Adjudicating Emerging Trends in Child Health in Punjab: Insights from National Family Health Surveys

Simranjeet Kaur and Sukhwinder Singh
Punjabi University, Patiala

This paper unravels emerging trends in child health in Punjab by analysing data of two National Family Health Surveys NFHS-4 (2015-16) and NFHS-5 (2019-21). Punjab, a state known for its agricultural and economic advancements in the past, presents a dual narrative of progress and persistent challenges in child health. Key indicators such as child mortality rates, nutritional deficiencies, vaccination coverage, and maternal health service utilization were analysed to identify trends and gaps in child health. The study highlights Punjab's achievements in reducing neonatal and under-five mortality rates yet underscores concerns such as rising anaemia rates among women and children, declining antenatal care (ANC) visits, and disparities in vaccination coverage. By comparing Punjab's performance with Kerala and India, this paper emphasizes the need for targeted policy interventions and improved public health initiatives to bridge existing gaps.

Section-I

1. Imperative of Early Childhood Care

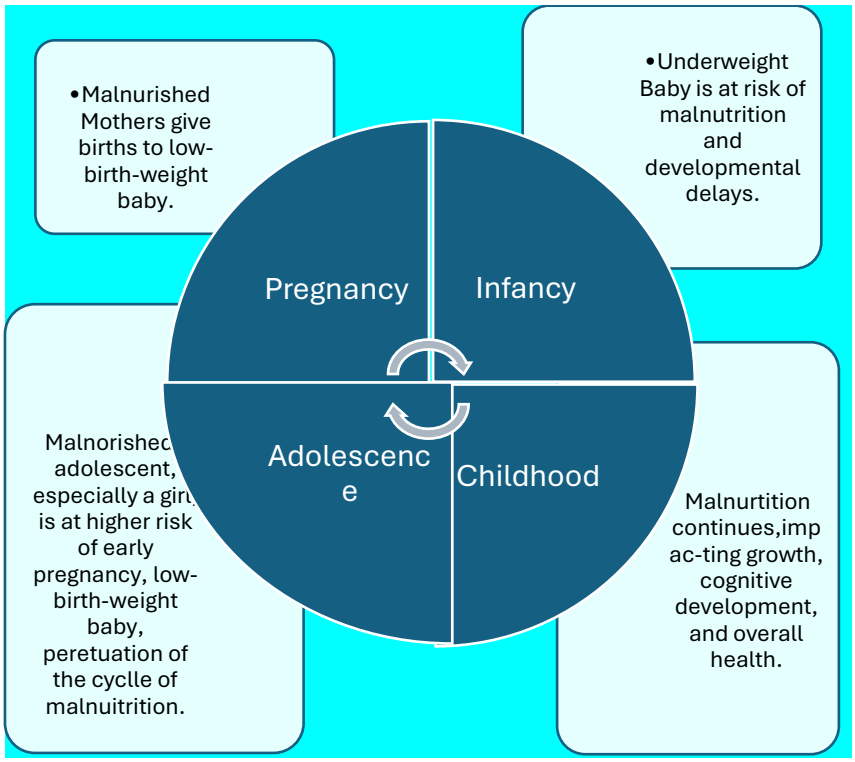
Child health is a critical determinant of a nation's human capital and overall development (WHO, 2023). A healthy childhood lays the foundation of productive and fulfilling adult life. Despite significant strides in the global health scenario, wide disparities in child health still persist, with developing countries bearing a disproportionate burden of child morbidity (Kaur, 2024). India, being a rapidly developing nation, has made considerable progress in improving child health indicators; yet many challenges persist, especially in the regions/states facing socio-economic deprivation and infrastructural limitations (Appaix and Belli, 2003). Mainstream institutions/organizations also argued that investment in children's health yields substantial social and economic returns along with fostering a healthy, educated, and productive future generation (WHO, 2023; UNICEF, 2018; World Bank, 2016; Singh, 1991; and Kumar, 2011). Conversely, childhood malnutrition, various diseases and deficiencies in their upbringing can significantly impede human capital formation (Appaix and Belli, 2003.

Field experiences across the globe also demonstrate that mothers and their children's health and care needs are considered the fountainhead of a country's public health policy (Yesudian, 1998; Singh, 1991; and Kumar, 2011). In fact, these two groups of people in India are more vulnerable to certain health hazards and diseases compared to other groups of people in a country (Chatterjee, 1988).

By nature, health problems of mother-child are linked with each other biologically and socio-economically (Park and Park, 1989). For instance, a child from the moment of conception to the weaning time, is physically dependent on his/her mother. And, mother's health, particularly her nutrition, infections and education levels directly affect the child's health and survival (Singh, 1991).

This biological and socio-economic intergenerational transmission cycle of malnutrition is depicted logically and clearly in Figure 1. This intergenerational transmission cycle of malnutrition, in fact, refers to a vicious cycle where a malnourished mother gives birth to a low birth weight baby, who then grows up to become a malnourished adult (if the adult is she), then she will be repeating the cycle by becoming a malnourished pregnant woman, passing on nutritional deficiencies to their own offspring. It means that this malnutrition essentially is passed down from one generation to the next due to poor nutrition during critical developmental stages, particularly in early childhood and pregnancy.

Figure 1: Intergenerational Transmission Cycle of Malnutrition



Source: Almond & Chay, 2006; Hoke & McDade, 2015.

Such poor health conditions of mothers and new-born babies were highlighted even in the pre-independence studies (GOI, 1946; Gill, 1987 and Singh, 1991).

To tackle their health problems, maternal and child health (MCH) services were made an integral part of overall planned development strategy in India since the early 1950s, as envisioned in the Bhore Committee Report (GOI, 1946) and Sokhey Committee Report (National Planning Committee, 1948). Under this strategy, more public funds were spent to create an extensive network of public health care institutions (Hospitals, CHCs, PHCs and SCs) for catering the health care of women and children by keeping them disease-free, as well as healthy, both physically and mentally (World Bank, 1993; Misra, et al., 2003; Singh and Gill, 2008). And, all these heavy doses of public expenditure have certainly improved child and maternal survival rates and helped to reduce population growth in India (Singh and Jain, 2011). Many research studies still point out the dismal picture of women and child health in India (Visaria, 1985; Jeffery, 1988; Tulasidhar and Sharma, 1993; and Misra, et al., 2003).

In India, MCH services were developed initially as part of the officially adopted family planning programme since 1950-51 and continued up to the Fourth Five Year Plan (1969-74). In subsequent years, child survival and safe motherhood were added to this program (GOI, 1992). In October 1997, it was named as reproductive and child health (RCH) program. The latest RCH, in its holistic approach, seeks to integrate maternal health, child health, and fertility (reproductive health) aspects together. The most crucial aspects of RCH are: (a) provisions for antenatal care, including at least three antenatal visits, iron and folic acid tablets (IFA) for pregnant mothers, two doses of tetanus vaccine, detection and treatment of anaemic mothers, and management of high-risk pregnancies; (b) promotion of institutional deliveries or home deliveries assisted by a skilled health personnel; (c) provisions for postnatal care, including at least three postnatal visits; and (d) identification and management of reproductive tract and sexually transmitted infections (GOI, 1997).

The National Health Mission (NHM), by subsuming NRHM-2005 and NUHM-2013, started in 2013 also stresses upon safe motherhood and enhancing child survival rates, particularly in rural areas across the states (GOI, 2005; Dhar, 2012). Rashtriya Bal Swasthya Karyakram (RBSK), launched in 2013, under NHM, also focuses on early identification and intervention for diseases, disabilities, and development delays in children. Moreover, Poshan Abhiyaan of 2018, or the National Nutrition Mission, addresses the basic nutrition needs of children during their first 1,000 days of life (Kaur, 2024). These initiatives demonstrate that comprehensive efforts have been made to improve child health and well-being in India.

This paper explored trends in child health in Punjab by examining key indicators of child health such mortalities, morbidities, nutritional deficiencies (e.g., anaemic children), etc. It also elucidates utilization pattern and determinants of MCH care services along with identifying strategic and potential areas for public policy interventions in the state. The study primarily utilized the data derived from two latest rounds of National Family Health Surveys[1] (NFHS-4 and NFHS-5) conducted in India during 2015-16 and 2019-21. These surveys provided most reliable and comparable information about various aspects of family health in India and across Indian states as these surveys

were conducted through a well-designed scientific sampling technique. Moreover, these data were collected from nationally representative large samples consisting of 636,699 households during NFHS-5 and 601,509 households during NFHS-4 (Kaur, 2024).

The paper is divided into six sections. Section-I, besides examining the need for early childhood care, discusses the main objectives, data sources and methodology of study. Section-II examines progress in child health indicators, such as mortality rates, weight at birth, and vaccination coverage in India and Punjab. Section-III discusses child morbidity in Punjab, with respect to common childhood diseases. Section-IV examines prevalence of nutritional and anaemic level of children and women in Punjab. Section-V analyses the utilization pattern and determinants of maternal and child health (MCH) care in Punjab. Main conclusions and doable public policy interventions are summarized in Section-VI.

Section-II

2.1 Child Health Status in India and Punjab

Child health status is basically measured in India through various mortality rates (neonatal, post-neonatal, infant, child, and child under-five year mortality rates). A progressive decrease in these rates reflects the nation's child health status, socio-economic development and quality of life. These rates also serve as crucial indicators for monitoring public health programs and guiding interventions to improve child health outcomes. A few specific rates are defined as below:

Neonatal mortality: The probability of a child dying within one month of life.

Post-neonatal mortality: The probability of a child dying between one month of life and first birthday (computed as the difference between infant and neonatal mortality).

Infant mortality: The probability of a child dying between birth and 1st birthday.

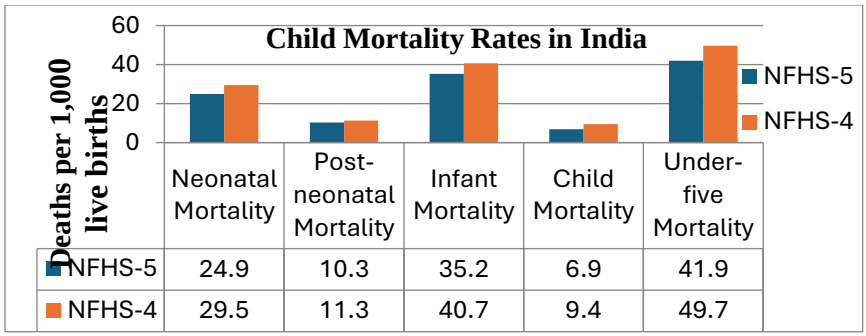
Child mortality: The probability of a child dying between the first and 5th birthday.

Under-five mortality: The probability of child dying between the birth and 5th birthday.

An analysis of these rates in India (Figure 2) during NFHS-4 and NFHS-5 showed a declining trend across all types of child mortality rates. For instance, neonatal mortality decreased significantly from 29.5 deaths per 1,000 live births in NFHS-4 to 24.9 deaths per 1,000 live births in NFHS-5. Post-neonatal mortality rate declined slightly from 11.3 deaths to 10.3 deaths per 1,000 live births. During the same period, infant mortality dropped from 40.7 deaths to 35.2 deaths per 1,000 live births; child mortality rate dropped significantly from 9.4 deaths to 6.9 deaths per 1,000 live births; and under-five mortality rate decreased from 49.7 deaths to 41.9 deaths per 1,000 live births. These improvements are largely attributed to overall advancements in the health care infrastructure, targeted public health programs, and better access to the MCH

services (neonatal, natal and postnatal cares) along with better vaccine coverage, etc.

Figure 2: Trends in Child Mortality Rates in India during NFHS-4 and NFHS-5



	Neonatal Mortality	Post-neonatal Mortality	Infant Mortality	Child Mortality	Under-five Mortality
NFHS-5	24.9	10.3	35.2	6.9	41.9
NFHS-4	29.5	11.3	40.7	9.4	49.7

Source: NFHS-5 India, 2019-21; NFHS-4 India, 2015-16.

2.2 Child Health Status in Punjab vs. Few States

The data in Table 1 below showcases childhood mortality rates across few states of India; these indicate very wide disparities across different regions/states of India so far as the childhood mortality rates are concerned. When comparing these rates in Punjab with other states and India as a whole, several key differences and trends have been observed.

2.2.1 Punjab vs. India

Punjab demonstrated a better performance in all mortality measures compared to the national average (Table 1) at the time of NFHS-5. For neonatal mortality, Punjab's rate is 21.8 deaths per 1,000 live births, which is significantly lower than the national average of 24.9 deaths per 1,000 live births. This trend continued across other mortality rates: post-neonatal mortality in Punjab was 6.3 deaths per 1,000 live births compared to India's 10.3 deaths per 1,000 live births; Punjab's infant mortality was 28.0 deaths vs. India's 35.2 deaths per 1,000 live births; Punjab's child mortality at 4.8 deaths against India's 6.9 deaths; and Punjab's U5MR was 32.7 deaths compared to India's 41.9 deaths per 1,000 live births. These figures suggested that Punjab had a relatively better health care infrastructure and public policy interventions in place, which contributed positively to lowering the childhood mortality rates (Kaur, 2024).

2.2.2 Punjab vs. Other States

Comparing Punjab's childhood mortality rates to the other states, the Southern states like Kerala and Puducherry exhibited the lowest childhood mortality rates in the country. Kerala's neonatal mortality rate was just 3.4 deaths per 1,000 live

births and Puducherry at 2.3 deaths per 1,000 live births, with corresponding figures of U5MR of 5.2 deaths and 3.9 deaths per 1,000 live births, respectively. These figures are substantially lower than Punjab's rates, which may be indicating better health care systems, early intervention, and better socio-economic conditions in these Southern states. Moreover, Himachal Pradesh's performance was slightly better than that of Punjab with respect to figures of neonatal, at 20.5 deaths and U5MR at 28.9 deaths per 1,000 live births.

Punjab, however, enjoyed a much better position than that of Uttar Pradesh and Bihar. For instance, Uttar Pradesh's neonatal mortality was 35.7 deaths, and Bihar's 34.5 deaths per 1,000 live births, along with U5MR of 59.8 deaths and 56.4 deaths per 1,000 live births, respectively. When Punjab is compared with West Bengal and Assam, figures showcase mixed performance. For instance, West Bengal, with a neonatal mortality rate of 15.5 deaths, Infant mortality rate of 22.0 deaths, and U5MR of 25.3 deaths per 1,000 live births, performed better than Punjab.

