

Original Research Article

Incidence of diarrhoea and household diarrhoea management among children of integrated child development services in Buldhana district of Maharashtra

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ABSTRACT

Background: Adequate water and sanitation facilities are crucial in promoting good child health. Unfortunately, many children lack access to these resources. Thus, this study aimed to investigate the prevalence of diarrhoea among children and the household-level management of diarrhoea.

Methods: The study utilized both qualitative and quantitative methods, quantitative analysis involved selecting a total of 300 samples using the stratified random sampling method. Twenty key informants were interviewed conducted to qualitative study.

Results: The study found that, the prevalence of diarrhoea among ICDS children 24.5 percent. However, this prevalence varied depending on several factors, including gender, caste, education, occupation, and wealth. The findings highlighted the importance of a mother's education in preventing and addressing diarrhoea within the household. Additionally, the availability of improved water resources played a crucial role in the prevalence of diarrhoea, as a significant portion of the population had limited access to such resources. Unfortunately, many mothers lacked sufficient knowledge about diarrhoea, negatively impacting their children's health. Mothers commonly relied on traditional methods to manage diarrhoea, which could result in additional health complications for their children.

Conclusions: Providing access to safe drinking water from a single source can help to reduce cases of diarrhoea. Overall, improving education, increasing access to clean water, and promoting better hygiene practices are essential steps to preventing and managing diarrhoea effectively.

Keywords: Diarrhoea, Sanitation, Education, Management, Health

INTRODUCTION

Diarrhoea is a significant contributor to morbidity and mortality among under-five years age population in low-income and developing countries.¹ One of the study reported that, over 85% of diarrhoea cases worldwide are caused by unsafe water and poor sanitation.² Globally, nearly 1.7 billion cases of childhood diarrhoea occur each year, resulting in approximately 5.25 lakhs deaths.³ In

India alone, 120,000 children under the age of five year from diarrhoea annually, equating to 328 deaths per day or 13 deaths every hour.⁴ Inadequate access to improved sanitation results in significant economic losses, accounting for approximately 6.4% of India's GDP in 2006.⁵ Shockingly, more under-five years children die from diarrhoea than HIV/AIDS.⁶ According to the World Health Organization, diarrhoea is classified into two types based on its duration: acute or persistent. Acute diarrhoea

is defined as an episode lasting less than two weeks, while persistent diarrhoea is characterized by an episode lasting more than two weeks. Many people feel sick or even die due to preventable and controllable diseases. Under-five years children are more vulnerable and consequently affected more due to, the polluted water, poor sanitation and unhealthy hygiene. Childhood diarrhoea can lead to increased economic burden on the parents, because of medical expenses and child care leave. Poor sanitation and water resources are not only causes of diarrhoea, but also may lead to several other types of waterborne diseases. This study provides some insight of rural Maharashtra on incidence of diarrhoea and interlinkage with the sanitation and hygiene behaviour of the household. The research is based on the primary data and is deemed to be useful for policies intervention and adoption to altered behaviour among the community, such as, use of latrine, hand washing, etc. In short of drinking water, sanitation, and hygiene behaviour referred to as the water, sanitation and hygiene (WASH) variables by the United Nation Children's Emergency Funds (UNICEF) are widely acknowledge as being the three main determinant of Diarrhoeal disease, but the impact of their complementarity on disease incidence remain understudied.⁷ The poor sanitation and unsafe drinking water can have adverse effects on the growth and development of children, including weight loss, increased infections, interrupted education, and impaired growth. According to UNICEF, washing hands with soap and water can significantly decrease the incidence of Diarrhoeal disease by one-third. Children under six years of age often do not use latrines, leading to the disposal of their stool in the streets, yards, or latrines, increasing the likelihood of water contamination.

