Utilization of Health Services and RCH Status in Madhya Pradesh: A District Level Analysis

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Abstract

The study attempts to explore the pattern of utilization of RCH services viz. antenatal care, safe deliveries, child immunization and reproductive and child health status (complications during pregnancy, delivery and post-delivery etc.) in the districts of Madhya Pradesh. The linkages of different socio-economic and demographic indicators with utilization of services and RCH status are also studied. The study elicits district wise reproductive health status indices. Further some indices namely; index of social development, health facilities, utilization of services, reproductive morbidities and index of quality of care has been computed for all districts. As a final point, the correlation of these indices with indices of reproductive and child health has been illustrated. The study reveals that utilization of health services and social development depicts strong negative relation with reproductive morbidities.

Introduction

Reproductive health issues have attained higher international visibility and renewed social and political commitments in recent decades. To accelerate the level of awareness and action, a meeting of patterns for safe motherhood was held in Washington D.C. in March 1992. The meeting introduced a new phase of safe motherhood initiatives to make an existing action of designing and implementation of community level programs to provide increased and improved family planning, pregnancy and delivery care for women (Eschen, 1992). After ICDP conference (1994), the concept of Reproductive Health attracted a wide attention among academician, researchers and in Government and NGOs' programme and activities. It has a multidimensional sphere which generally includes pregnancy, child birth and post partum care, breast feeding, maternal and infant nutrition, infertility, sexual behaviour, STDs and HIV/AIDS, reproductive rights and freedom and women's status and empowerment. Under these circumstances there is an increasing thinking in the scientific community about the need to give stress on maternal health, in essence of their reproductive health problems (Jejeeboy, 1997; Pachauri, 1996).

Government of India has launched several programmes related to maternal and child health from time to time and updates its strategies in order to improve health status of women and children and fulfill the unmet need of the MCH care through out the country. Since the introduction of family welfare programmes in First Five Year Plan (1951-56), Government has taken various steps to strengthen the maternal and child health. Maternal and child health and nutrition were integrated with family planning programme during fifth five year plan (1974-79). In year 1992-93 the programme was renamed as child survival and safe motherhood programme (CSSM), with intention to improve quality and utilization of MCH services. But in the year 1997, the proramnme was again renovated and labeled as Reproductive and Child Health (RCH) - which incorporate all components of Child Survival and Safe Motherhood (CSSM) and additional introduced new components related to reproductive tract infections and sexually transmitted infections. Broadly, the programme aims to universalize the immunization,

antenatal care, skilled attendance during delivery as well as for common childhood elements. A step further new endeavor of Government of India, National Rural Health Mission (NRHM, 2005) outlines its objectives, 'to promote equity, efficiency, quality and accountability of public health services through community driven approaches, decentralization and improving local governance'.

Despite of all these programme and efforts, some studies have revealed that reproductive and child health situation in India is very panic, especially in northern states. In the northern states viz. Uttar Pradesh, Bihar, Madhya Pradesh and Rajasthan, the utilization of Government health facilities for delivery was poor that is only 5 to 16 percent, whereas home deliveries were widely prevalent and largely attended by untrained birth attendants that is 80 to 92 percent with greater probability of high risk of maternal morbidity and mortality (Raju, 2002). The variation in RCH indicators shows that there exists a wide variation among different states and among different regions within a state. The variation in RCH outcome indicators is also notified among different districts within a region of the state (Raju, 2002). A glance of maternal and child health indicators of Madhya Pradesh shows that they are far below than Indian average. Madhya Pradesh state, only second to Orissa, has highest maternal and infant mortality rates (SRS, 2005). Nevertheless a wide inter-district variations in demographic and RCH indictors is also observed. The infant morality varied from 122 deaths per 1000 live births in northern region to 80 in the southern region. Similarly, the crude birth rate varied from 35 births per 1000 population in the northern region to 28 in the south central region of state (Government of Madhya Pradesh, 2000). There are number of districts in the state where the risk of a maternal death remains extraordinary high (Ranjan, 2000). With this, a need was felt to explore the inter districts variation in RCH indicators in the state of Madhya Pradesh. This study is thus aimed to examine the variation in the utilization of health services and reproductive and child health status among the districts of Madhya Pradesh.

