# MASTER OF PUBLIC HEALTH

*A cooperative Program of*

JOHNS HOPKINS BLOOMBERG SCHOOL OF PUBLIC HEALTH

&

INDIAN INSTITUTE OF HEALTH MANAGEMENT RESEARCH

## Capstone Project at The IIHMR University

**By**

**Gowthamghosh Bheemireddy**

**IIHMR/JHSPH MPH**

**2013-2015**

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## Capstone Project

**At**

**The IIHMR University**

**A Study on Infant Mortality Trends and Child Survival Programmes in Rajasthan**

**By**

**Gowthamghosh Bheemireddy**

Under the guidance of

**Dr. Suresh Joshi**

## Master of Public Health

**Year 2013-15**

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**TO WHOMSOEVER IT MAY CONCERN**

*This is to certify that* **Gowthamghosh Bheemireddy** *student of Master of Public Health Program offered by Institute of Health Management Research; Jaipur in cooperation with Johns Hopkins Bloomberg School of Public Health, Baltimore has undergone capstone training at* **IIHMR University** *on the topic* **A Study on Infant Mortality trends and Child Survival programmes in Rajasthan** *from May 2014 to October 2014.*

*The Candidate has successfully carried out the study designated to him during capstone training and his approach to the study has been sincere, scientific and analytical.*

*The Capstone is in fulfillment of the course requirements.*

*I wish him all success in all his future endeavors.*

**Dean, Academics and Student Affairs**

**IIHMR, Jaipur**

**Capstone Advisor/ Advisors**

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## CERTIFICATE BY SCHOLAR

This is to certify that the Capstone Project titled *A Study on Infant Mortality Trends and Child Survival Programmes in Rajasthan* submitted by ***Gowthamghosh Bheemireddy*** enrollment No **IIHMR-JHU/MPH/2013-2015/1-3** under the supervision of **Dr.Suresh Joshi** for award of **Master of Public Health** carried out during the period from **May 2014** to **October 2014** embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.

B.G.Ghosh

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## ABSTRACT

The current study *'A Study on Infant Mortality trends and Child Survival programmes in Rajasthan'* attempts to understand the trends of Infant Mortality Rate relate to the child survival programmes and interventions in the state of Rajasthan. The study tried to analyze the trend of IMR in the state in comparison to the national figures. The main focus is on child survival intervention coverage and infant mortality trends in Rajasthan.

Published data from various representative surveys / reporting systems was used to analyze the trends in infant mortality over the years. The study attempts to correlate the trends of identified key Child Survival Indicators with Infant Mortality Rates in Rajasthan. Karl Pearson correlation coefficient *(r)* was used in the study.

Declining trends of Infant Mortality Rates were observed during 1990 to 2012 period which corresponded to an increase in the coverage of child survival interventions during this period. Pearson correlation coefficient calculated to establish a relationship between interventions and IMR. A negative correlation observed in the study. And the correlation coefficient among the variables ANC visits, Institutional deliveries, breast feeding, immunization coverage, care seeking for Diarrhoea and ARI were significant.

[Key Words: Infant Mortality, RCH, Child Survival, Immunization]

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## ABBREVIATIONS

| | |
|---|---|
| AHS | Annual Health Survey |
| ARI | Acute Respiratory Infection |
| BCG | Bacillus Calmette-Guerin |
| CSSM | Child Survival and Safe Motherhood |
| DLHS | District Level Household and Facility Survey |
| DPT | Diphtheria, Pertusis, Tetanus |
| EAG | Empowered and Action Group |
| FBNC | Facility Based New Born Care |
| F-IMNCI | Facility based Integrated Management of Neonatal and Childhood Illness |
| HBNC | Home Based New Born Care |
| ICPD | International Conference on Population and Development |
| IMNCI | Integrated Management of Neonatal and Childhood Illness |
| IMR | Infant Mortality Rate |
| INAP | India New born Action Plan |
| IYCF | Infant and Young Child Feeding |
| JSSK | Janani Shishu Suraksha Karyakram |
| MDG | Millennium Development Goal |
| MoHFW | Ministry of Health and Family Welfare |
| NBCC | New Born Care Corner |
| NBSU | New Born Stabilization Unit |
| NFHS | National Family Health Survey |
| NMR | Neonatal Mortality Rate |
| NRHM | National Rural Health Mission |
| NSSK | Navajat Shishu Suraksha Karyakram |
| ORT | Oral Rehydration Therapy |
| RCH | Reproductive and Child Health |
| SNCU | Special New Born Care Unit |
| SRS | Sample Registration System |
| UIP | Universal Immunization Programme |