In rural India, demonstrated that improved access to piped water significantly reduced the incidence of diarrhoea cases in children under five years old.⁸ The study in Uttar Pradesh suggested that long-term morbidity can have an impact on a child's brain development.⁹ The found that, inadequate toilet facilities increase the risk of diarrhoea by 5%, while safe water supply reduces the incidence of diarrhoea by 5%.¹⁰ Diarrhoea infection can be prevented by raising awareness and practicing hygiene behaviours on disease-specific awareness among mothers.¹¹ In a clinical trial in a refugee camp in Malawi found that, 39% reduction in diarrhoea among children when water was stored in containers with covers and spouts.¹² Water-related disasters, such as floods, droughts, and poor sanitation in domestic, agricultural, and industrial water allocation, can pose significant health risks. Disparities in access to water and sanitation are created by power imbalances in society. Poverty and unemployment are significant factors in the health outcomes of children under the age of five, with diarrhoea morbidity being negatively associated with poor socioeconomic and demographic status. A study found, children aged 0-23 months are more vulnerable to diarrhoea, with vulnerability declining after the age of two.¹³ Unhealthy breastfeeding practices by mothers can also increase the

incidence of diarrhoea.¹⁴ In India, girls are more likely to be affected by diarrhoea than boys, and those in lower castes are more vulnerable.¹⁵ A case study in Gogo, Tanzania, found that while diarrhoea is often caused by environmental or physical factors, severe cases can be attributed to transgressions of sexual taboos by parents, especially mothers.¹⁶ In India, governments have launched several programs to combat diarrhoeal diseases. However, low coverage of ORT and ORS is a major determinant of diarrhoea-related deaths among under-five children in India.¹⁷ One reason for this could be the poor knowledge of diarrhoea among mothers, leading to more than 50% of them relying on traditional and market medicine instead of ORS as a treatment method.¹⁸ Additionally, majority of mothers avoid the use of ORS as they believe that it only contains salt and water and do not cure diarrhoea.¹⁹ This has resulted in low acceptance of ORS by mothers and an unwanted use of anti-diarrhoeal drugs and antibiotic injections in India. This research investigates the relationship between water sanitation and diarrhoea among children as well as the management of diarrhoea in households.

METHODS

To gather data, both qualitative and quantitative methods were utilized, with separate studies conducted for each. The research was conducted in the Buldhana district of Maharashtra, a region that is considered less developed in comparison to other districts in the state. Child health in the district is a major concern, with 12% of children under the age of five experiencing diarrhoea and 41.3% of children being underweight, which is significantly higher than the state average (NFHS-5, 2019-20). These statistics indicate that the health of children in the district is not at a satisfactory level. The Buldhana block is average in terms of water sources, sanitation, and health coverage compared to the district as a whole. For the study, twenty-three villages within the Buldhana block were randomly chosen as the research area.

Sample selection

The study focused on three blocks (Tehsils) in Buldhana district - Buldhana, Chikhli, and Sangrapur - due to their diverse population backgrounds. Within these blocks, a total of 22 villages were selected as study area. To draw the sample, data from the Integrated Child Development Services (ICDS) of each village was collected from the anganwadi worker. Stratified random sampling was used to select 300 eligible households based on their social background. The primary sampling units (PSUs) - villages - were selected using the 2011 census as the sampling frame. The data was collected from October 2021 to January 2022.

Inclusion criteria

The study included children who were enrolled as beneficiaries of the Integrated Child Development

Services (ICDS). When a household had multiple ICDS beneficiaries, the younger children were selected for health assessment. This choice was made because younger children were more susceptible to being affected by diarrheal diseases.

Exclusion criteria

Children who were not registered with ICDS were not considered for the study.

Selection of the respondent

The study collected data on under-five diarrhoea and household management from parents within the community. In study area fathers are the primary decision-makers in households and possess knowledge about health facilities. Moreover, the research also considered the viewpoints of Accredited Social Health Activists (ASHAs) and other key community informants since they are the initial health service providers. The study analyzed various indicators, such as sanitation practices, household management of childhood diarrhoea, and people's perceptions of diarrhoea from different socio-economic and demographic perspectives.