Material and Methods

The district level analysis is done for all districts as curved out in 2001 Census. The state was divided in to 45 administrative districts grouped in six geographical regions, namely *Central Region, Malwa Plateu, Northern Region, South Central, South Western and Vindhya Region*. To study the inter-districts variation in the utilization of health services and its outcomes in terms of reproductive and child health status, different datasets has been utilized. These datasets are as Census of India 2001 (Census of India 2001 & 2001a), District Level Health Survey 2002-04 (IIPS, 2004), Facility Survey 2004 (IIPS, 2004a) and Socio-Demographic Database prepared by NIMS (ICMR) New Delhi (NIMS, 2004).

Different composite indices are computed to study the pattern of socio-economic development, availability of health facilities, utilization of RCH services and reproductive and child health status in the districts of Madhya Pradesh state. All districts are ranked according to the absolute values of these indices. A composite index may encompass information for several indicators. The indicators may be grouped into positive and negative indicators. But before computing a composite index it needs to make them uniform, i.e. each indicator needs to be standardized. The positive and negative indicators are standardized as:

For a positive indicator = [redacted]

Where as *Vi* is the value of a indicator for i[th] district and V_{max} *and* V_{min} are the maximum and minimum value of that particular indicator.

For a negative indicator = $$Xi = \frac{V\max - Vi}{V\max - V\min} * 100$$

But before computing a composite index, each indicator used in the index is assigned a weight, the weight for each indicator is computed as

$$Wi = \frac{\frac{1}{\sqrt{Var(Xi)}}}{\sum \frac{1}{\sqrt{Var(Xi)}}}$$

And finally, using these weights a composite index is computed as $$Ci = \sum_{i=1}^{n} Wi * Xi$$

Where *Xi* is the standardized value of an indicator and *Wi* is the weight assigned to that particular indicator and *n* is the number of indicators included in the composite index.

Results and Discussion

Socio-demographic profile of Madhya Pradesh

Madhya Pradesh is one of the populous and backward states of India. It accounts of 9.37 percent of India's geographical area and about six percent of its population. According to Census 2001, state's population was 6.04 million. The decadal growth rate of population (24.34 %) during 1991-2001 was higher than the national decadal growth rate (21.34 %).

The sex ratio of 920 females per 1000 males in state is lower than national sex ratio of 933 females per 1000 males. Madhya Pradesh state has the highest scheduled tribe population ((20.3 percent) in the country (Census, 2001). The literacy rates were 76.80 percent for males and 50.28 percent for females as compared to 75.9 percent and 54.2 percent for males and females respectively in India (Census, 2001). According to demographic indicators Madhya Pradesh performs poorly relative to most other states. The crude birth rate (CBR) of Madhya Pradesh is 30.2, crude death rate (CDR) 9.8, natural growth rate (NGR) 20.5, infant mortality rate (IMR) 82 and total fertility rate (TFR) is 4.0 percent. Madhya Pradesh, next to Orissa state, has highest CBR and IMR in the country (SRS, 2005). The utilization of health services is poor and RCH status is panic. State ranked on 28th position according to RCH indicators (NIMR, 2004).

Table 1 : Socio-demographic and RCH Profile of Madhya Pradesh

Indicators	Madhya Pradesh	India
Demographic Indicators		
Population	60385118	1027015247
Density (persons per sq km)	196	324
Sex ratio (female per 1000 males)	920	933
Av. annual exp. growth rate (%)	2.18	1.93
Urbanization (%)	26.67	27.8
Percent of tribal population	20.3	8.2
RCH indicators (Percentage)		
Girls married before age 18	43.5	28.0
Contraceptive use (modern)	47.3	45.7
Full ANC	5.9	16.4
Delivery at home	71.5	59.0
Full Immunization (12-35 months)	35.5	47.6
Birth order 3+	49.4	42.0
RCH Status (Rank within India)	28	

Socio-economic development

Utilization of health services and health outcomes depends on the socio-economic development of the communities. The economical well off respondents and those who are from higher social status families have better utilization of health services (Navaneethan and Dharmalingam, 2002). The district with better socio-economic development will be having better health status too (Ranjan and Sharma, 2002). A composite social development index (SDI) is computed by taking into account the information on three important indicators, viz. proportion of women marry before age 18 years, female literacy and proportion of males working in non-agricultural sector.

