

## WATER SUPPLY AND ITS RELATION TO DIARRHOEAL DISEASES

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## ABSTRACT:

**Background:** As per WHO estimates, 80% of all the diseases in developing countries including India are related to unsafe drinking water and poor sanitation. Water pollution is invariably high in community wells. As such, incidence of diarrhoeal diseases is more in the rural set up and can be partly attributed to this. About 40% of the population does not have access to safe drinking water.

**Objective:** To establish a relationship between water supply and incidence of diarrhoeal diseases.

**Methods:** A cross-sectional study was conducted in Sawli village, District Samudrapur (Maharashtra). The study group comprised of 75 under five children, selected by simple random sampling. Data was collected on a pre-designed questionnaire by interviewing the mothers and was analyzed using an appropriate statistical package.

**Results:** Prevalence of diarrhoea was found out to be 71%. only 8% of the children who were exclusively breast-fed had any episode of diarrhea. Incidence of diarrhea was high in cases that were drawing water from open wells i.e. 65.3%. Only 28.5% cases reported diarrhea and were drawing water from sanitary wells as against 80.32% who took water from insanitary wells. About 45.33% mothers had wrong beliefs about the causes of diarrhea. ORS was used in only 30.66% of the cases as a treatment modality.

**Conclusions:** Diarrhoeal incidence was significantly high in children below 3 years of age, prevalence was least in exclusively breast fed

## Introduction :

Diarrhoea is a major cause of illness and death amongst children in developing countries. Globally it is estimated that 1.3 billion episodes of diarrhoea and 4 million diarrhoea attributable deaths occur each year in children under the age of five years<sup>(1)</sup>.

Diarrhoea is also indirectly responsible for the deaths of many more children because it is one of the major underlying causes of malnutrition. Worldwide, it is reported that children under the age of 5 years experience an average of 3.3 episodes of diarrhoea annually. In some areas of the world, this average can exceed 9 episodes per year. This can have a significant effect on the nutritional status of a child<sup>(1)</sup>.

Diarrhoea can result from a variety of causes like poor environmental condition, poor personal hygiene and various infections; however a common cause is the consumption of contaminated food and water. It is estimated that up to 70% of diarrhoeal episodes are caused by food and water borne pathogens<sup>(2)</sup>. Therefore, ensuring the safety of food and water consumed could prevent most of diarrhoeal morbidity and mortality.

As per WHO estimates, 80% of all diseases in developing countries like India are related to unsafe drinking water and poor sanitation. Incidence of diarrhoeal diseases is more common in rural set-up, partly attributed to above reason<sup>(3)</sup>. The methods of extracting water, its storage and method of taking out water from the storage vessels play very important role in the perpetuation of diarrhoeal diseases. The present

study had been undertaken with a view to establish relationship between type of water supply and incidence of diarrhoeal diseases and KAP of safe water utilization and management of diarrhoeal disease in the study group.

## Material and Methods :

A house to house KAP survey for safe water utilization and management of diarrhoeal diseases were conducted for a period of four months in Sawli village of District Samudrapur (Maharashtra). The children were selected by simple random sampling method and thus a total of 75 children less than 5 years of age constituted the study population. Mothers of those children were interviewed and the data was recorded on a pre-designed and pre-tested questionnaire for the purpose of the study. Proper training was given to the interviewers prior to the start of the study. The results were statistically tested by using SPSS statistical package.

## Working Definitions :

## Diarrhoea :

Passage of loose, liquid or watery stools > 3 times a day.

## Exclusive Breast Feeding :

Breast feed infants exclusively for six months.

## Results :

Table 1

Out of the total 75 children (< 5 years of age) who were randomly surveyed, 71% had diarrhoea, amongst them 54.75% were male and 45.3% were female.

Table 2

The prevalence of diarrhoea was maximum in the age group of 7-12 months followed by the age group of 25-36 months.