Data analysis

Quantitative data were collected using structured questionnaires. After data collection all questionnaires were scrutinized and data entry was performed using MS office excel. Statistical analysis conducted using SPSS. Bivariate analysis has been used to understand the prevalence of diarrhoea morbidity across demographic and socio-economic background characteristics. Qualitative data collected to address study objectives, total 20 semi-structured in-depth interview of ASHA and parents of children in local language Marathi. All the participants were allowed to express their views openly. All interviews were transcribed and translated in English language and verified for accuracy.

RESULTS

Demographic background of the children

Table 1 presents an overview of the socio-economic and demographic characteristics of the children and families in the study area. Among the children, 15% fall within the age range of 6-24 months, while 43% fall within the 25-48 month range, and a similar percentage (42%) belongs to the 49-71 month category. Examining educational levels, 19% of the parents were illiterate. Only 18% have completed primary education, whereas 29% have finished secondary education. A quarter of household heads (25%) have attained higher secondary education, with a mere 9% having graduated.

Tables 1: The percentage distribution of socio-economic and demographic profile of children in study area.

Category	Sub-category	Percent	Numbers
Age of children	6-24 month	15	45
	25-48 month	43	129
	49-71 month	42	126
Father education	Illiterate	19	57
	Primary	18	54
	Secondary	29	87
	Higher secondary	25	75
	Graduate	9	27
Occupation	Labour	51	153
	Agriculture	40	120
	Other	9	27
Caste	SC	15	45
	ST	32	96
	OBC	34	102
	Other caste	19	57
Ration card	Antodaya	10	30
	BPL	44	132
	APL	46	138
Wealth	Poor	56	168
	Middle	29	87
	Rich	15	45
Mean age of children			24.20 month
Mean age of father education			9.74 years
Mean number of family members			5.27 months

In terms of occupation, more than half of households (51%) are engaged in labor-related work. Around 40% are involved in agriculture, while 9% pursue other occupations. Analyzing the social background, 15% of households are from Scheduled Castes (SC), and 32% are from Scheduled Tribes (ST). Apart from SC and ST, 34% belong to Other Backward Classes (OBC), and 19% identify as part of the "Other" community category. Regarding ration cards, various types are held across households. Antodaya cards are possessed by 10%, while 44% have Below Poverty Line (BPL) cards and 46% possess Above Poverty Line (APL) cards. Turning to wealth distribution, a significant majority (56.33%) are classified as poor, followed by 27% in the middle-class category, and a smaller 15% in the rich category. The mean age of the children is 24.20 months, while the average years of education for fathers stand at 9.74 years. Furthermore, the average family size is 5.27 individuals per household.

Prevalence of diarrhoea among ICDS beneficiaries children's

Diarrhoea is characterized by the passing of three or more loose or liquid stools per day, or more frequently than usual for the individual (WHO, 1999). For this study 30-

day period as a reference for estimating diarrhoea prevalence. The prevalence of diarrhoea among children upto the age of six years in research area is 24.5%. In case of sex of child and prevalence of diarrhoea shows that boys have a slightly lower prevalence of 23% compared to girls, who have a prevalence of 26% among children under the age of five.

Age and sex wise prevalence of diarrhoea among ICDS beneficiaries children's.

The prevalence of diarrhoea varies by the child's age and sex (Figure 1). In infant age groups every third (33%) girls had suffer form diarrhoeas whereas among boys only 17% suffer from diarrhoea. The bar graph shows the difference in the prevalence of diarrhoea among boys and girls across several age groups, with females experiencing diarrhoea at a higher rate. In two year old age range, where children are also more exposed to various forms of diarrhoeal infection agents, such as unsanitary food, contaminated water, and an adverse environment, the peak prevalence of diarrhoea in boys has been noted.

