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Morbidity among Slum Children of Mumbai City

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Abstract:

Childhood diseases are aggravated by lack of knowledge and facility for their care which in turn becomes more problematic if mothers come from low socio-economic strata where environmental problems remain at galore. This study selects the socio-economic, demographic and environmental variables at individual and community level from National Family Health Survey (1998-99). Bi-variate analysis and multivariate logistic regression has been done to arrive at the results. It is found that high proportions of children suffering from ARI are in Maha_Rural followed by slum and lesser proportion is in Urban Maharashtra, among 0, 1, and 2 year age group. Impact of mothers' education on ARI is high in urban Maharashtra urban followed Maharashtra rural and less proportion is on Mumbai slum, as well as proportion having ARI is high in absence of more numbers of room and low in presence of more number of rooms like that in low SLI have higher proportion of having ARI except Mumbai slum. . It is suggested that intensive efforts are required to educate the masses, particularly those as the slum dwellers or living in far off rural areas regarding danger signs of diarrhea, ARI and pneumonia and its proper treatment.

Keywords: *Childhood diseases, ARI, Diarrhea, Mumbai Slum, Environmental Conditions*

1. Introduction

Twenty two percent women are in the age group of 15-45 years while 40 percent are under 15 years of age in India. The problems of these vulnerable groups relate to excessive reproduction, infections and malnutrition within the background of poverty, ignorance, gender preferences and social inequalities. They deserve priority in planning and implementation of development programs in view of their critical role in human development (Karunakaran, 2000). Mother and Child Care' has been the priority area for the planners all-over the world because (a) maternal and child mortality rates are higher compared to other segments of population and (b) mother and child care affects the quality of life of the future generations. It is a well documented fact that knowledge and utilization of reproductive health care services in different communities in India are intimately associated with tradition belief, customs and individual background characteristics. These practices are interwoven in the social and religious life of the people, almost on a daily basis.

2. Urbanisation And Slum

Urbanization is one of the major social changes sweeping all over the world, especially in developing countries, where urban growth rate is rapidly increasing. Urbanization brings fundamental changes in the ways people live, in the number of people they see, in the places they work, and often in the quality of water they drink, the air they breathe, and the housing in which they live. Such changes have profound implications both positive and negative for the health of urban or city residents. It is worth mentioning that slightly more than one fourth of India's population live in urban areas and one third of urban population live in slums (Reichmann et.al., 2004). According to the Slum Area Act 1956 slums are the areas where buildings are unfit for human habitation for reasons such as dilapidation, overcrowding, faulty arrangement of streets and lack of ventilation, light or sanitary facilities. "Slum is a group of buildings, or area characterized by over-crowding, deterioration, unsanitary conditions or absence of facilities or amenities which, because of these conditions or any of them, endanger the health, safety or morals of its inhabitants or the community. The characteristics of slums include appearance, economic status, overcrowding, urban land politics, health and sanitation, morals, ways of life, social isolation, morbidity, slum permanency etc. The slums in India have been described as chaotically occupied, unsystematically developed and generally neglected. They are over populated and overcrowded with ill-repaired and neglected structures, insufficiently equipped with proper communication and physical comforts (Karunakaran, 2000).

Indian slums have inadequate social services and welfare agencies to deal with the needs and social problems of families, who are victims of biological, psychological and social consequences of the physical and social environment. Shortage of water, electricity and sanitary facilities are common in these slums. Studies on Bombay slums have been carried by many scholars (Desai and Pillai, 1970; Ramchandran, 1971). A team of governmental officials from Bombay and University of Edinburgh carried out a study on the health status of Dharavi slum children in 1985 which described the detailed processes of slum formation in Bombay, and the contemporary socio-cultural and socio-economic status of slum dwellers. It revealed that heavy industrialization led to slum formation in Bombay. Particularly the textile mills of nineteenth and early twentieth century brought in the unskilled and semi skilled labourers from Ratnagiri and Satara. The physical and social conditions of today's Indian slums are generally the worst. For example the streets, lanes, and open, drainage in typical slum areas are filthy and as many as six to twelve people sleep in a room or hovel or sacks covered shed. Prevalence of disease, chronic illness and infant mortality remain high. Personal hygiene, sanitation, nutrition and child care are very poor. Illiteracy is exceedingly high and cultural and recreational activities are almost nil. (Bir, 2001). The government hospitals have been providing the health care services free of costs to common people. Slum populations are of course the beneficiaries of all government health institutions including hospitals and municipal/corporation dispensaries. In the urban setting and being integral part of urbanism, the slum dwellers also are exposed to some non-governmental health institutions. But the provision of these health services and the utilization pattern are totally different in the real field. Child survival is closely linked to the timing, spacing and number of births and reproductive health of mothers. Early, late, numerous and closely spaced pregnancies are major contributors to high infants and child mortality and morbidity rates, especially where health care facility are scarce.

