Household Environmental Health Hazards and Child Survival in selected states in India

ABSTRACT

Most deaths of children under age five in India and other developing countries have been linked to the household environment. This study, therefore, hypothesized that variation in household environmental conditions (e.g. sources of drinking water, types of toilet facilities, main flooring material of the household, type of cooking fuel) could affect children's survival chances. Using secondary data from the National Family Health Surveys (NFHS) round 3, the study broadly categorized the eight selected states into low and high under-five mortality groups. Uttar Pradesh, Madhya Pradesh, Bihar and Rajasthan are in the high under –five mortality group whilst Maharashtra, Karnataka, Kerala and Tamil Nadu are in the low mortality group.

The dependent variables are under-five mortality and childhood morbidity. Childhood morbidities were measured by the occurrence of diarrhoea, and acute respiratory infection (ARI) within two weeks preceding the survey. The household environmental variables included sources of drinking water, duration of time from water source, types of toilet facilities, main flooring material of the household, type of cooking fuel in the household. The socioeconomic factor was measured with variables such as the mother's educational level, father's educational level, rural or urban residence, and household wealth index. The analysis involved the use of descriptive statistics and logistic regression to examine the distribution of household environmental health hazards in each state. The logistic regression model was used to examine the effects of household environmental health hazard on childhood mortality in the selected states.

The study found that high-mortality states are at a relative disadvantage on basic household environmental variables. The household environmental conditions had significant influence on child survival. Some of the differences in childhood morbidity and mortality between the two groups can be explained by household environmental health hazards and by mother's socioeconomic status. In order to meet Millennium Development Goal 4, which requires under-five mortality reduction by two-thirds between 1990 and 2015, attention should be given to various factors affecting the distribution of resources and facilities especially to the high-mortality states. Policy should be redirected to programs that encourage household hygiene and sanitation.

Introduction: Most deaths of children under age five in India and other developing countries have been linked to the household environment. Thus providing safe drinking water and access to improved sanitation within the household environment can reduce the risk of mortality and morbidity among children under age five (WHO, 2009). Millennium Development Goal (MDG)

4 aims is to reduce under-five mortality by two-thirds between 1990 and 2015. **The** National (India) level target of MDG is to achieve 42 per 1000 live births in the mortality figures by 2015. Under 5 mortality in India was 74 per 1000 live births in 2006 and it varied across the states, highest was in Uttar Pradesh (96) and lowest was in Kerala (16) according to the National Family Health Survey round 3. This study, therefore, hypothesized that variation in household environmental conditions could affect children's survival chances. Although some states in India are in the process of achieving substantial lower childhood mortality due to interventions measures, such as providing safe drinking water and improved sanitation, however, the situation remains critical in many states.

Review of Literature: Although several factors could be responsible for the survival of children under the age of five in developing countries, studies reveal that some childhood diseases that often result in mortality can be explained by well-known health hazards within the child's household environment (Rutstein, 2000; United Nations, 2001). Environmental health hazards are threats to the health of millions of people in the settings where they live (World Bank, 2000; UNICEF, 2001). A variety of health hazards, including poor air quality, poor building standards, and contamination of water and food are some of the key factors in the household environment. Children under age five are in the dynamic stage of growth. Their immune, respiratory, and digestive systems are still developing. The impact of an unhealthy environment is felt among them because they are always close to the ground; this increases the risk of exposure to many contaminants, including pathogens (WHO, 2003).

Most of the factors identified from various studies on childhood mortality in developing countries have followed the Mosley and Chen (1984) framework, which is based on the idea that the factors that affect childhood mortality work through a set of "proximate determinants". Proximate determinants, as defined by Mosley and Chen (1984), are divided into five categories: maternal and demographic factors; environmental health factors; nutrient deficiency; injury; and personal illness. The World Health Organization (WHO, 2003) reported that 75% of deaths from acute respiratory infections occur before the first birthday, and one-quarter of deaths among children under age five are linked to diarrhoea. Women and young children are at high risk of exposure to the smoke emitted from burning coal, firewood, and other sources of fuel, due to women's traditional role in food preparation. In addition, rapid urban growth often has outpaced the provision of safe water and sanitation, with crowded living conditions facilitating the spread of diseases that can affect child survival (Rutstein, 2000; Mishra and Retherford, 2007; Md. Masiur Rahman et. Al., 2010).