Table 2 : Five best and worst performing districts according to social development index (SDI)

Rank	Districts	Women married before 18 yrs (%)	Female literacy (%)	Males in non-agri. sectors (%)	SDI
1	Bhopal	20.2	66.67	82.3	92.4
2	Jabalpur	19.8	59.47	66.14	78.8
3	Indore	38.2	63.96	76.84	78.4
4	Gwalior	24.3	56.76	65.03	73.9
5	Balaghat	8.6	57.02	29.56	63.7
41	Dindori	51.2	38.5	13.4	19.9
42	Jhabua	37.4	25.5	17.0	18.9
43	Tikamgarh	69.0	41.0	23.3	17.9
44	Sheopur	52.7	29.0	23.4	17.1
45	Sidhi	71.1	36.4	25.0	14.3

The index reflects the social and economic development status of districts. The five best and worst performing districts with their respective values of social development index and all used indicators are given in Table 2. The respective values of index and ranking for all other districts are given in appendix I. The values and ranking of districts according to SDI index reflect that most of districts of central and southern region are relatively better off. The important districts like Bhopal, Jabalpur, Indore and Gwalior also have better social and economical development. Districts like Sidhi, Sheopur, Dindori and Jhabua are least developed. The most of southern districts have higher values of development index, which reflects a strong clustering in social development within the state.

Availability of health infrastructure

Availability of health facilities is essential to reduce higher infant, child and maternal mortalities and morbidities (Ramaroa et al, 2001). The National Population Policy (NPP-2002) and National Rural Health Mission (NIMR, 2005) emphasized on availability of health facilities and utilization of services. To study the spatial variation in available health facilities within the state, a composite index of health facilities is computed. The index is computed on basis of the proportion of PHCs with adequate infrastructure, PHCs with adequate staff, PHCs with adequate supply, PHCs with adequate equipments and PHCs with adequate training. Table 3 shows five districts with better health infrastructure and five districts with poor health facilities.

Table 3 : Five best and worst performing districts according to index of health infrastructure (HII)

Rank	Districts	Percentage of health centers have adequate					HII
		Infrastructure*	Staff^	Supply*	Equipment*	Training*	
1	Sheopur	14.3	42.9	57.1	71.4	42.9	70.3
2	Dewas	18.2	45.5	59.1	45.5	50.0	69.7
3	Gwalior	7.7	76.9	76.9	53.8	15.4	64.7
4	Sehore	17.6	64.7	76.5	52.9	5.9	63.1
5	Neemuch	18.8	43.8	56.3	31.3	31.3	57.5
41	Katni	0.0	17.6	11.8	17.6	0.0	11.3
42	Shahdol	0.0	14.6	20.8	8.3	0.0	9.9
43	Rewa	3.4	6.9	6.9	0.0	6.9	7.1
44	Sidhi	3.3	13.3	3.3	3.3	0.0	6.2
45	Dindori	0.0	5.0	10.0	0.0	0.0	2.3

* having at least 60 percent of critical inputs, ^ having at least 60 percent of staff

Among districts of state, Sheopur, Dewas, Gwalior, Sehore and Neemuch districts have comparatively better health infrastructure. While availability of health facilities are worst in backward and tribal dominated districts like Sidhi, Dindori and Rewa. It is also important to know that health infrastructure is by and large poor in eastern region of state.