## 1. INTRODUCTION

The present study *'A Study on Infant Mortality trends and Child Survival programmes in Rajasthan'*, was done in context of Rajasthan, which is the largest state of India, located in the North western part of the country and has a population of 68.5 million [1]. It is the largest state in the country by constituting 10.4 percent of total geographical are India. With a decadal growth rate of 21.44 percent and sex ratio of 926 females per thousand males, Rajasthan is one of the states which contributes high fertility and mortality along with other eight states named as EAG states(Uttar Pradesh, Madhya Pradesh, Bihar, Odisha, Uttarakhand, Chattisgarh, Rajasthan and Jharkhand). It is estimated that together, these states contribute to more than half (55 percent) of the estimated live births, two-thirds of infant deaths (66 percent) and eight out of ten maternal deaths (80 percent) in India[2].

Considering the fact that most of population and health indicators is at a low level in the state, it has been considered as a High Focus State under the National Rural Health Mission (NRHM: 2005-2012). Through NRHM various child survival programmes and interventions like Facility Based Newborn Care (FBNC) with the specialized care through Special new born care units (SNCU), New Born Stabilization Unit (NBSU),New Born Care Corners (NBCC) to address the Neonatal and Early Neonatal Mortality, facility based new born care services have been emphasized. Nutrition Rehabilitation Centres (NRCs) have been established to specifically treat severely malnourished children. Another initiative Janani Shishu Suraksha Karyakram (JSSK) was conceived to further promote institutional

delivery, eliminate out of pocket expenses which act as a barrier to seeking institutional care for mothers and sick new borns and facilitate prompt referral through free transport. Other child survival interventions include Facility based integrated Management of neonatal and childhood illness (F-IMNCI), Integrated Management of neonatal and childhood illness (IMNCI), Home based newborn care (HBNC), Navajat Shishu Suraksha Karyakram (NSSK), and Infant and young Child Feeding (IYCF), Zinc and ORT in diarrhea and Universal Immunization Programme. Provision of improved care seeking for Acute Respiratory Infections (ARI) has also contributed to reduction in child mortality and morbidity. All the above programmes and interventions are implemented by the Department of health and family welfare, Government of Rajasthan.

The basic research question for the study is- How do the trends of Infant mortality relate to the child survival programmes and interventions in the state?

**Objectives:**

- To analyze the trend of Infant mortality rate in the state in comparison to the national figures.
- To correlate the trends with the existing child survival programmes and interventions in the state.

## 2. LITERATURE REVIEW

Infant mortality is regarded as one of the powerful indicators of basic health care and quality of life in a country. A right mix of strategies is necessary in reducing

infant mortality rate. Many researches attempted to account the trends of Infant mortality in India. A framework has been provided by AK Jain and others [3] to understand the declining trends of Infant Mortality during 1968 to 1978 period. With the help of framework the researchers tried to analyze the factors contributing infant mortality in the study. Proximate indicators like medical care during antenatal period, care at birth and preventive and curative care in the postnatal period are part of the frame work. Increased access to minimum package of essential services like reproductive health services, perinatal care, improved breast feeding practices, immunization, and home based treatment of diarrhea and timely introduction of supplementary food can reduce high Infant Mortality Rate significantly [4,5,6,7,8].

A significant increase in the proportion of neo-natal deaths to total infant deaths was observed in a longitudinal cross sectional study conducted by Gupta SD and others in Rajasthan [9]. Ninety eight percent of all neonatal deaths occur only in developing countries [10, 11], post neonatal and child mortality reducing faster than neonatal mortality in third world countries [12,13,14] this trend resulted in increase the neonatal mortality contribution to overall under-5 mortality from 39 percent in 1970 to 41percent in 2010 [10,14,15]. The share of neonatal deaths in under-five deaths has been increasing over time from 45 percent in 1990 to 54 percent in 2010 [10]. In the last twenty years India has observed quicker reduction in post-neonatal and childhood mortality than reduction in neonatal mortality [16].

"The child survival programs in India have been focusing more on the causes of mortality and morbidity which mostly affect children in the post-neonatal period like pneumonia, malaria, diarrhea, and six vaccine-preventable diseases" [17].There

has been less focus on factors such as neonatal infections, prematurity and low birth weight [18, 19, 20].