Hypothesis and Data: This study hypothesized that variations in household environments could affect children's survival chances. The objective of the study is to examine differences in the household environmental health hazards between low and high under-five mortality states and their subsequent effect on child survival. Using unit level data of the National Family Health Surveys (NFHS) round 3, the study broadly categorized the eight selected states into low and high under-five mortality groups. Uttar Pradesh, Madhya Pradesh, Bihar and Rajasthan are

selected as high under –five mortality group. Maharashtra, Karnataka, Kerala and Tamil Nadu are selected as low under-five mortality group (Table 1).

Materials and Methods: The analysis involved the use of descriptive statistics to examine the distribution of household environmental health hazards in each state. Tables and graphs were used to provide a general overview of the different socioeconomic and demographic variables, household environment, and health hazards categories after weighing the samples. The Logistic regression model was used to identify cofactors of childhood morbidity by household environmental health hazards in high and low under 5 mortality states.

Dependent variables selected are Childhood mortality, Childhood diarrhoea *in the last 2 weeks,* Acute Respiratory Infection *the last 2 weeks*

Socioeconomic variables: Mother's educational level (None, Primary, Secondary, Higher), Father's educational level (None, Primary, Secondary, Higher), Residence (Urban, Rural), Wealth index (Low, Middle, High), **Household environmental variables Household environmental variables: Source of drinking water: 1**)Piped water - piped into dwelling; piped into yard/plot; public tap or standpipe **2)** Other improved sources - protected dug well; protected spring; bottled water; rainwater; tube well/borehole **3)**Unprotected dug well **4)**Other unimproved sources - unprotected spring; cart with small tank/drum; tanker truck; surface water; **Time to water source: Regrouped from actual values in minutes to 1**)On premises **2)**Less than 15 minutes **3)**15-29 minutes **4)**30 minutes and above, **Toilet facility: 1**)Improved flush - flush to piped sewer system; flush to septic tank; flush/pour flush to pit **2)**Other improved facility - composting toilet; Ventilated Improved Pit latrine; pit latrine with a slab **3)**Unimproved facility - flush/pour flush elsewhere; pit latrine without a slab/open pit; bucket; hanging toilet **4)**No facility, or bush, **Type of flooring material**: **1**)Finished - parquet; polished wood; vinyl/ asphalt strips; ceramic tiles; cement; carpet **2)**Rudimentary - wood plank; bamboo **3)**Natural - earth; sand; dung, **Type of cooking fuel: 1**)Biomass fuel - wood; crop residue/dung cake; straw; lignite; charcoal **2)**Non-biomass fuel - electricity; LPG; biogas; kerosene

Five selected environmental variables recoded are as follows:

i. Source of drinking water: Improved source of drinking water (code 1);Unimproved source of drinking water (code 0)

ii. Time to get to water source: On premise or less than 30 minutes (code 1);30 minutes and more (code 0)

iii. Type of toilet facility: Improved sanitation facility (code 1);Unimproved sanitation facility and no facility (code 0)

iv. Main flooring material: Finished flooring (code 1); Natural and rudimentary flooring (code 0)

v. Type of cooking fuel: Non-biomass fuel (code 1); Biomass fuel (code 0)

Health Hazard Index: An index of the status of household environmental health hazards is derived from the responses on five household environmental variables. The index is prepared by summing the codes of the household environmental health hazard variables. The highest value of health hazard index implies non health hazard in household environment and lowest value implies high health hazard in household environment. For our analysis, the index 0 to 5 was further categorized into: non- health hazard (5=2), low health hazard (3-4= 1) and high health hazard (0-2 = 0).

Table 1: Distributions of samples of the selected states by under-five mortality rate, National Family Health Survey 2005-6, India

States	Region	Under 5 mortality rate*	Sample women	Sample births	Births to dejuri residence within 5 years preceding survey
High Childhood Mortality States					
Rajasthan	North	85.4	3892	10178	1872
Madhya Pradesh	Central	94.2	6427	15339	2801
Uttar Pradesh	Central	96.4	12183	32768	6481
Bihar	East	84.8	3818	10448	2169
Low Childhood Mortality States					
Maharashtra	West	46.7	9034	16600	2917
Karnataka	South	54.7	6008	11489	2088
Kerala	South	16.3	3566	5535	1001
Tamil Nadu	South	35.5	5919	10043	1679

* Number of under 5 children deaths per 1000 live births

Table 1 shows the division of the selected low and high under-five mortality states, with the number of sampled women and births within the five years preceding the survey. De jure residents are the usual residents in the household Information. The detailed sampling procedures are given in National Family Health Survey (round 3).

