

Impact of Domestic Environment & Personal Hygiene on Morbidity Pattern and Health Status of Children: A Community Based Cross Sectional Study in Surendranagar City.

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Abstract:

Introduction: Children are more vulnerable than adults to environmental risks, both physical and psychosocial, because of factors related to the development and growing up. Comprehensive risk assessments suggest a cluster of environmental hazards, many of which may concur in the places where children dwell, play and learn. With this background, current study can help to improve hygiene practices and thereby health of children. **Objectives:** To find the prevalence of various childhood morbidities and to assess the relationship of personal hygiene and domestic environmental factors with childhood its morbidity pattern and health status. **Method:** A cross sectional study was carried out in Surendranagar, including 210 children (5 to 14 years) selected by cluster sampling method. **Results:** Prevalence of morbidity among children was 82.38%. About 89% of students brushed their teeth once/day; for brushing, 70% used toothbrush and 97% used toothpaste. Majority (84%) of participants were taking bath daily while only 48% were using soap daily for bathing. Hygiene score was more in normal weight individuals as compared underweight and overweight participants and this difference was statistically significant. ($p=0.00001$) Various domestic environmental factors like type of house ($p=0.03$), presence of exhaust fan/window in kitchen ($p=0.003$) drinking water facility ($p=0.02$), size of house ($p=0.02$), cross ventilation ($p=0.0003$) and mosquito presence ($p=0.007$) were all significantly associated with presence of morbidity. **Conclusion:** The results of the present study confirm that there is great effect of personal hygiene practices and domestic environmental factors on morbidity pattern of children.


Keywords: Children, Domestic environment, Morbidity Rearrange, Personal Hygiene

Introduction:

Children are more vulnerable than adults to environmental risks, both physical and psychosocial, because of factors related to the development and growing up. Moreover, children have little control over their physical and social environment. Comprehensive risk assessments suggest a cluster of environmental hazards, many of which may concur in

the places where children dwell, play and learn.^[1]

A child's world centres around the home, school and the local community. These should be healthy places where children can thrive, 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. In 2020, an estimated 8, 69,000

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older children and young adolescents (5 to 14 years) died in linked to the environments in which they live, learn and play. Many children are born at home, and spend a major part of their young lives there. But from conception, their health may be adversely affected by hazards in the home such as lack of sufficient water, indoor air pollution, inadequate hygiene, contaminated food and water etc.^[2]

Infection and malnutrition form a vicious circle and hamper children's physical development and cognitive performance, which compromise children's attendance and performance at school. Majority of the childhood diseases can be preventable by promotion of hygienic practices at school and home through proper health education.^[3]

To the best of our knowledge there are very few studies taking into account the impact of domestic environment & personal hygiene on morbidity pattern and health status of children. Most of these studies used unrepresentative samples and measured only conventional socioeconomic variables, which led to mixed results. So, it is critical to generate information which can assist in developing programs in these regards. With this background, current study can help to improve hygiene practices and thereby health of children. It will also guide in policy making and interventions aimed at impact of domestic environment on health of children.

Objectives:

- 1) Assessment of hygiene practices and domestic environment among children of 5-14 years of age-group in Surendranagar city.
- 2) To find the prevalence of various childhood morbidity among children of 5-14 years of age-group.
- 3) To assess the relationship of personal hygiene with its morbidity pattern and health status.
- 4) To assess the relationship of domestic environment with its morbidity pattern and health status.

Method:

A cross sectional study was conducted in Surendranagar city. After obtaining permission from Ethical committee, C. U. Shah Medical College to conduct the study, data collection was started. Parents/ guardians of Children participating in this study were approached for verbal informed consent. Those who found with faulty hygienic practices were corrected after interview with proper education regarding correct hygienic practices.

Study period: November 2022 to January 2023.

Study Subjects: The study population included children aged 5 to 14 years who were permanent residents of the area and ready to be part of our study. Informed consents were taken from guardians. Parents/guardians were communicated for information. Those not willing to participate in the study, intellectually disable, not able to respond to interview due to illness were excluded from the study.

Pilot study: Carried out by personal interview of 25 subjects sharing same Socio-demographic and geographic conditions

Sampling technique: Cluster sampling method

Study tool: A pre formed, pre tested semi-structured questionnaire was used in this study. This questionnaire was filled up by investigator. Hygiene practice was assessed by a Likert scale, which contained 14 questions. Main variables of which were oral hygiene, hand washing, bathing practices, hand dipping while drawing drinking water, covering face while coughing and sneezing, trimming finger and toe nails, cleaning eyes and nostrils, washing hands and feet after returning home, wearing clean cloths, wearing slippers while going outside. Each question had three options, i.e. never, sometimes, and always. During the analysis, scores were given such as never – 0, sometimes – 1, and always – 2. Hence, the minimum score of the scale could be 0 and maximum could be 28.

