Effects on Household Environmental Health Hazards to Child Survival in selected states in India

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 4 is to reduce under-five mortality by two-thirds between 1990 and 2015. (MDG National level target of 42) (2015). Under 5 mortality in India was 74 and varies across the states, highest is in Uttar Pradesh (96) and lowest is in Kerala (16) (NFHS 3). Although several factors are responsible for the survival of children under age 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 present in the household environment (Racioppi, 2002). 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, where many contaminants settle (WHO, 2003; Mutunga, 2004). 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).

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 National Family Health Surveys (NFHS) round three (2005-06), 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. The analysis involved the use of descriptive statistics to examine the distribution of household environmental health hazards in each state. Percentage
distribution of 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 under5 mortality states.

Dependent Variables:

Childhood mortality (Yes, No) - *Response to question: Child is alive?*

Childhood diarrhoea (Yes, No) - *Response to question: Had diarrhoea in the last 2 weeks?*

ARI (Yes, No) - *Response to questions: Had cough and had short rapid breathing in the last 2 weeks?*

Socioeconomic variables:

Mother’s highest educational level (None, Primary, Secondary, Higher)

Father’s highest educational level (None, Primary, Secondary, Higher)

Residence (Urban, Rural)

Wealth index (Low, Middle, High)

*Low – lowest and second quintiles; high – highest and fourth quintiles*

**Household Environment Variables:**

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)
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. There is surprising evidence that there is little difference between high and low mortality states, more than 85% households access to improved source of drinking water. However, low mortality states 87% in TN, 77% in MH, 53% in Karnataka and 25% in Kerala have access to piped water. Although the source of water may be improved and made hygienic, timely 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 children under age five in UP, Bihar, states with low under5 mortality live in households with access to drinking water on the premises or within 15 minutes of the household. 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 under5 mortality states, use unimproved toilet facilities, or have no toilet facility. In TN and Karnataka one in three, in Maharashtra one in two, use improved toilet facility. It has been observed that the type of materials used for flooring is an indicator of the economic situation of households and a 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. 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 from wood, charcoal, straw, and dung. Unprocessed biomass fuels have a high level of toxic indoor air pollutants that have been linked to reduced birth weight, ARI, nutrition deficiency, and child mortality (Mishra and Retherford, 2007). More than 88% of children in the selected high under5 mortality states live in households where their mothers cook with firewood, charcoal, or straw whereas 61% of children in the low mortality states. Overall, the results from the study 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 having non-health hazard, much higher than the proportions in the high under-five mortality states. Moreover, more than six in ten children in high under age five states live in households classified as having high health hazard. 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.

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. In all the selected states, the higher the parent's educational level, the lower 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 in Rajasthan, live in a presumably safe environment, their counterparts in 9% of Bihar and 14% each in MP & UP live in households with high health hazards. Though partner’s tertiary level education have an impact, however less as compared to spouse’s education for giving children in safe environment in high under5 mortality states. However, in low mortality states, while most of the children of mothers with tertiary education, live in a presumably safe environment. Even father’s tertiary education helps children to live in safe environment in low under5 mortality against in high under5 mortality states. 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 good sanitation and housing environments. The significant positive relationship observed among all the selected states implies 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 under5 children are at risk. Children under age five living in rural areas are more likely to be exposed to household health hazards because of lack of basic infrastructure and amenities except the state of Kerala 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 high mortality states and rural Maharashtra and Karnataka in (60-65%) in low mortality states. The higher the wealth index, the greater is the likelihood of a good household health environment. Therefore, children from lower social classes may be more likely to be subject to ill health due to household environmental health hazards. In high under5 mortality states and Maharashtra, over 90% of children living in households in the lowest wealth index quintile are exposed to high household environmental health hazards. However, in Kerala and Tamil Nadu 32% of children in poor households are in a non- or low health hazard environment. In addition, within the high wealth index category, there are substantial differences among the selected states in the percentages with household environmental health hazards. The percentages of the high wealth index group living in a high health hazard environment are 10% to 19% in high under5 mortality states. Conversely, in this same wealth index group only 1% in Kerala and Tamil Nadu, 6% in Maharashtra, and 9% in Karnataka are in a high health hazard environment.

Household Environmental Health Hazards and Childhood Morbidity: Dehydration from diarrhea has been identified as one of the causes of death among children under age five. Data on childhood diarrhea in the last two weeks preceding the survey show that in MP children under age five have the highest incidence of diarrhea. One low-mortality state Karnataka, have a higher prevalence of childhood diarrhea than UP, in the high-mortality group. Logistic regression analysis reveals that source of drinking water and toilet facility has a significant effect on diarrhea for the low under5 mortality group. Children under age five 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 if the drinking water of a household in the low under-five mortality group is from an improved source and improve toilet, the risk of diarrhea significantly decreases 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%.

Conclusion: Disparities exist in the household environment of children in the selected states in India; the high under-five mortality groups are at a relative disadvantage on basic household environmental variables that affect hygiene. Socioeconomic status of mothers is salient 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 equal distribution of resources and facilities especially 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.

References:


