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Infant Mortality in India: Use of Maternal and Child Health Services in Relation to Literacy Status

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ABSTRACT

Slow reduction in infant mortality rate in the last couple of decades is a major concern in India. State-level aggregate data from the National Family Health Survey 1992 and micro-level data on rural mothers (n=317) were used for examining the influence of female literacy on reduction of infant mortality through increased use of maternal and child health (MCH) services. Illiteracy of females was strongly associated with all variables relating to maternal care and also with infant mortality rate. States were grouped into best, medium, and worst on the basis of female illiteracy (about 11%, 48.5%, and 75% respectively). Infant mortality rate (per 1,000 livebirths) was significantly ($p<0.01$) higher among the worst group (90.99) than that among the medium (64.2) and the best (24.0) groups. Use of maternal health services increased in the worst to become the best groups for tetanus toxoid (from 48.0% to 84.4%), iron and folic acid tablets (36.6% to 76.2 %), hospitalized deliveries (14.2% to 69.7%), and childcare services, such as vaccination (23.8% to 64.9%). Illiteracy of females had a more detrimental impact on rural than on urban areas. In the event of high female illiteracy, male literacy was beneficial for improving the use of services for reducing infant mortality rate. The micro-level study supported all major findings obtained for the national-level aggregate data. Programmes, like providing free education to girls, will yield long-term health benefits.

Key words: Infant mortality; Education; Maternal education; Educational status; Maternal-child health; Maternal health services; Child health services; India

INTRODUCTION

Although overall literacy has improved in the post-independence period in India, the rate of increase has not been sufficient to reduce the number of illiterates over time (1). This is more so in female literacy. One of the reasons for failure to achieve significant reduction in infant mortality rate, despite widespread network of maternal and child health (MCH) services, could be low levels of female literacy in India. Results of several micro- and macro-level studies point out strong influence of the low level of female education on child mortality in developing countries (2-5).

Perhaps, influence of female literacy on infant mortality rate operates through use of MCH services. Several studies have shown that prenatal care is dependent on maternal education (6-8). Such studies are scarce in India, and those available examined the effect of female literacy on infant mortality rate rather than on use of MCH services (9).

In the Indian context, it may be worthwhile to investigate the synergistic effect of male literacy because women of poor communities rarely have any decision-

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making power. The present study examined the influence of female literacy on use of MCH services and on infant mortality rate using state-level data from the National Family Health Survey (NFHS) 1992 (10) and micro-level data collected on rural women from Maharashtra.

MATERIALS AND METHODS

Study area and sampling

The NFHS is a survey of households with an overall sample size of 89,777 ever-married women aged 13-49 years. A uniform sample design, adopted in all NFHS states, is a systematic, stratified sample of households with two stages in rural areas and three stages in urban areas. The target sample size for each state was set considering the size of the state. The initial target sample size was 3,000 completed interviews with eligible women for states having a population of 25 million or less in 1991; 4,000 completed interviews for large states with more than 25 million population; 8,000 for Uttar Pradesh, the largest state; and 1,000 each for the six small north eastern states: Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, and Tripura. A two-stage stratified sampling design was adopted for rural areas: selection of villages was followed by selection of households. Primary sampling units were selected systematically, with probability proportional to size. A three-stage sampling design was adopted for urban areas in each state: selection of cities and towns was followed by urban blocks and finally households.

Data

Detailed information on mortality and use of MCH services, gathered by interviewing women who had a livebirth during four years preceding the survey, was used in this study. This included antenatal care sought, tetanus toxoid injections, supplementation of iron and folic acid tablets, and place of delivery. Similarly, information on use of childcare included percentage of infants suffering from gastrointestinal infections who were taken to a health facility, percentage of infants treated with oral rehydration solution (ORS)/ recommended home fluids (RHF), and percentage of children aged 12-23 months who were fully vaccinated. Children were considered fully vaccinated if they received BCG vaccination, measles vaccination, and all doses of DPT and polio vaccines. The state-level percentages for female illiteracy were considered. Female illiteracy still being very high in some states, we also examined the role of male literacy in influencing the use of maternal and childcare services.

For maternal care indicators, the denominator was all livebirths in four years preceding the survey, while for diarrhoea and treatment with ORS/RHF, it was the number of sick infants who were actually reported to have diarrhoea two weeks before the survey. In the present study, we considered 24 major states of India for analysis.