Table 1: Childhood Mortality Rates across Different States in India during NFHS-5

State	Neonatal Mortality	Post-Neonatal Mortality*	Infant Mortality	Child Mortality	Under-Five Mortality
India as whole	24.9	10.3	35.2	6.9	41.9
Punjab	**21.8**	**6.3**	**28.0**	**4.8**	**32.7**
Himachal Pradesh	20.5	5.1	25.6	3.4	28.9
Uttar Pradesh	35.7	14.7	50.4	10.0	59.8
Bihar	34.5	12.3	46.8	10.2	56.4
West Bengal	15.5	6.5	22.0	3.4	25.3
Assam	22.5	9.5	31.9	7.4	39.1
Gujarat	21.8	9.4	31.2	6.6	37.6
Kerala	3.4	1.0	4.4	0.8	5.2
Puducherry	2.3	0.7	2.9	1.0	3.9
'*' computed as the difference between the infant and neonatal mortality rates					

Source: NFHS India-5, 2019-21.

2.2.3 Weight and Size of a Child at Birth

Birth weight is another important indicator of a child's vulnerability to the risk of childhood illness and survival chances. Children whose weight at birth is less than 2.5 kg, or children reported to be 'very small' or 'smaller than average' are considered to have a higher-than-average risk of early childhood death. In Punjab, 22.4 percent of child births were reported as having weight of less than 2.5 kg compared to the national average of 18.2 percent (Table 2). This higher percentage indicated a greater prevalence of low birth weight among infants in

Punjab. Interestingly, in Punjab, 93.7 percent of live births were also reporting birth weights compared to the national average of 90.6 percent. This means that Punjab had better record-keeping and reporting practices of live births.

Regarding the size of a child at birth, 3.1 percent of child births in Punjab were reported as being 'very small', slightly higher than national average of 2.6 percent. Additionally, 6.6 percent of child births were reported as being 'smaller size' than the average size in Punjab as compared to 8.0 percent at national level. Further, the percentage of child births categorized as 'average' or 'larger size' was almost similar in Punjab (88.7 percent) and of national average (88.2 percent). The percentage of missing or unknown data on child births was slightly higher in Punjab (1.6 percent) compared to the national average (1.2 percent).

Kerala, on the other side, had a much lower percentage of child births (16.3 percent) weighing less than 2.5 kg compared to Punjab's 22.4 percent. Further, in Kerala, 83.7 percent of child births weighing equal to 2.5 kg or more were found to be higher than that of Punjab's 77.6 percent. Kerala has a higher percentage of births classified as average or larger (93.2 percent) compared to Punjab (88.7 percent). It means that children in Kerala were enjoying better socio-economic development and MCH care services.

Table 2: Percentage Distribution of Children by Weight and Size of Child at Birth in India, Punjab, and Kerala

State	% Distribution of Births with A Reported Birth Weight		% of Live Births Whose Birth Weight was Reported	% Distribution of All Live Births by Size of Child at Birth			
	Less than 2.5 kg	2.5 kg or more		Very Small	Smaller than Average	Average or Larger	Do not Know/ Missing
India	18.2	81.8	90.6	2.6	8.0	88.2	1.2
Punjab	22.4	77.6	93.7	3.1	6.6	88.7	1.6
Kerala	16.3	83.7	99.1	0.6	6.1	93.2	0.2

Source: NFHS India-5, 2019-21; NFHS Punjab-5, 2019-21; NFHS Kerala-5, 2019-21.

2.2.4 Vaccination Coverage of Children

Theoretically, universal immunization of children against six-vaccine preventable diseases (Tuberculosis, Diphtheria, Pertussis, Tetanus, Polio, and Measles) is the most critical program in India to reduce infant and child mortality. WHO guidelines states that children are considered to be fully vaccinated when they have received a vaccination against Tuberculosis (BCG-one dose); three doses of vaccine of Diphtheria, Pertussis (whooping cough) and Tetanus (DPT); three doses of poliomyelitis (Polio) vaccine; and one dose of measles vaccine by the age of 12 months. BCG should be given at birth or at first clinical contact; DPT and Polio require three vaccinations at approximately

4, 8 and 12 weeks of child's age, and measles should be given soon after reaching 9 months of age (Kaur, 2024).

An analysis of vaccine coverage (Table 3) revealed that Punjab's BCG, DPT, Polio vaccination coverage consistently remained higher than that of the national average in both surveys (NFHS-4 and NFHS-5). Intriguingly, Punjab's immunization performance suffered a lot during NFHS-5 as compared to immunization performance during NFHS-4. For instance, DPT-1 coverage slightly decreased from 96.7 percent in NFHS-4 to 93.7 percent in NFHS-5. DPT-2 coverage saw a slight drop from 96.3 percent in NFHS-4 to 92.1 percent NFHS-5. DPT-3 coverage declined significantly from 94.5 percent NFHS-4 to 88.5 percent in NFHS-5

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Table 3: Percentage of Children Aged 12-23 Months Got Vaccination in India, Punjab, and Kerala

Vaccination/Dose	India		Punjab		Kerala	
	NFHS-4	NFHS-5	NFHS-4	NFHS-5	NFHS-4	NFHS-5
BCG	91.9	95.2	98.2	95.3	98.1	97.6
DPT 1	89.5	93.6	96.7	93.7	95.4	95.8
DPT 2	85.7	91.4	96.3	92.1	93.8	92.2
DPT 3	78.4	87.0	94.5	88.5	90.4	85.9
Polio 0	79.1	85.5	96.8	92.6	95.1	92.5
Polio 1	90.8	92.4	97.5	93.4	96.7	95.2
Polio 2	86.0	88.5	96.5	89.1	88.6	90.0
Polio 3	72.8	80.5	93.7	79.7	88.5	84.1
Measles	81.1	87.9	93.1	88.1	89.4	88.9
All Basic Vaccination	62.0	76.6	89.0	76.2	82.1	78.4
No Vaccination	6.0	3.6	1.7	3.7	1.7	1.8
% of Children having a Vaccination Card	63.2	85.8	90.9	83.9	86.1	88.6

Source: NFHS India-5, 2019-21; NFHS Punjab-5, 2019-21; NFHS Kerala-5, 2019-21; NFHS India-4, 2015-16; NFHS Punjab-4, 2015-16; NFHS Kerala-4, 2015-16.

Interestingly, Punjab's measles vaccination rate was higher than that of national averages, although Punjab's measles vaccination rate was also down from 93.1 percent in NFHS-4 to 88.1 percent in NFHS-5. Punjab's coverage for all basic vaccinations was 89.0 percent, which was much higher than the national average of 62.0 percent in NFHS-4, but it declined significantly to 76.2 percent in NFHS-5 from 89.0 percent in NFHS-4. Moreover, Punjab has lower percentage of children with no vaccination at all compared to the national averages.

On the vaccine coverage, Kerala has much better performance during both surveys than that of Punjab, as well as India as a whole. For example, Kerala consistently had higher DPT vaccination rates compared to Punjab. Both states, in fact, showed a strong coverage of Polio vaccine coverage, though Kerala state performed slightly better than that of Punjab. Punjab consistently outperformed national averages for most vaccines, yet lagged behind Kerala, which continued to set a high standard for vaccination coverage.