In 1977 the family planning programme evolved into family welfare programme. Maternal and child health became part of family welfare programme. The programme aimed to reduce birth rates as the high birth rates contributes in Infant and child mortality rates (MoHFW, 1998). The National Diarrhoeal Disease Control Program began in 1978. In 1979, the expanded programme on immunization was established to provide the tetanus toxoide to pregnant women and BCG, DPT, Polio and measles vaccines to children. The Universal immunization programme and oral rehydration therapy both were launched in 1985. In the Eighth Five Year Plan (1992-1997), Safe motherhood programme was initiated. The acute respiratory infection control programme was launched in 1990 (in 14 districts).The national population policy in 2000 and National Health policy in 2002 addressed the issues of child survival and increased the outreach and coverage of the comprehensive package of RCH. The second phase of RCH started in 2004 with a strong focus on improving the utilization of RCH services by the poor and underserved population

Since 1995, the government of India has adopted a target free approach after the International Conference on Population and Development (ICPD) in 1994. India was one of the participant nations, which promptly responded and the reproductive health approach has since been adopted as national policy of the Government of India [21]. The ICPD adopted a programme of action with a set of qualitative and quantitative goals, Infant, Child and Maternal Mortality reduction was one of them. Maternal and Child health services including immunization of children were

included in RCH programmes. During 1992-1996 the World Bank and UNICEF supported Child Survival and Safe Motherhood (CSSM) programme was initiated to train the un-trained traditional birth attendants and intrapartum care was provided by the trained TBAs [22]. The CSSM was an integrated programme of UIP, Diarrheal control programme, safe motherhood programme and ARI control programmes which was launched in 1992. In 1997 the CSSM further expanded to the Reproductive and Child Health programme (RCH). The RCH programme is an integrated package of various health services including antenatal care, natal care and post natal care for pregnant women, infant care with immunizing against six well known vaccine preventable diseases [23]. A review by Srinivasan on RCH programme found no significant improvement in the number of RCH indicators after the launch of RCH programme when compared to earlier period, especially maternal care, skilled attendants during delivery and immunization to the children [21].

The National Rural Health Mission was launched in 2005 to improve the availability and quality of accessible health care for those who are residing in rural areas including poor, women and children. The major goals of the NRHM are to reduce Infant Mortality rate (IMR), Maternal Mortality Ratio, improve universal access to public health services like women's health, child health, water, sanitation and hygiene, immunization and nutrition. Later the RCH phase two merged into NRHM [24].

The current study aims to understand the trends in Infant Mortality rates in India and Rajasthan. And will try to correlate the child survival interventions coverage with Infant Mortality rate in Rajasthan.

## 3. METHODOLOGY

For the study, secondary data from various surveys including Sample Registration System- 1990-2012 (SRS)(India and Rajasthan)[25,26], National Family Health Survey (NFHS) round - I, II, III,[27,28,29] District Level Household & Facility Survey (DLHS) round- I, II, III [30,31,32], Coverage Evaluation Survey (CES) - 2005,2006 & 2009 [33,34,35] and Annual Health Survey (AHS) -2010-2013 [36,37,38] for Rajasthan were collected. Key child survival indicators were identified from the data sources. IMR data was obtained from SRS reports and the child health coverage indicators were taken from the DLHS, NFHS, CES and AHS surveys.

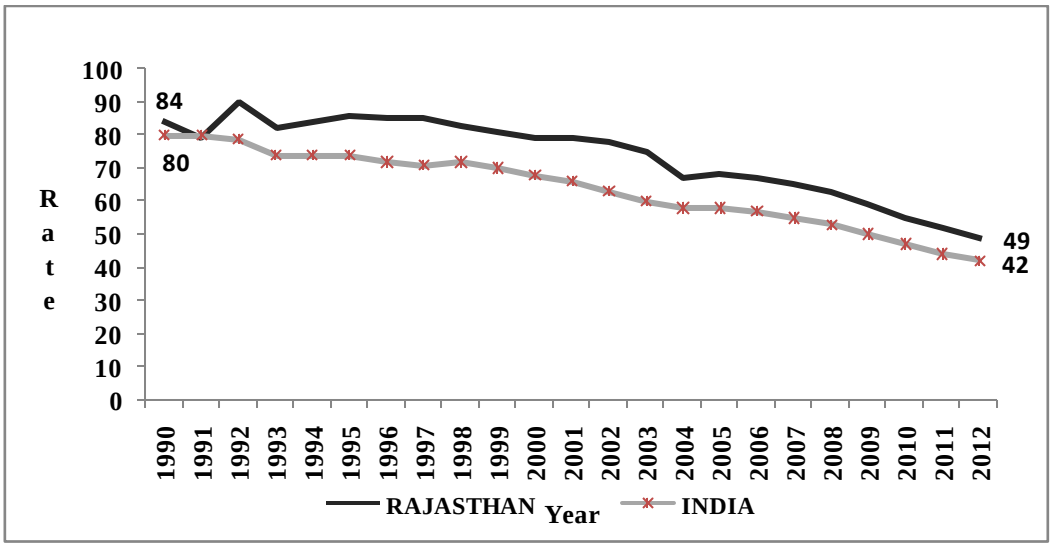
Published data from these representative surveys / reporting systems was used to analyze the trends in infant mortality over the years 1990 to 2012. The study attempts to correlate the trends of identified key child survival indicators with Infant Mortality Rates in Rajasthan. Simple correlation was used in the study and Karl Pearson simple correlation coefficient *(r)* was calculated.

