

# Domestic environment & morbidity of under five children

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## Abstract

Under five children are vulnerable to many factors. The most important role is played by harmful domestic environment through which a child has to pass, which may lead to morbidity and mortality. Over 40% of the global burden of disease attributed to environmental risk factors fall on children below 5 years of age, who account for about 10% of the world's population. 1 These deaths can be prevented. In September 2002, WHO launched the Healthy Environment for Children Initiative. To look into the new area of concern, this cross sectional study was carried out to explore the influence of domestic environment over the illness of under five children. The study areas were selected by the method of two-stage sampling. History of fever, cough or diarrhoea among under five children within last 15 days from the day of the interview was enquired to perform relational analysis with domestic environment. When collection of water within 15 meters of the house was considered, 100% of the Urban slum households reported for fever as compared to only 3.6% in the MIG area. The lack of hygiene was reflected in the form of significantly higher skin disease rate of 15.2 % among Slum children as compared to 3.95% in MIG area.

## INTRODUCTION

A child's world centers around the home, school and the local community. These should be healthy places where children can thrive and remain protected from disease. But in reality, these places are often so unhealthy that they underlie the majority of deaths and a huge burden of disease among children in the developing world.<sup>2</sup> More than 5 million children from 0-14 years old die every year from diseases linked to the environments in which they live, learn and play: their home, school and community. They are now working to make children's lives healthier where they live, learn and play.<sup>2</sup>

Strategies have been developed to combat these threats to children's health. They need to be implemented on a global and national scale. So the World Health Day-2003 was dedicated to "Healthy Environment for Children".

To understand this new area of concern, this study was carried out to assess the influence of domestic environmental factors over the health of sampled under five children in a fast growing Surat city so that magnitude of the problem can be understood for making suitable recommendations for prevention of morbidity and mortality among them.

## MATERIALS AND METHOD

This cross sectional study was undertaken to assess the influence of domestic environmental factors over the health

of under five children in Surat city. Surat is situated 300 Km north to Mumbai. Since past 2-3 decades, fast industrialization has been noted in Surat, particularly in Textile and Diamond sector. The population of Surat City according to 2001 census was 24,33,085 with a high population density of 21,676 people per sq. km and a fast decadal growth rate of 62%. Around 4,06,018 (17%) population resides in 306 slum pockets. The study areas were selected by the technique of two-stage sampling. Thus, an urban slum (Morarji Vasahat) and a Middle-income group (Harinagar-3) areas were selected which were under Khatodara Urban Health Center. The information was collected using interview technique by house to house survey. Study period was from January to May 2005. A sample size of 600 families was estimated, that is why 300 households from urban slum and 300 households from Middle Income Group area were surveyed. Data entry and analysis was undertaken by EpiInfo software (version 6.04).

## RESULTS

The study areas were in Udhna Zone whose urban health center (Khatodara Urban Health Center) was about 1.5 Km from the campus of Government Medical College, Surat. These areas predominantly cater to many textile and chemical industries. The Urban slum (Morarji Vasahat) selected for this study was about 5 Km away from the Government Medical College, Surat. The population of this

area was 6145 and mainly industrial workers were living in it. The area had piped water supply from Surat Municipal Corporation (SMC). The drainage of houses was either connected to sewage system of SMC or was directly connected to nearby khadi (Open drainage system). Solid waste disposal was indiscriminate. Majority of the houses were kuchcha.

Another study area from same Udhna Zone (under Khatodara Urban Health Center) was selected (MIG area - Harinagar-3) which was roughly 1.5 Km away from the Urban slum area (Morarji Vasahat). It was also 5 Km away from Government Medical College, Surat. The population of this area was 3627. In this area majority of the houses were pucca. The water supply was through piped water of Surat Municipal Corporation and there was well-developed network of underground sewage system. There was well planned and working facility of collection and disposal of solid waste.

**Figure 1**

Table 1: Comparison of domestic environment of study population of two areas.

