

Original Research Article

## Study on Innovations in Reducing Infant and Child Mortality under NRHM: Experiences from Madhya Pradesh

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### ABSTRACT

**Background:** The decline in IMR of Madhya Pradesh has come down 22 points (28.95%) since 2005. As per the SRS report 2013, NMR of Madhya Pradesh was 8 points above the national level. Half of the Under5 deaths are taking place after neonatal period and about 22% child deaths are taking place after infancy.

**Objectives:** The objective is to study innovations in reducing infant and child mortality under NRHM in the state of Madhya Pradesh.

**Materials and Methods:** In this study, two districts namely Indore as better performing district in terms of child health care and Shivpuri as poor performing were randomly selected to collect primary as well as secondary data regarding programmatic factors affecting infant and child mortality in Madhya Pradesh.

**Results:** It was found that the state has implemented various child health related schemes under NRHM and also launched state specific innovative schemes to lower the infant and child mortality. Lack of trained human resources, facilities and access to services were largely responsible for slow decline in infant /child mortality indicators in the poor performing districts in the state.

**Conclusion:** There are regional differences in the state so it requires local solutions. The socio-cultural issues need to be considered for effectively bringing down infant and child mortality rates. There is need to link health workers with community in order to address most serious causes of deaths like low birth weight, asphyxia, congenital abnormalities etc.

**Keywords:** Neonatal, Infant and Child Mortality, Programmatic Factors, NRHM, Madhya Pradesh.

### INTRODUCTION

The Infant Mortality Rate (IMR) is an important measure of the well-being of infants, children, and pregnant women. The Millennium Development Goal 4 was set to reduce infant and child mortality by two-thirds between 1990 and 2015. In the case of India, this would imply a reduction of the IMR and U5MR to less than 28 and 41 per thousand live births, respectively.

The largest absolute numbers of neonatal deaths (10, 98,000) still taking place in India, accounting for 27% of global neonatal death (WHO, 2005). <sup>(1)</sup>

Over last 42 years, infant mortality has reduced from 129 per 1000 live births in 1971 to 83 in 1990 and further to 41 per thousand live births (SRS, 2013) in India. The U5MR goal for 2015 for India was fixed 38 per 1000 live births (UNICEF,

2009).<sup>(2)</sup> However, India missed the deadline to achieve the MDG 4 to reduce child mortality by two thirds (MoSPI, 2015)<sup>(3)</sup> but the target is moderately on track due to sharp decline in recent years.

Lahariya and Paul (2010)<sup>(4)</sup> had utilized the Sample Registration System (SRS) data to report the Early Neonatal Mortality Rate (ENMR), Neonatal Mortality Rate (NMR), Infant Mortality Rate (IMR) and estimated Under-Five Mortality Rate (U5MR) in India for the year 2007 using both SRS and NFHS data. They estimated that out of 26.2 million births, 1.84 million were under five deaths, 1.44 million (78% of under-five deaths) deaths during the first year of life; 943,000 (52% of under-five deaths) neonatal deaths and 7,60,000 (81% of neonatal deaths) deaths within the first week of life occurred during 2007. The most recent estimates of NMR, IMR and U5MR were 28, 40 and 49 per 1000 live births respectively (SRS, 2013).

Madhya Pradesh is one of the poor performing states in terms of reduction in IMR. The share of NMR in IMR has gone up from about 64 per cent in 2005 to about 69 per cent in 2012. Moreover, the share of new-borns deaths within a week to total infant deaths was about 53 per cent in 2012 (MoHFW 2011, ORGI 2013a).<sup>(5,6)</sup> The limited improvement in IMR has been largely due to the relatively larger decline in the post-neonatal mortality rate which is partly due to nutrition, health and immunisation programmes (Rammohan et al. 2013).<sup>(7)</sup>