## 4. RESULTS

The Infant Mortality Rate trends (IMR) in India and Rajasthan for 1990 to 2012 shown in the **Figure 1**. As per the latest report on mortality by the central census office, infant deaths constituted 19.2 percent of the total deaths in Rajasthan where

as at the national level this proportion was 13 percent [26]. Infant mortality rate in India as well as in Rajasthan is showing a declining trend. The decline was rapid during 2006 to 2012. Since 2000-02 (65.7) to 2010-12 (44.5) -33.2 percent change has been observed in average infant mortality rate all over India while in Rajasthan this decline has been of -34.5 percent during this period [26]. Child survival improvement since 1990 due to affordable and evidence based interventions like universal immunization, oral rehydration therapy to treat diarrhoea helped in preventing major infectious diseases [39].

**Figure 4.1 : IMR Trends of India and Rajasthan 1990-2012**

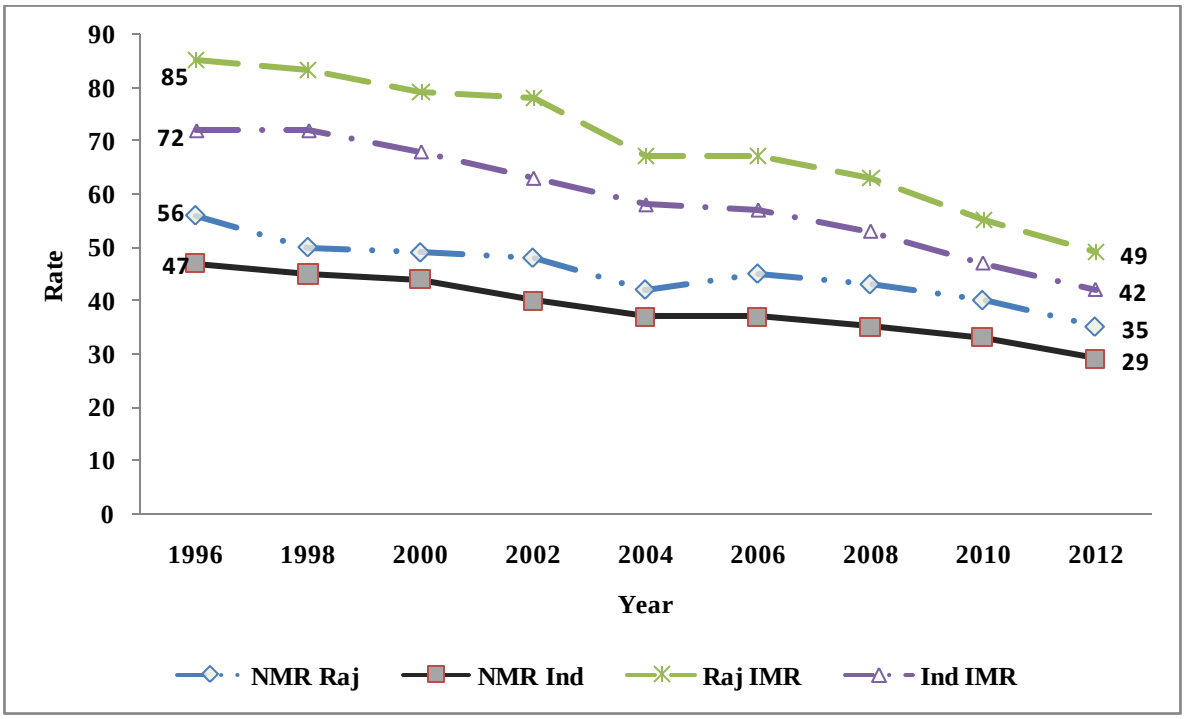



*Source: SRS by ORGI, Govt. of India*

First 28 days of life after birth (Neo Natal period) are very important and vulnerable in survival of a child. In Rajasthan the Neo-natal mortality rate during the SRS report period (SRS 2012) [26] was 35, which is contributing 71 percent to Infant deaths in the state. Of this, 72.8 percent neonatal deaths were from rural areas. At the National Level, neonatal deaths contribute to 69 percent of total infant deaths. A huge gap between urban (16) and rural areas (33) was also reported [26].Globally

the number of neonatal deaths declined from 4.7 million in 1990 to 2.8 million in 2013. The decline in neonatal period was slower when compared with post neonatal mortality (40% and 56%) [39].748 thousand neo-natal deaths occurred in Indian in 2013, a major share in South Asia region.