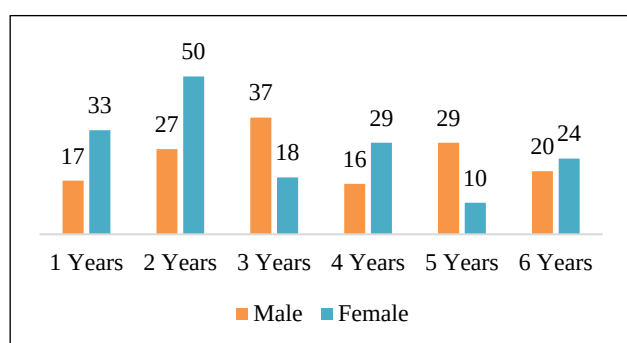


Figure 1: Age-wise and sex-wise prevalence of diarrhoea among children.

In the age group two year, diarrhoea prevalence was reported to be more than half (51%) among females, but only 33% of boys in the same age group. Girls are more likely to experience diarrhoea at a prevalence of 29% in the four year age group, whereas boys are more likely to experience it at a prevalence of 28% in the five year age group. Every fifth boy and almost every fourth girl between the ages of five and six suffered from diarrhoea.

Mother education and prevalence of diarrhoea among children

In contrast to children whose mothers were illiterate, those whose mothers with a higher secondary level of education have much lower rates of diarrhoea. This may be explained by the fact that educated mothers practise better hygiene, child feeding, and sanitation habits, all of these are crucial in reducing diarrhoeal infection. They also have a greater understanding of the causes of diarrhoea. The Figure 2 shows that among illiterate mother children every third (33%) had affected by diarrhoea. In comparison, if the mother has primary

education, the prevalence drops to 28%. However, the graph demonstrates a sharp decline in diarrhoea prevalence among children whose mothers have completed secondary education or higher.

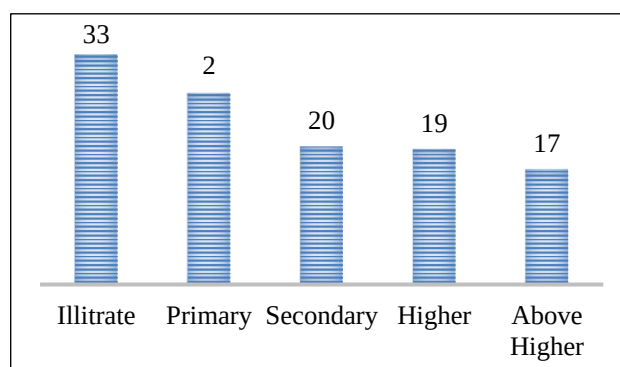


Figure 2: Mother education and prevalence of diarrhoea among under-five children.

Water sources, household sanitation behaviour and prevalence of diarrhoea

Access to piped water facilities significantly reduced diarrhoea prevalence among under five children. A study in Pakistan by Murtaza et al, (2015) found that children belong to household using improved drinking water are less likely to get diarrhoea disease. Table 2 illustrate water processing, toilet at home and toilet use by the children are significantly contributing in prevention of diarrhoea among the under-five children. The table revels that, presence of tap water in household reduced in prevalence of diarrhoea 21% as compared to the community handpump 35% and open well water 27%. It is expected that each seven household cluster, two case of under-five children diarrhoea without water processing household 28%, whereas only 16% of diarrhoea prevalence among water processing household.

Table 2: Water sources, household sanitation behaviour and prevalence of diarrhoea.

Characteristics	Diarrhoea %
Hand pump	35
Open well	27
Tap water	21
Water processing	16
Without water processing	28
Toilet at home	23
No toilet at home	26
Toilet use	18
No toilet use	31

Toilet at home and unavailability did not find any drastic change in diarrhoea prevalence, this could be cultural taboo and behaviour aspects in rural area towards the toilet use. On the other side toilet using household

reported very less prevalence of diarrhoea 18%, whereas 31% among non-toilet user households.