Section-III

3. Prevalence of Child Morbidity in Punjab

This section discussed the prevalence and treatment of diarrhoea, acute respiratory infections (ARIs) and fevers amongst young children. According to WHO, diarrheal disease is termed as the third leading cause of death in children aged 1-59 months. Acute respiratory infections (ARIs), primarily pneumonia, are also a major contributor to child mortality. Fevers, a common symptom of many childhood diseases, can exacerbate severity of these diseases, which raises the risk of death. Child health statistics revealed diarrhoea remained the most common causes of death among children under age five, followed by acute respiratory infections (ARIs) and unknown fevers in India. Table 4 presents data on percentage of children (aged less than five years) suffering in the past two weeks from (i) diarrhoea; (ii) acute respiratory infections (ARIs); and (iii) fevers in India, Punjab, and Kerala

3.1 Diarrhoea

In medical parlance, deaths from acute diarrhoea are most often caused by severe dehydration due to loss of water and electrolytes in the body of children. Most of the dehydration-related deaths, however, are preventable by prompt administration of rehydration solutions. The data reveals (Table 4) that Kerala has the lowest prevalence rate for diarrhoea (4.3 percent) amongst children, followed by Punjab (4.9 percent), and India as a whole (7.3 percent). Further, data for Kerala show the highest percentage of children taken to health facilities or providers (87.1 percent) for treatment; followed by Punjab (80.8 percent) and India (76.2 percent). When looking at ORT treatment data, Kerala again leads with 75.3 percent coverage, whereas India and Punjab have lower but similar rates (68 percent and 68.4 percent, respectively).

3.2 Acute Respiratory Infections

Medical science research confirms that a considerable proportion of deaths caused by ARIs can be prevented by an early diagnosis and treatment with antibiotics. A child suffering from a cough accompanied by short as well as rapid breathing is supposed to be a patient of ARI. The data reveals that just 2.8

percent children aged less than five years in India showed symptoms of ARI at the survey time. Among them, 56.1 percent of children received some advice or treatment from a health facility or provider when they were ill with ARI. Overall 38.8 percent of children were taken to a health provider on the same day or next when they were ill. In Punjab and Kerala, 2.5 percent and 2.4 percent of children under age five years showed symptoms of ARI, respectively. In Punjab and Kerala, 45.7 percent and 69.6 percent of children received some advice or treatment from a health facility or provider when they were ill with ARI, respectively. Similarly, 42.3 percent and 53.5 percent of children who fell ill in Punjab and Kerala, respectively, were taken to a health facility or provider on the same day or next day for treatment.

3.3 Fevers

Fever is another most common disease or symptom of children suffering from an illness. It is a manifestation of many diseases, though malaria, viral and other acute infections of children may cause more malnutrition, morbidity, and mortality in young children. The data in Table 4 shows that Kerala had the highest prevalence rate of fevers as 22.5 percent of the children were found to be suffering with fever in the past two weeks of the survey date, which was significantly higher than that of India's children (13.2 percent) and Punjab's children (9.0 percent). Health care seeking behaviour was impressive in the case of Kerala as 89.0 percent of the children suffering from fever were taken to a health facility or provider, followed by India (75.9 percent) and Punjab (63.9 percent). The data for seeking treatment on the same day or next day (53.7 percent) and receiving antibiotic drugs (23.5 percent) was only available in the case of India.

These statistics, in a nutshell, reveal that Kerala had consistently demonstrated better health care quality and access, as evidenced by the higher percentages of children taken to a health facility/provider and treated promptly across all conditions. This is likely due to Kerala's strong health care infrastructure and higher literacy rates, which contribute positively to health-seeking behaviour. Furthermore, the lower prevalence of diarrhoea and ARI in Kerala compared to India and Punjab indicated better socio-economic conditions and public health measures.

Table 4: Prevalence of Diarrhea, ARI and Fever Among Children under 5 Years of Age in India, Punjab, and Kerala

Percentage of Children Suffering in the Past 2 Weeks from:	**India**	**Punjab**	**Kerala**
with Any Type of Diarrhea	7.3	4.9	4.3
with Diarrhea Taken to Health Facility or Provider	76.2	80.8	87.1
who was Treated with ORT	68.0	67.4	75.3
with Symptoms of ARI	2.8	2.5	2.4

with ARI Taken to Health Facility Provider	56.1	45.7	69.6
who Sought Treatment on Same Day or Next Day	38.8	42.3	53.5
with Fever	13.2	9.0	22.5
with Fever Taken to Health Facility or Provider	75.9	63.9	89.0
who Sought Treatment on Same Day or Next Day	53.7	-	-
who Received Antibiotic Drugs	23.5	-	-

Source: NFHS India-5, 2019-21; NFHS Punjab-5, 2019-21; NFHS Kerala-5, 2019-21.

Section-IV

4. Nutrition and Anaemia Levels of Child and Mother in Punjab

Adequate nutrition is the most critical input to a child's physical and mental development, particularly up to the child's second birthday. Up to this age, children are more vulnerable to common childhood diseases such as diarrhoea and acute respiratory infections (ARI), etc. A child born to a poorly nutritious or anaemic mother often faces some serious health implications such as low body mass index (BMI), short stature (height), anaemia, other micronutrient deficiencies, etc.

4.1 Nutritional Status of Children in Punjab

Nutritional status in children has been measured by judging children's (i) height-for-age (stunting), - showing long-term malnutrition; (ii) weight-for-height (wasting) - indicating acute malnutrition; and (iii) weight-for-age (underweight) - a composite measure of both. These indices help to identify children at risk of malnutrition. A comparative analysis of the nutritional status of children in India, Punjab, and Kerala, as recorded in the NFHS-4 and NFHS-5, is presented in Table 5. These statistics show a slight improvement in the nutrition level of children between these two surveys. Specifically, in India, stunting among children decreased from 38.4 percent to 35.5 percent, wasting from 21.0 percent to 19.3 percent, and underweight from 35.7 percent to 32.1 percent. These improvements, though modest, suggest positive progress in addressing child malnutrition across the country.

Further, Punjab fared better in terms of child nutrition. For instance, stunting decreased slightly in Punjab, from 25.7 percent in NFHS-4 to 24.5 percent in NFHS-5. Wasting improved significantly, as the percentage of children below -2SD dropped from 15.6 percent in NFHS-4 to 10.6 percent in NFHS-5; and underweight children decreased from 21.6 percent in NFHS-4 to 16.9 percent in NFHS-5. Children in Kerala, however, showed an increase in stunting from 19.7 percent in NFHS-4 to 23.4 percent NFHS-5, but wasting remained largely unchanged during both surveys and underweight children further deteriorated from 16.1 percent in NFHS-4 to 19.7 percent in NFHS-5.

Table 5: Nutritional Status of Children in India, Punjab, and Kerala						
	India		Punjab		Kerala	
	NFHS-4	NFHS-5	NFHS-4	NFHS-5	NFHS-4	NFHS-5
Height-for-Age (Stunted)						
% below-3SD	16.3	15.1	8.3	9.0	6.8	7.1
% below-2SD	38.4	35.5	25.7	24.5	19.7	23.4
Weight-for-Height (Wasted)						
% below-3SD	7.4	7.7	5.6	3.6	6.5	5.8
% below-2SD	21.0	19.3	15.6	10.6	15.7	15.8
% below+2SD	2.1	3.4	2.3	4.1	3.4	4.0
Weight-for-Age (Underweight)						
% below-3SD	11.0	10.6	5.8	4.3	3.6	4.6
% below-2SD	35.7	32.1	21.6	16.9	16.1	19.7
% below+2SD	0.5	1.0	0.8	1.7	1.3	1.2

Source: NFHS India-5, 2019-21; NFHS Punjab-5, 2019-21; NFHS Kerala-5, 2019-21; NFHS India-4, 2015-16; NFHS Punjab-4, 2015-16; NFHS Kerala-4, 2015-16.

