

ESTIMATION OF INFANT AND CHILD MORTALITY RATES AND IDENTIFICATION OF ITS DETERMINANTS: A DISTRICT LEVEL STUDY

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INTRODUCTION

The World Health Organisation estimates that five million children under one month of age die each year, and nearly all (98 per cent) of these deaths occur in the developing countries (1996)¹ The causes of neonatal deaths are difficult to ascertain, as untrained midwives deliver most babies in the developing countries at home. Many cases of the neonatal infection never reach treatment facilities. A proper understanding of how various socio-economic and demographic factors affect infant and child mortality helps policy makers to formulate family health programmes towards improving child survival. Among all children born in India during the last 12 years, 88 out of 1000 died before the first birthday and 121 out of 1000 died before reaching age of five. Although still high, mortality levels

declined over the period between 1981 and 1990 by 24 per cent² Variation in the socio-economic, demographic factors and availability of health care facilities are responsible for differential rates of mortality among various States of India^{3,4} Further, within states, these rates vary between different districts and between rural and urban areas. It is essential to assess and monitor their levels in different parts of the state and to identify high-risk problem areas and high-risk population groups within areas so that health services may be directed to where they are most needed. Assessment of the level of mortality helps in

- a) understanding the causes of neonatal, post-neonatal, infant and child mortality,
- b) evaluating the impact of various programmes being implemented to reduce these mortality rates, and

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- c) identifying the risk factors and formulate programmes for reduction of these mortality rates.

The Sample Registration System (SRS) is the primary source of data on infant mortality. SRS provides National and State level estimates of neonatal, post-neonatal and overall infant and child mortality by rural or urban sectors. State level estimates conceal large variation among districts within a state. The district level estimates of infant and child mortality rates as well as the factors affecting these mortalities can be obtained from sample surveys. This may help in improving and understanding the determinants of mortality and the regional variations in the rates and in assessing the relative importance of socio-economic developmental programmes and required health services. In view of this, a district level sample survey in rural areas of North 24 Parganas, West Bengal was conducted to determine the factors that go together to cause prevailing and anticipated high rates of infant and child mortality in some rural areas of West Bengal. The main objectives of the study are: i) to estimate the neonatal, infant and child mortality rates by household survey based on the occurrences of such deaths found in the sample in rural sector of the North 24 Parganas, West Bengal, (ii) to learn the causes of infant mortality and its associated socio-economic and other influencing factors and (iii) to investigate the regional variations in mortality in relation to health facilities available in villages and blocks.

The district profile

North 24 Parganas district, with an area of 4,094 square kilometers and a population of 7.281 million (Census, 1991)⁶ is located towards South of West Bengal. The climate is hot and humid except in winter. The average rainfall in 1994 was 1352 mm. The district has 33 police stations, 22 blocks, 22 Panchayat Samitis, 214 Gram Panchayats,

1611 Mouzas, 1613 villages and 26 Municipalities.⁷ The estimated number of households in the district is 1.364 million. Barasat is the district headquarter. There are four sub-divisions: Barasat, Bashirhat, Bongaon and Barrackpore. Barrackpore is the largest subdivision having a population of 30.3 lakhs followed by Bashirhat (17.6 lakhs), Barasat (16.3 lakhs) and Bongaon (8.6 lakhs). The dominant population of the district is Hindu, with 21.5 per cent being scheduled caste and three per cent scheduled tribe. A substantial percentage of population are Muslim. The principal language is Bengali. The district represents about 10.7 per cent of the state population (Table 1). The density of population is 1779 per sq. km. The percentage of urban population is 52. Sex ratio is 907 (907 females out of 1000 males). The literacy rate is 67 per cent (male 74.7 per cent and female 58.0 per cent). Birth rate per 1000 population is 26 while death rate is 9.3 (rural 11.2 and urban 6.8).