**Figure 4.2: NMR & IMR Trends: India and Rajasthan 1996-2012**




*Source: SRS by ORGI, Govt. of India*

Since 2005 (NRHM phase) the ENMR, NMR and IMR are showing a decreasing trend in Rajasthan. Correspondingly though, Neonatal mortality as a proportion of Infant Mortality rate has increased **(Table1**).

There is evidence that early neonatal period is critical to child survival, since one million children die during their first day of life. These deaths can be averted as the causes are mostly preventable. Moreover, two thirds of neonatal deaths are occurring in ten countries

(India, Nigeria, Pakistan, China, DRCongo, Ethiopia, Bangladesh, Indonesia, Angola, and Kenya).More than two thirds deaths are accounting from India. [40]

Most neonatal deaths are preventable. Children those die in the first 28 days of life suffer from diseases and conditions that are often associated with quality of care around the time of childbirth and are readily preventable or treatable.

To correlate the trends with the existing child survival programmes and interventions in the state; data on selected child survival indicators from various surveys were collected. The launch of National Rural health Mission (NRHM) in 2005 has helped in increasing the coverage of various maternal and child health indicators. It is evident that the NRHM succeeded in reducing the child mortality across the country as well as in Rajasthan.

In 2008, One million neonates died in India. This constituted about 55% of the under 5 mortality. The main causes were prematurity (13%), birth asphyxia (10%) and various infections (19%). Midwifery care at birth can directly influence Neonatal deaths for causes such as birth asphyxia and prematurity. Breastfeeding practices also influence the number of neonatal deaths [22].

The Antenatal care indicator status of Rajasthan in **Table 2** shows the proportion of mothers receiving their first antenatal check up within first trimester of pregnancy has increased. Mothers who had three or more antenatal checkups also increased. But, mothers receiving full ANC have declined from 16.6 percent during RCH-RHS (DLHS-1) to 9.5 percent during AHS-2012-13. The proportion of mothers who received at least one dose of TT vaccine has increased significantly.

Institutional deliveries **(Table 3)** have been increased significantly during the period 1998 (22.5 percent) to 2013 (78 percent).The proportion of safe deliveries increased from 33.5 percent to 83.8 percent. 42.6 percent home deliveries were conducted by skilled health personnel during AHS-2012-13.

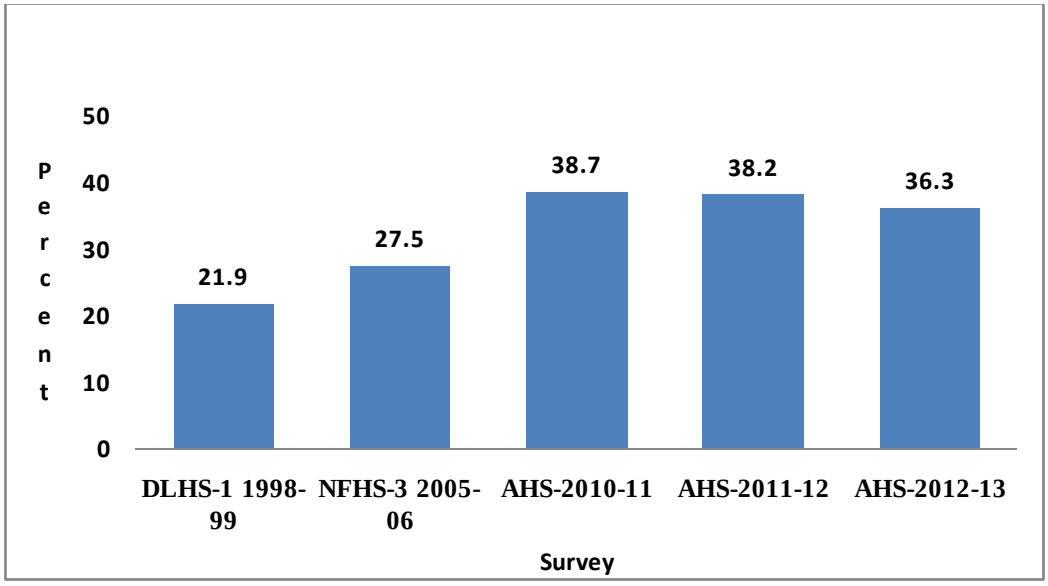
Status of early initiation of breast feeding (within one hour) and exclusive breast feeding presented in **Table 4.** Significant increase of early initiation of breast feeding noticed from DLHS-1 to AHS 2012-13. Childhood illness and management of Diarrhoea, ARI and Fever data shown in **Table 5.**

As observed from **Tables 6 and 7**, all indicators except Full ANC have shown a high negative correlation with Infant Mortality Rate. The increased coverage of maternal and child health services could have helping in reduction of Infant Mortality in the state. Correlation coefficient of IMR with institutional deliveries had high significant value (*Pearson -0.943, $p<0.001$*)

The status of babies born with low birth weight (less than 2.5 kg) is shown in the Figure 3. As per the latest survey reports the current Low birth weight babies born in the state was 36.3 percent.