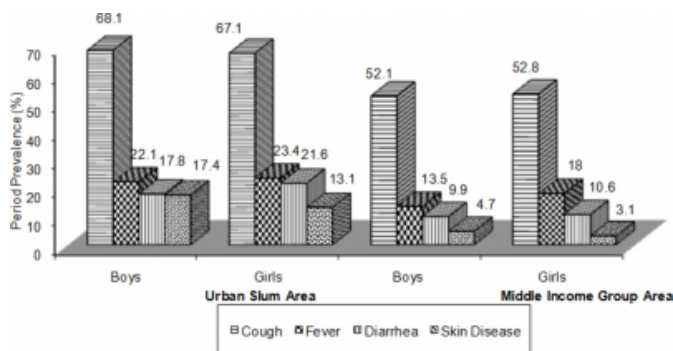
Characteristics	Type of urban area of the City			X <sup>2</sup>	df	P
	Urban slum (Morarji Vasahat)	Middle Income Group (Harinagar-3)				
<b>Households</b>	n=300	n=300				
<b>Housing</b>						
- Kuchcha	50 (16.7)	Nil				Not Applicable
- Kuchcha-pucca	249 (83.0)	2 (0.6)				
- Pucca	1 (0.3)	298 (99.3)				
<b>Floor of the house</b>						
- Crevices	9 (3.0)	NIL				Not Applicable
- Impervious	291 (97.0)	300 (100.0)				
<b>Purification of drinking water</b>						
- No method	10 (3.3)	Nil				Not Applicable
- Filtering with clothe / net	287 (95.7)	191 (63.7)				
- Boiling	3 (1.0)	109 (36.3)				
<b>Separate Kitchen</b>						
- Present	99 (33.0)	225 (75.0)	104.8	1	0.001	
- Absent	201 (67.0)	75 (25.0)				
<b>Adequacy of Natural Light in Kitchen</b>						
- Present	118 (39.3)	299 (99.7)	254.7	1	0.001	
- Absent	182 (60.7)	1 (0.3)				
<b>Adequacy of Ventilation in Kitchen</b>						
- Present	126 (42.0)	299 (99.7)	238.6	1	0.001	
- Absent	174 (58.0)	1 (0.3)				
<b>Fuel Used</b>						
- Gas	52 (17.3)	276 (92.0)				
- Kerosene	196 (65.3)	24 (8.0)	334.4	1	0.001	
- Chula / wooden stick	52 (17.3)	Nil				
<b>Smoke Outlet</b>						
- Present	2 (0.6)	Nil				Not Applicable
- Absent	298 (99.3)	300 (100.0)				
<b>Washing Facility</b>						
- Sink / Basin	8 (2.7)	156 (52.0)	181.3	1	0.001	
- Tap / Chaukadi	292 (97.3)	144 (48.0)				
<b>Garbage Disposal</b>						
- Public bin	205 (68.3)	300 (100.0)				Not Applicable
- Outside / Khadi	95 (31.7)	Nil				

Selected variables of domestic environment were studied in the 600 households. There was only one pucca house in

urban slum (Morarji vasahat) of Surat city and most of the houses (99.3%) were pucca in another locality “Middle Income Group”. Floor of all the houses were impervious in MIG area whereas 97.0% houses in urban slum had impervious floor. According to various domestic environmental criteria, the people were living in better housing conditions in MIG area as compared to the urban slum area. Status of natural light in kitchen & it’s ventilation was adequate in most of the houses in MIG area as compared to the urban slum area (Table 1). Kerosene as fuel was used by 65.3% households in urban slum whereas 92.0% families were using LPG gas in MIG area. All households were using public bin in MIG area as compared to only 68.3% in urban slum.

**Figure 2**

Figure 1: Sex specific morbidity pattern among under five children in the last 15 days from the day of survey



In this study, 788 children of under five age group were assessed to find out the influence of different environmental components on the morbidity of under five children. Around two third of the boys (68.1%) on the day of survey had history of cough within last fifteen days in urban slum as compared to 52.1% boys in MIG area. In the same way two third of the girls (67.1%) had similar complaint in urban slum and 52.8% girls in MIG area. (Figure I)

Influence of adequate ventilation in the kitchen on period prevalence of cough was studied in urban slum. The period prevalence of cough due to the presence and absence of adequate ventilation in the kitchen could not show any significant difference (SEP=4.49) in urban slum area. But it was lower (52.4%) in MIG area among under five children as compared to urban slum area (72.3%) in spite of adequate ventilation in the kitchen.

The influence of different fuel used over period prevalence of cough was also studied and no difference could be noted in urban slum area. (Table 2).