Reproductive health scenario

The complications that affect women during pregnancy and childbirth, affect the feotus as well, are by products of poorly managed pregnancies, quality of care provided during deliveries and delay or non-availability of medical facilities. Among them most of the pregnancy related complications could be effectively prevented or managed. Experience has shown that maternal and neonatal mortality can be reduced when communities are informed about danger signs or symptoms, and develop a referral system to manage complications at adequate level of the health care system (WHO, 1994). The inter-district variation in reproductive health status is measured in terms of women having any complication during pregnancy, delivery and post-delivery period. Higher complications among women reflect poor reproductive health situation in the district.

A reproductive health index is computed using indicators like proportion of women had any pregnancy complications, delivery complications, post-delivery complications, complications related menstruation and had any symptoms of RTI/STIs. The reproductive heath complications were least reported in districts like Sidhi, Panna, Gwalior and Satna (Table 4). Whereas it was higher in districts Guna, Vidisha, Dewas and Dindori. Overall, reproductive health index (RHI), districts from northern and eastern region has better status.

Table 4 : Five best and worst performing districts according to index of reproductive health (RHI)

Rank	Districts	Pregnancy compl.	Delivery compl.	Post-delivery compl.	Menstruation Related compl.	Any symptom RTI/STIs	RHI
1	Sidhi	25.6	5.3	20.5	4.0	16.9	94.1
2	Panna	21.7	16.1	20.0	14.2	30.6	79.9
3	Gwalior	25.3	16.5	14.5	18.7	25.4	78.7
4	Satna	28.0	14.1	24.5	11.4	29.5	78.0
5	Sagar	19.0	12.0	16.0	18.4	42.5	75.6
41	Guna	49.3	64.4	51.0	21.4	53.4	27.3
42	Dindori	48.0	21.0	50.2	37.4	45.7	27.2
43	Vidisha	45.4	63.7	57.0	21.5	61.0	23.6
44	Dewas	45.9	65.1	44.8	30.6	58.3	21.7
45	Dindori	0.0	5.0	10.0	0.0	0.0	2.3

Child health scenario

Child health is another important component of RCH programme. To study child health status it is important to look into prevalence of some of the diseases prone to children. In DLHS survey information is only available for the prevalence of diarrhoea and Pneumonia during two weeks before the survey. A composite index is computed with indicators like proportion of children who had Diarrhea and proportion of children having Pneumonia. Table 5 shows the inter-district variations in the child health within Madhya Pradesh.

Districts like Sidhi, Gwalior, Shivpuri, Chhatarpur and Satna have better child health, while it is worse in districts like Sehore, Narsimhapur, Dindori, Chhindwara and Seoni.

Table 5 : Five best and worst performing districts according to index of child health (CHI)

Rank	Districts	Diarrhoea	Pneumonia	CHI
1	Sidhi	0.6	9.9	98.4
2	Gwalior	5.9	13.7	86.0
3	Shivpuri	11.3	10.0	82.8
4	Chhatarpur	11.9	12.8	78.4
5	Satna	13.1	12.7	76.8
41	Sehore	31.1	31.3	27.2
42	Narsimhapur	26.8	36.5	27.1
43	Dindori	30.6	36.3	21.7
44	Chhindwara	26.8	42.2	19.9
45	Seoni	29.6	48.9	7.4

Utilization of RCH services

The health status of inhabitants of a region depends on the availability and utilization of health services. However, some study argued that mere existence of health services is not enough for better utilization of health services, physical proximity of health facilities also play important role in utilization of these services (Stock, 1983; Paul, 1991; Chakraborty et al. 2003). The utilization of health services is a complex behaviour phenomenon related to availability, accessibility, affordability and quality of health services (Abbas et al, 1986; Becker et al, 1992; Bloom, Wypii and Das Gupta, 2001; Stephenson and Tusi, 2002).

To study the pattern of health services utilization, especially RCH services, in districts of Madhya Pradesh a composite index is computed. Which includes the information on indicators like proportion of women using contraceptives (modern methods), received full ANC (3 ANC visits, 1 TT, 100 + IFA Tablets), proportion of safe delivery (Institutional/ attended by skilled person), proportion of fully immunized children, proportion of women sought treatment for pregnancy complications, pot-delivery complications, for abnormal vaginal discharge, and proportion of children received treatment for Diarrhoea and for Pneumonia.