### **Infant and Child Mortality Status in the State**

Madhya Pradesh is having population over 72.6 million with high percentage of children below six years (14.88%) with the low female literacy rate (60%) according to the Census, 2011. The state continues to be with high levels of MMR 230 (SRS 2010-12) and high level of NMR, IMR and U5MR, 36, 54 and 69 respectively (SRS, 2013) which were higher than the national level. The decline

in IMR of India since the beginning of National Rural Health Mission (NRHM) in 2005 till 2013 has come down 18 points (31.03%) where as the IMR of Madhya Pradesh has come down 22 points (28.95%) since 2005. The NMR in 2013 for Madhya Pradesh was 8 points above the national level. Still almost half of the under 5 deaths are taking place after neonatal period and about 22% child deaths are taking place after infancy.

### **MATERIALS AND METHODS**

In this study two districts namely Indore (IMR 40, AHS 2011) as better performing and Shivpuri (IMR 71, AHS, 2011) as poor performing district were selected to collect primary as well as secondary data. The study was conducted during February-March 2013. From each selected district, one urban ward and one rural village were selected. From Indore district, Shekhar Nagar of Indore city was selected as urban ward and village Kanaria was selected from rural area. From Shivpuri district, Ward No. 69 of Shivpuri city was selected as urban ward and village Noharikala was selected from rural area. Interviews were conducted with the District Chief Medical Officer (CMO) and PHC Medical officer and health workers etc. The Focus Group Discussions (FGDs) with mothers with at least one living child 5 years or below were conducted at government facility in the selected study area. Semi-open ended interview schedules were used for collection of data regarding infant and under 5 mortality, socio-economic conditions, diseases and causes of deaths among infants and children, mother and child health services, related Health Management Information System (HMIS) data from the selected districts, programmatic interventions under NRHM, availability of services etc. from the study population. Tools for FGDs were developed as per the framework given by Mosley and Chen (1984).<sup>(8)</sup> About 8 to 12 mothers in the age group of 19-35 years, were invited to participate in FGD.

## Findings Health Infrastructure and Services in Madhya Pradesh

The Table 1 describes that 25-50 percent of shortfalls in infrastructure as well as human resources. There was acute

(about 80%) shortage of Obstetricians & Gynaecologists, Paediatricians and Specialists at Community Health Centres which are pre-requisite to reduce infant and child mortality.

**Table 1: Status of Health Facilities and Human Resources in the state**

Particulars	Required	In Position	Shortfall	% Shortfall
Sub-Centres	12314	8869	3445	27.98
Primary Health Centres	1977	1156	821	41.53
Community Health Centres	494	333	161	32.59
Health worker (Female) /ANM at Sub-centre & PHCs	10025	10204	*	*
Health worker (Male) at Sub-Centres	8869	3733	5136	57.91
Health Assistant (Female)/LHV at PHCs	1156	546	610	52.77
Health Assistant (Male) / at PHCs	1156	293	863	74.65
Doctors at PHCs	1156	814	342	29.58
Obstetricians & Gynaecologists at CHCs	333	73	260	78.08
Paediatricians at CHCs	333	67	266	79.88
Total Specialists at CHCs	1332	267	1065	79.95
Radiographers at CHCs	333	192	141	42.34
Pharmacist at PHCs & CHCs	1489	678	811	54.47
Lab Technicians at PHCs & CHCs	1489	609	880	59.10
Nursing Staff at PHCs & CHCs	3487	2491	996	28.56

(Source: RHS Bulletin, March 2012, M/O Health & F.W., GOI)

As per AHS data 2010-11, the percentage of mothers consumed IFA Tablets for 100 Days was 17.5%. The percentage of children with birth weight less than 2.5 kg was 29.7 % in rural areas, 25.9 in urban areas and 28.6% aggregate seems to be due to low consumption of IFA tablets. The percentage of children

aged 12-23 months who were fully immunized was only 54.9%. The low immunization may be one of the most serious factors affecting infant mortality in the state. The percentage of children suffering from fever, diarrhoea and ARI at the time of survey was 24.2%, 15.2% and 15.4% respectively.