**Table 8,** shows the Immunization trends in Rajasthan. A significant improvement is visible in full immunization coverage in the state since DLHS-1(RCH-RHS) 37 percent to AHS-2012-13, 74 percent. 74.2 percent children received at least one dose of Vitamin-A during AHS-2012-13, where as it was 22.2 percent during DLHS-1.

**Figure 4.3: Low Birth Weight status in Rajasthan**




## 5. DISCUSSION

Various child survival activities are being implemented in the state. At the facility level there are New born care corners, SNCUs, F-IMNCI, Navajat Shishu Suraksha Karyakram and recently introduced birth attendant at facility(Yashoda) while at the community level MCHN sessions, IMNCI, Home Based Post Natal Care interventions are contributing towards better child survival. The study attempted to find a correlation between coverage of child survival interventions and the trend of Infant Mortality rate. The Infant Mortality rate in India as well as in Rajasthan is showing declining trend. The declining trend can be the effect of various interventions under Reproductive and Child health programme and the National Rural Health Mission. Since 1990, a variety of national programmes have been initiated to address the high child mortality. Health seeking behaviour of the pregnant women during pregnancy has an important role to play for the health of newborn [3].The present study shows that the proportion of women receiving their first antenatal check up with in first trimester has increased. Although the consumption of IFA has decreased and

there is a significant change in proportion of pregnant women receiving three or more ANC visits, it was noted that the proportion of pregnant women receiving at least one dose of TT vaccination has increased. The institutional deliveries have increased during NRHM phase (2005-12). The risk of stillbirth and neonatal death falls by about 20 per cent if a skilled health provider is present to assist a woman in labour [41, 42]. Fourty percent of the child birth related Neonatal deaths can be averted by referring mothers to basic emergency obstetric care those who are facing complications [40]. Janani Suraksha Yojana provided incentives for institutional deliveries to increase the institutional deliveries. The initiative promoted institutional delivery by eliminating out of pocket expenses which was one of the primary barriers to seeking institutional care for mothers and sick new borns.

Skilled attendance during delivery can be assured in the health facility, as the presence of skilled attendance during child birth is strongly associated with Neonatal Mortality Rate [40].Percentage of mothers who delivered their babies in an health institution has increased and a strong correlation with the decreasing trend in IMR was observed (r= -*.943)* which was highly significant *(p<.001).*

Proportion of mothers' who initiated breast feeding immediately after birth has also increased significantly from 15.8 percent (DLHS-1 RCH-RHS) to 54.1 percent (AHS-2012-13). Fourty four percent neonatal death risk can be reduced if the mother initiates breastfeeding within one hour of birth .The infant can be protected from diarrhoea and pneumonia in early life as the breast feeding supports the immune systems of the infant [40].

A direct effect of immunization in preventing vaccine preventable diseases like Measles, Whooping cough, Diphtheria and Tetanus has been observed by researches [45].Proportion of children who received all vaccines has increased from 37 percent to 74 percent during 1997-2013. The correlation coefficient (-.819) of IMR with the full vaccination (BCG, three doses of DPT, three doses of Polio (exclude Polio "0") and measles) was found statistically significant *(p<.006).*

Pneumonia and diarrhoeal diseases are the major causes of the child deaths in India. These causes can be prevented and can be treated with effective interventions like prenatal, intrapartum care and immediate care for new born babies [19]. It was notable that care seeking for ARI increased from 35.2 percent in (1998-99) to 94.9 percent in (2012-13). This increase in care seeking for ARI correlated strongly with the declining trend of IMR (r= -.970) which was statistically highly significant *(p>.000).* Proportion of children given ORS to treat diarrhoea has also increased from 4.7 percent to 86.4 percent during the period. Due to large amount of water and salts from the body result in Dehydration in infants and young children. Dehydration usually prevented by giving plenty of fluids and increasing the frequency of breast feeding as soon as diarrhoea starts. More than 90 percent of all deaths due to diarrhea could potentially be avoided with the use of ORS [44]. Increased use of rehydration salts in treating diarrhoea and decreasing Infant Mortality rate shown strong correlation with high significance *(p>.001).*

Increased female literacy rate in the state may be one of the reasons in increased coverage of interventions. During the past two decades information and technological changes has brought many changes in the society. Mother's education plays a significant role in prenatal care [46].