Results and Discussion

Patterns of Household Environmental Health Hazards: Improved sources of drinking water are less likely to be contaminated, while other sources, such as surface water and open wells, are

more likely to carry disease-causing agents (NPC, 2004). Table 2 shows that there is little difference between high and low mortality states, more than 85% household's have an access to improved source of drinking water. However, percent using piped water as source of drinking water was found quite low (13%) in high under 5 mortality states as compared to low under 5 mortality states (68%). Other improved sources of drinking might not be that safe to use as sources of drinking water in high under 5 mortality rates. In low under 5 mortality states, piped water is the main source of drinking water except Kerala, where 25% sampled households in Kerala have access to piped water (Table 2) and figure 1.

More than half of sampled households in both high and under 5 mortality states have access to safe drinking water within premises. Although the source of water may be improved and made hygienic, timely/easy access to the water is also very important. If the source of the water is more than 15 minutes away from the household, there may not be sufficient water from that source, and unsafe water might be consumed at times. The time to source of drinking water examined among the selected states shows that 70% of households of children under age five in UP and Bihar states with high under 5 mortality, live in households with access to drinking water on the premises or within 15 minutes of the household whereas Madhya Pradesh and Rajasthan only close to half of households have access to drinking water within premises or within 15 minute away from households. However, in low mortality states around 75% of the of the households have access drinking water within premises or within 15 minutes and the state Kerala has 78percent households, drinking water access is within premises.(Table 2).
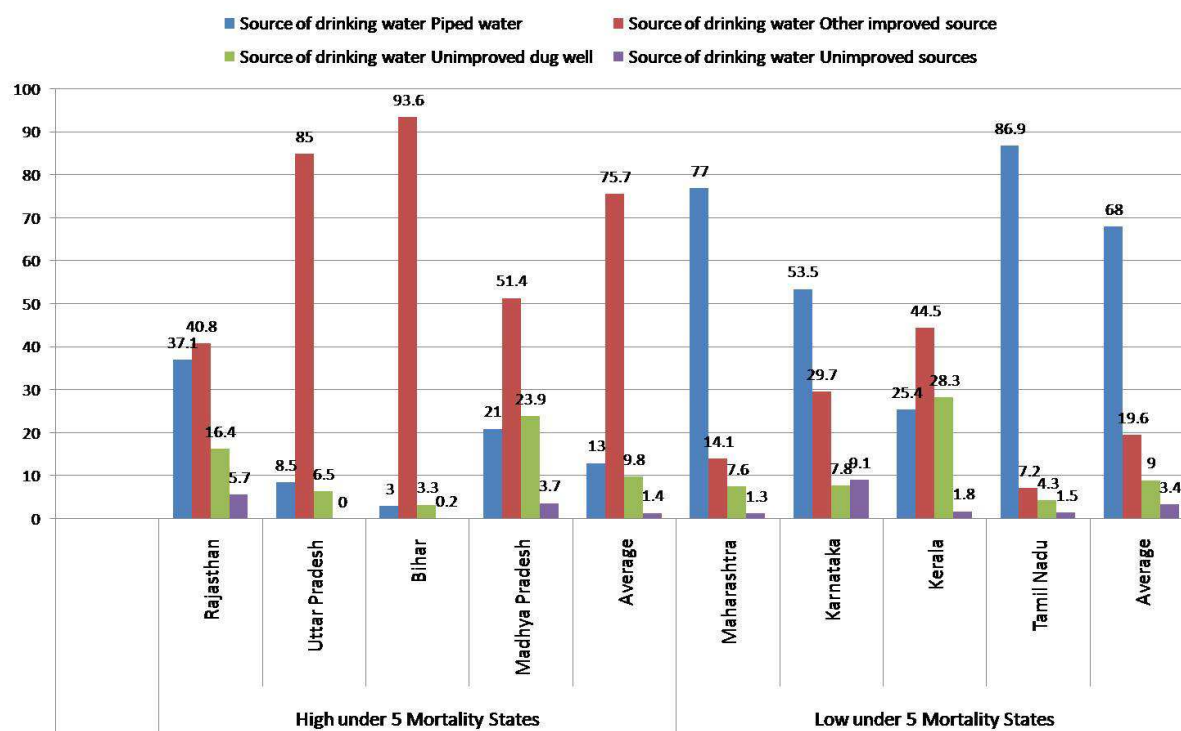
An examination of the sanitary facilities within the household reveals that the use of flush toilet facilities is very low in all the selected states except Kerala (90%). About 4 in 5 households in all high under 5 mortality states, use unimproved toilet facilities, or have no toilet facility. In TN and Karnataka one in three and in Maharashtra one in two sampled households use improved toilet facility. (Table 2).