TABLE 1
Country, State and District:
A demographic comparison

Sociodemographic indicator	North 24 Parganas
Total population (in million)	7.3
Decennial population growth rate (1981-91)	31.7
Density of population (per sq km)	1779
Per cent of urban population	51.2
Sex ratio (females per 1000 males)	907
Literacy rate (%)	66.8
Male literacy	74.7
Female literacy	58
Birth rate/1000 population (1993)	25.6
Rural birth rate/1000 population (1993)	28.6
Urban birth rate/1000 population (1993)	17.7
Death rate/1000 population (1993)	9.3
Rural Death rate/1000 population (1993)	11.2
Urban Death rate/1000 population (1993)	6.8
Infant mortality rate/1000 live births (1993)	64
Per cent of SC population	21.5
Per cent of ST population	2.3

*Source: Statistical handbook, West Bengal, 1994.⁸

The district has one district hospital, three sub-divisional hospitals and five rural hospitals for the four sub-divisions, 22 Block Primary Health Centres (BPHCs), 49 Primary Health Centres (PHCs) and 678 sub-centre. There is one PHC for every 30,000 population and a sub-centre, for a population of 5,000. Other health facilities for rural and urban sectors of the district include 15 CMDA clinics, 9 postpartum units CUDP III, 13 ICDS (Integrated Child Development Scheme) centers (urban 5, rural 8) and two UFWCs (Urban Family Welfare Centre).

Sampling scheme and estimation procedures

Rural sector of the North 24 Paraganas district consists of 22 BPHCs (one Block Primary Health Centre in each block). In each block there are PHCs (Primary Health Centres) other than the BPHC. There are altogether 49 PHCs in the district.

The Blocks were divided into two groups. The blocks that are easily accessible from Barasat town or Calcutta city are named as "Easily Accessible Areas" (A) and rest of the blocks are named as "Not So Easily Accessible Areas" or "Difficult to

Access Areas" (D). The numbers of BPHCs belonging to easily and not-so-easily accessible areas are 8 and 14, respectively. The corresponding number of PHCs (other than BPHCs) are 16 and 33, respectively.

From the list of 16 PHCs in area 'A' and 33 in area 'D', simple random sample without replacement was used to select two independent sets, each constituting a half sample* of three PHCs from each area. The BPHCs corresponding to the selected PHCs were also selected. The number of BPHCs selected were three for each group for each half sample. The total number of BPHCs and PHCs thus selected were 12 each (Tables 2 and 3). Since independent half samples were taken, one BPHC and one PHC were common to both the half samples. However, sub-centres were selected separately and independently for each half sample from these two common BPHCs and PHCs. From the list of sub-centres for each selected PHC and BPHC the sub-centre, located either in the PHC/BPHC was selected, and one or two sub-centre from the others (one sub-centre if the number of sub-centres (other than the PHC/BPHC sub-centre) was less than seven, otherwise two (Table 4). Thus, 12

TABLE 2
Number of sampled BPHCs and PHCs

Sub-division	BPHCs		PHCs	
	Total	Sample	Total	Sample
Barasat	7	4	15	4
Basirhat	10	5	22	5
Bongaon	3	3	10	3
Barackpore	2	0	2	0
Total	22	12	49	12

* Independent half samples may be used to estimate the variance of the population estimates. This was done because the direct estimate of the variance is difficult in this type of complex sampling scheme. Estimates of variances are not presented in this paper.

TABLE 3
Sampled BPHCs and PHCs and associated multipliers

BPHC-Village	Multiplier	SD	PHC-village	Multiplier	Block
Half Sample 1					
A1 Rekjoani	20/7	Barasat	Chandpur	16/3	Rajarhat
Maslandapur	20/7	Barasat	Gobardanga	16/3	Habra-1
Shibhati	16/3	Basirhat	Nakhodaha	16/3	Basirhat-1
D1 Dhanyakuria	176/31	Basirhat	Shikra-Kulingram	11/1	Basirhat-2
Goshpur	176/31	Basirhat	Nazat	11/1	Sandesh-Khali-1
Sagarpara R H	1364/349	Bongaon	Sindrani	11/1	Bagdah
Half Sample 2					
A2 Madhyamgram R H	20/7	Barasat	Mitpukuria	16/3	Barasat-2
Biswanathpur	20/7	Barasat	Roypurchakla	16/3	Deganga
Rudrapur R H	16/3	Barasat	Rajitpurbelgho	16/3	Baduna
D2 Khulna R H	176/31	Basirhat	Jaliakhali	11/1	Sandesh Khali
Chandpara	2728/901	Bongaon	Dharampur	11/1	Gaighata
Sagarpara R	1364/349	Bongaon	Sindrani	11/1	Bagdah

A=Easily accessible, D=Not-so-easily accessible

TABLE 4
BPHC (PHC), sub-centres and non-BPHC (PHC) sub-centres selected under each stratum