**Table 2: Logistic Regression Analysis of DLHS-3 Data for Madhya Pradesh**

Variables	Categories	Odds Ratio/ Exp(B)
Source of drinking water	Pipe/bottled water®	
	Bore well/well water	1.102
	Spring/rain/ truck/tanker water	1.192
	Others	3.226
Wealth Index quintiles	Lower	1.473
	Middle	1.233
	Upper Middle	1.381*
	Rich®	
Type of toilet	Flush toilet®	
	Pit latrine/other	1.261
	No facility/open space/others	0.983
Education of mothers	Illiterate	7.099**
	1-4 years	2.595***
	5-9 Years	1.456**
	10 and above®	
Caste group	Scheduled caste	1.169
	Scheduled tribe	0.964
	OBC	0.889
	General®	
Safe delivery	No	1.431***
	Yes®	
Feed mother's milk 'colostrum/khees'	Yes	0.862
	No®	
Child have check-up within 24 hours of birth	Yes	.811
	No ®	
Type of locality	Rural	1.017
	Urban®	

®Reference Category, Significance at \* $P < 0.05$ , \*\*  $P < 0.01$ , \*\*\* $P < 0.001$

## Factors Affecting Child Mortality in the State of Madhya Pradesh

### Findings from Logistic Regression Analysis

The Logistic Regression Analysis (Table 2) using DLHS- III data is applied to identify important factors affecting child mortality in the state. It was found that likelihood of child mortality was lower among those who are using piped water compared to those who were using bore well or well water, spring/rain water or truck/tanker water or lake/pond/river water. Those who are taking water from other sources have more than three times higher chance of child mortality (OR=3.226).

When we consider the type of toilet facility available, those who are using pit latrine have 26 percent higher odds compared to flush toilet. The illiterates have more than 7 times higher the likelihood of child mortality compared to highly educated mother (10 and above years of schooling). When we analyse the caste wise population, scheduled caste group have higher odds of child mortality (OR=1.169) compared to general category population. Those women who didn't have safe delivery; have 43 percent higher chances of child mortality compared to those women had safe delivery. Women who feed colostrum after the birth of the child have less likelihood of child mortality compared to those do not feed colostrum. The analysis also indicates those child had check up within 24 hours of birth have less likely to have child mortality compared to those who didn't had check up within 24 hours of birth.

### Female Literacy

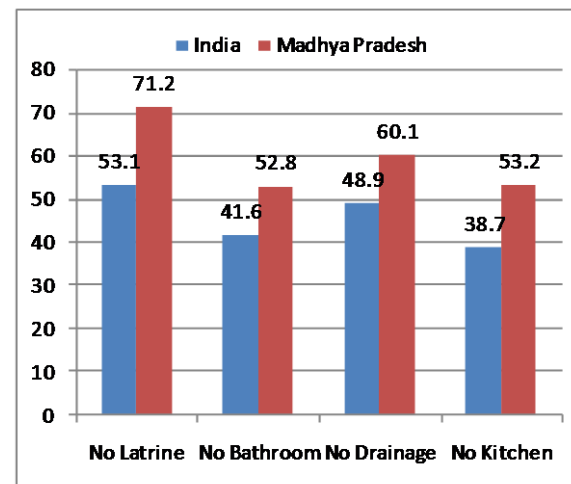
Mother's education has inverse relationship with child mortality. Higher the level of mother's education, lower is the child mortality in urban as well as rural areas.