Table 2: Percent distribution of Household Environment variables in selected states with High and Low levels of Under 5 Mortality

Household environment	High under 5 Mortality States	Low under 5 Mortality States

variables		Rajasthan (%)	Uttar Pradesh (%)	[Bihar (%)	Madhya Pradesh(%)	Total (%)	Maharashtra (%)	Karnataka (%)	Kerala (%)	Tamil Nadu(%)	Total (%)
Source of drinking water	Piped water	37.1	8.5	3.0	21.0	13.0	77.0	53.5	25.4	86.9	68.0
	Other improved source	40.8	85.0	93.6	51.4	75.7	14.1	29.7	44.5	7.2	19.6
	Unimproved dug well	16.4	6.5	3.3	23.9	9.8	7.6	7.8	28.3	4.3	9.0
	Unimproved sources	5.7	.0	.2	3.7	1.4	1.3	9.1	1.8	1.5	3.4
Time to water source	On premises	38.0	65.2	64.4	26.3	55.2	63.3	42.2	78.4	30.7	52.6
	< 15 min	14.5	19.6	22.4	17.6	19.3	14.9	29.1	14.0	31.4	21.9
	15-29 min	15.6	9.5	8.4	18.8	11.5	12.2	9.8	4.4	22.9	13.1
	30 min and above	31.9	5.7	4.8	37.3	14.0	9.7	18.9	3.2	14.9	12.5
Toilet facility	Improved flush	19.3	22.8	17.2	20.4	20.6	51.1	34.0	90.6	32.8	46.8
	Other improved facility	1.6	1.3	1.9	1.5	1.5	.2	6.4	3.5	.1	2.1
	Unimproved facility	1.6	6.4	1.2	3.7	4.1	1.8	1.9	1.5	8.8	3.3
	No facility	77.5	69.5	79.7	74.4	73.8	47.0	57.7	4.4	58.3	47.9
Type of floor	Finished	47.6	25.2	17.7	26.5	26.7	48.8	60.4	93.6	81.7	63.0
	Rudimentary	7.5	2.1	.4	2.7	2.5	16.8	15.4	.6	.3	11.4
	Natural	44.9	72.7	82.0	70.8	70.8	34.5	24.2	5.8	17.9	25.6
Type of cooking fuel	Biomas fuel	86.1	86.8	94.5	86.7	88.6	51.7	69.5	73.4	64.1	61.0
	Non biomas fuel	13.9	13.2	5.5	13.3	11.4	48.3	30.5	26.6	35.9	39.0
Potential Hazard	High health hazard	61.7	67.4	74.7	75.8	69.7	36.4	42.6	7.2	24.0	32.5
	Low health hazard	27.4	22.6	21.4	15.4	21.8	31.6	37.9	71.5	56.1	42.2
	Non health hazard	10.9	10.1	4.0	8.8	8.5	32.0	19.5	21.4	19.9	25.3
Mean (5 indicators)		2.3	2.5	2.3	1.9	2.3	3.0	3.3	3.0	3.8	3.3

Figure 1: Percentage of sampled households by types of sources of drinking water in sample states