Stratum	BPHC	Subcentre	PHC	Subcentre
A	(Half sample 1)			
1a	Rajarhat	1 Rekjoani 2 Kofaberra	1b Chandpur	1 Chandpur 2 Bolgufi
2a	Habra-1 (Maslandpur)	1 Baugachi 2 Kumra	2b Gobardanga	1 Maslandpur 2 Sadpur
3a	Basirhat-1 (Shibati)	1 Gachha 2 Shibati	3b Nakhudaha	1 Nakhudaha
A	(Half sample 2)			
1a	Barasat-II (Madhyamgram)	1 Madhyamgram 2 Sahara	1b Mitpukuria	1 Mitpukuria 2 Galasia
2a	Deganga	1 Biswanathpur 2 Gobardhanpur	2b Chakla	1 Chakla 2 Walipur
3a	Baduna	1 Rudrapur 2 Jangalpur 3 Iswanigachha	3b Bajitpur	1 Bajitpur 2 Gandarbapu
D	(Half sample 1)			
1a	Basirhat-II (Dhanyakuria)	1 Dhanyakuria 2 Kankra	1b Sikrakulngir	1 Kulingram
2a	Sandeshkhali-I (Goshpur)	1 Goshpur 2 Kalinagar-B 3 Bosmani-B	2b Nazat	1 Nazat 2 Kanmani-A
3a	Bagdah (Sagarpara RH)	1 Bagdah 2 Mashyarpur	3b Sindrani	1 Sindrani 2 Pathuria
D	(Half sample 2)			
1a	Sandeshkhali-II (Khulna)	1 Khulna 2 Dholkhali	1b Jeliakhali	1 Jeliakhali 2 Goberia
2a	Gaighata (Chandpara)	1 Chandpara 2 Chikanpara	2b Dharampur	1 Dharampur 2 Gopalpur
3b	Bagdah (Sagarpara RH)	1 Bagdah 2 Mashyarpur	3b Sindrani	1 Sindrani 2 Naldingri

sub-centres situated within BPHC, 12 sub-centres situated within PHC and 25 sub-centres neither within BPHCs nor within PHCs were finally selected

In the next stage, from each of the 49 selected sub-centres the village in which the sub-centre was situated and one or more villages from the rest of the villages under the sub centre was selected. If the number from the rest of the villages was less than six, one or 2 were selected. Thus, overall, selected 101 villages, which belong to 49 sub centers, 25 PHCs, 12 BPHCs, and 4 half samples (A1, A2, D1 and D2) and 2 strata (A and D) were selected

From each selected village a list of 300 (approximately) households was the sample size. If the total number of households in the village was more than 600, every alternate household from a random starting point was taken. If the total number of households was less than 600 but more than 300, then each household from a random start and stopped as soon as it reached 300. If the number of households was less than 300, then all were included. From the list of households for each village 20 per cent households were taken as the final sample. Thus, in all, 4,661 households were selected from a total of 101 villages in the district. The selected units of the study at different levels is shown in Table 5

Estimation

Suppose π_i is the probability for i th unit being included in the sample. The estimate

of the population total for the study variable Y_i say can be obtained by the formula

$$\hat{Y} = \sum_{i=1}^n \frac{y_i}{\pi_i}$$

where y_i 's are the values of the variable included in the sample and π_i 's are the corresponding inclusion probabilities and n is the sample size. If one defines

$$m_i = \frac{1}{\pi_i}$$

then m_i may be called the multiplier for the i th unit. Thus, the formula for Y becomes

$$\hat{Y} = \sum_{i=1}^n y_i m_i$$

In this sampling procedures there are two independent half samples. Thus, two independent estimates for each study variable, say \hat{Y}_1 and \hat{Y}_2 using the above formula is obtained. The combined estimate is then

$$\hat{Y} = \frac{\hat{Y}_1 + \hat{Y}_2}{2}$$

Example

Since half samples have been taken, there will be two estimates for each parameter. The population was divided into two strata, namely "easily accessible areas" denoted by "A" and "not so easily accessible areas" or "difficult to access areas" denoted by "D". Thus there are the following four cases in the first stage: 1A, 1D, 2A and 2D. Suppose 1A (i.e. half sample 1 from the

TABLE 5

BPHCs, PHCs, sub-centres, villages and household select in accessible and difficult to access blocks