3. Integrated Child Development Services

The ICDS is a unique national program of the Indian Government, which started on October 2, 1975. It provides health services, nutrition and pre-school education to pre-school children through a co-ordinate approach. ICDS is implemented by department of women and child development, Ministry of welfare, at the central and state levels with active participation of the health and family welfare ministry.

4. Breathing Difficulty

Large number of children's death fewer than five years of age in the country are caused by ARI, mainly pneumonia, cough and cold accompanied by rapid breathing are the alarming signals of ARI. Many ARI deaths among children could be averted if families were aware of these signals of pneumonia (United Nations Children's Fund, 1997). At the time of birth a child may face the breathing problem due to various reasons. In this problem baby's respiratory rate is more than 60 breaths per minute, and the baby has central cyanosis (blue tongue and lips), the baby has chest in drawing. The baby is grunting on expiration. Children suffer from a variety of diseases such as acute respiratory infection, pneumonia and diarrhoea etc.

5. Acute Respiratory Infection (ARI)

ARI is a major cause of infant and child morbidity and mortality throughout the world. Early diagnosis and treatment with antibiotics can prevent a large proportion of acute respiratory infection. It has been realized that there should be a specific program for the ARI control. The WHO has recommended special efforts at the national level in developing countries for controlling the acute respiratory infections. A National Programme for control of acute respiratory infections has been proposed to be introduced in India. Such national programs have already been introduced in 14 countries. ARI is more common among boys than girls and among children living in rural areas. In these crucial times of world's development, nearly 20 percent children die before their fifth birthday and one third of these deaths are associated with ARI. Fifteen million children die in India due to acute respiratory infection. All over the world 7, 50,000 per year children below the five years of age die due ARI, i.e. 2000 deaths per day and 80 deaths per hour. Both these points indicate that the risk of an Indian child dying from ARI is 30-75 times more than that of in other parts of the world. In India, ARI accounts for 14.3 percent deaths that occur during infancy and 15.9 percent deaths during the age 1-5 years. A child suffers 5-8 episodes per years in the urban and 2-3 episodes per year in the rural areas of India. (Mahajan and Gupta 1992) Acute Respiratory Infection comprises 25-30 percent of the hospitals consultations and 25 percent of the hospital admission (Mahajan and Gupta, 2004).

6. Host Factor For ARI

- Low birth weight: Many children have low birth weight (less than 2500 gm) at the time of birth. These children have more chance to get infected from pneumonia, cough and cold, which might turn severe and lead to death. A recent study in rural India demonstrated that fatality rate of ARI was higher among infants in a village where Acute Respiratory Infection control program was going on. It was also observed that incidence of ARI is somewhat different among children living in rural areas, children living in slum areas of Mumbai, children of lower birth order, children of mothers from other backward classes, children of literate mothers and children living in households with a medium or high standard of living index.
- Malnutrition: The average duration and incidence of Acute Respiratory Infection is often very high. The predictable illness in malnourished children is even higher. The illness complication are more frequent and the prognosis more grave; for instance, pneumonia may be twenty times more frequent in malnourished children as compared to normal children. (Mahajan and Gupta 1992) Breastfeeding can protect against severe respiratory infection because of the colostrums, which is found in human milk just after the child birth which have as a host resistance factors present in human milk and

play a crucial role against both viral and bacterial agents. ARI incidence is higher because of deficiency of Vitamin-A. It is an essential element for the continuation of the proper breathing of infants and child.