4.2 Prevalence of Anaemia among Children and Women in Punjab

Anaemia is characterised by a low level of haemoglobin in the blood of a person. Iron element is the key component of haemoglobin, and iron deficiency in human blood leads to anaemia. Haemoglobin is necessary for transporting oxygen from the lungs to other organs and tissues of the body. Apart from iron deficiency, other causes of anaemia include morbidity from malaria, hookworm, and other nutritional deficiencies (folate, vitamin B12, etc.), prevalent of chronic infections and genetic conditions. Anaemia further causes low cognitive development, stunted growth, and increased morbidity from infectious diseases among the children and women (Kaur, 2024).

An analysis of anaemia data of children aged 6-59 months (under five years old) showed (Table 6) a very dismal picture. For instance, in India overall (any type), anaemia prevalence among children aged 6-59 months increased from 58.5 percent in NFHS-4 to 67.1 percent in NFHS-5; mild anaemia children rose from 27.8 percent in NFHS-4 to 29.2 percent in NFHS-5; and moderate anaemia children from 29.2 percent in NFHS-4 to 35.8 percent in NFHS-5. Like India, Punjab also witnessed the same trend, but in a more pronounced form, particularly in the case of overall (any type) anaemic children, moderate anaemic children and severe anaemic children. Although Kerala showed consistently lower anaemia prevalence among children as compared to India and Punjab, anaemia among children had slightly increased there too. Kerala, however, remained in a much better off position, particularly having low severe anaemia rates.

Table 6: Anaemia Among Children Aged 6-59 Months in India, Punjab, and Kerala			
	India	Punjab	Kerala

Percentage (%) of Children having:	NFHS-4	NFHS-5	NFHS-4	NFHS-5	NFHS-4	NFHS-5
Any Anaemia (<11.0 g/dl)	58.5	67.1	56.6	71.1	35.7	39.4
Mild Anaemia (10.0-10.9 g/dl)	27.8	29.2	27.3	25.3	22.8	24.1
Moderate Anaemia (7.0-9.9 g/dl)	29.2	35.8	27.9	40.8	12.5	14.6
Severe Anaemia (<7.0 g/dl)	1.6	2.1	1.6	5.0	0.4	0.7

Source: NFHS India-5, 2019-21; NFHS Punjab-5, 2019-21; NFHS Kerala-5, 2019-21; NFHS India-4, 2015-16; NFHS Punjab-4, 2015-16; NFHS Kerala-4, 2015-16.

Regarding anemia prevalence among the women aged 15-49 years, the data in Table 7 reveals few worrying trends. In India, any type of anemia among the women has increased from 53.1 percent in NFHS-4 to 57.0 percent in NFHS-5, along with a significant rise in moderate and severe anemia in NFHS-5. Any type of anemia among Punjabi women also showed a sharper increase from 53.5 percent in NFHS-4 to 58.6 percent in NFHS-5, driven by a substantial rise in the moderate and severe types of anemia. On the other side, women in Kerala, while maintaining lower anemia rates in all types of anemia than that of the national average and of Punjab, also experienced a rise of any type of anemia from 34.3 percent in NFHS-4 to 36.3 percent in NFHS-5.

These statistics clearly showed that there was a consistent rise in the anaemia among women across these regions, particularly in the case of moderate and severe types of anaemia. It means that women and children in India and Punjab faced nutritional deficiencies, poor dietary practices, and inadequate access to health care. These trends underscore the urgency of enhanced public health interventions, including nutrition programs, health education, improved sanitation, and targeted anaemia control measures to address this persistent public health issue (Singh and Jain, 2011; and Kaur, 2024).

Table 7: Anaemia Among Women Aged 15-49 Years in India, Punjab, and Kerala

Percentage (%) of Women Having	India		Punjab		Kerala	
	NFHS-4	NFHS-5	NFHS-4	NFHS-5	NFHS-4	NFHS-5
Any Anaemia (<12.0 g/dl)	53.1	57.0	53.5	58.6	34.3	36.3
Mild Anaemia (11.0-11.9 g/dl)	39.6	25.6	42.3	24.6	29.6	21.0

Moderate Anaemia (8.0-10.9 g/dl)	12.4	28.7	10.8	31.1	4.4	14.1
Severe Anaemia (<8.0 g/dl)	1.0	2.7	0.5	3.0	0.3	1.2

Note: The values for pregnant women are different.
Source: NFHS India-5, 2019-21; NFHS Punjab-5, 2019-21; NFHS Kerala-5, 2019-21; NFHS India-4, 2015-16; NFHS Punjab-4, 2015-16; NFHS Kerala-4, 2015-16.

Section-V

5. Utilization of MCH Care Services in Punjab

In Punjab, MCH care is part and parcel of overall health care services (Singh, 1991; and Kaur, 2024). These services are provided both by the public and private providers, which offer a wide range of crucial health care such as antenatal care (ANC), safe child delivery, and postnatal care to pregnant mothers and their children. Many programs were started from time to time, such as ICDP, NHM, etc., whose aim was to improve access to MCH care, especially for the rural populations and the poor, whereas ASHA workers play a vital role in community outreach. Even the latest program, namely RMNCH+A (reproductive, maternal, newborn, child and adolescent health approach) puts more emphasis on crucial delays in accessing and utilizing health care services by mothers and children (Kaur, 2024).

5.1 Utilization of Antenatal Care (ANC) in Punjab

Antenatal Care (ANC) refers to pregnancy-related health care provisions accessible to mothers before childbirth, which is usually provided by a doctor, an auxiliary nurse midwife (ANM), or another health professional. The first step for utilization of ANC services is the pregnancy registration and issuing of MCP card that informs her about essential care schedule, and links them to few related programs such as ICDS and NHM, etc. Next, ANC also provides crucial health care support to pregnant women, including monitoring for complications, addressing health issues, and offering vital counselling. WHO recommends at least four ANC visits spaced at regular intervals during the pregnancy, but in India key indicators of better ANC utilization include at least one ANC visit, four or more visits, a first-trimester visit, two or more tetanus toxoid (TT) injections, and iron-folic acid supplementation.

The data in Table 8 showed wide variations in the utilization of ANC services in Punjab, Kerala and national level as reported in NFHS-5. For Instance, in Punjab, 85.9 percent of women received ANC from skilled health providers (doctor, auxiliary nurse midwife, nurse, midwife, and lady health visitor), 2.0 percent from Anganwadi/ICDS, 5.9 percent from ASHA worker, and 5.3 percent of pregnant women did not approach anyone to get ANC. In contrast, In Kerala, 98.0 percent of pregnant women received ANC from skilled health providers. At national level, the picture is much similar to Punjab,

whereas 85.1 percent pregnant women got ANC from skilled health providers and 6.1 percent of pregnant women did not receive any kind of ANC.