The ranking of districts according to index of utilization of RCH services reveals that districts like Indore, Bhopal, Seoni, Jabalpur and Hoshangabad are performing better (Table 6). While Chhatarpur, Dindori, Datia, Shivpuri and Sidhi are some poorly performing districts. Most of districts adjoining to Bundalkhand region of Uttar Pradesh state have poor utilization of RCH services. Tribal dominated districts (Jhabhua, Dindori, Sidhi, Shahdol) also have comparatively poor utilization of RCH services.

Table 6: Five best and worst performing districts according to index of utilization of RCH services (URCHI)

Rank	Districts	Contraceptive use	Full ANC	Safe Del.	Full immu	Sought treatments for complications					URCHI
						Pregnancy	Post-Delivery	Abnormal vaginal Discharge	Diarrhoea	Pneumonia	
1	Indore	65.9	14.6	76.0	49.6	56.5	40.3	44.8	75.3	76.3	83.3
2	Bhopal	59.0	19.7	53.3	37.2	68.4	45.7	51.8	61.7	85.8	80.9
3	Seoni	55.6	18.4	36.8	62.0	54.9	45.3	39.1	68.3	66.4	72.6
4	Jabalpur	55.5	13.2	44.9	50.2	53.0	45.7	34.6	57.1	68.3	66.0
5	Hoshangabad	54.9	9.0	38.8	66.5	60.7	46.4	28.1	60.9	59.9	64.8
41	Chhatarpur	32.0	0.5	24.4	34.3	23.7	27.9	24.6	51.4	65.9	32.2
42	Dindori	46.8	3.2	24.2	38.6	30.7	30.6	17.6	42.3	32.9	31.6
43	Datia	45.7	7.3	40.5	27.1	24.2	27.4	16.7	32.3	40.2	31.3
44	Shivpuri	41.4	1.7	34.3	19.4	20.9	27.8	16.0	46.1	31.7	26.0
45	Sidhi	27.2	0.8	12.0	10.7	8.5	5.5	19.7	59.4	3.3	8.0

Utilization of Government health services

Both union and state Governments have created gigantic health infrastructure in terms of buildings and health personnel. Each district have a district hospital, a CHC centers on average per lakh population and a PHC for every 20,000- 30,000 population and for every 5,000 population a sub-centre is established.

Table 7 : Five best and worst performing districts according to index of utilization of Govt. health facilities (UGHI)

Rank	Districts	Utilization of Govt. of Health facility for					UGHI
		ANC	Delivery	Preg. comp	Post. deivery comp	Vaginal Discharge	
1	Bhopal	49.2	35.9	63.1	41.9	47.2	85.6
2	Panna	31.4	24.8	59.2	57.2	36.1	69.0
3	Guna	24.0	24.0	53.2	45.3	55.1	65.2
4	Datia	30.5	22.6	49.6	59.2	29.7	61.5
5	Mandsaur	52.5	21.5	37.3	29.3	36.4	57.4
41	Tikamgarh	23.3	13.2	29.2	26.3	18.7	24.6
42	Narsimhapur	18.1	18.7	20.3	33.7	15.8	24.3
43	Jabalpur	28.9	17.0	15.2	21.5	20.8	23.6
44	Satna	17.5	14.4	18.1	26.3	28.7	22.4
45	Sidhi	13.6	3.8	36.7	27.5	32.3	22.2

Thus it is also important to study the utilization pattern of Government health facilities. A composite index incorporating information on indicators like proportion of women received ANC services from Government health services, deliveries conducted at Government institutes and proportion of women sought treatment for pregnancy, post-delivery and RTI/STI (abnormal vaginal discharge) from public health institute.

Table 7 shows that utilization of Government health facilities is highest in Bhopal districts followed by Panna, Guna, Datia and Mandsaur districts. On the other hand, it is worse in Tikamgarh, Narsimhapur, Jabalpur, Satna and Sidhi districts. Some districts of Central region like Sagar, Vidisha, and Damoh also have comparatively poor utilization of Government health facilities.