- Lack of immunization: Pneumonia is a common complicated disease associated with the measles and whooping cough which can be prevented by appropriate immunization. Cough and common cold are also common disease among the infants and children. (Mahajan and Gupta 1992)
- Antecedent viral infection: Such types of infection occur due to imbalance of the child's immune system which is often not properly treated by the guardian during infancy. Accuracy of these measures is affected by the reliability of the mother's recall of when the disease episodes have occurred (Mahajan and Gupta 1992)

7. Environmental Factors For ARI

- Air pollution: Air pollution, both indoor and outdoor, is the main cause of incidence of ARI during childhood. The increased pollution of air damages the breathing system of the infants and children, which can paralyse the immune system or lungs, and which also, might increase susceptibility to severe infection.
- Passive smoking: Indoor smoking of cigarettes and bidis can affect the child's respiratory illness; Passive exposure to smoke in childhood at home has bearing on the low development of respiratory function which puts the infants and children to increased risk from the environmental agent later in life.
- Pollution from biomass fuel: Pollution due to smoke from cooking and heating fires can increase a child chance to have severe ARI. Environmental pollution like burning tyres, plastics and other metallic elements can also create pollution for the infants and child.
- Overcrowding: In crowded households the members of the family very often come into close contact of each other which will increase the secondary attack rate in infants and children for respiratory infection.

8. Preventive Measures For ARI

Anaemia may have detrimental effects on the health of women and children and may become an underlying cause of maternal mortality and perinatal mortality. Anaemia results in an increased risk of premature delivery and low birth weight. Early detection can help to prevent complications related to pregnancy and delivery as well as child development problems. In India, the Government's Reproductive and Child Health program, iron and folic acid tablets are provided to pregnant women in order to prevent anaemia during pregnancy. The preventive measures include reduction in malnutrition, promotion of breastfeeding, improvement of birth weight, reduction, in indoor smoke exposure and strengthening of immunization services and coverage. The ARI which can be prevented by immunization includes measles, diphtheria and whooping cough. These have been covered under the universal immunization program.

9. Diarrhea

Deaths from acute diarrhoea are most often caused by the dehydration due to loss of water and electrolytes. Nearly all dehydration related deaths can be prevented by prompt administration of solution. Because deaths from diarrhoea are in significant proportion of all child deaths, the Government of India has launched the "Oral Rehydration Therapy Programme" as one of its priority activities for child survival. One major goal of this program is to increase awareness among mothers and communities about the causes and treatment of diarrhoea.

10. Oral Rehydration Salt (ORS)

ORS packets are made widely available and mothers are taught how to use them. There are non infectious causes of diarrhea, but sepsis is the most common cause in the newborns during the newborn period. The use of unnecessary anti-diarrheal drugs is widespread across all socioeconomic groups, and is particularly common among urban children (particularly children in Mumbai), children of more educated mothers, and children from households with high standard of living (Mahajan and Gupta, 2004).

"Observe strict infection prevention practices at all times when caring for any baby with diarrhoea to prevent spreading one baby's infection to other babies in the newborn special care unit. Wear gloves when handling soiled napkins and other items used to care for the baby, and carefully wash hands after handling a baby with diarrhoea." (World Health Organization)

11. Problems Due to Diarrhea

During this type of condition the baby passes stool many times in a day with increased frequency. The baby's discharges the watery stool and may be in green colour, it may contain mucous or blood. Ask the mother about the baby's daily routine. Baby being fed any foods or fluid other than breast milk? What colour the baby's stool look like? Is it watery or green in colour, or does it contains mucous or blood? How frequently has the baby been passing stool in a day? Sign of dehydration (loss of water) Due to loss of water many disease can occur e.g. sunken eyes, loss of skin elasticity, or dry tongue, blue lips or mucous membranes. Sign of sepsis (e.g. poor feeding, vomiting, breathing difficulty). Given this, it would be interesting to find out an analysis of ARI and Diarrhea in a less developed area like slum of Mumbai City.