Pattern of childhood diarrhoea

The pattern of under-five childhood diarrhoea among the children reported by parents. There is substantial inconsistency in the duration of diarrhoea based on the household background of the children's. The duration of days ranging from 3 to more than 7days. Table 3 reveals some of the complexity of diarrhoea illness patterns percentage in days'. The duration has been divided into three categories: (i) 1-3 days, (ii) 4-7 days, and (iii) >7 days. Second and third category of diarrhoea duration is considered more serious due to more fat extraction and dehydration among the children. The table do not show any consistency with upper background of the household.

Consequences of childhood diarrhoea

Brief examination of ICDS beneficiaries mother have been done based on the certain characteristics knowledge of diarrhoea. Table 4 shows the awareness among the mother about the diarrhoea. According to the response results, 25% of the respondents reported that prolonged diarrhoea can lead to weight loss and weakness in children. Meanwhile, 17% reported an increase in the frequency of stool, and 16% reported that severe diarrhoea can lead to the death of a child. Additionally, 15% reported that the child eats less food during diarrhoea. The survey also found that 14% of respondents observed that diarrhoea resulted in child malnutrition, while 13% reported that the child's skin became dry and yellowish. Diarrhoea as per the traditional knowledge and belief of disease among under-five children and it also has essential benefit for to determine the treatment choice of the children. Particularly whatever family has experience during the diarrhoea disease of children and they react to likely children illness symptoms.

Table 3: Pattern of diarrhoea duration in days with household background.

Socioeconomic cat.	1-3 days	4 -7days	>7days
SC	10	7.8	11
OBC	9.0	13.0	5.0
NT, D	0.0	5.0	10.0
General	4.5	13	0.0
Poor	9.0	7.0	9.0
Medium	10.0	17	4.0
Rich	3.0	8.0	8.0
Primary	9.0	10	9.0
Middle	9.0	10	4.0
Higher and above	6.0	11	5.0
Male (child)	7.0	12	5.0
Female (child)	7.0	10	8.0

Belief practices and cultural context in diarrhoea

In Marathi speaker community in rural research area, *hagvan* is general term for of childhood diarrhoea. It has been various kind of stools based on the stools colors which may be combination of waterway, fruits and blood. Sometime diarrhoea and vomiting become a combine illness and they called that *dhal vantya*. If the children is suffering from vomiting they avoid to supply liquid solution. They have different type of treatment seeking behaviour based on the stool colors. If the stool is green they used to curd and *sabudhana khichadai* as remedy, whereas treatment preference as a raw banana and honey, if the stools colors red or white. People seeks help from various source if child do not give positive response during the household treatment practices, people prefer hospital based on their economic capability. Sometimes some traditional Ayurveda healers are given. Community caste, culture and household head are the main stakeholder to take decision, sometime social network also influence to determine the treatment seeking behaviour.

Table 4: Mother awareness of diarrhoea and diarrhoea consequences.

Mother awareness of diarrhoea and diarrhoea consequences	Percentage
Child may lose weight if the diarrhoea duration is more than week.	25.0
Child scream frequently due to continues frequency of stools and weakness.	17.0
If the diarrhoea become severe there are possibility of child death due to more fat extraction and underweight.	16.0
Child prefer to take less food during the phase of diarrhoea due to the more frequency of stools.	15.0
Weight loss and there is possibility of suffering from malnutrition.	14.0
During diarrhoea phase there is an imbalance of water level in child body and skin become yellowish, dry and hard	13.0

Causes of diarrhoea and approaches of household diarrhoea management

The Table 5 illustrate causes of diarrhoea and household diarrhoea management, household management of diarrhoea help controlling the illness and its possibilities

are substantially increase due to proper household diarrhoea treatment. The table show only 8.5% household are unaware about the causes of diarrhoea, whereas 47.5% household are supplying relevant food during the Diarrhoea illness as per the WHO norms. It's also clearly indicated that still more than half 52.5% household are

behind lack to provide essential food supply. Considering the food quantity during the diarrhoea illness we found that, due to continuous frequency of stools few households (30%) give sufficient amount of food quantity to children. Still 38 percent household do not believe of liquid solution as treatment method of diarrhoea illness. As per the WHO norm continuous supply of liquid solution during diarrhoea illness is one of the essential

treatment for prevention from dehydration but, we found that only 44% household have given relevant liquid solution to children during the diarrhoea illness. In research area 30% are rely on antibiotic use, whereas more than half (50.5 percent) reported that they preferred private clinic or hospital for the diarrhoea illness treatment.