State-level data from the NFHS can only indicate major associations and need not imply causal relationship. To explain such relationships, it is necessary to examine micro-level data collected at individual level. We, therefore, analyzed data on 317 rural mothers aged 15-26 years collected over a three-year period. The analysis pertained to 286 livebirths. Mothers were interviewed about their education, age-at-marriage, and occupation and those of their husband(s), obstetric history, place of delivery, supplementation of iron and folic acid tablets, tetanus toxoid injections, and presence of trained child birth attendant, if any.

Data were analyzed using multiple regression and cluster methods using SPSS/PC+ version 4.0.

RESULTS

Inter-state variation in infant mortality rate and use of MCH services

Substantial inter-state variations in the literacy status and use of MCH services were observed (Table 1). Female illiteracy ranged from 11% in Mizoram to 75% in Rajasthan, while male illiteracy ranged from 6% in Mizoram to 40% in Bihar. A maximum percentage of illiterate males was much lower compared to female illiteracy.

Among different components of maternal care services, use of antenatal care varied from 32% in Rajasthan to 98% in Kerala. The coverage for tetanus vaccine was more than 90% in Kerala, Tamilnadu, and Goa, while it was 45% in Uttar Pradesh, Madhya Pradesh, and Rajasthan. Less than 30% of mothers in Nagaland, Bihar, and Uttar Pradesh received iron and folic acid tablets, while it exceeded 84% in Kerala, Goa, and Tamilnadu. The percentage of hospitalized deliveries was 88% in Kerala, and Goa, and it ranged from 11% to 12% in Uttar Pradesh, Bihar, and Assam.

The percentage of hospitalized children suffering from diarrhoea ranged from 31% in Assam to 86% in Punjab

Table 1. Illiteracy and use of maternal care services in different states of India

State	Illiteracy (%)		TT	IRFL	HDEL	ANC
	Female	Male	(%)	(%)	(%)	(%)
Haryana	54.1	27.9	70.2	60.1	16.7	72.7
Himachal Pradesh	43.3	21.1	71.0	71.9	16.1	76
Jammu & Kashmir	49.0	26.4	78.0	70.8	21.7	79.6
Punjab	47.9	34.2	86.7	73.9	24.8	87.9
Rajasthan	74.7	39.5	34.7	29.3	11.6	32.8
Madhya Pradesh	66.0	36.4	51.3	44.2	16.0	53.4
Uttar Pradesh	68.0	36.2	44.3	29.6	11.0	45.5
Bihar	71.6	39.9	37.0	21.4	12.1	37.5
Orissa	58.6	31.1	63.0	49.9	14.2	62.9
West Bengal	44.8	24.6	77.7	56.3	31.5	75.4
Arunachal	57.7	38.0	43.1	44.5	19.8	48.9
Assam	49.2	30.3	43.9	39.5	11.1	43.9
Manipur	36.9	14.8	61.6	35.6	22.6	63.4
Meghalaya	39.9	33.1	44.6	49.6	29.7	51.8
Mizoram	11.1	6.4	85.9	63.7	48.7	88.9
Nagaland	28.0	19.9	43.3	23.8	6.1	39.3
Tripura	36.4	19.0	65.2	53.0	30.2	64.9
Goa	27.1	11.7	92.8	89.3	87.1	95.9
Gujarat	49.6	24.7	69.9	69.3	35.7	76.2
Maharashtra	44.6	20.6	81.6	70.6	44.1	82.8
Andhra	62.0	39.6	81.2	76.1	33.0	87.8
Karnataka	53.7	32.1	76.5	74.8	37.6	84.2
Kerala	17.6	10.1	94.1	91.0	88.4	98.1
Tamil Nadu	54.1	23.2	93.6	84.0	63.6	94.5

ANC=Percentage of livebirths among mothers who received antenatal care
HDEL=Percentage of livebirths among mothers who delivered in hospitals
IRFL=Percentage of livebirths among mothers who received iron and folic acid tablets during pregnancy
TT=Percentage of livebirths among mothers who received at least one dose of tetanus toxoid vaccine

while use of ORS/RHF was maximum, i.e. 45% for Assam and the lowest 16**%** in Rajasthan (Table 2). The immunization coverage was 4% in Nagaland.

