, GDP Per capita, Current Health Expenditure Per capita, ARDL-Error Correction Model.

Introduction

The health of mothers and children is an essential indicator of a country's well-being. India is one of the nations where mother and child health has improved but at a slow pace. Maternal mortality rates in the early twenty-first century were higher than the global average, at roughly 254 per hundred thousand live births (SRS-2004-06). The fifth Millennium Development Goal aimed to reduce the MMR by three-quarters between 1990 and 2015. Even though development has been inconsistent, India has made great progress toward the Millennium Development Goals and accomplished certain goals before the 2015 deadline. High maternal and infant mortality rates compromise population health and human capital, which impedes economic growth and