12. Objective

- To analyze the socio-economic, demographic and environmental factors affecting morbidity of children in Maharashtra with special reference to Mumbai Slum both at the individual and community level
- To find out the levels in ARI and diarrhea in Maharashtra both at the individual and community level

13. Data and Method

The data for the current study has been taken from the National Family Health Survey (1998-99). The survey covers 91,000 ever married women from 26 States in India. This study attempts to understand the dynamics of morbidity pattern among children, its determinants at the household and community level in slums of Mumbai. This paper presents the morbidity pattern, particularly for infants and young children. Only ARI and Diarrhoea related information on the prevention and treatment diseases, especially those that are life threatening to young children have been considered. Detailed information on the ARI and Diarrhoea can be used to identify the population at high risk and in the need of health services. This paper is in two parts, first part describes about the Acute Respiratory Infection (ARI). This is primarily pneumonia, a major cause of illness among infants and children and leading cause of childhood mortality throughout the world (Murray and Lopez, 1996). Early diagnosis and treatment with antibiotics can prevent a large proportion of ARI / Pneumonia deaths, and the second part describes diarrhea. Bi-variate analysis and multivariate logistic regression has been applied for analysis.

13.1. Child care and Background variables considered for analysis

Acute Respiratory Infection (ARI) is considered as dependent variables and which is dichotomous in nature. The explanatory variables have been discussed at two level individual and household level. The explanatory variables have been selected based on their theoretical and empirical importance as evident from the existing literatures, for the utilization of child health services on the one hand, and their availability in the NFHS-II data set on the other. The dependent and independent variables considered for analysis is listed.

DEPENDENT VARIABLES

Child care:

ARI infection	'0' for no ARI & '1' for suffering from ARI
Diarrhoea	'0' for no Diarrhoea & '1' for suffering from Diarrhoea

INDEPENDENT VARIABLE

Individual level:

Age of Child	'0' for all other age group, 1' for age 1 & '2' for age 2
Sex of Child	'0' for male & '1' for female
Birth order	'1' for 1 st birth order, '2' for 2 nd birth order & '3' for 3 rd birth order and above
Mothers education	'0' for Illiterate, '1' up to primary school '2' for middle and above

Household level

Standard of living	'1' for low standard of living '2' for medium standard of living '3' for high standard of living
Religion	'1' for Hindu '2' for others (Muslim, Christian, Jain and Others)
Residence	'0' for other urban area '1' for urban with slum area '2' for rural area
Number of rooms	'1' for 1 room, '2' for 2 rooms & '3' for 3 and above rooms
Fuel	'1' for LPG/ Electricity, '2' for Kerosene & '3'

Others

Water supply	'1' for unsafe & '2' for safe
Water filter	'1' for unfiltered & '2' for filter

13.2. Individual Level Characteristics

We have examined the child and his/her parents socio-economic background characteristics at the time of survey. It is well established that the children of educated mothers are more likely to take advantage of modern health care services than uneducated mothers. Educated mother women are considered to have greater awareness of the existence of child health services and benefits in using such services. Educated women are also likely to have proper knowledge and information on modern medicals treatments and have greater capacity to recognize specific illness. Working women are expected to have greater control over resources in the household. They are likely to have greater knowledge about childbirth due to greater freedom for movement. However, it is also argued that women's work in developing country is poverty induced and therefore likely to have negative impact on the use of their health care services (Berman et al., 1997). Women's exposure to the mass media is an important source of information regarding the beneficial impact of preventive care for child health services (Rao et al., 1998). A composite measure on number of rooms and fuel has been computed taking the sum of equally weighed binary input variables. The composite variables considered three factors, namely, 1, 2, 3 and LPG, Electricity, Kerosene, Other on getting good quality living.

13.3. Household level characteristics

Religion may have influence on the utilization of child health services as it reflects imbedded socio culture beliefs and practices. In India, there are many religions. It is believed that household with higher standard of living are more modern and therefore they are more likely to use modern health care services. Economic status of the households is measured by a composite index computed from the score on several indicators of items and facilities such as availability of piped water, toilet, housing condition bicycle, car etc. NFHS-II provided three categories of standard of living under low, medium and high category.