Type of unit of selection	Half A1	sample I D1	Half A2	sample II D2	Total
BPHC	3	3	3	3	12
PHC	3	3	3	3	12
Subcentres	13	11	13	12	49
Villages	23	29	26	23	101
Households	910	1227	1366	1188	4661

easily accessible areas) is taken, the following are then the sampled BPHCs and

PHCs along with their multipliers in this case:

BPHC	Multiplier	Y value	PHC	Multiplier	Y Value
REKJOANI	20/7	$\hat{Y}_1^{(1A)}$	Chandpur	16/3	$\hat{Y}_4^{(1A)}$
MASLANDAPUR	20/7	$\hat{Y}_2^{(1A)}$	Gobardanga	16/3	$\hat{Y}_5^{(1A)}$
SHIBATI	16/7	$\hat{Y}_3^{(1A)}$	Nakhoadaha	16/3	$\hat{Y}_6^{(1A)}$

Thus,

$$\hat{Y}_1 = \left(\frac{20}{7}\right) \hat{Y}_1^{(1A)} + \left(\frac{20}{7}\right) \hat{Y}_2^{(1A)} + \left(\frac{16}{7}\right) \hat{Y}_3^{(1A)} + \left(\frac{16}{3}\right) \hat{Y}_4^{(1A)} + \left(\frac{16}{3}\right) \hat{Y}_5^{(1A)} + \left(\frac{16}{3}\right) \hat{Y}_6^{(1A)}$$

To estimate $\hat{Y}_1^{(1A)}$, suppose $r = 3$, the sub-centres and multipliers are as follows:

Sub-center	Multiplier	Y value
GACHHA	m_1	\hat{Y}_1
SHIBATI	m_2	\hat{Y}_2

The estimate is:

$$\hat{Y}_1^{(1A)} = m_1 \hat{Y}_1 + m_2 \hat{Y}_2$$

The same procedure is followed for village and household level data. In other words, all the selected households in these three BPHCs and three PHCs, get combined multipliers by taking the product of multipliers at each stage and add the Y-values after multiplying with this combined multiplier.

In this study the data on village profile, household and child characteristics related to immunisation, morbidity and mortality rates were considered: (i) according to strata (Accessible (A) and Difficult to access (D)) and (ii) according to four types of villages: BPHC, PHC, sub centre and other villages. The classification is based on the assumption that health status of a particular village may depend on the type of health facilities available to the villagers. The district level estimates were obtained for each variable with specific multiplier

calculated for each village, as per the statistical sampling procedure.

Neonatal mortality, post neonatal mortality and infant mortality rates have been calculated using multipliers and also without using multipliers. Neonatal mortality rate is the number of deaths within one month per 1,000 live births. Post neonatal mortality rate is the number of non-neonatal deaths before the first birthday per 1000 live births. The infant and child mortality rates are defined similarly as number of deaths within one year and number of deaths within 1-5 years per 1000 live births. Infant mortality rates (IMRs) have been considered according to some of the socio-economic attributes like education of the mother, religion, exposure to media, occupation of the husband, monthly per capita income groups, so as to investigate the associated factors of mortality in North 24 Parganas, West Bengal.

RESULTS

A majority (74%) of the households in "difficult to access" areas and between 63-71 per cent in PHC, sub-centre and other village areas have temporary type of houses; 61-74% are one-bedroom houses. The vast majority (92%) of the BPHC villages have permanent type of houses and

with one or two bedrooms. In the district, 54 per cent households have flush and pit type of toilet facilities, whereas 39 per cent households do not have toilet facility. While 17 per cent households in the BPHC villages have either flush or pit type of toilet facilities, at the sub-centre and other village levels 32 per cent and 43 per cent, respectively, households do not have toilet facility. Only 20 per cent households in the district have electricity. The monthly per capita income ranges from Rs 200 - Rs 800, in the district, the average per capita income was Rs 353 (\$7.8).

Immunisation

Table 6 indicates that 68 per cent of the children had received BCG, 56 per cent polio, 56 per cent DPT and 47 per cent measles vaccinations. A relatively higher percentage of children in accessible (A) areas received BCG, polio, DPT and measles vaccination than in difficult-to-access areas. Of the four types of villages, BPHC and PHC show higher percentage of children vaccinated with BCG, polio, DPT and measles vaccination than in sub-centre

and other village levels. Muslim children received fewer, BCG, polio and DPT vaccination, while for measles the percentage of Muslim children was higher than the Hindu children.