Consequently, the infant mortality rate (per 1,000 livebirths) varied drastically from one state to another. The rate ranged from 15 in Mizoram to 112 in Orissa, while Uttar Pradesh, Bihar, Assam, and Madhya Pradesh had an infant mortality rate above 79, which is also the national average (Table 2). It was necessary to examine whether use of MCH services was the underlying factor that explains the link between female literacy and infant mortality rate.

Association of care-seeking with female illiteracy

Relationship of each of MCH services and childcare variables with female illiteracy is presented in Table 3. All maternal care-seeking and childcare variables were negatively associated with female illiteracy. These associations were significant in case of all maternal care-seeking variables but not with childcare variables. We, therefore, analyzed data to understand the contributions of these variables to explain the variability in infant mortality rate using multiple regression model, taking infant mortality rate as a dependent variable (Table 4).

Regression coefficients for all maternal care-seeking variables were not statistically significant with a value of R^2=24.9%. Inclusion of female illiteracy in this equation reduced regression coefficients (ß values) for all maternal care-seeking variables and singled out female illiteracy as the only significant independent variable with increase in the value of R^2 to 59%. Similar exercise for childcare variables showed a significant association initially with vaccination (p=0.0074) with a value of R^2=60.9%. Inclusion of female illiteracy in this case too reduced the value of regression coefficient and showed female illiteracy as the only significant variable

Table 2. Use of childcare services and infant mortality rates in different states of India

State	HINFD	ORSINF	VACC	IMR
Haryana	59.1	16.8	53.5	73.3
Himachal Pradesh	69.8	41.1	62.9	55.8
Jammu & Kashmir	72.5	39.8	65.7	45.4
Punjab	85.5	30.9	61.9	53.7
Rajasthan	49.0	15.7	21.1	72.6
Madhya Pradesh	69.5	32.2	29.2	85.2
Uttar Pradesh	62.4	17.4	19.8	99.9
Bihar	62.4	17.4	10.7	89.2
Orissa	44.4	34.3	36.1	112.1
West Bengal	–	–	34.2	75.3
Arunachal	–	–	22.5	40.0
Assam	30.7	45.1	19.4	88.6
Manipur	–	–	29.1	42.4
Meghalaya	–	–	9.7	64.2
Mizoram	–	–	56.2	14.6
Nagaland	–	–	3.8	17.2
Tripura	–	–	19.0	75.8
Goa	74.2	41.9	74.9	31.9
Gujarat	57.5	19.5	49.8	68.7
Maharashtra	47.4	34.6	64.1	50.5
Andhra	66.0	31.9	45.0	70.4
Karnataka	60.8	33.8	52.2	65.1
Kerala	68.2	20.5	54.4	23.8
Tamil Nadu	58.6	28.6	64.9	67.7

HINFD=Percentage of hospitalized infants suffering from diarrhoea; IMR=Infant mortality rate (per 1,000 livebirths); ORSINF=Percentage of infants suffering from diarrhoea, who received ORS/RHF at home; VACC=Percentage of children, aged 12-23 months, who received all vaccinations, i.e. BCG, measles, and three doses of DPT and polio

Table 3. Regression analysis of relationship of female illiteracy with maternal and child health service as dependent variables

Dependent variable	Female illiteracy (%)		
	R^2 (%)	ß±SE	p value
Maternal care*			
ANC	27.4	-0.6487±0.22	0.0066
HDEL	36.67	-0.8386±0.23	0.0017
IRFL	18.66	-0.5529±0.25	0.035
TT	28.99	-0.6436±0.21	0.0066
Childcare†			
ORSINF	13.61	-0.2439±0.16	0.1451
HINFD	5.84	-0.2105±0.218	0.35
VACC	9.75	-0.4102±0.27	0.1374