14. Analysis And Findings

14.1. Incidence Of ARI In The Study Area

Infants suffering from acute respiratory infection in Mumbai slum are 8.2 percent while in urban Maharashtra and rural Maharashtra such percentages are 11.2 and 17.5 respectively. It is evident from table 1, that proportion of children suffering from ARI in rural Maharashtra is more than double of Mumbai slum. Similarly in case of children aged 1 year, ARI affected children in Mumbai slum are 13.6 percentage points, and in urban Maharashtra 11.8 percent. In case of children aged 2 years the percentage of ARI affected is 13.2 in rural Maharashtra followed by the 9.9 percent in Mumbai slum 8.9 percent is urban Maharashtra. The sex wise break up indicates that ARI affected male children are 13.1 percent in Mumbai slum, which is higher than Maharashtra urban but lesser than Maharashtra rural. Caste is an important factor all over India. According to NFHS-II, castes were divided into many categories, but in this study the castes have been categorized as SC/ST/OBC and others. It is found that slightly higher proportion of SC/ST/OBC of rural Maharashtra (17.2) had their children suffering from ARI compared to the SC/ST/OBC of urban Maharashtra and Mumbai slum. In other castes larger proportion of children suffering are in rural Maharashtra and lesser percentage is in Mumbai slum. In Mumbai slum the occurrence of ARI appears to be less among SC/ST/OBC than others. It can be said that SC/ST/OBC of rural Maharashtra are far behind. As mentioned earlier in NFHS-II there were many classifications of religion but after clubbing only two categories as presented in above table, Hindu and others includes all other religions.

Characteristics		Mumbai Slum	Maha Urban	Maha Rural
Age of Child	0	8.2(147)	11.2(125)	17.5(252)
	1	13.6(147)	11.8(127)	16.3(252)
	2	9.9(142)	8.9(112)	13.2(228)
Sex of Child	Male	13.1(221)	10.5(191)	16.6(410)
	Female	7.4(230)	10.1(189)	13.1(358)
Mother's Education	Illiterate	31.7 (142)	45.7 (105)	39.8 (362)
	Primary	42.3 (130)	43.5 (138)	42.1 (171)
	Middle & above	29.6 (162)	33.0 (279)	38.1 (197)
Caste	SC/ST/OBC	9.1(110)	11.8(187)	17.2(361)
	Others	10.6(341)	8.8(193)	13.0(400)
Religion	Hindu	11.1(244)	8.3(217)	15.3(681)
	Others	9.2(207)	12.9(163)	12.6(87)
Birth Order	1	8.2(159)	9.9(151)	15.2(224)
	2	9.6(136)	7.8(103)	14.6(212)
	3 or above	12.8(156)	12.7(126)	15.1(332)

Table 1: Percentage distribution of children suffering from ARI in Mumbai slum, Rural and Urban Maharashtra by socio-economic and demographic characteristics
Figures in parenthesis show frequency.

The findings suggest that intensive efforts are required to educate the masses, particularly those as the slum dwellers or living in far off rural areas regarding danger signs of ARI and pneumonia and its proper treatment. The residents of Mumbai slum appear to be more health conscious.

Characteristics		Mumbai Slum	Maha Urban	Maha Rural
House type	Pucca	12.4(249)	8.1(161)	6.1(66)
	Non pucca	7.4(202)	11.9(218)	15.6(698)
Numbers of room	1	12.2(287)	7.0(115)	13.0(269)
	2	6.3(144)	14.3(119)	15.2(297)
	3+	10.0(20)	9.6(146)	17.3(202)
Fuel	LPG/Electricity	5.4(148)	6.1(147)	14.8(61)
	Kerosene	12.6(301)	14.2(162)	13.7(51)
	Others	--	9.9(71)	15.1(656)
Standard of Living Index	Low	4.8(21)	15.6(64)	17.8(365)
	Medium	11.7(299)	9.8(214)	12.6(302)
	High	7.2(83)	6.5(92)	9.8(82)

*Table 2: Percentage distribution of children suffering from ARI in Mumbai slum, rural and urban Maharashtra by household characteristics
Figures in parenthesis show frequency*

Material used for the construction of house also effects occurrence of ARI. On the basis of material used the houses have been classified as pucca and non pucca. It is interesting to note from table no. 2 that incidence of ARI is more among pucca houses of Mumbai slum and non pucca houses of rural as well as urban Maharashtra. More is the number of rooms in the house, greater is the ventilation. In Mumbai slum larger proportions of houses have only one room where as in rural Maharashtra many houses have more than three (+) rooms. It is believed that use of kerosene and firewood may lead to ARI and use of LPG/electricity may cause less problem and hence less occurrence of ARI. This phenomenon is clearly observed in Mumbai slum and urban Maharashtra where incidence of ARI affected children is less among the household using LPG/electricity compared to house using kerosene etc. In rural Maharashtra use of firewood, coal and other things are very much prevalent. This may be one of the causes of higher incidence of ARI in rural Maharashtra. Standard of living index also play an important role in well being of children. Here the standard of living index has been divided into three categories such as low, medium and high. It is found that low SLI people of Mumbai slum are more aware about their children's suffering from ARI compared to the same group from rural and urban Maharashtra. In case of medium and high standard of living index, urban Maharashtra appears to be quite ahead.