Nearly one-third girls (23.4%) in urban slum had history of fever as compared to 18.0 % girls in MIG area. Sex wise more girls reported with history of fever as compared to the boys (22.1%) in urban slum and (13.5%) in MIG area. (Figure-1)

**Figure 3**

Table 2: Relationship between domestic environment and illness among under five children.

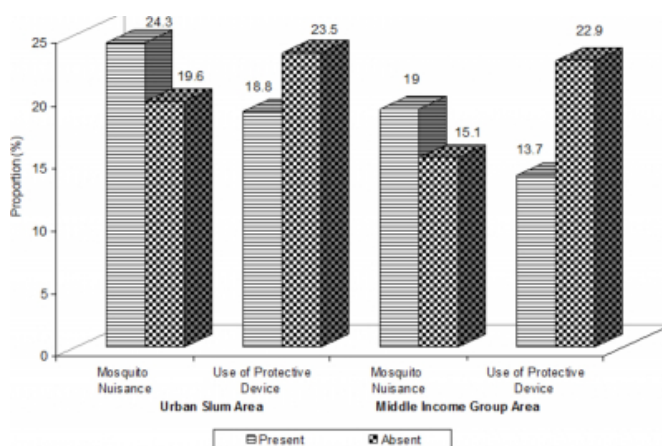
Variables	No. of under five children with h/o cough / diarrhoea in last 15 days in different urban area of Surat City					
	Urban slum (Morarji Vasahat)			Middle Income Group (Harinagar-3)		
	n	Illness Present (No)	PP (%)	n	Illness Present (No)	PP (%)
<b>Cough</b>						
<b>Adequacy of Ventilation in Kitchen</b>						
- Present	177	128	(72.3)	353	185	(52.4)
- Absent	257	165	(64.2)	01	(100.0)	(100.0)
<b>Fuel Used</b>						
- Gas	69	44	(63.8)	328	168	(51.2)
- Kerosene	283	194	(68.5)	26	18	(69.2)
- Chula / wooden stick	82	55	(67.1)	Nil	Nil	Nil
<b>Smoke Outlet</b>						
- Present	02	02	(100.0)	Nil	Nil	Nil
- Absent	80	53	(66.3)	Nil	Nil	Nil
<b>Diarrhoea</b>						
<b>Purification of drinking water</b>						
- No method	10	06	(60.0)	Nil	Nil	Nil
- Filtering with clothe/ net	420	80	(19.1)	223	22	(9.9)
- Boiling	04	Nil	Nil	131	14	(10.7)
<b>Use of toilet facility by elderly people</b>						
- Within house	290	54	(18.6)	354	36	(10.2)
- Public / Community	137	29	(21.2)	Nil	Nil	Nil
- Open defecations	07	03	(42.9)	Nil	Nil	Nil

(PP= Period prevalence in percentage)

Relationship between history of fever in last fifteen days among under five children and presence of mosquito nuisance in the house was studied. The period prevalence of fever was higher (24.3%) among under five children of urban slum area as compared to MIG area (Figure II). It was noted that period prevalence of fever among under five children was lower in both the study group where people were using protective device as compared to those not using protective device.

**Figure 4**

Figure 2: Relationship between mosquito nuisance / use of protective device and period prevalence of fever among under five children.



Further, the period prevalence of fever was slightly higher among under five children of urban slum area (22.8%) as compared to children of MIG area (15.5%). Collection of water inside the house of fever cases was noted in 43.4% houses of the children in urban slum area. It was very low (1.8%) in MIG area.

One fifth of the girls (21.6%) had history of diarrhoea in urban slum area within last fifteen days as compared to 10.6% in MIG area. However the boys did suffer from diarrhoea in last 15 days on the day of survey but in fewer proportions than girls. (Figure-1)

Influence of purification of drinking water on period prevalence of diarrhoea among under five children was studied. 60% of under five children had diarrhea whose parents did not use any method for purification of drinking water whereas 19.1% under five children had diarrhoea where parents were filtering with cloth or net in urban slum area. In MIG area, 9.9% under five children had diarrhoea whose parents filtered drinking water with cloth or net.