Childhood illness, mortality and contributing factors

Acute respiratory infection (ARI) and diarrhoea are two common illnesses among children. The ARI in general is recognized by symptoms of illness with coughing or without coughing accompanied by short, rapid breathing. In general children who suffer from pneumonia show symptoms of heavy cough and short, rapid breathing. In the present study, cough without ARI was found to be more frequent in accessible areas while cough with ARI was frequent in difficult to access areas. In the entire district about 20 per cent children suffer from cough without ARI was 14 per cent cough. More children in difficult-to-access areas (36 per cent) had diarrhoea than in accessible areas. About 28 per cent children in the district have diarrhoea, and about 14 per cent of children in D stratum (difficult

TABLE 6
Immunisation status

Character	BCG		Polio (dose)				DPT (dose)				Measles
	0	1	2	3	0	1	2	3			
Stratum											
Accessible	70.9	25.4	4.4	7.2	63.0	26.0	4.7	7.6	61.7	51.3	
Difficult to access	60.0	40.5	2.2	10.2	47.1	40.8	2.2	10.6	46.4	35.8	
Total	67.7	31.0	3.5	9.2	56.4	31.4	3.6	9.5	55.5	46.8	
Type of village											
BPHC	70.8	21.8	2.5	1.9	73.8	26.7	2.5	1.87	68.9	51.8	
PHC	79.9	18.1	4.1	1.5	76.4	22.3	4.1	3.6	70.0	55.0	
Sub centre	69.4	28.5	6.0	4.1	61.4	30.4	6.8	4.4	58.5	50.6	
Other village	64.4	35.9	2.0	13.0	49.1	37.5	2.0	14.0	46.5	42.2	
Religion											
Hindu	73.0	28.5	2.5	11.6	57.4	29.1	2.5	12.1	56.4	42.9	
Muslim	59.2	37.0	4.4	7.8	50.8	37.0	4.7	7.6	50.8	49.3	

to access areas) have tetanus, while no child had tetanus in accessible areas (Table 7).

TABLE 7

Children 12 to 23 months of age with illness in accessible and difficult to access areas

Illness	Accessible	Difficult to access	Total
Tetanus	0.0	1.4	0.4
Cough with ARI	5.5	27.5	13.6
Cough without ARI	22.8	13.1	19.9
Diarrhoea	24.0	36.0	28.1
Fever	12.8	4.4	9.2
Others	35.0	17.6	28.9
Total	100.0	100.0	100.0

Table 8 presents percentage distribution of children according to types of illness and percentage of deaths during the last one year preceding the survey. The estimates were based on children who were 12 to 23 months of age. Although antenatal care programmes are popular in the district, the results show very low occurrence of tetanus (0.4 per cent). One of the common childhood illnesses is considered to be fever. However, in this study there were only about nine per cent of the children suffering from it during the period. Acute respiratory infection (ARI) with cough is a major disease that affects the children. The results show that 14 per cent were affected by ARI. Though cough without ARI is not that severe, it is a common illness. About 20 per cent of the children suffer from cough. Overall, about 71 per cent of the children suffer from the five diseases. The four diseases contribute to 17 per cent of deaths while the total deaths due to all diseases among the children was 18 per cent. The major causes of deaths due to diseases are: tetanus which is 100 per cent fatal, cough with ARI and diarrhoea, both result to about equal fatal rate of about 35 per cent each and cough without ARI is about 11 per cent.

TABLE 8

Child deaths (12 to 23 months) and cause of death

Illness	Suffered during Last one year(S)	Death during last one year (D)	Per cent died (D/S x 100)
Tetanus	0.4	0.4	100.0
Cough with ARI	13.6	4.7	34.9
Cough without ARI	19.9	2.1	10.8
Fever	9.2	0.0	0.0
Diarrhoea	28.1	9.6	34.1
Others	28.9	0.6	2.1

Infant mortality rates

Information about survival status of all children born during the last five years preceding the survey was utilized to calculate neonatal mortality and infant mortality rates.