Table 8: Distribution of Antenatal Care by Type of Health Provider during NFHS-5

State	Type of Health Provider							% of Mothers Receiving ANC from Skilled Provider*	% of Mothers Receiving MCP Card
	Doctor	ANM/Nurse/ Midwife/LHV	Dai/TBA	*Anganwadi*/ ICDS Worker	Community/Village Health Worker	ASHA	No ANC		
India	62.6	22.5	0.4	4.4	0.1	3.8	6.1	85.1	95.9
Punjab	52.2	33.6	0.5	2.0	0.1	5.9	5.3	85.9	96.9
Kerala	97.9	0.1	0.0	0.1	0.0	0.2	1.7	98.0	99.9

*Skilled provider includes doctor, auxiliary nurse midwife, nurse, midwife, and lady health visitor

Source: NFHS India-5, 2019-21; NFHS Punjab-5, 2019-21; NFHS Kerala-5, 2019-21.

A comparative picture of ANC presented in Table 9 revealed that at the national level, the percentage of women receiving at least one ANC visit rose significantly from 82.7 percent in NFHS-4 to 92.6 percent in NFHS-5. However, proportion of women attending four or more ANC visits, an essential measure for comprehensive maternal care, rose modestly from 51.2 percent in NFHS-4 to 58.5 percent in NFHS-5. Similarly, percentage of women accessed ANC during the first trimester rose from 58.6 percent in NFHS-4 to 70.0 percent in NFHS-5, suggesting a progress in early detection and intervention of potential pregnancy-related complications. Further, proportion of women receiving two or more TT injections, crucial for preventing neonatal tetanus, remained steady at around 83 percent during both surveys. The consumption of IFA tablets, which is vital for preventing anaemia during the pregnancy rose from 77.7 percent in NFHS-4 to 87.6 percent in NFHS-5. All these marked improvements in coverage reflected a growing awareness and better access to maternal health services across the country.

Punjab, in contrast to the national trends, exhibited a decline in several ANC indicators. For instance, percentage of women receiving at least one ANC visit in Punjab decreased from 97.1 percent in NFHS-4 to 91.3 percent in NFHS-5. A sharper decline was observed in the proportion of pregnant women completed

four or more ANC visits, which dropped from 68.4 percent in NFHS-4 to 59.7 percent in NFHS-5. Similarly, early utilization of ANC in first trimester also declined from 75.6 percent in NFHS-4 to 68.5 percent in NFHS-5. The proportion of pregnant women receiving two or more TT injections also dropped from 89.0 percent in NFHS-4 to 83.5 percent in NFHS-5. However, consumption of IFA tablets remained relatively stable, showing a minor decline from 88.9 percent in NFHS-4 to 88.7 percent in NFHS-5. All these declining trends point to potential challenges in the service delivery, accessibility, or follow-up care in the state.

In India, Kerala state showed consistently high ANC utilization rates, though some indicators saw a slight decline. For instance, percentage of women receiving at least one ANC visit dropped marginally from 92.6 percent in NFHS-4 to 88.9 percent in NFHS-5. Similarly, proportion of women completing four or more ANC visits declined from 90.1 percent in NFHS-4 to 81.3 percent in NFHS-5. Despite these declines, Kerala's other indicators remain significantly higher than that of national average and of Punjab.

Table 9: Percentage of Women Utilized Antenatal Care during NFHS4 to NFHS-5

State	NHFS	At Least One ANC Visit	Four or More ANC Visits	ANC Visit during First Trimester	Two or More TT Injections during Pregnancy	Consumption of IFA Tablets/ Syrup (Any amount)
India	NFHS-4	82.7	51.2	58.6	83.0	77.7
	NFHS-5	92.6	58.5	70.0	83.1	87.6
Punjab	NFHS-4	97.1	68.4	75.6	89.0	88.9
	NFHS-5	91.3	59.7	68.5	83.5	88.7
Kerala	NFHS-4	92.6	90.1	95.1	94.8	96.1
	NFHS-5	88.9	81.3	93.6	93.3	98.0

Source: NFHS India-5, 2019-21; NFHS Punjab-5, 2019-21; NFHS Kerala-5, 2019-21; NFHS India-4, 2015-16; NFHS Punjab-4, 2015-16; NFHS Kerala-4, 2015-16.

5.2 Factors Determining Utilization of ANC Services in Punjab

Table 10 highlights the factors determining the utilization of ANC services in Punjab. An analysis of data revealed that 83.8 percent mothers aged 20 years or less received ANC from a skilled provider, 52.2 percent such mothers had four or more ANC visits, 91.1 percent had an ultrasound test, and 94.2 percent of pregnancies were registered. On the other side, 86.1 percent mothers with age 20-34 years received ANC from a skilled provider, 59.3 percent had four or

more ANC visits, 91.9 percent had an ultrasound test, and 91.9 percent of the pregnancies were registered. Similarly, 84.2 percent mothers with age 34-49 years received ANC from a skilled provider, 64.9 percent had four or more ANC visits, 89.7 percent had an ultrasound, and 87.7 percent of pregnancies were registered. This trend implied that utilization of ANC services generally increases with mother's age, with the highest percentage of four or more ANC visits among 34-49 age group mothers.

Table 10: Factor Determining Utilization of ANC Services in Punjab

Background Characteristic	Percentage of Pregnant Women Received:			
	ANC from a Skilled Provider	4 or More ANC visits	A Ultrasound Test	Registered
Mother's Age at Birth				
< 20	83.8	52.2	91.1	94.2
20-34	86.1	59.3	91.9	91.1
34-49	84.2	64.9	89.7	87.7
Birth Order				
1	87.9	61.2	N.A.	92.0
2-3	85.4	59.1	N.A.	90.6
4+	76.7	48.5	N.A.	88.8
Residence				
Urban	86.8	60.8	91.7	95.8
Rural	85.3	58.4	91.8	94.1
Schooling				
No schooling	75.6	**61.0**	88.9	84.0
< 5years	78.3	71.6	90.9	88.3
5-9 years	82.7	66.3	91.0	93.7
10-11years	88.8	70.9	93.0	92.8
12 or more years	89.7	70.7	92.6	90.7
Caste/Tribe				
SC	83.7	66.9	91.9	93.0
Other BC	86.1	70.0	90.4	90.7
Other (Not SC/ST/BC)	70.0	69.8	92.5	89.3
Punjab	85.9	59.3	91.7	91.1

Source: NFHS Punjab-5, 2019-21.

Birth order seems to be the determining factor so far as utilization of ANC is concerned. For instance, 87.9 percent of mothers who had first birth received ANC from a skilled provider as compared to 85.4 percent of mothers who received ANC from a skilled provider having second or third birth order, and 76.7 percent of mothers who received such ANC for the fourth or higher birth order. It implies that utilization of ANC services declined with higher birth orders. Further, urban pregnant women (86.8 percent) slightly outperformed the

rural pregnant women (85.3 percent) in ANC utilization, but the difference was found to be very low.

A higher education level of pregnant women had a strong correlation with a better utilization of ANC services. For instance, pregnant women with 12 years or more of schooling (89.7 percent) have a higher percentage in all ANC metrics as compared to the pregnant women with lesser years of schooling. Interestingly, pregnant women belonging to SC and OBC castes showed higher utilization of ANC services compared to the other caste categories (Non SC/OBC), though the differences were not very pronounced.