A possible influence of sanitation habit of elderly people on period prevalence of diarrhoea among under five children was explored. The period prevalence of diarrhoea was 42.9% in families where elderly people had habit of open field defecation as compared to those who used toilet within their house or public facility in urban slum area. In MIG area all elderly people were using toilet facilities within their houses. (Table 2)

In the urban slum, 17.4 % boys and 13.1 % girls were affected by skin disease as compared to 4.7 % boys and 3.1 % girls in MIG area. All under five children in MIG area

were found wearing clean clothes on the day of the survey, in comparison to 72.4% in Urban Slum area.

### DISCUSSION

Under five children are vulnerable to many factors. The most important role is played by domestic environment through which a child has to pass avoiding all risk, which may lead to morbidity or mortality. As they grow and develop, there are “windows of susceptibility”: periods when their organs and system may be particularly sensitive to the effect of certain environmental threats.<sup>1</sup>

That’s why the current study was carried out in the Surat city to explore the influence of domestic environment on the health of under five children. This study was carried out in a slum area- “Morarji Vasahat” and in “Harinagar-3”, which was constituted by people belonging to Middle Income Group.

According to various domestic environmental criteria, the people were living in better housing conditions in MIG area as compared to the urban slum area. Status of natural light in kitchen & it’s ventilation was adequate in most of the houses in MIG area as compared to the urban slum area. In urban slum, most of the people were living in single room with kitchen inside it. On the contrary the general living condition in MIG area was better and most of the people had separate kitchen in their houses. This could be the reason of lower period prevalence of cough in MIG area as compared to urban slum. This observation could not be compared due to the lack of relevant literature.

This study further reported history of cough among more than 50% under five children. Other studies have reported very low period prevalence of cough among children as per MICS-2 for India <sup>3</sup>, 29% children had cough during preceding survey. Shah<sup>4</sup> in Valsad district reported 18.7% cough.

The high period prevalence of cough in the study area may be due to the time of survey, the winter season and the early part of summer. Tondon & Sahai <sup>5</sup> were of the opinion that the prevalence of cough is very high in the month of Jan-March. Other reason could be the proximity of textile industries to their residential area. The investigator had frequently noticed that the residential area was often surrounded by dust at the time of data collection.

History of fever within last fifteen days on the day of the survey was reported by 18.0 % girls in MIG area and 23.4%

in urban slum. Girls were found in higher proportion with history of fever as compared to the boys. Shah <sup>4</sup> and NHFS-2 study for Gujarat <sup>6</sup> have also reported almost similar findings. But Tondon & Sahai <sup>5</sup> reported 37.2% prevalence of fever among infants in ICDS projects. They also reported that the 2<sup>nd</sup> quarter of the year (April-June) was observed with the maximum morbidities.

One fifth of the girls (21.6%) had history of diarrhea in urban slum within last fifteen days as compared to 10.6% in MIG area. However the boys did suffer from diarrhoea in last 15 days on the day of survey but in fewer proportions than girls. Grover et al <sup>7</sup>, MICS of Surat <sup>8</sup> and Shah <sup>4</sup> had also reported almost similar findings.

In the urban slum, 17.4 % boys and 13.1 % girls were affected by skin disease as compared to 4.7 % boys and 3.1 % girls in MIG area. In spite of thorough search data pertaining to skin disease among under five children could not be found and hence could not be compared. Thus information can be used in future as baseline data.

Children are particularly vulnerable to environmental hazards because they are constantly growing, and consume more food, air and water than adults do in proportion to their weight. Their immune, reproductive, digestive and central nervous systems are still developing and they spend their time closer to the ground where most dust and chemicals accumulate. The WHO has also launched the Healthy Environment for Children Alliance (HECA) in the year 2002 to draw attention towards this important issue, which plays very important role for the survival of child.

Recently the health department of the government of India has also introduced two programmes viz RCH- II and IMNCI with the aim to reduce child mortality as well as maternal mortality in different part of the country. The findings of this study will be very useful, as it has helped in understanding the influence of domestic environment on the health of the children in a fast developing urban area of Gujarat State. It seems that the time has come to develop strategies to combat these threats to children’s health.

Contributors: R.K.S conceived the idea, supervised the data collection, helped in analysis and drafting the manuscript. He will act as guarantor for the paper. V.C collected data, helped in analysis and prepared the initial draft of the paper. V.K.D provided support, encouragement and administrative help to carry out this study.

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