Table 3: NMR, IMR and U5MR by Mother's Education and Residence

State/India	Total	Rural	Urban
<b>Neo-natal Mortality Rate by Mother's Education and Residence</b>			
Madhya Pradesh	36 (60.0%)	39 (53.2%)	23 (77.4%)
India	28 (65.5%)	31 (58.8%)	15 (79.9%)
<b>Infant Mortality Rate by Mother's Education and Residence</b>			
Madhya Pradesh	54 (60.0%)	57 (53.2%)	37 (77.4%)
India	40 (65.5%)	44 (58.8%)	27 (79.9%)
<b>Child (U5) Mortality Rate by Mother's Education and Residence</b>			
Madhya Pradesh	69 (60.0%)	75 (53.2%)	40 (77.4%)
India	49 (65.5%)	55 (58.8%)	29 (79.9%)

Source: Female Literacy Rate in parenthesis (Census 2011), IMR (SRS 2013)

### Household Environment



Source: Census 2011

Figure 1: Percentage of households not having basic household amenities and drainage system in Madhya Pradesh and India.

Above 60% of households in Madhya Pradesh do not have any drainage (not even open drainage) system. More than 70% household population defecates in open. The health department has greater challenges in providing effective health care services in urban slums due to its poor determinants of health. As experienced in FGD held in Indore urban slum, the challenges are many folds. Lack of basic civic amenities and environmental issues in urban slums are causes of alarming child health indices even compared to rural areas. The similar findings are echoed in the article by Awasthi S and Agarwal S (2003) <sup>(9)</sup> on the rapidly expanding and under privileged urban poor who lack an organized health care delivery system in contrast to the rural population. They lack basic civic amenities including safe water

supply and proper sewage disposal. It is therefore understandable that their child health indices are two to three times worse off than their counterparts.

#### ***Access to Safe Drinking Water***

As per the Census 2011 report, the piped (Tap) water supply in the state of Madhya Pradesh is 23.4%. Only 10 percentage rural households in Madhya Pradesh have access to safe drinking water. The situation on availability safe drinking water in urban Madhya Pradesh is also not good as 37.8% of urban households lack safe drinking water which is major cause of diarrhoea among children.

#### **Innovations under Child Health Programme under NRHM**

##### ***Default Tracking System***

To overcome the dropout rate, UNICEF innovated Defaulter Tracking System at the Sub-Centres in the state.

##### ***Janani Express Yojana (JEY) and EMRI-108***

Under this scheme, free transport to all from home to facility and facility to higher facility in case of referral is ensured. The average reach time is approximately 20 minutes.

##### ***Provision of Free Services for Delivery and Newborn Care***

Under this scheme free drug and free blood during complications is provided to all pregnant mothers. The free diagnostic services were provided to all BPL patients. There is provision of free diet at the District Hospitals and Community Health Centres.

##### ***Improving Janani Suraksha Yojana (JSY)***

In the JSY scheme verifications of 2% cases at divisional and 5% cases at district level are done. Payment to beneficiaries through bearer cheques and payment to ASHAs through e-transfer/account payee cheques was implemented.

##### ***Newborn Care Corners (NBCC) and Sick Newborn Care Units (SNCU) in the State***

By the year 2014, Newborn Care Corners are established at all delivery

points. Madhya Pradesh has 53 SNCUs operational present in each of its districts due to which the IMR has decreased with treatment of 84,334 infants in 2014. Also there are 99 Newborn Care Units (NBCUs) operational in the state which over 11446 underweight infants has been treated. The Integrated Management of Neonatal and Childhood Illness (IMNCI) programme was implemented in more than 25 high focus districts and.

##### ***Interventions under Infant and Young Children Nutrition (IYCN)***

Under the Bal Shakti Yojana scheme, Nutrition Rehabilitation Centers (NRCs) were established in all High Focus districts. Under the Bal Suraksha Maah programme, Vitamin A supplementation, de-worming and IFA supplementation was vigorously promoted.

##### ***Mother-Baby Friendly Hospital Initiative***

The Infant and Young Children Nutrition (IYCN) Cell is made operational with UNICEF support. Breastfeeding counsellors were appointed at districts with UNICEF support.