5.3 Utilization of Child Delivery Services

Another critical period surrounding childbirth necessitates comprehensive care, both for the mothers and their newborn children, during the delivery and postnatal care period. An assessment of data in Table 11 highlighted that there has been a significant increase in institutional deliveries across India, Punjab, and Kerala over the years. At national level, percentage figures of institutional deliveries increased from 78.9 percent (NFHS-4) to 88.5 percent (NFHS-5). In Punjab, institutional deliveries increased from 90.5 percent (NFHS-4) to 94.3 percent (NFHS-5). Further, Kerala consistently had a very high rate of institutional deliveries (almost 100 percent) during both surveys.

Further, it was also observed at national level that child deliveries in public sector institutions saw the most significant increase from 52.1 percent (NFHS-4) to 61.9 percent (NFHS-5), whereas in Punjab, the share of such deliveries rose from 51.6 percent (NFHS-4) to 53.9 percent (NFHS-5) – much lesser than the national average. On the other hand, in Punjab, the share of private sector deliveries rose from 38.6 percent (NFHS-4) to 40.3 percent (NFHS-5), whereas in Kerala, over 60 percent of deliveries were performed in private health facilities. Interestingly, the proportion of child deliveries at home declined significantly across all these regions.

Table 11: Percentage Distribution of Deliveries by Source

Survey	Health Facility/ Institution				Home			Missing
	Public Sector	NGO/Trust	Private Sector	Total	Own Home	Parents Home	Other Home	
India								
NFHS- 4	52.1	0.5	26.3	78.9	17.9	2.7	0.2	0.3
NFHS- 5	61.9	0.4	26.2	88.5	9.7	1.4	0.1	0.2
Punjab								
NFHS-4	51.6	0.3	38.6	90.5	7.7	1.5	0.3	0.0
NFHS-5	53.9	0.1	40.3	94.3	3.9	1.1	0.5	0.1
Kerala								
NFHS- 4	38.4	0.1	61.4	99.9	0.1	0.0	0.0	0.1
NFHS-5	34.1	0.5	65.1	99.8	0.1	0.0	0.0	0.1

Source: NFHS India-5, 2019-21; NFHS Punjab-5, 2019-21; NFHS Kerala-5, 2019-21; NFHS India-4, 2015-16; NFHS Punjab-4, 2015-16; NFHS Kerala-4, 2015-16.

Further, an analysis of data in Table 12 shows an overall improvement in the percentage of deliveries assisted by a skilled provider in India and Punjab. In India, the overall percentage share of institutional births under the supervision of a skilled provider rose substantially from 81.4 percent in NFHS-4 to 89.4 percent in NFHS-5. During NFHS-5, most of births (61.8 percent) were attendant by doctors, 27.2 percent by ANM/nurse/midwife/LHV and 5.9 percent by Dais/TBA in India. In Punjab, the percentage of child births conducted under the supervision of a skilled provider rose marginally from 94.1 percent in NFHS-4 to 95.6 percent in NFHS-5. But the proportion of child births conducted by doctor declined from 62.6 percent in NFHS-4 to 61.2 percent in NFHS-5 (near to national average). On the other hand, the share of child births assisted by ANM/nurse/midwife/LHV rose from 31.3 percent in NFHS-4 to 34 percent in NFHS-5. In Punjab, there was a substantial decrease in the share of child births done by non-skilled providers like Dai/TBA from 5.0 percent in NFHS-4 to 2.7 percent in NFHS-5. This decline in the use of Dai/TBA and other non-skilled providers suggested a positive shift towards utilization of more formal health care settings for childbirth.

Table 12: Percentage Distribution of Deliveries by Type of Assistance

Survey	Type of Health Provider							% of Delivery Receiving Care from Skilled Provider*
	Doctor	ANM/ Nurse/ Midwife/ LHV	Other Health Personnel	Dai/TBA	Friends/ Relatives	Other	No one	
India								
NFHS-4	56.0	24.7	0.7	11.0	6.4	0.9	0.3	81.4
NFHS-5	61.8	27.2	0.5	5.9	3.7	0.7	0.3	89.4
Punjab								
NFHS-4	62.6	31.3	0.2	5.0	0.9	0.1	N.A.	94.1
NFHS-5	61.2	34.0	0.3	2.7	1.2	0.4	0.2	95.6

Source: NFHS India-5, 2019-21; NFHS Punjab-5, 2019-21; NFHS India-4, 2015-16; NFHS Punjab-4, 2015-16.

5.4 Cost of Child Delivery/Birth in Punjab

A comparative picture of cost of childbirth during NFHS-4 and NFHS-5 by rural-urban locations and type of health facility (Table 13) reveals a few significant changes. For instance, overall average out-of-pocket expenditure incurred for the latest childbirth during last the five years preceding the survey, and that was delivered in a health facility was ₹7,938 (NFHS-4), increased to

₹13,750 (NFHS-5); showing a 73.3 percent rise. Further, during NFHS-4, average cost of childbirth was found to be five times higher in private health facilities (₹16,522) as compared to public health facilities (₹3,197); and the cost of childbirth during NFHS-5 rose manifold to ₹25,444 in the private health facilities, whereas it was just ₹3745 if the option was to use public health facilities (NFHS-5). It means that the cost of childbirth escalated more in private health facilities compared to public ones.

Table 13: Delivery/Childbirth Costs by Residence in Punjab

Residence	Average Costs (Rs/₹)								
	Public Health Facility			Private Health Facility			Any Health Facility		
	NFHS-4	NFHS-5	(%) Increase	NFHS-4	NFHS-5	(%) Increase	NFHS-4	NFHS-5	(%) Increase
Urban	3,913	4,352	11.2	18,287	27,040	47.9	10,998	16,413	49.3
Rural	2,946	3,476	18.0	15,034	24,345	61.9	6,427	12,293	91.2
Total	3,197	3,745	17.2	16,522	25,444	53.9	7,935	13,750	73.3

Source: NFHS Punjab-5, 2019-21; NFHS Punjab-4, 2015-16.

The data analysis further observed differences in the cost of childbirth across rural-urban locations. Childbirth in urban areas generally incurred higher delivery costs compared to rural areas. In urban areas, for institutional delivery, the average delivery cost was ₹10,998 (NFHS-4), whereas in the rural area, this cost was ₹6,427 (NFHS-4), which increased to ₹16,413 (49.3 percent increase) and ₹12,293 (91.2 percent increase), respectively in NFHS-5. Further, the average cost of childbirth if opting for a public health facility in the urban areas increased modestly by 11.2 percent, but in the case of private health facilities increased significantly by 47.9 percent. In the rural areas, the average cost of childbirth in the public health facilities during NFHS-5 rose by 18.0 percent compared to the highest increase of 61.9 percent in average cost of childbirth in the private health facilities. Overall, the average cost for childbirth in any health facility during NFHS-5 rose significantly at 73.3 percent (17.2 percent for the public and 53.9 percent for the private health facilities). This rise in the cost of childbirth at an institutional level may pose a severe challenge for accessibility and affordability for the economically disadvantaged populations.

5.5 Utilization for Postnatal Care

Health of mothers and newborn babies depends not only on the health care they receive during pregnancy and at the time of childbirth but also depends on postnatal care of them during the first few weeks after childbirth. Postnatal check-ups are particularly important for births in non-institutional settings. In India, a large proportion of maternal and neonatal deaths occur during 48 hours after delivery (Singh and Jain, 2011). Safe motherhood program has emphasized

the importance of postnatal care, which favoured that all mothers and their babies must receive a medical check of their health within two days of delivery (Kaur, 2024). An analysis of data (Table 14) elucidates that in India, 61.2 percent of mothers during NFHS-4 survey got postnatal care within two days of childbirth, whereas this proportion was 88.1 percent in Punjab and 88.8 percent in Kerala. In the latest survey (NFHS-5), however, these figures rose to 65.1 percent at the national level, 89.3 percent in Punjab and 93.2 percent in Kerala.