Quality of care

The provision of quality health care service, health infrastructure, health personnel are considered to be essential elements for improving health of mother and child (Gulati & Sharma, 2004). Good quality of health services may enhance the demand of various health services (Verma et al, 1994). Though, Government have establish huge health infrastructure but these are not optimally utilized by people. Instead, people prefer to go to private health care, if they can afford it or they go to practitioner of indigenous methods, who are not qualified such as traditional birth attendant (TBA), local traditional healers who live and work with them.

To evaluate the quality of RCH services at district level, a composite index is computed with using information on indicators like proportion of ANC received at home, proportion of women received full ANC (3 ANC visits, 1 TT and 100+ IFA tablets), and women who received post-delivery visit from health worker (ANM/LHV/other health personnel). Table 8 shows that according to index the quality of care (QCI), the quality of health services are best in Shivpuri district followed by districts Morena, Indore, Barwani and Neemuch. On the other hand, it is worse in Shahdol, Rewa, Dindori, Satna and Sidhi districts. It is also important to notice that most of districts from eastern region not only have poor utilization of RCH services but the quality of services is also worse in most of these districts.

Table 8 : Five best and worst performing districts according to index of quality of care (QCI)

Rank	Districts	ANC at home	Full ANC	Safe delivery	Visited by health worker	QCI
1	Shivpuri	42.0	1.7	34.3	15.7	56.7
2	Morena	38.3	4.1	45.6	10.2	54.7
3	Indore	4.5	14.6	76.0	3.6	53.7
4	Barwani	20.1	9.6	30.9	14.9	50.7
5	Neemuch	13.9	12.2	46.7	7.9	47.6
41	Shahdol	10.1	8.6	22.6	1.5	18.4
42	Rewa	10.7	4.5	27.6	1.6	16.7
43	Dindori	7.2	3.2	24.2	4.1	15.4
44	Satna	6.8	1.0	28.8	1.5	10.7
45	Sidhi	10.6	0.8	12.0	1.4	3.9

Association of reproductive and child health indices with other indices

Above analysis reveals that most of the districts from eastern region and tribal dominated districts like Jhabua, Chhindwara, Mandala, Dindori and Sidhi of states not only have lower socio-economical development, utilization of health services, but quality of available health services is also poor in these districts. Zero order correlations are also carried out to test these relationships. Table 9 shows that districts those have better socio-economic development also have better reproductive and child health and higher utilization of health facilities. Both reproductive and child health indexes show high positive and significant association with the utilization of RCH services, Government health facilities and quality of health services.

Table 9 : Zero-order correlation matrix

Indicators	SDI	HII	RHI	CHI	URCHI	UGHI	QCI
SDI	1						
HII	-0.044	1					
RHI	0.293	0.04	1				
CHI	0.295*	0.046	0.992**	1			
URCHI	0.255	0.021	0.974**	0.974**	1		
UGHI	0.318*	0.038	0.971**	0.977**	0.964**	1	
QCI	0.289	0.008	0.987**	0.993**	0.983**	0.972**	1

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed)

Table 10 : Partial correlation

Correlation between	Coef. (sign.)	Controlling for variables
Reproductive Health		
RHI & URCHI	0.973**	Urbanization, % Muslim, % SC, % ST, Female Literacy, % Male in non-agriculture sector, % births of order 3+
RHI & UGHI	0.976**	Urbanization, % Muslim, % SC, % ST, Female Literacy, % Male in non-agriculture sector, % births of order 3+
RHI & QCI	0.987**	Urbanization, % Muslim, % SC, % ST, Female Literacy, % Male in non-agriculture sector, % births of order 3+
RHI & URCHI	0.973**	SDI, HII
RHI & UGHI	0.969**	SDI, HII
RHI & QCI	0.986**	SDI, HII
Child Health		
CHI & URCHI	0.975**	Urbanization, % Muslim, % SC, % ST, Female Literacy, % Male in non-agriculture sector, % births of order 3+
CHI & UGHI	0.979**	Urbanization, % Muslim, % SC, % ST, Female Literacy, % Male in non-agriculture sector, % births of order 3+
CHI & QCI	0.994**	Urbanization, % Muslim, % SC, % ST, Female Literacy, % Male in non-agriculture sector, % births of order 3+
CHI & URCHI	0.973**	SDI, HII
CHI & UGHI	0.975**	SDI, HII
CHI & QCI	0.993**	SDI, HII

** Correlation is significant at the 0.01 level (2-tailed).

These associations remain highly significant even after controlling the effect of different social variables like, percent of SC, ST population, female literacy, Muslim population and proportion of birth of 3rd or higher order (Table 10). The significant and highly positive association between reproductive health index and child health index reveals that better reproductive health will also improve child health. This will also reduce the burden of child mortality.

Conclusion

World wide efforts are being made to provide complete health care, especially to women through the presence of trained birth attendants, provision of emergency obstetric care, helping women to avoid unwanted pregnancy, preventing sexually transmitted infections and addressing other factors contributing to poor health. Both union and state governments in India have taken enormous necessary measures to curb down the higher maternal and child mortalities. In addition to national programmes, Government of Madhya Pradesh also implemented various programme like Prathmik Swasthy Sewa Kosh, Swath Jeevan Sewa Guarantee Yojana, Jannini Surkksha Yojana etc. But the maternal and child health status in the state is far below than the national average. There are also gigantic differences among the districts of Madhya Pradesh in respect to social development, reproductive and child health and utilization and quality of services. Different indices show different results but by and large districts like Bhopal, Jabalpur, Gwalior, Indore are better off, while districts Dindori, Sidhi, Jhabua, Satna, Sehore are comparatively worst off. Tribal dominated districts not only have poor social-economical development but also have poor health infrastructure. Some social and economically developed districts like Ratlam, Ujjan, Indore, Vidisha and Sehore also have worse reproductive health status.

Overall, reproductive health and child health is highly and positively association with utilization of RCH services, utilization of Govt. health services and quality of services. It clearly demonstrates that districts that have higher utilization of RCH services, better quality of services also have better reproductive and child health. Thus an improvement in utilization of reproductive and maternal health services will not only reduce the reproductive morbidities, but it will also trim down the child mortality. State Government should focus more on worst performing districts and try to improve the availability and quality of health services. This will help government in reducing the reproductive and maternal morbidities and facilitate reduction in stagnated high infant and child mortalities in the state.

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Appendix 1: Values and ranking of different indices for districts of Madhya Pradesh