Rajasthan: 37.1, 40.8, 16.4, 5.7
Uttar Pradesh: 8.5, 85, 6.5, 0
Bihar: 3, 93.6, 3.3, 0.2
Madhya Pradesh: 21, 51.4, 23.9, 3.7
Average: 13, 75.7, 9.8, 1.4
Maharashtra: 77, 14.1, 7.6, 1.3
Karnataka: 53.5, 29.7, 7.8, 9.1
Kerala: 25.4, 44.5, 28.3, 1.8
Tamil Nadu: 86.9, 7.2, 4.3, 1.5
Average: 68, 19.6, 9, 3.4

High under 5 Mortality States   **Low under 5 Mortality States**

It has been observed that the type of materials used for flooring is an indicator of the economic situation of households and a potential source of exposure to disease-causing agents. The results show that, although there are slight variations in the type of flooring material among the selected low-mortality states, on average about 63% live in households with finished flooring material such as cement, carpet, or rug. While more than 70% children in high-mortality states live in households with natural or rudimentary flooring; most households in UP, Bihar, and MP use natural flooring material, which is common among rural dwellers. The natural flooring materials include earth and sand, which could have an adverse effect on the health of children under age five, especially those who are still crawling (Table 2).

The type of cooking fuel used in the household is an important variable, as many children are exposed to toxic pollutants from the use of unprocessed biomass fuel such as wood, charcoal, straw, and dung, often with no provision for smoke extraction. Unprocessed biomass fuels have a high level of toxic indoor air pollutants that have been linked to reduce birth weight, ARI, nutrition deficiency, and child mortality (Mishra and Retherford, 2007). More than 88% of children in the selected high under 5 mortality states live in households where their mothers cook with firewood, charcoal, or straw whereas this figure was 61% for children in the low mortality states (Table 2).

While measuring potential health hazard, overall, the results show that in low under-five mortality states 32%, 20%, 21%, and 20% of children in Maharashtra, Karnataka, Kerala, and

Tamil Nadu respectively, live in a household environment classified as non- health hazard living conditions, much higher than the proportions in the high under-five mortality states (Table 2). Moreover, more than six in ten children in high under 5 mortality states live in households classified as high health hazard living conditions. This is unacceptably high and raises a serious concern about public health especially for the four high-mortality states studied where about 90% of the children are exposed to at least one health hazard in the household(Figure 2).

Mean household health hazard given in table 2 also indicate that in high under 5 mortality states mean household health hazard was lower than the low under 5 mortality states. Higher mean scores indicate high living conditions and lower mean scores lower living conditions in the households for under 5 children.

Figure 2:Percentage distribution of Potentia
Low under 5 Mortality
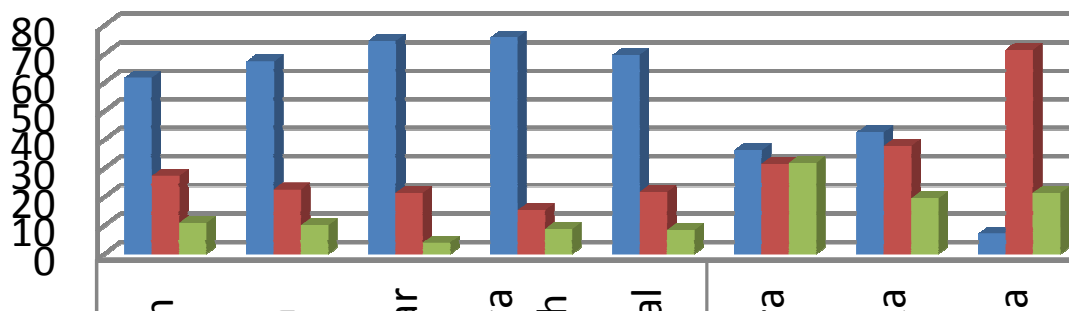
Household Environmental Health Hazards and Background Characteristics: There are significant associations between household environmental health hazards and background characteristics such as maternal education, paternal education, and rural or urban residence, as well as household wealth. National Family Health Survey (round 3) calculated household wealth index by taking into consideration of household's tangible wealth.

In all the selected states, the higher was the parent's educational level, the lower was the likelihood of a health hazardous household environment for children under age five**.** Among the high under-five mortality states, while most of the children of mothers with tertiary education live in a presumably safe environment, however, 9% in Bihar and 14% each in MP and UP live in households with high health hazards living conditions (Table 3a). Though partners'/fathers' tertiary level education has an impact; this is much less compared to that of spouses' in providing children safe living environment in the high under 5 mortality states. However, in the low mortality states, most of the children of mothers with tertiary education live in a presumably

safe environment. Even fathers' tertiary education helps children to live in safe environment in the low under 5 mortality states compared to the high under 5 mortality states (Table 3a).