Similarly, the percentage of new-born babies receiving postnatal health care within the first two days after birth at the national level, Punjab, and Kerala improved significantly. At national level, this coverage increased from 24.2 percent (NFHS-4) to 81.6 percent (NFHS-5); whereas these percentages in Punjab rose from 47.2 percent (NFHS-4) to 86.1 percent (NFHS-5) and from 49.1 percent (NFHS-4) to 91.2 percent (NFHS-5) in Kerala. So, there has been a significant improvement in the percentage of mothers/infants receiving postnatal care within the first two days of childbirth across all these regions.

Table 14: Percentage of Mothers and Infants Received Postnatal Care within First Two Days of Delivery/Childbirth

State	Mothers Received Postnatal Care		Infants Received Postnatal Care	
	NFHS-4	NFHS-5	NFHS-4	NFHS-5
India	61.2	65.1	24.2	81.6
Punjab	88.1	89.3	47.2	86.1
Kerala	88.8	93.2	49.1	91.2

Source: NFHS India-5, 2019-21; NFHS Punjab-5, 2019-21; NFHS Kerala-5, 2019-21; NFHS India-4, 2015-16; NFHS Punjab-4, 2015-16; NFHS Kerala-4, 2015-16.

Section-VI

6. Main Conclusions and Public Policy Interventions

Improving child health is the most critical determinant of a nation's human capital and overall development. A healthy childhood lays the foundation because it ensures a faster, equitable and sustainable development of a country. The study highlighted that in India, many targeted programs such as ICDS, Universal Immunization, MCH, Poshan Abhiyaan, etc. were launched to tackle wide-spread malnutrition, improve immunization, and early care of mothers and children. Though all these state initiatives have improved child health indicators such as infant and child mortality and maternal mortality went down significantly in India, yet an easily accessible and universal coverage to quality health care remains a distant dream for the poor and marginal sections of society.

Punjab shows mixed performances in improving child health. An analysis of the data of NFHS-4 (2015-16) and NFHS-5 (2019-21) reveals that Punjab has made significant progress in reducing child mortality in Punjab: neonatal

mortality has dropped from 29.5 to 21.8 deaths per 1,000 live births, which is better than national average of 24.9 deaths but lagging behind Kerala's 3.4 deaths. Common childhood morbidities like diarrhoea, acute respiratory infections (ARI), and fever are still very high. While diarrhoea prevalence in Punjab (4.9 percent) is lower than the national average (7.3 percent), yet it remains higher than Kerala's (4.3 percent). Treatment-seeking behaviour for diarrhoea and ARI are found to be weaker in Punjab - suggesting gaps in health care access and awareness campaigns.

Malnutrition is another critical issue, with 22.4 percent of child births in Punjab classified as low weight babies, compared to Kerala's 16.3 percent. While Punjab performed better than the national average in reducing stunting (24.5 percent vs. 35.5 percent) and wasting (10.6 percent vs. 19.3 percent), it lags behind Kerala in these indicators. Rising anaemia rates among children and women were found to be alarming. In NFHS-5, 71.1 percent of children in Punjab were anaemic, a sharp increase from 56.6 percent in NFHS-4, again surpassed the national figure of 67.1 percent.

Punjab observed significant advancements in institutional deliveries, which rose to 94.3 percent in NFHS-5. The most worrying point is that a significant proportion of institutional deliveries in Punjab occur in private facilities (40.3 percent), reflecting potential affordability challenges for lower-income families. Public health facilities account for only 53.9 percent of deliveries in Punjab as compared to Kerala's nearly universal institutional deliveries mostly in public settings. Punjab shows declining utilization of ANC services because percentage of women receiving at least one ANC visit fell from 97.1 percent in NFHS-4 to 91.3 percent in NFHS-5. Similarly, women receiving four or more ANC visits in Punjab also dropped from 68.4 percent to 59.7 percent; early ANC utilization during the first trimester declined from 75.6 percent to 68.5 percent. These trends underscore barriers to access comprehensive maternal care, particularly in rural and underserved areas.

Vaccination coverage in Punjab paints a mixed picture as well. While it surpasses the national average in most vaccinations, it falls behind Kerala. For example, BCG coverage in Punjab was 95.3 percent compared to Kerala's 97.6 percent during NFHS-5. Similarly, coverage for all basic vaccinations in Punjab dropped from 89 percent in NFHS-4 to 76.2 percent in NFHS-5, even slightly below the national average of 76.6 percent. This decline underscores the need for revitalizing immunization efforts.

Analysis highlights the role of socio-economic factors in child health outcomes. Punjab's rural areas outperformed urban areas in pregnancy registration (94.1 percent vs. 85.8 percent) and receipt of MCP cards (97.6 percent vs. 95.4 percent). As expected, higher maternal education level correlates with better health service utilization, as Punjabi women with 12 or more years of schooling showed the highest ANC utilization rates.

Regarding childbirth costs in Punjab or elsewhere, analysis of NFHS data reveals significant high and rising, particularly in private facilities. Urban areas generally incur higher costs than rural areas. While childbirth costs in the public facility have modestly increased, private facility costs have risen substantially.

This escalating cost poses a significant challenge to accessibility and affordability for many. Postnatal care for both mothers and newborns has shown marked improvement across India, Punjab and Kerala. This positive trend reflects successful efforts in enhancing post-natal care of mothers and new-born babies.

In summary, Punjab has made progress in reducing mortality rates and expanding institutional deliveries, but few gaps persist in ANC utilization, immunization coverage, and managing anaemia and malnutrition. Socio-economic disparities, declining utilization of ANC, and over-reliance on private facilities highlight systemic issues that must be addressed by changing basic contours of public health policy. Kerala's achievements also demonstrate the potential to bring better health outcomes in Punjab through robust public health systems, effective community engagement, and public policy interventions. Punjab must address these challenges with targeted strategies to ensure equitable improvements in child health outcomes.

Notes

1. National Family Health Surveys (NFHSs) in India have provided valuable data on numerous aspects family health status in India and across its major states. Till date, five rounds of NFHS have been conducted, namely, NFHS-1 (1992-1993); NFHS-2 (1998-1999); NFHS-3 (2005-2006); NFHS-4 (2015-2016); and NFHS-5 (2019-2021). These surveys have generated most reliable, comparative and reprehensive data collected through applying a scientific methodology. Using such data helped the policy makers and health care providers to understand important trends and challenges of family health both at macro and micro levels in India. In the latest two surveys (NFHS-4 and NFHS-5, health information were gathered by applying two-stage stratified random sampling technique/method, in which at first place, districts were chosen and stratified into rural and urban areas, followed by selecting villages (in rural areas) or census enumeration blocks/ wards (in urban areas) as primary sampling units (PSUs) with probability proportionate ratio to population size (giving the larger populations a higher chance of being chosen), which were further stratified by considering factors such as Scheduled Caste/Scheduled Tribe population, female literacy, etc.. Within each selected PSU, a fixed number of households were selected using systematic random sampling technique. Both surveys collected comparable data on various aspects of child related mortalities, morbidities, nutrition level, MCH care, etc.

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