Table 3

The diarrhoea cases were maximum in those who had not breast fed at all and minimum in those had been exclusively breast fed for a duration of six months.

Table 4

Maximum number of children had an episode of diarrhoea at around four months of age.

Table 5

It was observed that a total of 49 (80.32%) out of 61 children using water from insanitary well had diarrhoea.

Table 6

About 62.66% of the mothers of the study population were aware about the importance of chlorination but nobody was aware about whether the chlorination of well was done or not and whether required or not.

Table 7

It was found that 100% of the study population using earthen pots had diarrhoea.

Table 8

Maximum diarrhoea cases were treated with medication (36%) followed by ORS (30.66%).

#### Discussion :

The present study revealed that the over all prevalence of diarrhoea was significantly higher amongst children before 3 years of age (Table 2). These findings are similar to those of Black et al who studied the prevalence of diarrhoea amongst 0-5 years children in five developing countries including India and found that the highest incidence of diarrhoea was in the first and second years of life<sup>(4)</sup>. The findings of Lal et al have also reported higher prevalence of diarrhoea during the first two years of life<sup>(5)</sup>. Thus it is evident from these findings that mothers with children below 3 years of age should be given priority during the health education activities.

As per our study, diarrhoeal cases are more in males which is also supported by the finding of Huilan et al<sup>(6)</sup>. However all these studies including the present one observed diarrhea to be more in males but the difference was insignificant. This shows that the risk of diarrhea in all children irrespective of sex is practically the same.

Most of the diarrhoeal cases are reported to be attributable to the consumption of contaminated food and water<sup>(7)</sup>. In our study 92.45% of the diarrhoeal cases were drawing water from insanitary well (Table 5), contributing to the high prevalence of diarrhoea amongst these children.

It has been proved that the quantity of water has a greater impact on health than water supply (piped water) not only increases the quantity of water used, but also

remove the need for water storage and therefore contamination. This may in turn reduce contamination and proliferation of diseases bearing vectors such as mosquitoes and flies<sup>(8)</sup>. Whereas on the contrary in our study area, no body has had piped water supply (Table 5).

According to the Planning, Research and Action Institute UP, the prevalence diarrhoea is much higher in children using water from open well as compared to those using private and public (community) taps<sup>(9)</sup>. We also had the similar findings in our study but on the contrary Sudarshan et al<sup>(10)</sup> and Chakraborty et al<sup>(11)</sup> observed that the source of drinking water per se did not influence the prevalence of diarrhea. This emphasizes that while providing the source of water supply the topography of the area should also be taken into consideration.

Chlorination cuts the diarrhoeal disease prevalence by 35 percent<sup>(8)</sup>. About 2/3rd of the mothers in our study were aware of the importance of chlorination (Table 6), still the diarrhoeal cases were very high i.e. 71% (Table 1), the reason being lack of practicing their proper knowledge. Many studies have been conducted to understand the relationship between water supply and diarrhoea. The cost effective analysis indicates that some water supply and sanitation (WSS) interventions are highly cost effective for the control of diarrhea among under five year olds, on a par with oral rehydration therapy. These are relatively inexpensive "software related" interventions such as hygiene education, social marketing of good hygiene practices, regulation of drinking water, and monitoring of water quality. Such interventions are needed to ensure that the potentially positive health impacts of WSS infrastructure are fully realized in practice<sup>(12)</sup>. However in our study only 30.66% of the cases were treated with ORS (Table 8).

The choice of specific diarrhoeal control strategies depends on local factors such as diarrhoea aetiologies, the existing infrastructure, awareness level and government priorities. The effective implementation of preventive strategies requires the involvement of a range of sectors (e.g. health, agriculture, water supply and sanitation) working together for the same<sup>(13)</sup>, and all these require strong political commitment and generous community participation.

Many politicians and decision makers do not strongly realize the importance of sanitation and that it is inexpensive and will halve the death toll in those who do not currently enjoy this fundamental entry point for poverty alleviation and hence health.