* Data were available for 24 states

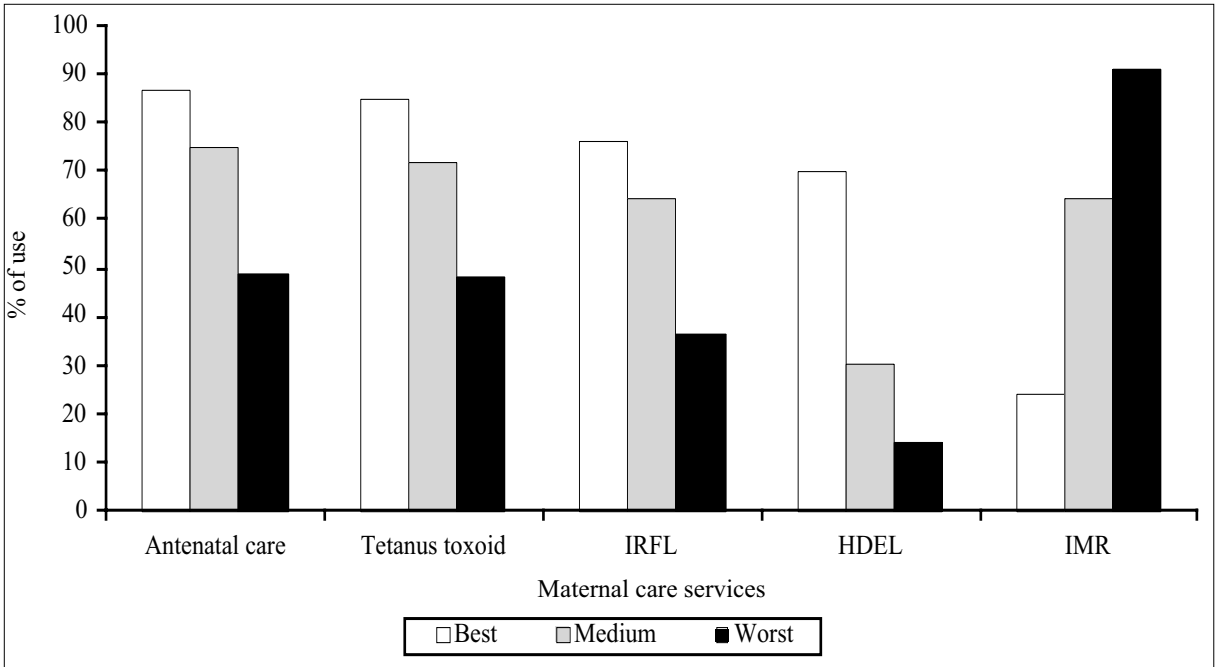
† Data were available for 17 states

ANC=Percentage of livebirths among mothers who received antenatal care; HDEL=Percentage of livebirths among mothers who delivered in hospitals; HINFD=Percentage of hospitalized infants suffering from diarrhoea; ILF=Percentage of illiterate females aged six years and above; IMR=Infant mortality rate (per 1,000 livebirths); IRFL=Percentage of livebirths among mothers who received iron and folic acid tablets during pregnancy; ORSINF=Percentage of infants suffering from diarrhoea, who received ORS/RHF at home; TT=Percentage of livebirths among mothers who received at least one dose of tetanus toxoid vaccine; VACC=Percentage of children, aged 12-23 months, who received all vaccinations, i.e. BCG, measles, and three doses of DPT and polio

with marginal increase in the value of R^2 (75.3%). Thus, in both the cases, i.e. maternal care-seeking variables and childcare variables, female illiteracy had a significant association. Regression coefficients for female illiteracy suggested that a 10% reduction in female illiteracy would result in the reduction of infant mortality rate by 12.5 per thousand. Female illiteracy was, thus, singled out showing a strong association with infant mortality rate.