14.2. Percentage distributions of children suffering from Diarrhoea

Diarrhoea is the second most important killer of the children under age five worldwide, following acute respiratory infection (National Family Health Survey 1998-99). According to this table age of child is divided in three categories, among 0-12 month's child are more affected with diarrhoea in relatively higher proportion of urban Maharashtra, than following rural Maharashtra. Again higher proportion of diarrhoea affected children age 13-24 months in urban Maharashtra, which is relatively quite high other than two categories and rest categories have almost same proportion of diarrhoea children. Like that 25-36 month's children have again relatively high proportion of diarrhoea affected children in urban Maharashtra and rest of them categories have almost same proportion of diarrhoea children. The sex wise break up indicates that irrespective of sex, higher proportion of children of urban Maharashtra suffer from diarrhoea but incidence of diarrhoea appears to be more common among the girls than boys. It is apparent from table 3 that the proportion of children suffering from diarrhoea is less in Mumbai slum than urban and rural Maharashtra.

Characteristics		Mumbai Slum	Maha Urban	Maha Rural
Age of Child	0	21.8(147)	33.6(125)	25.4(252)
	1	25.9(147)	37.8(127)	23.0(252)
	2	16.2(147)	24.1(112)	18.4(228)
Sex of Child	Male	20.4(221)	29.3(191)	21.2(410)
	Female	20.9(230)	32.3(189)	21.5(358)
Mother's Education	Illiterate	21.1 (142)	33.3 (105)	24.4 (361)
	Primary	23.7 (131)	35.5 (138)	25.7 (171)
	Middle & above	19.8 (162)	22.6 (279)	16.3 (196)
Caste	SC/ST/OBC	10.9(110)	29.4(187)	20.2(361)
	Others	23.8(341)	32.1(193)	22.3(400)
Religion	Hindu	13.9(244)	26.3(217)	21.7(681)
	Others	28.5(207)	36.8(163)	18.4(87)
Birth Order	1	23.3(159)	31.8(151)	19.6(224)
	2	17.6(136)	26.2(103)	17.5(212)
	3 or above	20.5(156)	33.3(126)	20.0(332)

*Table 3: Percentage distributions of children suffering from Diarrhoea in Mumbai slum, rural and urban Maharashtra
Figures in parenthesis show frequency*

Mother's education plays an important role in well being of children. In NFHS-II mother were categorized in many categories. Slightly higher proportion of illiterate mother's children in urban Maharashtra suffers from diarrhoea compared to the primary educated women ones. It is called interest to note that proportion of children suffers from diarrhoea is almost half in case of SC/ST/OBC compared to other caste in Mumbai slum. Religion also divided only in two categories, Hindu and others, includes Muslims, Christian, Sikh and Buddhist. That indicates irrespective of religious composition, higher proportion children suffering from diarrhoea are in urban Maharashtra. In Case of Hindus, proportion of children suffering from diarrhoea in urban Maharashtra is almost double in urban Mumbai slum. Similarly proportion of children suffering from diarrhoea in Mumbai slum among Hindus is less than half of others religious. It can be opened that Hindus of Mumbai slum are very much aware of the incidence of diarrhoea.