Data collection: For data collection, 30 by 7 cluster sampling technique was used (developed by WHO) to reach final sample size of 210. The list was obtained from the Nagarpalika office. There were total 85 societies under Nagar palika. Here we consider one society as a one cluster. Total 210 children who are between age-group of 5-14 years were selected from 30 societies (7 children/society).^[4] To get better representativeness, selection of children was done by dividing each cluster was into 4 quadrants. From 3 quadrants, 2 children were selected and from remaining 1 quadrant 1 child was selected. For multiple rows society random sampling was used for selection of children. In case of no child in house or unwillingness for participation in study, child was selected from next house.

Case definition of morbidity: In current study morbidity was considered as any common diseases or illness or symptoms of disease like fever, upper respiratory tract infection (URTI), diarrhea/dysentery, dental caries, skin disease, eye infection, ear infection, louse infestation, pallor and worm infestation in last 3 months from the date of interview in children.

Nutritional status: It was assessed using BMI for age percentile based on CDC growth charts for children and teens.^[5]

Statistical analysis: Data entry and analysis were done using MS excel and epi info version 7.2.5.0. Chi-square, Mann Whitney U test, Kruskal wallis test and Binary logistic regression were used to find out association.

Results:

The average age of the study participants was 8.7 ± 2.93 years (mean ± SD). More than half of the participants were female (53.81%). More than one third participants were from general caste (40.48%). Around 30% of mothers of participants were educated up to primary level while only around 10% of mothers were graduated. Almost half (48.10%) of the mothers of participants were working as a housewife. Two thirds of the participants were belonging to middle socio economic class (62.38%) (Table 1)

Table 1: Socio demographic profile of study participants (N=210)

Variables	Frequency	Percentage (%)
Age in years		
5	38	18.09
6	24	11.43
7	31	14.76
8	21	10.00
9	13	6.19
10	16	7.62
11	12	5.71
12	25	11.90
13	21	10.00
14	09	4.29
Mean age	8.7 ± 2.93 years	
Gender		
Male	97	46.19
Female	113	53.81
Caste		
General	85	40.48
Other	125	59.52
Mother's education		
Illiterate	38	18.10
Primary	63	30.00
Secondary	52	24.76
Higher Secondary	35	16.67
Graduate	17	08.09
Post graduate	05	02.38
Mother's Occupation		
House wife	101	48.10
working	109	51.90
Socio economic class[#]		
Upper class	09	4.29
Upper middle	19	9.05
Middle	131	62.38
Lower middle	41	19.52
lower	10	4.76

[#] as per modified Prasad classification

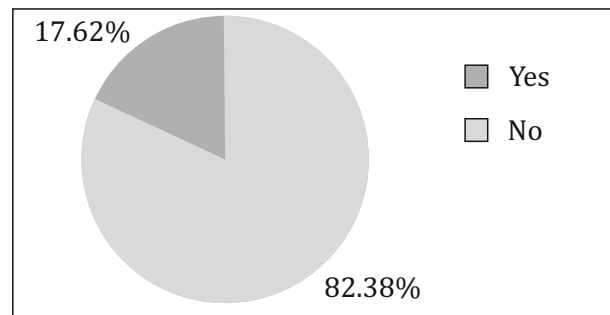
About 89% of students brushed their teeth once/day; for brushing, 70% used toothbrush and 97% used toothpaste. Majority (84%) of participants were taking bath daily while only 48% were using soap daily for bathing. Around two third of the participants were never covered their face while

coughing and sneezing. One third of the participants were not washing hands and feet after returning home. More than half (57.14%) of the participants were wearing slippers always while going outside. (Table 2)

Table 2: Distribution of study participants according to practice of personal hygiene (N=210)