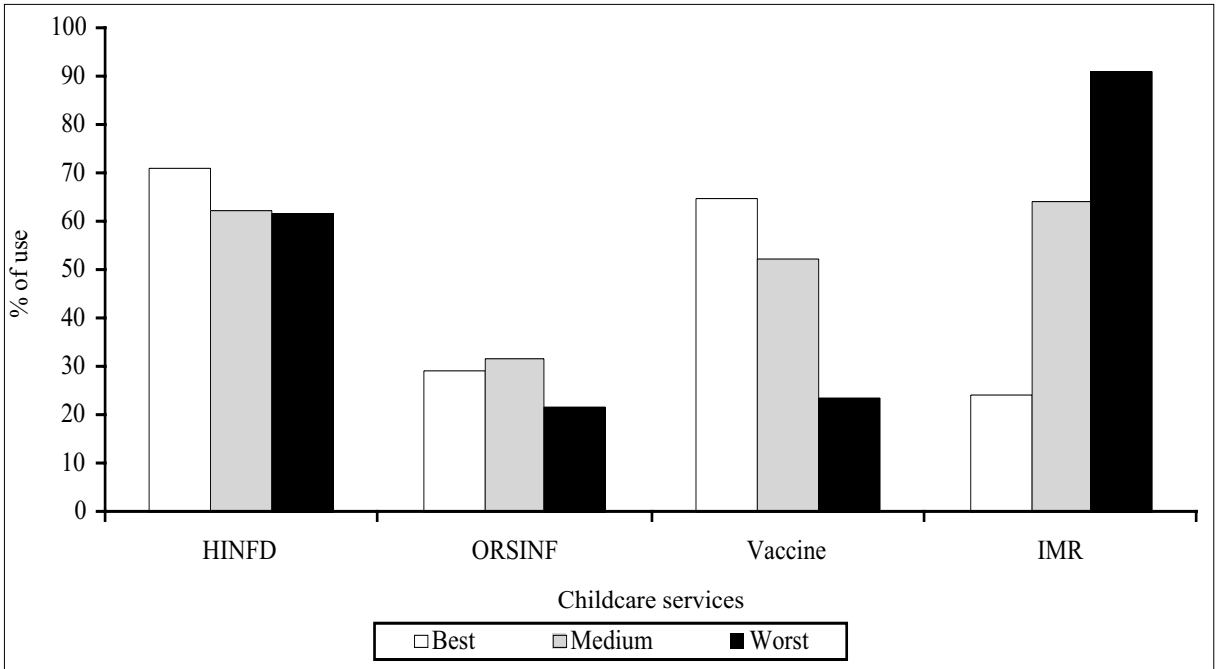
The states were grouped into three clusters with the lowest, medium and highest female illiteracy using cluster analysis in the SPSS. Clusters were formed with minimum within-variation and maximum between-variation. Four states, viz. Mizoram, Nagaland, Goa, and Kerala, formed the best group with the lowest female illiteracy rate (about 11%). Six states, viz. Rajasthan, Madhya Pradesh, Uttar Pradesh, Bihar, Orissa, and Andhra Pradesh, formed the worst group with the highest female illiteracy rate (about 75%). The remaining 14 states were classified as medium group (48.5%). The weighted proportions for infant mortality rate and use of maternal and childcare services are compared in Figure 1 and Figure 2 respectively.

The infant mortality rate for the worst group (90.99) was significantly ($p<0.01$) higher compared to that for the medium group (64.2) and for the best group (24.0). On the other hand, use of maternal services was lowest in the worst group and increased significantly ($p<0.01$) in the best group for tetanus toxoid (48.0% to 84.4%), iron and folic acid tablets (36.6% to 76.2%), and hospitalized deliveries (14.2% to 69.7%) with values for the medium group lying in between. The greatest difference was observed in hospitalized deliveries. The differences in the best and worst groups were less striking with respect to the childcare variables, except for vaccination (64.9% vs 23.6%, $p<0.01$). These observations indicate that the influence of female illiteracy was more prominent on maternal care-seeking behaviours, while amongst childcare services, it was



HDEL=Delivered in hospitals
IMR=Infant mortality rate (per 1,000 livebirths)
IRFL=Iron and folic acid tablets

Fig. 1. Weighted ratios for use of maternal care services among groups of states



HINFD= Hospitalized infants suffering from diarrhoea
IMR=Infant mortality rate (per 1,000 livebirths)
ORSINF=Infants suffering from diarrhoea, who received ORS/RHF at home

Fig. 2. Weighted ratios for use of childcare services among groups of states

Table 4. Multiple regression analysis of relationship of use of maternal and child health services with infant mortality rate with inclusion of female illiteracy as an independent variable

Dependent variable	Independent variable	R^2 (%)	p value	Regression coefficients	
				ß±SE	p value
Maternal care					
IMR	(A) ANC	24.9	0.22	-0.55±2.3	0.81
	HDEL			-0.57±0.36	0.13
	IRFL			0.62±0.91	0.50
	TT			-0.51±1.9	0.97
	(B) ANC	59.00	0.004	0.45±1.8	0.80
	HDEL			-0.02±0.31	0.95
	IRFL			-0.36±0.74	0.63
	TT			-0.03±1.4	0.98
	ILF			1.25±0.32	0.0011
Childcare					
	(A) HINFD	60.9	0.0055	-0.33±0.36	0.37
	ORSINF			0.18±0.46	0.71
	VACC			-0.82±0.26	0.0074
	(B) HINFD	75.3	0.0012	-0.44±0.3	0.17
	ORSINF			0.26±0.38	0.51
	VACC			-0.32±0.29	0.29
	ILF			0.89±0.33	0.021