Characteristics		Mumbai Slum	Maha_Urban	Maha_Rural
House type	Pucca	18.9(249)	23.0(161)	21.2(66)
	Non pucca	22.8(202)	36.2(218)	21.5(698)
Water supply	Safe	20.7(450)	31.5(368)	20.2(504)
	Unsafe	-(1)	8.3(12)	23.5(264)
Water filter	Unfiltered	21.3(385)	33.3(309)	22.1(671)
	Filter	16.7(66)	19.7(71)	16.5(97)
Standard of Living Index	Low	33.3(21)	32.8(64)	23.3(365)
	Medium	21.2(299)	32.2(214)	20.5(302)
	High	20.5(83)	20.0(92)	17.1(82)

Table 4: Percentage distributions of children suffering from Diarrhoea in Mumbai slum, rural and urban Maharashtra
Figures in parenthesis show frequency

In NFHS-2 birth order is divided in four categories but for this table, it divided in three categories one, two and three (+). This table shows that the prevalence of diarrhoea is relatively high among first order birth, children in Maharashtra urban followed by Mumbai slum and rural Maharashtra. In second birth order, higher proportions of diarrhoea affected children are in urban Maharashtra and in rest of both categories having same proportion of diarrhoea affected children. In third birth order again urban Maharashtra has relatively higher proportion of diarrhoea affected children and rests of them have same percentage of diarrhoea affected children. This table indicates that Maharashtra urban people are less aware about diarrhoea.

Table 4 indicates that urban Maharashtra has relatively higher proportion of diarrhoea affected children and almost same proportion is observed in other two places. It is important to note that the incidence of diarrhoea is very low/ negligible in some pockets of Mumbai slum where water supply is very much unsafe. Around 1 of every 4 or 5 children in rural Maharashtra irrespective of safe/unsafe water suffered from diarrhoea. Supply of quality of water affects the health of an individual to a greater extent. Infect many of the diseases which occur during the children are water born disease. Water contains lots of impurities. Top are hand pump water are generally termed as safe source of water supply. Water contains many jaundice impurities. These impurities act a health of an individual. If not removed or water not filtered properly, there is a chance of infection which in turn may cause jaundice, diarrhoea and other water born diseases. It is evident from table 4 that proportion of children suffering from diarrhoea is comparatively higher where children use unfiltered water. Standard of living index is divided in three categories. Low, medium and high around three of every 10 children from low SLI group suffer from diarrhoea. The scenario changes in case of Mumbai slum and rural Maharashtra with the change in SLI but remains unchanged in case of medium SLI in urban Maharashtra. In case of low standard of living index higher proportion of diarrhoea affected children are in Mumbai slum followed by urban Maharashtra and rural Maharashtra. Low SLI residents of Mumbai slum are using unsafe drinking water like those in urban Maharashtra, for medium standard of living index higher proportion of diarrhoea affected children are in urban Maharashtra. And in high standard of living index category occurrence of diarrhoea is less among children of rural Maharashtra this table also shows that irrespective if SLI children from rural Maharashtra suffer less from diarrhoea.

Characteristics	Odds ratio	
Age of Child	0	1.0
	1	1.125
	2	.778**
Sex of Child	Male	1.0
	Female	.894
Mother's Education	Illiterate	1.0
	Primary	1.149
	Middle and above	.860
Religion	Hindu	1.0
	Others	1.479***
Birth Order	1	1.0
	2	.841
	3 or above	.804
Numbers of room	1	1.0
	2	1.065
	3+	1.425**

Fuel	LPG/Electricity	1.0
	Kerosene	1.385**
	Other	1.425
Standard of Living Index	Low	1.0
	Medium	.869
	High	.729
Region	Rural	1.0
	Slum	.796
	Rest of urban	.986

Table 5: Logistic Regression Results for ARI: Maharashtra
 *** $P < 0.01$, ** $P < 0.05$, * < 0.1 ; Figures in parenthesis show frequency