In the district, the neonatal mortality rate was found to be 39 per thousand live births per year. Of the two strata, difficult-to-access areas show higher neonatal mortality rate (60) than in easily accessible areas. Among the different types of villages 'other-villages' showed the highest neonatal mortality rate (42.5). Both PHC and sub-centre villages show about equal levels (29 and 25) of neonatal mortality (Table 9).

IMR of the district was found to be 64 per thousand live births. Of the two strata, difficult-to-access area shows higher IMR, which is greater than that in accessible areas (44). Among the four types of villages, 'sub centre' and 'other village' showed higher levels of IMR (77 and 60), which is four to five times higher than the rates obtained in 'BPHC' (14), and about two times higher than that in 'PHC villages' (35) (Table 9).

TABLE 9

Type of village by neonatal and infant mortality rates

	Neonatal mortality	Infant mortality
Stratum		
Accessible	27.1	43.9
Difficult to access	59.9	105.7
Total	38.7	66.3
Type of village		
BPTC / PHC	14.7	27.5
BPHC	0	14.1
PHC	29.2	34.7
Sub centre / other Village	38.4	77.0
Village		
Sub centre	25.0	75.6
Other village	42.5	60.1

Demographic, socio-economic and cultural milieu of the population has strong influence on infant mortality. In this study, a few influencing factors have been considered viz., religion, occupation, monthly per capita family income, education and age of the mother. Mothers below 20 years of age showed higher neonatal mortality as compared to older age group; Muslims (44) more than Hindus (38); women with lower level of education (39) than women with higher level of education (28), lower income group (below Rs. 600) (41) than the higher income group (36). Of the four occupations, professional and daily labourer categories show lower neonatal mortality rates (27 and 28) than cultivation (34), and it was highest in business category (Table 10).

High infant mortality rates were noted for younger mothers below 20 years of age (76) than mothers between 20-24 years of age (66), mother's less educated below secondary level (71) than those better educated (30), Muslims (70) more than Hindus (65), low per capita income (74) than high (38), business families (85), cultivators (63) and daily wage earners (73) than professionals (29) (Table 10).

TABLE 10

Sociodemographic characteristics of parents and neonatal and infant mortality

	Neonatal mortality	Infant mortality
Age (mother)		
15-19	45.4	75.6
20-24	41.3	65.8
35-39	0	69.5
Religion		
Hindu	37.9	65.5
Muslim	44.5	69.7
Per capita income (Rs)		
<600	40.7	74.4
>600	36.2	38.5
Occupation (father)		
Professional	26.8	29.3
Cultivation	33.8	62.9
Business	82.0	85.0
Daily labourer	27.9	73.0
Mother's education		
Below Class VIII	39.4	70.9
Class VIII and above	28.3	30.2
Father's education		
Below Class VIII	33.9	66.0
Class VIII and above	47.5	59.4

This analysis indicates the effectiveness of antenatal care on neonatal and infant mortality. The mortality rate among mothers who received tetanus toxoid injections was significantly lower than those mothers who had not received tetanus toxoid injections. It was similar, for those mothers who took iron and folic acid. Exposure to media, however, did not show a direct impact on the mortality rates.

TABLE 11

Neonatal and infant mortality rates - antenatal care and exposure to media

ANC Status / media exposure	Status mortality	Neonatal mortality	Infant mortality
Tetanus injection	Yes	33.4	50.6
	No	111.1	221.4
Iron and folic acid	Yes	33.6	55.8
	No	50.8	80.0
Exposure to media	Yes	40.7	52.3
	No	38.2	72.9

Children who were immunized with BCG, polio and DPT vaccinations showed a significantly high survival compared to those children who did not receive immunization (Table 12).

TABLE 12
Immunisation status and mortality rates

Immunisation	Status	Neonatal	Post neonatal	Infant	9 months - 23 months
BCG	Yes	0	3.1	3.1	
	No	100.9	80.0	159.5	
Polio	Yes		3.0		
	No		81.2		
DPT	Yes		3.1		
	No		80.0		
Measles	Yes				1.1
	No				7.3

*Among 1000 children born and survived up to 9 months

CONCLUSION

- The location, accessibility and type of health facility available in rural areas are important factors that can substantially reduce the infant and child mortality rates.
- Lack of education and health awareness related to common illness, cleanliness, dietary habits etc. are some of the associated factors of high infant and child mortality rates in the rural areas.

- Proper and regular immunisation and intake of iron and folic acid tablets reduce mortality rates substantially.

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