Table 5: Distribution and outcomes of explanatory variables.

Explanatory variables	Percent	Explanatory variables	Percent
Causes of diarrhoea		Types of liquid solution	
Polluted water	45.5	ORS	13.5
Inadequate sanitation	9.5	Rice	30.5
Bad climate	8.5	Milk	7.0
Others	32.5	Other	11.5
Food supply		No	38.0
Rice	28.5	Antibiotic use	
Sabudana khichdi	19.0	Yes	30
Daily meals	8.5	No	70
Other type of foods	3.0	Treatment preference	
No food	41.0	Govt hospital	41.5
Liquid solution		Pvt hospital	50.5
Yes	62.0	Both hospital	5.5
No	38.0		

“I am as a ASHA visit every household about seriousness of under-five diarrhoea and also distributes ORS packets but the acceptance of ORS is very low because they prepare their traditional food. I making every effort to ensure good health of children” (ASHA workers 34 years old).

“Majority of child health decision are taken by my husband if children is suffering from diarrhoea, there is no need to worry because we know by feeding curd, sabudna khichdi and less spicy food it will be cured” (mother of 26 years old).

DISCUSSION

Evidence that emerged from the present study portrayed substantial evidence that, in infant stage more girl (33%) exposed diarrhoea as compared to boys 17 % only. More prevalence of diarrhoea among children up to two years of age. Children with illiterate mother background more likely to exposed diarrhoea as compare to educated mother. The higher prevalence of diarrhoea among children living in household using polluted water source is higher.²⁰ The educational level of household significantly contribute in prevention of diarrhoea illness and they have very much awareness of diarrhoea management in household level.²¹ Similarly the effect of socioeconomic background of household are also considered as one the key determinant of diarrhoea reduction and household management. Study also finds the higher prevalence of diarrhoea among children living in household using polluted water source is higher. It

suggests an urgent need from the government stakeholder in Maharashtra to raise the coverage of improved water source. More awareness about the causes of diarrhoea and treatment of disease need to focus on illiterate women in rural Maharashtra and health worker need to put efforts in informing women about the causes that lead to diarrhoea and the need of clean hygienic practices. Treating a sick child from diarrhoea by giving Zinc Tablet or ORS is the recommended treatment from the WHO.²² It may be advisable to propagate idea of counselling of both children mother and senior parents, so that both may learn to how to manage the under-five diarrhoea. These counselling sessions may also help learn new ways of conflict management and shared responsibility so that vulnerability of children.

This study has limitation that must be noted. In study area information was obtained from women and men from household. But due to cultural and ingonarance of health services from parents side of child. The result of the study may be generalised to other communities.

CONCLUSION

In conclusion, the relationship between water sanitation and the prevalence of diarrhea among under-five children is a critical concern with significant implications for public health and child well-being. The evidence presented underscores the pivotal role that access to clean and safe water, along with proper sanitation and hygiene practices, plays in preventing diarrheal diseases in this vulnerable age group. Additionally, limited access to facilities for proper handwashing and sanitation

exacerbates the transmission of disease-causing agents. Efforts to combat this issue must encompass multidimensional approaches. Investment in infrastructure development, such as improved water supply and sanitation facilities, is paramount. Furthermore, the judicious use of oral rehydration solution (ORS) and, when necessary, seeking medical attention, can drastically shorten the duration of illness and aid in a quicker recovery. Improving household diarrhea management is a shared responsibility that extends from individual caregivers to the larger healthcare system. By prioritizing education, awareness, and access to appropriate resources, we can significantly reduce the burden of diarrheal diseases and contribute to healthier and more resilient communities.

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