This study also supports the association found in various publications on urbanization and household environment; it is evident in the literature that urban-rural residence influences better sanitation and housing environments. It is observed that those living in urban areas are much less likely to have health hazards in their household environment except Bihar and MP, where one third under 5 children are at risk in high under 5 mortality states.

Children under 5 living in rural areas are likely to be more exposed to household health hazards because of lack of basic infrastructure and amenities except the state of Kerala, with only 8% children at risk followed by Tamil Nadu 36%. The highest proportion is found in rural MP (89%), a high-mortality state, while the other states are in the range of 75% to 80% in the high mortality states and rural Maharashtra and Karnataka in (60-65%) in low mortality states (Table 3b).

The wealth index derived by National family health survey is used for our analysis. The higher the wealth index, the greater is the likelihood of a better household health environment. Therefore, children from households with lowest wealth index may be more likely to be subject to ill health due to household environmental health hazards. In the high under 5 mortality states and Maharashtra, over 90% of the children living in households with the lowest wealth index quintile are exposed to high household environmental health hazards. However, in Kerala and Tamil Nadu 32% of the children in poor households live in a non- or low health hazard environment. In addition, within the high wealth index category, there are marginal differences among the selected states in terms of household environmental health hazards (Table 3b).

The percentages of households in the high wealth index group living in a high health hazard environment is 10% to 19% in the high under 5 mortality states; conversely, in this same wealth index group only children in 1% of households in Kerala and Tamil Nadu, 6% in Maharashtra, and 9% in Karnataka are in a high health hazard environment.

Figure 3:Prevalence of diarrhea and Acute Respiratory Infections (ARI) in the past two weeksamongunder5childrenintheselectedstates

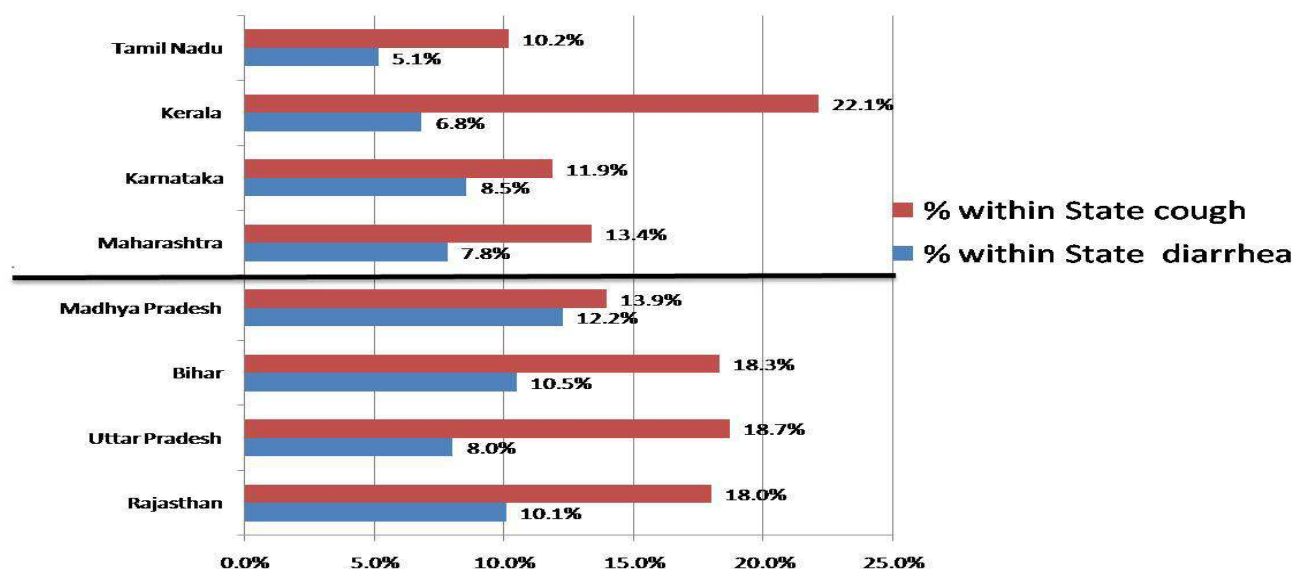**TABLE 4: Logistic regression estimates among children risk of Childhood Morbidities by Household Environmental Factors in Low and High Under5 Mortality states**