##### ***Home Based Newborn Care (HBNC) Initiative***

ASHAs were trained in module 6 & 7 across the state for provision of home based newborn care. Master trainers and district level trainers were also trained. Besides, an incentive to ASHAs for provision of HBNC is introduced.

##### **Findings from District Indore**

As per Census 2011 data, the population of Indore district was 3.27 million with population density of 841 persons per Sq. Km. as against the state average 230. The decadal growth rate of the district was 32.7 % higher than the state growth rate of 20.3%. The sex ratio in the district was 924 compared 930 in State. The child sex ratio in the district is low at 892 female children per 1000 male children in the age group 0-6. The 0-6 population was 16.15 % in the District compared to 14.5% in State. The literacy rate is 82.3 % compared to 70.6% for the State. The literacy rate for male was 89.2%



and for Females 74.9%. As per AHS 2010-11, the NMR, IMR and U5MR of District Indore are 25, 40 and 51 per live births respectively.

As per the Rapid Household Survey Data 2011, there were 111 Sub-Centres, 25 PHCs, and 4 CHC, 1 Medical College and 1 Children Hospital in Indore district.

As per the AHS data 2010-11, the percentage of women received 3 or more ANC was as quite high at 87.3% in aggregate. The percentage of mothers consumed IFA tablets for 100 days was low at 31.3%. The percentage of institutional delivery was high at 92.5 and more than half deliveries are taken place in Government Hospitals. The newborns breastfed within one hour of birth were 55.1% and percentage newborns checked within 24 hours of birth were high at 89.3. About one fourth (24%) of the children born in the district were with birth weight less than 2.5 Kg may be due to poor intake of IFA tablets. The children aged 12-23 months fully immunized were 77.6%. The major childhood diseases in the district were fever, diarrhoea and ARI.

#### ***Interview with District Chief Medical Officer***

The Chief Medical Officer (CMO), Indore informed that every PHC/CHC is provided with a Newborn Baby Corner. At every 2 Sub-centres, one Sector Medical Officer is posted. For tribal dominated block, Mobile Clinics are provided. Sick Newborn Care Unit is functioning at Chacha Nehru Hospital in the city. In rural areas Deen Dayal Chalit Upchar Yojna (Mobile Health Scheme) is implemented in one block which is predominantly tribal.

#### ***Planning and Implementation of Child Health Programmes***

The CMO informed that 13 Basic Emergency Obstetric Care (BEmOC) and 7 Nutrition Rehabilitation Centres (NRC) are established in the district. Besides 2 CHCs (Samer and Dipalpur), New Born Stabilization Units (NBSU) are also established at Sub District Hospital and

District Hospital. Bal Suraksha Maah programme is arranged to distribute Vitamin A every six months in all Anganwadi Centres. All the NRHM sponsored schemes like FBNC-Facility Based Newborn Care Centres [SNCUs-Special Newborn Care Units, NBSUs-Newborn Stabilization Units, NBCCs-Newborn Care Corners] at DHs, CHCs and PHCs are functioning well. Navjat Shishu Suraksha Karyakram (NSSK), Janani Shishu Suraksha Karyakram (JSSK), F-IMNCI, Home Based Neonatal Care (HBNC) etc. are already implemented in the district and running smoothly. Besides NRHM schemes, the State Government schemes such as Ladli Laxmi Yojna are also contributing in improving status of the girl child. Under district PIP, special initiatives are taken for the children having congenital heart problem. 'Bal Hridaya Upchar' Scheme is started to treat the children suffering from heart disease at Medical College Hospitals and few specialized private hospitals are also empanelled for this purpose. The treatment is completely free of cost to the families irrespective of their economic status.

#### ***Human Resource and Training***

The CMO of the district informed that there is shortage of human resources in the district but the work is managed by redeployment of staff as per requirement within the district. Some positions are filled on contractual basis with NRHM funds. Medical college is fully involved in skill based training to health staff. All regular and contractual staff is trained in various trainings launched by Central and State Governments under NRHM. Trainings on HBNC and IMNCI are most effective in bringing down infant and child mortality in the district.