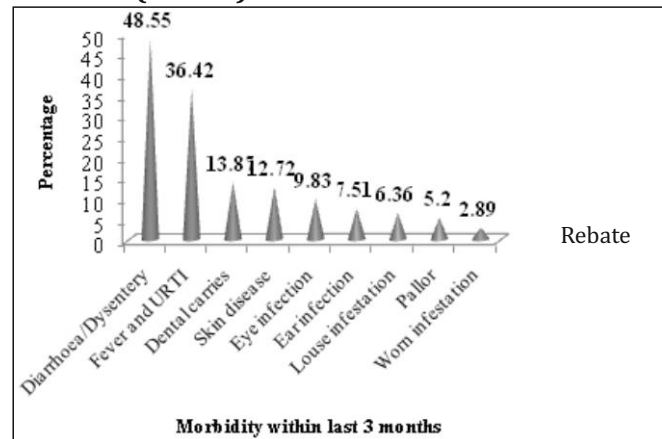
Variables	Frequency	Percentage
Brushing frequency per day		
Once	186	88.57
twice	24	11.42
Hand washing before eating with soap water		
Never	15	07.14
Sometimes	58	27.62
Always	137	65.24
Hand washing after defecation with soap water		
Never	07	03.33
Sometimes	16	07.62
Always	187	89.05
Taking bath		
Daily	176	83.81
Alternate day	25	11.90
Bi weekly	09	04.29
Trimming finger and toe nails		
Regularly	138	65.71
Irregularly	72	34.29
Cleaning eyes and nostrils		
Regularly	148	70.48
Irregularly	62	29.52
Wearing clean cloths		
Yes	162	77.14
No	48	22.86

Figure 1: Prevalence of morbidity (N =210)



In present study prevalence of morbidity among children in last three months was 82.38%. (Figure 1)

Figure2: Distribution of child according to type of morbidity within last three months (N=173)



Almost half of the participants were suffered from Diarrhea/Dysentery followed by one third of participants were having fever and upper respiratory tract infection within last three months. Dental caries, skin disease, eye infection and ear infection (13.87%, 12.72%, 9.83% and 7.51%) were also reported from participants. Only few participants had complained of worm infestation. (2.89%) (Figure 2)

Table 3: Association of hygiene score with morbidity and Nutritional status (N=210)

Variables	Mean hygiene score \pm SD	Statistical test	p value
Morbidity			
Yes (n=173)	20.33 \pm 2.96	Mann Whitney U test U=2030	<0.001
No (n=37)	22.79 \pm 2.21		
Nutritional status according to BMI			
Normal Weight (n=121)	22.08 \pm 3.14	Kruskal-Wallis test H=47.1168	<0.001
Underweight (n=55)	17.66 \pm 3.57		
Overweight(n=34)	21.09 \pm 3.82		

Table 4: Association of various domestic environmental factors with morbidity status of children (N=210)

Domestic environmental factors	Morbidity		P value
	Present n (%)	Absent n (%)	
Type of house			
Pucca	115 (78.76)	31 (21.23)	0.03
Semipucca/kaccha	58 (90.62)	06 (09.38)	
Floor type			
Mud	27 (93.10)	02 (06.90)	0.1
Concrete	146 (80.66)	35 (19.34)	
Separate kitchen			
Yes	118 (81.37)	27 (18.63)	0.56
No	55 (84.61)	10 (15.39)	
Fuel			
LPG	129 (81.13)	30 (18.87)	0.56
Domestic Chula/Kerosene stove	19 (90.47)	02 (9.53)	
Electrical chula	25 (83.33)	05 (16.67)	
Exhaust fan/window in kitchen (n=145)			
Yes	39 (69.64)	17 (30.36)	<0.001
No	79 (88.76)	10 (11.24)	
Household drinking water			
Piped	32 (71.11)	13 (28.89)	0.02
Other	141 (85.45)	24 (14.55)	
Overcrowding in house			
Yes	129 (86.00)	21 (14.00)	0.02
No	44 (73.33)	16 (26.67)	
Cross Ventilation			
Present	42 (67.74)	20 (32.26)	<0.001
Absent	131 (88.51)	17 (11.49)	
Toilet facility			
Available	150 (81.08)	35 (18.92)	0.17
Not available	23 (92.00)	02 (8.00)	
Presence of mosquito in house			
Yes	135 (86.53)	21 (13.47)	<0.001
No	38 (70.37)	16 (29.63)	
Smoking by other family member in house			
Yes	128 (87.67)	18 (12.33)	0.002
No	45 (70.31)	19 (29.69)	

Table 5: Binary logistic regression showing association between different factors and presence of morbidity among children (N=210)

Variables	SE	Coefficient	Odds Ratio	95% CI	P value
Gender	0.4134	-0.2157	0.806	0.3585-1.8124	0.6019
Mother's Education	0.7674	-0.6966	0.4983	0.1107-2.2423	0.364
Mother's Occupation	0.4249	1.1815	3.2593	1.4172-7.4961	<0.001
Socio Economic status	0.3347	-1.1973	0.302	0.1567, 0.5821	<0.001
Hygiene score	0.083	-0.3312	0.7181	0.6102-0.8450	<0.001

Children who suffered from any type of morbidity had less hygiene score than who had no morbidity in the last 3 months and this difference was statistically significant ($p < 0.001$) Hygiene score was more in normal weight individuals as compared under weight and overweight participants and this difference was statistically highly significant. ($p < 0.001$) (Table 3)