Variables	Diarrhoea		ARI	
	Low U5 mortality group	High U5 mortality group.	Low U5 mortality group	High U5 mortality group.
Source of drinking water Improved source	.710*	.901	1.089	.828**
Time to water source On premises/< 30 minutes	1.094	1.069	.757**	.832**
Toilet facility Improved toilet facility	.801*	1.116	.767**	.965
Flooring material Finished flooring	1.018	.798**	.787**	1.049
Type of cooking fuel Non-biomass fuel	1.130	1.070	1.380**	1.178*

Significance level:** p<0.001, * p<0.05

Figure 3 shows the patterns of childhood morbidity experienced in the two weeks preceding the Survey were examined in the selected states: diarrhea and Acute Respiratory Infection (ARI). Dehydration from diarrhea has been identified as one of the causes of death among children under age five. Among the sample households, data on childhood diarrhea in the last two weeks preceding the survey show that in Madhya Pradesh, Bihar and Rajasthan, children under age five of high mortality states have the highest incidence of diarrhea (10-12%). Low-mortality States, Karnataka and Maharashtra, however, have higher prevalence of childhood diarrhea. Further examination of the households' risk factor on childhood diarrhea using logistic regression reveals that the source of drinking water and toilet facility have a significant effect on diarrhea for the the low under 5 mortality states (Table 4). Children under age 5 in the high mortality states living in households with natural and rudimentary flooring have higher risk of diarrhea than those in households with finished flooring, particularly toddlers who are likely to crawl and pick up dirty things on the floor. It is evident that provision of 'safe' drinking water and improved toilet facilities in a household in the low under-five mortality states reduces the risk of diarrhea by 29% and 20%, respectively.Acute respiratory infection, characterized by coughing and short rapid breaths, is also one of the major causes of childhood mortality in developing countries. Prevalence of ARI is higher in the low-mortality states, as measured within the two weeks preceding the survey. For example, 22% of children in Kerala have symptoms of ARI, the highest prevalence among states, while Tamilnadu has the lowest prevalence of ARI, at 10%. Around 18% prevelance of ARI occurs In high under 5 mortality states. Non biomass fuel decreases the morbidity of ARI by 20 percent among children in high under 5 mortality states.

Conclusion: There is little difference between the high and low mortality states as more than 85% households have access to improved source of drinking water. Time to source of drinking water showed that 70% of children under 5 years in UP and Bihar, with high under five mortality have access to drinking water on the premises or within the 15 minutes of the household. Use of flush toilet facility is very low in all the selected states except Kerala (90%). In all the high under five mortality states about 4 in 5 households use unimproved toilet facility or have no toilet facility. Among the selected low mortality states on an average 63% live in households with finished flooring material such as cement, carpet or rug. Whereas more than 70% children in the high mortality states live in households with natural or rudimentary flooring so chances of infection among children are very high. More than 88% of children in selected high under 5 mortality states live in households where mothers cook with firewood, charcoal, or straw. There is significant association between household environmental health hazards and background characteristics such as maternal and paternal education, rural and urban residence as well as household wealth index. It can also be concluded that higher the wealth index the greater is the likelihood of a good household health environment. Therefore children from lower social class may be more likely to be subjected to ill health due to household environmental health hazards.

Disparities exist in the household environment of children in the selected states in India; the high under-five mortality states are at a relative disadvantage on basic household environmental variables that affect hygiene. Socioeconomic status of mothers is important in the reduction of childhood morbidity and mortality from health hazards within the household. In order to meet

Millennium Development Goal 4 prompt attention should be given to various factors affecting the provision of resources and sanitary conditions especially in the high-mortality states. Policy should be redirected to programs that encourage household hygiene and sanitation. Government, non-governmental organizations, and the private sector should seek to invest in programs that promote a healthy and hygienic household environment and increase access to clean water and good sanitation as part of community development efforts. Women should also have more access to education and information on best childcare practices in the household environment, irrespective of their place of residence.