#### ***Inter-Sectoral Coordination***

The CMO informed that ICDS and private health sector hospitals are working with Government health department to reduce infant and child mortality in the district. Indian Association of Paediatrics (IAP) is involved in training and

organizing paediatric camps. NGOs like World Vision, Urban Health Resource Center, Bhartiya Gramin Mahila Sangh etc were involved in child health awareness and immunization activities. Mahila Mandals were helping for providing food to mothers delivering in hospital under JSSK scheme.

### ***Social Mobilization and Community Participation***

It was informed that Village Swasthya Samitis under PRIs were functioning. The CMO informed that for strengthening health services in urban area, whole city is divided into 4 Zones under one Zonal Officer. There are 69 Wards and in every ward, one Medical officer is posted. One USHA worker per 200 households in urban slums was appointed under NRHM.

### ***Monitoring of Child Deaths***

CMO informed that data on Infant and Child Deaths is compiled and weekly review meeting is done. However, Child Death Review at PHC level is not initiated in the district.

### ***Findings from the District Shivpuri***

As per Census 2011 data, the population of the Shivpuri district was 17,25,818. The overall literacy rate 63.7%, male literacy 76.2% and female literacy was 49.5%. The sex ratio was low 877 in compared to the state's sex ratio 930. The child sex ratio was 889 as compared to state figure of 912. The percentage of Child Population (0-6 years) was 16.3% compared to 14.5% of the state. The Sex Ratio at birth (SRB) of the district was 901 less than state figure of 904. Surprisingly, sex ratio at birth in urban areas was far below 837 (state figure is 876) compared to 912 (state figure 915) of rural areas and the maternal mortality rate was 262. As per AHS 2010-11, the NMR, IMR and U5MR of District Shivpuri were 44, 70 and 101 per thousand live births respectively.

In the district, there is 1 District Hospital, 8 CHCs, 12 PHCs, 249 Health Sub-Centres, 1 Urban Family Welfare

Centre, 35 Ayurvedic Hospital/Dispensaries, 5 Homeopathy Hospitals/Dispensaries. If we consider the health service criteria based on population norm there is huge requirement of the Sub-health centres, Primary health centres and Community health centres in the district. There are 13 BEmONC facilities functional at the CHC/PHC level. There are three CEmONC functional at District Hospital Shivpuri, CHC Badarwas and CHC Pichore. Only District Hospital Shivpuri has sufficient staff in term of CEmONC functionality. Other two CEmONCs even do not have essential manpower. Most of the SHCs are situated far away from the villages. Average distance of villages from SHCs is 5.5 Km with maximum 8.30 Km. Most of the SHCs are burdened with around 7 to 8 thousand population. Only 82.83 % villages are having Anganwadi Centers and most of the AWWs are illiterate and ill oriented for their jobs.

### ***Selected Child Health Indicators in District Shivpuri***

As per the AHS data 2010-11, the percentage of women received 3 or more ANC was as low as 28.9% in aggregate, The percentage of mothers consumed IFA tablets for 100 days was also much low (17.7%). The percentage of institutional delivery was 77.9 and maximum 73.8% were taken place in Government Hospitals. The newborns breastfed within one hour of birth were better at 70.9% and percentage newborns checked within 24 hours of birth were high at 75.4. More than one fourth (25.5%) of the children born in the district were with birth weight less than 2.5 Kg may be due to poor intake of IFA tablets. Only 54% of the children aged 12-23 Months were fully immunized. The major childhood diseases in the district were fever and diarrhoea.