A: Multiple regression analysis without inclusion of female illiteracy

B: Multiple regression analysis with inclusion of female illiteracy

ANC=Percentage of livebirths among mothers who received antenatal care; HDEL=Percentage of livebirths among mothers who delivered in hospitals; HINFD=Percentage of hospitalized infants suffering from diarrhoea; ILF=Percentage of illiterate females aged six years and above; IMR=Infant mortality rate (per 1,000 livebirths); IRFL=Percentage of livebirths among mothers who received iron and folic acid tablets during pregnancy; ORSINF=Percentage of infants suffering from diarrhoea, who received ORS/RHF at home; TT=Percentage of livebirths among mothers who received at least one dose of tetanus toxoid vaccine; VACC=Percentage of children, aged 12-23 months, who received all vaccinations, i.e. BCG, measles, and three doses of DPT and polio

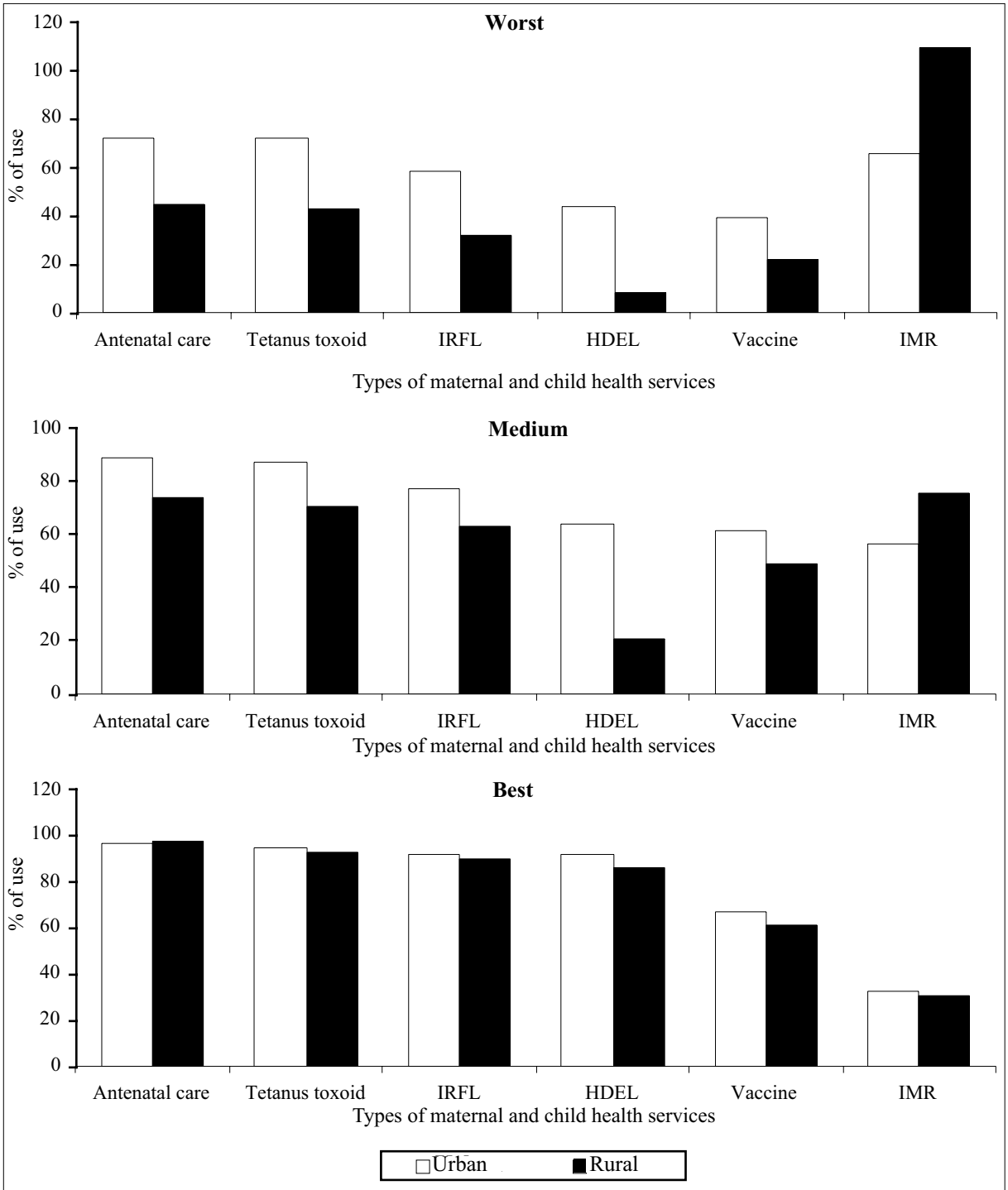
more on preventive services, such as immunization, than curative services, such as hospitalization and ORS/RHF treatment.

We further examined the rural-urban differences in these three groups. Rural-urban data on infant mortality were not available for two states in the best group and four states in the medium group. The rural-urban differences in infant mortality were smaller (30 vs 32) in the best group but increased substantially (109 vs 66) for the worst group. Similar trends were observed in the use of maternal and childcare services (Fig. 3). Female illiteracy adversely influenced the use of MCH services and infant mortality rate in rural area than that in urban area. The relatively higher use of services in urban areas of states with high female illiteracy, i.e. worst group, was partly because, in urban areas, the women had better exposure to media and information or better access to health facilities through services and programmes of the Municipal Corporation. It indicates that female illiteracy was a root-cause for under-use of MCH services, especially in rural areas, resulting in prominent rural-urban differences.

Influence of male literacy

In states with low female illiteracy, the role of male literacy was not seen in terms of use of maternal services or in infant mortality rate. We considered 12 states with female illiteracy higher than median value (48%) and further grouped them into states with low male illiteracy (<27%) and high male illiteracy (>27%) based on the median value.

The comparative figures on use of MCH services, along with infant mortality rate, are given in Table 5. The group with high female illiteracy and low male illiteracy showed not only better use of MCH services but also significantly lower infant mortality rate. The suggestion to involve male members, i.e. head of family or husbands, in the existing health-education programme would be beneficial in reducing infant mortality in the backward states.



HDEL=Delivered in hospitals
IMR=Infant mortality rate (per 1,000 livebirths)
IRFL=Iron and folic acid tablets

Fig. 3. Use of maternal and child health services in urban and rural areas of the best, medium and worst groups

Table 5. Weighted ratios for high and low male illiteracy groups among 12 states with high female illiteracy

Variable	Male illiteracy		Difference
	High (>27.5%)*	Low (<27.5%)†	
IMR	86.5	58.4‡	32% reduced
Use of MCH services			
ANC	53.1	77.6‡	46% improved
TT	51.3	73.5‡	43% improved
IRFL	41.5	70.0‡	67% improved
HDEL	16.2	29.5‡	83% improved
Childcare services			
VACC	27.6	57.0‡	106% improved
HINFD	60.2	65.6	9% improved
ORSINF	23.0	30.5‡	32% improved

* States include: Haryana, Rajasthan, Madhya Pradesh, Uttar Pradesh, Bihar, Orissa, Arunachal Pradesh, Assam, Andhra Pradesh, and Karnataka

† States include: Gujarat, Jammu and Kashmir

‡ $p<0.01$

ANC=Percentage of livebirths among mothers who received antenatal care; HDEL=Percentage of livebirths among mothers who delivered in hospitals; HINFD=Percentage of hospitalized infants suffering from diarrhoea; IMR=Infant mortality rate (per 1,000 livebirths); IRFL=Percentage of livebirths among mothers who received iron and folic acid tablets during pregnancy; ORSINF=Percentage of infants suffering from diarrhoea, who received ORS/RHF at home; TT=Percentage of livebirths among mothers who received at least one dose of tetanus toxoid vaccine; VACC=Percentage of children, aged 12-23 months, who received all vaccinations, i.e. BCG, measles and three doses of DPT and polio

Analysis of micro-level study

Years of schooling by women were considered into two groups: (a) illiterate and those educated up to 4th standard formed one group, and (b) those educated up to and above 5th standard formed the other group. Deliveries in hospitals were significantly ($p<0.01$) associated with educational level of mothers (Table 6). The percentage of hospitalized deliveries differed significantly in these two groups (63% vs 84.8%). Similarly, there was also a significant ($p<0.05$) association of maternal education with seeking of complete antenatal care, i.e. iron and folic acid tablets, tetanus toxoid injection, and deliveries in hospitals. Proportions of women who sought complete antenatal care in the two groups were 46.4% and 63.7% respectively. Since seeking of complete antenatal care was desirable, we examined the role of educational level of their husbands. Proportion of women seeking complete antennal care remained low (25.7%), if their husbands had education below 7th standard, than those whose husbands had education above 8th standard (74.3%). The findings of micro-level data supported the findings of macro-level study, suggesting that education of mothers improves the use of MCH services.