Infant Mortality is an important indicator of child health. After the independence in the first five year plan the Government of India started providing maternal and child health services. Since then many child survival interventions started throughout the nation and state to reduce the infant mortality rate. Due to these programmes the coverage of child survival interventions are showing an increasing trend and the Infant mortality rate is decreasing. But the low decreasing trend in Neonatal Mortality Rate is a major concern now.

## 6. CONCLUSION

The study indicates a strong correlation between infant mortality rates and key child health interventions, particulary mothers' received their first ANC in first trimester, mothers' received more than three antenatal checkups, institutional deliveries, early initiation of breast feeding, children with full vaccination, use of oral rehydration salt to treat diarrhoea, and care seeking for acute respiratory infections.

In Rajasthan, the 35 point reduction of IMR since 1990 to 2012 (SRS) is roughly 1.5 point reduction every year in the past 22 years. The neglected care to the neonatal at the facility and at the community level is a major concern in reducing Infant mortality as the neonatal mortality rate contributes more than fifty percent on the IMR. The Millennium Development Goal: 4 - Reduce Child Mortality, targeting to reduce Under Five Mortality Rate (U5MR) by two thirds between 1990 -2015. IMR is one of the indicators to measure the progress of the achievement of the target. Rajasthan is 20 points short in achieving the MDG target by 2015. It is un-likely to achieve the target in a short span.

The most recent initiation by the Government of India - India Newborn Action Plan (INAP) set target to achieve single digit neonatal mortality and still birth rate by 2030.The strategy

will focus on ending preventable newborn deaths, improving quality of care and care beyond survival.

A limitation of the study was that data used in the study was from different surveys over different periods of time. Even though all these surveys were representative, the analysis and results may not be conclusive. However given the requirement of resources and time to collect the primary data for such an analysis it is felt that the method used in this study offers a practical option to have a preliminary understanding from the available data.

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## APPENDIX

### Table 1: Comparison of Infant Mortality Rates of Rajasthan 2005-2012

| Year | ENMR | NMR | IMR | ENMR as proportion of NMR | NMR as Proportion of IMR |
|---|---|---|---|---|---|
| **2005** | 33 | 43 | 68 | 76.7 | 63.2 |
| **2006** | 33 | 45 | 67 | 73.3 | 67.2 |
| **2007** | 34 | 44 | 65 | 77.3 | 67.7 |
| **2008** | 33 | 43 | 63 | 76.7 | 68.3 |
| **2009** | 33 | 41 | 59 | 80.5 | 69.5 |
| **2010** | 33 | 40 | 55 | 82.5 | 72.7 |
| **2011** | 29 | 37 | 52 | 78.4 | 71.2 |
| **2012** | 27 | 35 | 49 | 77.1 | 71.4 |

*Source: SRS, ORGI, Govt. of India*

**Table 2: Antenatal Care Indicators for Rajasthan**

| Indicator | DLHS-1 | DLHS-2 | CES 2005 | CES 2006 | DLHS-3 | CES 2009 | AHS 2010-11 | AHS 2011-12 | AHS 2012-13 |
|---|---|---|---|---|---|---|---|---|---|
| Mothers who received antenatal care within first trimester of pregnancy (%) | 21.7 | 29.3 | 50.5 | 40.7 | 32.7 | 58.9 | 53.2 | 58 | 62.8 |
| Mothers who had at least one antenatal visit (%) | na | na | 61.2 | 65.2 | na | 86.8 | 84.8 | 87 | 88.8 |
| Mothers who had three or more antenatal visits (%) | 28.3 | 28.8 | 36.4 | 42.2 | 27.7 | 55.2 | 47.5 | 51.5 | 55 |
| Mothers who consumed 100 IFA Tablets (%) | na | na | 24.6 | 25.8 | na | 22 | 12.3 | 12.8 | 12.7 |
| Mothers who received TT vaccine (at least one dose)(%) | 62 | 69 | 80.8 | 88.6 | 54.8 | 88.9 | 84.3 | 86.1 | 87.8 |
| Mothers who received full ANC (%) | 16.6 | 4.5 | 6.6 | 20.9 | 15.9 | 14.6 | 8.5 | 9.2 | 9.5 |

**Table 3: Delivery care Indicators for Rajasthan**

| Indicator | DLHS-1 | DLHS-2 | CES 2005 | CES 2006 | DLHS-3 | CES 2009 | AHS 2010-11 | AHS 2011-12 | AHS 2012-13 |
|---|---|---|---|---|---|---|---|---|---|
| Institutional deliveries (%) | 22.5 | 30.3 | 38.7 | 46.2 | 45.5 | 71 | 70.2 | 74.4 | 78 |
| Proportion of safe deliveries (assisted by health personnel) | 33.5 | 43.4 | na | na | 52.7 | 75.8 | 76.2 | 80 | 83.8 |
| Delivery at home conducted by skilled health personnel (%) | na | 20 | 10.9 | 17.4 | 7.2 | 5.3 | 32.3 | 35.8 | 42.6 |