### ***Prioritization of Child Health Care Activities in the District Shivpuri***

The most important initiative taken up by the district was to make Emergency Obstetric and Maternal Care Service

(including emergency transport) to functional at newly constituted BEmONC and Accredited Sub-health centres. UNICEF has helped to establish fully functional New Born Care Transport system to make linkages between SNCU level 2 and SNCU level 1, putting in place additional Janani Express for Accredited SHC, BEmONC and accredited Sub-Health Centers. The government has ensured that all Nutrition Rehabilitation Centres will do 100% follow-up of children. The district has planned to complete essential training like IMNCI, SBA, Newborn Care training, EmONC Training, NSSK, BEmONC, Routine Immunization, Cold Chain etc. The district has decided to cover all vulnerable group and tribal population, hamlets, migrant population by monthly special drive.

The institutional specific innovation were also introduced viz., (i) Cold Chain Complex at district and block levels to ensure quality of vaccine availability (ii) Blood Component Separator for Blood Bank (iii) Microbiology Lab and Gas Analyzer for District Hospital (iv) Construction of additional labour room at accredited SHC (v) Installation of solar lights in SHC where ANM resided in the same campus (vi) Ensuring vehicle for immunization and VHND for difficult to reach area and vulnerable population for monitoring and service delivery (vii) Organizing follow-up camps for SNCU level 2 discharged patients (viii) Capacity building of administrative staff in management at IIM and capacity building of Specialist Doctors at AIIMS & PGI.

#### ***New alternative vaccine delivery system***

The use of new alternate vaccine delivery system was incorporated in the entire district since March 2009 with provision of giving Rs.50/- per immunization session to alternate delivery person.

#### ***Interview with Chief Medical Officer (CMO)***

The interview was conducted with Chief Medical Officer (CMO), Shivpuri. He informed that about 30% of population is very backward and has poor child health indicators. It was informed that CHCs and PHCs are insufficient as compared to population norms to provide newborn care. Private sector is almost non-existent as people do not have paying capacity for private health care. For tribal dominated district, no mobile clinics or any other innovative intervention could be provided through NRHM under given framework. The Sick New Born Care Unit (SNCU) was functioning at District Hospital Shivpuri which has been developed with technical and partial support from UNICEF and declared as one of the best in the country based on performance. This SNCU facility along with Janani Express Yojana is supervised by UNICEF consultants and managed excellently. The delivery facilities in the District Hospital are also upgraded and linked with SNCU under specific guidelines. Under the dynamic leadership of civil surgeon, the facility was one of the Models in the State.

#### ***Planning and Implementation of Child Health Programme***

The CMO informed that MCH (Type I, II & III) Centres are established in the district. The CMO also informed that all NRHM schemes were already implemented in the district. He further explained that due to low literacy status, the State Government schemes such as Ladli Laxmi Yagna for improving status of the girl child and 'Bal Hridaya Upchar' Scheme to treat children suffering from heart diseases are not properly utilized.

#### ***Human Resources and Training***

The CMO of the district informed that there is shortage of health facilities and human resources in the district. All the staff (regular and contractual) is trained in various trainings launched by Central and State Governments under NRHM. The CMHO felt that though ASHA workers are adequately trained but it is difficult to train them who were from backward areas.



### **Monitoring of Child Deaths**

CMO informed that data Child Death Review at CHC/PHC level is not initiated in the district; only maternal death audit is done. Review is also done at Principal Secretary Level quite frequently but not at fixed interval.

### **Coordination with International Organisations**

In Shivpuri district, UNICEF took lead to establish SNCU and well equipped modern labour room besides ANC and PNC rooms in Civil Hospital which became an ISO certified hospital.

### **DISCUSSION**

It is seen that more than 33% population in aggregate and 42% of rural Madhya Pradesh is below poverty line. The male child preference, sex determination & selective child abortion and poor care of girl child are the causes of such skewed sex ratios against girl child in the state. Due to the geographical vastness and large forest areas in Madhya Pradesh the health centers established on population norms are spatially difficult to access. This may be one of the major reasons associate with higher infant and child mortality in the Madhya Pradesh. As found by the Logistic Regression Analysis, environmental and hygienic factors have large influence on infant and child mortality. From the FGDs conducted in the selected areas, it was found that people in the urban slums of Indore city were living in much unhygienic conditions increasing vulnerability to spread of diarrhoea, jaundice, cholera, typhoid etc among the children.