#### Conclusion :

1. Diarrhoeal disease prevalence was significantly high in children before 3 years of age.
2. Prevalence was least in exclusively breast fed children.
3. Knowledge regarding safe water utilization and management of cases was found to be inadequate.

Thus it is obvious that Health Education was lacking in the community as a whole and was given for the same after the completion of the study.

Table 1  
SEX-WISE DISTRIBUTION OF DIARRHOEAL CASES AMONG THE STUDY SUBJECTS

Diarrhoea	Male	Female	Total	
	(No.)	(No.)	(No.)	%
Present	28	25	53	(71.00)
Absent	09	13	22	(29.00)
Total	37	38	75	(100.00)

( $p > 0.05$ , Insignificant)

Table 2  
AGE GROUP-WISE DISTRIBUTION OF DIARRHOEAL CASES AMONG THE STUDY SUBJECTS

Diarrhoea	Age Group in Months						Total	
	0-6	7-12	13-24	25-36	37-48	49-60	(No.)	%
Present	5	15	9	12	8	4	53	(71.00)
Absent	6	4	3	2	4	3	22	(29.00)
Total	11	19	12	14	12	7	75	(100.00)

Table 3  
DISTRIBUTION OF DIARRHOEAL CASES AMONG THE STUDY SUBJECTS  
ACCORDING TO THEIR BREAST FEEDING PRACTICES

Breast Feeding	Diarrhoea		
Practices	Present	Absent	Total
Breast Fed :			
-Exclusively Breast Fed	06	07	13
-Partially Breast Fed	17	06	23
Not Breast Fed	30	09	39
Total	53	22	75

( $P < 0.05$ , Significant)

Table 4  
DISTRIBUTION OF DIARRHOEAL CASES AMONG THE STUDY SUBJECTS  
ACCORDING TO THEIR NUMBER OF DIARRHOEAL EPISODES

No. Of diarrhoeal	Diarrhoea Cases	
episodes	(Number)	(Percentage)
1	24	45.23
2	14	26.41
3	09	16.98
>3	06	11.32
Total	53	100

Table 5

**DISTRIBUTION OF DIARRHOEAL CASES AMONG THE STUDY SUBJECTS  
ACCORDING TO THEIR SOURCE OF WATER CONSUMPTION**

Diarrhoea	Sanitary*		Insanitary**		Total	
	(No.)	%	(No.)	%	(No.)	%
Present	4	(28.57)	49	(80.32)	53	(71.00)
Absent	10	(71.43)	12	(19.68)	22	(29.00)
Total	14	(100.00)	61	(100.00)	75	(100.00)

(p 0.001, Highly significant), [\*Bore wells and hand pumps, \*\*Open wells]

Table 6

**DISTRIBUTION OF THE MOTHERS OF THE STUDY SUBJECTS ACCORDING TO THEIR KNOWLEDGE  
ABOUT THE IMPORTANCE OF WATER CHLORINATION**

Knowledge Of Importance Of Water Chlorination	Mothers Of The Study Subject	
	(Number)	(Percentage)
Present	47	62.66
Absent	28	37.33
Total	75	100.00

Table 7

**DISTRIBUTION OF DIARRHOEAL CASES ACCORDING TO THE PRACTICE OF WATER STORAGE**

Knowledge Of Importance Of Water Chlorination	Water Storage Vessel			Total
	Earthen	Metal	Both	
Present	4	28	21	53
Absent	0	15	07	22
Total	4	43	28	75

(p>0.05, Insignificant)

Table 8

**DISTRIBUTION OF DIARRHOEAL CASES ACCORDING TO THEIR TREATMENT MODALITY**

Treatment Modalities	Diarrhoea Cases	
	(Number)	(Percentage)
ORS	23	30.66
SSS	10	13.33
Medication	27	36.00
Home Remedies	15	20.00
Total	75	100.00

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