Various domestic environmental factors like type of house ($p = 0.03$), presence of exhaust fan/window in kitchen ($p = 0.003$) drinking water facility ($p = 0.02$), size of house ($p = 0.02$), cross ventilation ($p < 0.001$) and mosquito presence ($p < 0.001$) were all significantly associated with presence of morbidity in children. (Table 4)

Finally, binary logistic regression showed that the mother's occupation, hygiene score, and socio economic class were significantly related to the presence of morbidity while considering the effect of confounders. (Table 5)

Discussion:

The present study was conducted in urban areas of Surendranagar city among 5-14 years of children. Morbidity pattern of the children was assessed by history only. Authors did not performed any clinical examination or any invasive laboratory investigations.

Mean age of participants were 8.7 ± 2.93 years (mean \pm SD) in this study. The result of our study was nearer to study from West Bengal (7.4 ± 1.73 years) and from Spain (9.9 ± 0.27).^[6,7] Regarding Educational status of mothers our study observed that one third

of mothers (30%) were educated up to primary level followed by secondary (25%) and higher secondary (17%) level, majority of mothers had completed high school education (23.64%); 17.73% had studied up to primary school in study from Meghalaya. Two third of participants were belonging to middle class in present study while study carried out from Meghalaya stated that three fourth participants were belonging to middle class.^[8] Only 27% of mothers were employed in study from Maharashtra while it was almost 52% in present study.^[9] The differences in socio-demographic profiles might be due to different study areas, sample size, availability of opportunities and various cultural practices.

Overall, 89% of children brushed their teeth once per day in present study. Similar result was observed from the study done in Warangal district of Telangana while lower performance was seen from study conducted in North Chennai and Mumbai.^[9-11] Almost 70% of children were using toothbrush and around 90% used toothpaste as a brushing material in present study which was lower than study conducted by Ansari SY et al. and Hegde AM et al.^[9,12] Only two third of participants used to wash their hands before eating while around 90% of participants were washing their hand after defecation which was much higher from study conducted in rural coal-field area in West Benga.^[6] Nearly 100% of participants were washing their hand before eating and after defecation in study by Ansari SY et al.^[9] A Study conducted from Warangal district showed that all (100%) participants were taking bath regularly while around 84% of participants were taking bath daily in present

study.^[10] Similar result to ours study was found from study conducted in North Chennai.^[11] The reason for this differences might be due to study area of present study which was conducted in urban areas of Surendranagar city so practices were better as compared to study conducted in rural areas

Prevalence of morbidity was found 82.38% in present study while it was 29.2% in study by Maji B et al. from West Bengal and 74.04% by Sarkar M et al. from Kolkata.^[6,13] The reason for higher prevalence in this study was that authors had consider 3 month past history for morbidity while it was only last 15 days history in other studies. A study from Kolkata reported the most common morbidity was diarrhea, followed by fever with or without cough / cold which was similar to our study.^[13] In contrast to current study, skin diseases and dental carries were most common morbidities among study conducted from West Bengal.^[6] Though the prevalence of skin diseases and dental carries were almost similar in our study but they were not most common morbidities in our study. Personal hygiene was significantly associated with malnutrition and prevalence of morbidity in present study and the findings were comparable to study conducted by Maji B et al.^[6]

In present study, socio economic class and mother's occupation were significantly associated with the morbidity status While study from west Bengal had showed the significant association of morbidity status with gender, class, caste, mother's education, and occupation.^[6] Various domestic environmental factors like type of house, presence of exhaust fan/window in kitchen, drinking water facility, size of house, cross ventilation and mosquito presence were all significantly associated with presence of morbidity in this study while study from rural Nepal showed significant association with availability of toilet facility.^[14]

Conclusion:

Our study provides new evidence on the relationship among various morbidity, domestic

environmental factors and the personal hygiene practices of children. The practice of personal hygiene in present study was of moderate level. The domestic environment of household of children was up to the mark. The results of the present study confirm that there is great effect of personal hygiene practices and domestic environmental factors on morbidity pattern of children. Socio economic status and Mother's occupation also played an important role in determining the morbidity status of the children. Personal hygiene status had direct effect on nutritional status of children in current study.

Recommendation:

Majority of the childhood morbidities are preventable by promotion of hygienic practices. An improvement in domestic environmental factors through proper health education can also be helpful. Data of present study can be used for the development of new strategies like weekly session of personal hygiene at school, community based education of parents, peer education etc. which is of great importance to decrease the burden of communicable diseases in developing countries like India.

Declaration:

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Conflict of Interest: Nil

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