From the HMIS reports (2011-12), the percentage ANC registration is very high in Indore may be due to presence of migrant population. However, percentage of 3 ANC checkups against ANC registration is better in Shivpuri district in Madhya Pradesh may be because of more utilization of government health facilities. Whereas families in urban areas like in Indore districts avail private nursing home

facilities for ANC checkups, TT2/Booster and IFA tablets.

As per HMIS data of 2011-12, the Indore district tops with 98.7 institutional deliveries due to large urban population having access to better government hospitals and private nursing home facilities. In the contrary, the Shivpuri district with large rural and tribal population has 9.4 reported home deliveries.

The percentages of low birth weight babies in Indore and Shivpuri are high 22 and 25 respectively. Low birth weight could be one of the major reasons for high NMR in Madhya Pradesh. As compared to Indore, the percentage of newborns with low birth weight (<2.5kg) in Shivpuri is high. Low birth weight combined with less SNCUs could be one of the major reasons for high NMR in Shivpuri district. The ASHAs & ANMs in both the districts have made the mothers well aware of benefits of early (within one hour) breast feeding to the new-borns and also exclusive breast feeding till six months. However, still some tribal /nomad population in Shivpuri district do not follow this advice.

As per the AHS data full immunisation is 70.1 % in Indore district and 18.2% in Shivpuri district. Less immunisation sessions held in Indore district may be due to higher urban population but needs attention of government. The HMIS data (2011-12) on childhood diseases shows that measles among children is still major cause of illness which is vaccine preventable. Indore shows higher number of measles which may be due to large slum population in the city. Cases of Diarrhoea were high in Indore districts due to consumption of unsafe water in slums, but malaria was high in Shivpuri district (19.8%) due to forest. No cases of Diphtheria, Pertussis and Polio were reported in both the district during the year. It was informed during FGDs that parents seek the medical care from government or private health facility

and do not depend on home remedies. Some tribal community in both the state follows their customs, home remedies and magico-religious practices to cure the child from illness.

The HMIS data on causes of deaths among children in Indore district appears to be not classified properly as 83% of child deaths have put under 'others' causes of deaths. The deaths due to LBW, Asphyxia, Sepsis, Pneumonia, Diarrhoea, Fever were higher in Shivpuri district. These deaths are preventable with improved neonatal care. The child death audit in MP needs to be improved for better decision making.

HMIS report (2011-12) shows that 82% infants deaths in Indore and 15% in Shivpuri of were taking place within 24 hours of birth. However, deaths after 24 hrs to 1 year were less (18%) in Indore but were high (67%) in Shivpuri district. The percentage deaths between 1 to 5 years of age was 6% in Indore but 3 times higher (18%) in Shivpuri may be due to poor socio-economic conditions.

## CONCLUSION AND RECOMMENDATIONS

It is concluded that there are regional variations in the level of infant mortality therefore priority to be given to the districts where infant mortality rate are high. The most important indicators which need to be taken care for reducing the infant mortality are pregnant women received full ANC, institutional delivery, post natal checkup, full immunization and nutrition.

It is recommended that locally relevant innovations under NHM may be encouraged in the state. The birth preparedness and complication readiness schemes in socio-cultural settings should enforced for effectively bringing down

infant and child mortality rates. There is need to link health workers with community. Indigenous solutions which are acceptable and feasible in the district viz Kangaroo Care should be promoted in community. The Village Health Sanitation and Nutrition Committees and its urban equivalents that are a part of Local Government Institutions are a platform that must be strengthened and utilized for this purpose.

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