DISCUSSION

Infant mortality rate is a basic indicator of quality of life. The Government of India introduced MCH services since the first Five-Year Plan (1951-1956) to provide basic essential services to masses. Despite this, infant mortality is still a major public-health problem in India. Additionally, slow reduction in infant mortality rate in the recent past has been a matter of concern for health planners and policy-makers. Although female literacy

Table 6. Association of maternal education and maternal and child health service variables (micro-level study on rural mothers)

Maternal education	Hospital delivery			Availing complete antenatal care		
	Yes	No	Total	Yes	No	Total
Up to 4th standard	46	27	73	26	30	56
≥5th standard	178	32	210	121	69	190
Total	224	59	283	147	99	246
χ^2		15.53			5.34	
p value		<0.01			<0.05	

Complete antenatal care includes: supplementation of iron and folic acid tablets, tetanus toxoid injection, and hospitalized delivery or trained delivery attendant

is strongly associated with infant mortality rate (9,11), it was not investigated whether its influence was mediated through use of MCH services. State-level aggregate data (NFHS 1992) revealed that female literacy was associated with the use of MCH services, which, in turn, might facilitate reduction in infant mortality rate. Influence of male literacy, especially in states where female illiteracy was high, was also noted. These findings were supported by the micro-level data on rural women.

The state-level data further revealed that female illiteracy was negatively associated with each of maternal care-seeking variables. Further, female illiteracy was singled out when multiple regression analysis with infant mortality rate as a dependent variable was carried out with all maternal care-seeking variables as independent variables. Similar analysis for childcare variables showed a negative association with vaccination in individual regression, but in multiple regression, its significance disappeared when female illiteracy was included as an additional independent variable. Regression coefficient indicated that a 10% reduction in female illiteracy would result in reduction of infant mortality rate by 12.5 per thousand. Using district-level data in three states, viz. Bihar, Madhya Pradesh, and Uttar Pradesh, similar findings were reported for child mortality (12).

The states were grouped as best, medium, and worst on the basis of female illiteracy levels using cluster analysis. The groups differed significantly with respect to infant mortality rate and use of maternal services and vaccination in case of childcare. This suggests that illiterate women ignore the importance of preventive childcare services, such as vaccination.

It was interesting to note that the influence of female illiteracy on infant mortality rate and on the use of MCH services was more detrimental in rural areas than in urban areas, especially in the worst group of states where female illiteracy was high. Thus, efforts to disseminate necessary information for creating health awareness among rural females may be beneficial.

The role of male literacy is not likely to be observed when female literacy is high. In fact, an independent effect of male literacy on child mortality has not been observed (12). We observed that the states with high female illiteracy but with low male illiteracy (below median) had better use of MCH services, and the significantly lower infant mortality rate was of relevance. For example, in poorer communities where women are socially and economically dependent on their male counterparts, it would be worth to orient husbands or family heads with the existing health-education programmes.

Use of the state-level aggregate data suffers from a limitation that the apparent associations could be without causal relationships leading to ecological fallacy. We, therefore, analyzed the micro-level data on rural women collected at the individual level in Maharashtra. While the state-level data considered female literacy levels in the population, the micro-level data dealt with educational level of mothers. In defining educational levels, women with education up to 4th standard were grouped as illiterate, since primary education hardly helps in decision-making in real life. The micro-level data showed that the proportion of women who availed of complete antenatal care increased with their educational level. We observed that the educational level of husband had also significant influence on the use of complete antenatal care. All findings based on the state-level data were, thus, supported by the micro-level data on rural mothers.

It may be worthwhile to mention here that female illiteracy could be a proxy for one or more other variable(s), especially socioeconomic variables. Therefore, the relationship may be more complicated than actually perceived in the present study. The findings of our study have shown that this proxy variable operated through the use of maternal care-seeking variables which ultimately influence infant mortality rate. Literacy level in a population is an indication of the degree of social and political maturity of the existing system for organizing and mobilizing the available resources to provide basic essential services to the population. For example, investments in adult education programmes or for free education to girls will have long-term health benefits. Similarly, orientation of household heads or husbands with the existing health-education programmes may be explored. Concentrated efforts are needed to improve female literacy. The role of non-formal education in improving health awareness, thereby improving the use of health services, also needs to be understood.

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