**Table 4: Status of early initiation of breast feeding and exclusive breast feeding -Rajasthan**

| Indicator | DLHS-1 | DLHS-2 | CES 2005 | CES 2006 | DLHS-3 | CES 2009 | AHS 2010-11 | AHS 2011-12 | AHS 2012-13 |
|---|---|---|---|---|---|---|---|---|---|
| Women started breast feeding within one hour of Birth ( %) | 15.8 | 14.5 | 15 | 14.9 | 41.9 | 27.7 | 48.6 | 50.1 | 54.1 |
| Children received exclusive breast feeding (EBF for 6 Months) (%) | na | 5.3 | na | na | 25.4 | na | 24.7 | 29.4 | 32.1 |

**Table 5: Status of Childhood illness and management in Rajasthan**

| Indicator | DLHS-1 | DLHS-2 | DLHS-3 | CES 2009 | AHS 2010-11 | AHS 2011-12 | AHS 2012-13 |
|---|---|---|---|---|---|---|---|
| Children suffering from Diarrhoea (%) | 33.1 | 15.9 | 8.4 | 15.5 | 13.5 | 13.6 | 13.4 |
| Given ORS (%) | 4.7 | 14.3 | 30.6 | 39.2 | 77.3 | 81.7 | 86.4 |
| Children suffering from ARI (%) | 21.2 | 13.4 | 7.7 | 11.1 | 6.5 | 11.3 | 15.9 |
| Sought treatment (%) | 35.2 | 70.1 | 75.7 | 89.9 | 94.2 | 94.1 | 94.9 |
| Suffering with fever (%) | na | na | na | na | 19.2 | 20.1 | 20.3 |
| Sought treatment (%) | na | na | na | na | 92.4 | 93.4 | 92.6 |

**Table 6: Correlation Coefficient matrix of various child health indicators with IMR Rajasthan**

| **Indicator** | IMR | % received ANC in First Trimester | % of mothers received Three or more ANC checkups | % of mothers received Full ANC | % of Institutional Deliveries | % of Children received all vaccination | % of Early initiation of Breast Feeding |
|---|---|---|---|---|---|---|---|
| IMR | 1 | -.867 | -.815 | .356 | -.943 | -.819 | -.828 |
| % received ANC in First Trimester | -.867 | 1 | .927 | -.280 | .909 | .837 | .602 |
| % of mothers received Three or more ANC checkups | -.815 | .927 | 1 | -.066 | .922 | .800 | .566 |
| % of mothers received Full ANC | .356 | -.280 | -.066 | 1 | -.132 | -.084 | -.190 |
| % of Institutional Deliveries | -.943 | .909 | .922 | -.132 | 1 | .893 | .815 |
| % of Children received all vaccination | -.819 | .837 | .800 | -.084 | .893 | 1 | .847 |
| % of Early initiation of Breast Feeding | -.828 | .602 | .566 | -.190 | .815 | .847 | 1 |

**Table 7: Correlation coefficient matrix of various child health indicators**

| Indicators | Correlation Coefficient with IMR | p-Value |
|---|---|---|
| % received ANC in First Trimester | -.867 | .002 |
| % of mothers received Three or more ANC checkups | -.815 | .007 |
| % of mothers received Full ANC | .356 | .348 |
| % of Institutional Deliveries | -.943 | .000 |
| % of Early initiation of Breast Feeding | -.828 | .006 |
| % of Children received all vaccination | -.819 | .007 |
| % of Children 9 months and above who have received at least one dose of Vitamin A | -.805 | .016 |
| % of children received ORS to treat diarrhea | -.931 | .001 |
| % of children visited health facility to treat ARI | -.970 | .000 |

**Table 8: Status of Immunization and Vitamin-A among children in Rajasthan**

| Indicator | DLHS-1 | DLHS-2 | CES 2005 | CES 2006 | DLHS-3 | CES 2009 | AHS 2010-11 | AHS 2011-12 | AHS 2012-13 |
|---|---|---|---|---|---|---|---|---|---|
| % of Children who received all vaccines | 37.1 | 23.9 | 49.9 | 47.8 | 48.8 | 53.8 | 70.8 | 69.2 | 74.2 |
| % of Children who received one dose of Vitamin-A | 22.2 | 22.4 | na | 70.5 | 50.8 | 60.5 | 59.4 | 66.1 | 74.2 |