In bi-variate analysis, we have documented certain relationship between the child health indicator, Acute Respiratory Infection (ARI) with individual level and household level variables. Logistic regression analysis was carried out to identify the contribution of different background variables that have influenced different components of utilization of child health services. One set of logistic regression model was executed to study variables with same set of background characteristics. Logistic regression is considered the most appropriate statistical tool to adopt here since the investigation variables are categorical and dichotomous. The estimated odds ratios for each covariate with the level of significance obtained from logistic regression are given in table 5. An estimated odds ratios of 1 for a category indicates that the use of child health services by children's mothers do not differ from those in the reference category. If estimated odds ratio is greater than 1 the likelihood of use child health services is higher relative to the reference category and vice versa. Proportion of children who are treated with the medicine for ARI declines substantial with the age of children. It is evident from table 5 that other than Hindu religion other are more significant in terms of ARI disease. We have examined the child and his socio-economic background characteristics at the time of survey. It is an established fact that the children of educated mothers are more likely than uneducated mothers to take advantage of modern health care services. Educated women are considered to have greater awareness of the existence of child health services and benefits in using such services. Educated women are also likely to have proper knowledge and information on modern medicals treatments and have greater capacity to recognize specific illness. Working women are expected to have greater control over resources in the household. They are likely to have greater knowledge about childbirth due to greater freedom for movement. However, it is also argued that women's work in developing country is poverty induced and therefore likely to have negative impact on the use of their health care services (Berman et al., 1997). Women's exposure to the mass media is an important source of information regarding the beneficial impact of preventive care for child health services (Rao et al., 1998). A composite measure on water quality has been computed taking the sum of equally weighed binary input variables. The composite variables considered two factors, namely, unsafe and safe water on getting good quality of water. In case of negative answer in both the factors, water is considered as having unsafe and safe water (coded as '0' for unsafe) and '1' for safe water.

Characteristics	Odds ratio	
Age of Child	0	1.0
	1	.985
	2	.618***
Sex of Child	Male	1.0
	Female	1.017
Mother's Education	Illiterate	1.0
	Primary	1.133
	Middle and above	.765
Religion	Hindu	1.0
	Others	1.527**
Birth Order	1	1.0
	2	.704**
	3 or above	.896
Water supply	Unsafe	1.0
	Safe	.974
Water filter	Unfiltered	1.0
	Filter	.743*

Standard of Living Index	Low	1.0
	Medium	.916
	High	.833
Region	Rural	1.0
	Slum	.859
	Rest of urban	1.447**

Table 6: Logistic Regression Results for Diarrhoea: Maharashtra
 *** $P < 0.01$, ** $P < 0.05$, * < 0.1 , Figures in parenthesis show frequency

Religion may have influence on the utilization of child health services as it reflects socio culture beliefs and practices. In India, people are in many religions. It is hoped that household with higher standard of living are more modern and therefore they are more likely to use modern health care services. Economic status of the household is measured by a composite index computed from the score on several indicators of items and facilities such as availability of piped water, toilet, housing condition bicycle, car etc. NFHS-II provides three categories of household standard of living under low, medium and high. In bi-variate analysis, we have documented certain relationships between the child health indicator (Diarrhoea) with individual level and household level variables. Logistic regression analysis was carried out to identify the contribution of different background variables that have influenced different components of utilization of child health services. One set of logistic regression model was executed to for study variables with same set of background characteristics. The estimated odds ratios for each covariate with the level of significance obtained for diarrhoea. Results based on logistic analysis regression show that diarrhoea is caused by loss of water. Diarrhoea has a significant proportion of all child death, that's why Government of India launched *Oral Rehydration Salt* for child survival. These ORS packets are widely available and easy to use. According to this regression, child aged two years are more significant than other age group, in case of religion are also more significant than Hindu in term of diarrheal disease.

15. Discussion, Conclusion and Policy Implications

We set out to find the socio-economic, demographic and environmental factors affecting morbidity pattern of children with special reference to Mumbai Slum both at the community and individual level. In both the logistics table the child care is dependent variable are ARI infection and Diarrhoea, and independent variable are individual and household level. It is found that high proportion of children suffering from ARI is in Maha_Rural followed by slum and lesser proportion is in Maha_Urban among 0, 1, and 2 year age group. Impact of mothers' education on ARI is high in urban Maharashtra urban followed Maharashtra rural and less proportion is on Mumbai slum, as well as proportion having ARI is high in absence of more numbers of room and low in presence of more number of rooms like that in low SLI have higher proportion of having ARI except Mumbai slum. But in the high SLI category, proportion of having ARI is almost same. Higher proportion of children suffering from diarrhea are in urban Maharashtra and lesser proportion are in slum which shows that the impact of mothers' education is high in urban Maharashtra and less in Mumbai slum. Low SLI children have higher proportion of diarrhoea compared to those higher in SLI. All findings shows that age of child is significant as well as other than religion are also significant. It is suggested that intensive efforts are required to educate the masses, particularly those as the slum dwellers or living in far off rural areas regarding danger signs of ARI and pneumonia and its proper treatment. The residents of Mumbai slum appear to be more health conscious.

16. References

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