District name	SDI		HIFR		RH		CH		URCHS		UGHS		QHS	
	Index	Rank	index	Rank	Index	Rank	Index	Rank	Index	Rank	Index	Rank	Index	Rank
Balaghat	63.7	5	34.1	22	63.5	14	54.9	24	59.8	8	34.7	33	36.2	18
Barwani	27.0	38	33.7	23	45.6	29	61.9	16	60.0	7	55.9	8	50.7	4
Betul	57.6	8	35.2	21	67.7	12	75.7	6	36.4	36	51.6	14	30.3	28
Bhind	36.6	29	31.9	26	62.5	15	69.1	11	43.2	27	43.1	24	45.4	7
Bhopal	92.4	1	13.7	39	57.0	20	52.2	28	80.9	2	85.6	1	46.6	6
Chhatarpur	27.4	36	32.3	25	61.9	16	78.4	4	32.2	41	52.4	11	21.0	38
Chhindwara	59.2	7	30.6	29	60.6	17	19.9	44	54.1	14	44.8	20	24.6	35
Damoh	37.8	26	49.6	10	73.9	7	59.0	19	41.0	29	33.6	34	32.1	26
Datia	43.8	19	19.7	35	69.2	11	65.7	13	31.3	43	61.5	4	37.1	15
Dewas	26.2	39	69.7	2	21.7	44	46.1	33	51.4	16	54.3	10	34.8	20
Dhar	27.1	37	50.0	9	43.2	33	35.8	39	45.7	23	49.3	16	40.8	12
Dindori	19.9	41	2.3	45	27.2	42	21.7	43	31.6	42	54.8	9	15.4	43
East Nimar	48.0	12	14.4	38	45.3	30	54.9	25	50.1	19	26.5	39	36.4	17
Guna	27.5	35	33.7	24	27.3	41	37.6	38	37.8	34	65.2	3	29.7	29
Gwalior	73.9	4	64.7	3	78.7	3	86.0	2	51.4	15	48.3	17	35.7	19
Harda	47.3	14	29.6	30	56.1	21	55.5	21	55.4	11	36.1	32	20.3	40
Hoshangabad	60.4	6	39.4	15	50.9	23	63.1	15	64.8	5	31.1	37	26.2	33
Indore	78.4	3	43.5	12	31.5	40	53.6	26	83.3	1	47.7	18	53.7	3
Jabalpur	78.8	2	39.5	14	66.2	13	70.5	10	66.0	4	23.6	43	36.4	16
Jhabua	18.9	42	50.8	8	40.7	36	52.3	27	36.0	38	39.7	29	27.3	32
Katni	47.1	16	11.3	41	72.2	10	60.0	18	42.5	28	31.5	36	20.9	39
Mandla	44.1	18	19.6	36	49.6	25	51.6	29	43.6	25	56.6	7	25.3	34
Mandsaur	43.6	20	51.3	7	50.5	24	73.9	7	62.9	6	57.4	5	43.0	8
Morena	33.9	31	31.3	28	72.4	9	38.3	37	54.9	13	44.2	23	54.7	2
Narsimhapur	54.8	9	24.6	33	57.3	19	27.1	42	50.5	18	24.3	42	22.8	37
Neemuch	36.7	28	57.5	5	46.1	28	72.6	8	59.6	9	38.1	31	47.6	5
Panna	38.2	24	14.9	37	79.9	2	64.6	14	34.5	40	69.0	2	28.9	31
Raisen	54.0	10	43.3	13	48.3	26	55.5	22	39.6	32	42.8	25	33.4	22
Rajgarh	24.6	40	36.3	17	41.5	35	68.8	12	45.3	24	50.0	15	40.9	11
Ratlam	47.3	15	45.3	11	37.8	38	58.7	20	47.2	22	42.7	26	32.6	23
Rewa	40.1	23	7.1	43	44.8	31	49.9	30	38.2	33	51.9	13	16.7	42
Sagar	50.5	11	31.6	27	75.6	5	72.3	9	40.6	30	30.6	38	31.9	27
Satna	41.7	21	28.8	31	78.0	4	76.8	5	35.0	39	22.4	44	10.7	44
Sehore	31.5	33	63.1	4	8.3	45	27.2	41	48.1	21	57.0	6	29.7	30
Seoni	47.7	13	36.8	16	52.8	22	7.4	45	72.6	3	41.7	27	41.4	10
Shahdol	37.2	27	9.9	42	44.3	32	61.7	17	37.7	35	44.8	21	18.4	41
Shajapur	37.9	25	21.2	34	47.5	27	47.1	32	59.6	10	44.3	22	42.2	9
Sheopur	17.1	44	70.3	1	74.0	6	44.3	34	49.5	20	45.9	19	38.8	14
Shivpuri	29.7	34	35.9	20	59.1	18	82.8	3	26.0	44	39.5	30	56.7	1
Sidhi	14.3	45	6.2	44	94.1	1	98.4	1	8.0	45	22.2	45	3.9	45
Tikamgarh	17.9	43	36.0	19	72.8	8	47.9	31	36.4	37	24.6	41	32.6	24
Ujjain	46.7	17	36.2	18	38.1	37	39.7	35	55.2	12	40.1	28	33.8	21
Umaria	36.1	30	12.2	40	42.3	34	39.1	36	43.5	26	52.2	12	39.5	13
Vidisha	33.0	32	52.9	6	23.6	43	31.4	40	40.4	31	25.3	40	23.6	36
West Nimar	41.6	22	27.3	32	35.2	39	55.3	23	50.8	17	33.4	35	32.1	25