It is recommended that improvement in sanitation conditions, flooring of households and cooking fuel can lead to better child survival and low mortality in India. Strengthening of education programmes for girls in rural areas have also positive impact for survival of children. Strengthening of already undergoing rural water and sanitation programmes by policy makers and programme managers will lead to improvement child survival rates in India.

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TABLE 3a: Percentage Distribution of Household Environmental Health Hazards by Background Characteristics in High under 5 Mortality states

Characteristics		Rajasthan		Uttar Pradesh		Bihar		Madhya Pradesh	
		high health hazard	low health hazard	high health hazard	low health hazard	high health hazard	low health hazard	high health hazard	low health hazard
Maternal Highest education	No education	74.3	25.7	78.8	21.2	87.2	12.8	89.4	10.6
	Primary	52.7	47.3	63.5	36.5	68.5	31.5	75.3	24.7
	Secondary	22.6	77.4	41.7	58.3	32.0	68.0	50.6	49.4
	Higher		100.0	14.3	85.7	8.8	91.3	14.9	85.1
Total		61.7	38.3	67.4	32.6	74.7	25.3	75.8	24.2
Paternal educational level	No education	80.4	19.6	79.8	20.2	90.6	9.4	92.2	7.8
	Primary	70.6	29.4	72.5	27.5	86.7	13.3	79.5	20.5
	Secondary	51.9	48.1	65.0	35.0	62.4	37.6	70.2	29.8
	Higher	22.3	77.7	33.3	66.7	25.6	74.4	26.7	73.3
Total		61.7	38.3	67.4	32.6	74.6	25.4	75.8	24.2
Place of Residence	Urban	8.9	91.1	18.4	81.6	37.2	62.8	31.7	68.3
	Rural	75.4	24.6	80.3	19.7	79.4	20.6	89.2	10.8
Total		61.7	38.3	67.4	32.6	74.7	25.3	75.8	24.2
Wealth Index	lowest	93.9	6.1	94.6	5.4	96.5	3.5	98.0	2.0
	middle	50.3	49.7	62.1	37.9	56.3	43.7	65.4	34.6
	highest	19.1	80.9	13.4	86.6	9.8	90.2	13.1	86.9
Total		61.7	38.3	67.4	32.6	74.7	25.3	75.8	24.2

TABLE 3b: Percentage Distribution of Household Environmental Health Hazards by Background Characteristics in Low under 5

Mortality states

Characteristics		Maharashtra		Karnataka		Kerala		Tamil Nadu	
		high health hazard	low health hazard	high health hazard	low health hazard	high health hazard	low health hazard	high health hazard	low health hazard
Maternal Highest education	No education	65.5	34.5	72.7	27.3	40.0	60.0	43.8	56.2
	Primary	45.2	54.8	55.1	44.9	17.3	82.7	34.8	65.2
	Secondary	27.4	72.6	21.9	78.1	7.6	92.4	17.8	82.2
	Higher	1.3	98.7	3.3	96.7	1.0	99.0	.5	99.5
Total		36.4	63.6	42.6	57.4	7.2	92.8	24.0	76.0
Paternal educational level	No education	77.8	22.2	70.8	29.2	31.3	68.8	39.1	60.9
	Primary	52.1	47.9	54.6	45.4	26.3	73.8	39.4	60.6
	Secondary	30.4	69.6	30.9	69.1	5.8	94.2	18.5	81.5
	Higher	9.7	90.3	10.3	89.7		100.0	4.3	95.7
Total		36.4	63.6	42.7	57.3	7.2	92.8	23.9	76.1
Place of Residence	Urban	5.1	94.9	13.3	86.7	4.2	95.8	9.7	90.3
	Rural	63.9	36.1	60.9	39.1	8.6	91.4	36.3	63.7
Total		36.4	63.6	42.6	57.4	7.2	92.8	24.0	76.0
Wealth Index	lowest	91.1	8.9	82.2	17.8	68.1	31.9	68.2	31.8
	middle	50.7	49.3	42.9	57.1	22.0	78.0	17.9	82.1
	highest	6.3	93.7	8.9	91.1	1.2	98.8	.8	99.2
Total		36.4	63.6	42.6	57.4	7.2	92.8	24.0	76.0