

Diarrhoea and Sanitation Practices in Children a Study from Kishanganj District, Bihar

Kashif Shahnawaz¹,
Sanjay Kumar
Choudhary²,
Gautam Sarker³,
Laxman Kumar⁴

¹MD, Assistant Professor, Department of Community Medicine, M.G.M Medical College & LSK Hospital, Kishanganj, Bihar, ²MD, Senior Resident, Department of Community Medicine, I.G.I.M.S, Patna, Bihar, ³MD, Assistant Professor, Department of Community Medicine, M.G.M Medical College and LSK Hospital, Kishanganj, Bihar, ⁴MD, Assistant Professor, Department of Community Medicine, M.I.M.S, Barabanki, Lucknow, U.P

Corresponding Author: Dr. Kashif Shahnawaz, Assistant Professor, Department of Community Medicine, M.G.M. Medical College, Kishanganj, Bihar. Phone - 09234874192/09709640022. E-mail kashif.shahnawaz98@gmail.com

Abstract

Introduction: Diarrhoea is a common and preventable disease, but unfortunately in India like other developing countries of the world, diarrhoea continues to be serious problems in infants and children. It is among the topmost causes of morbidity and mortality in children.

Objective: Present study was conducted to study the association of different sanitation practices and diarrhoea in children of rural area of Kishanganj district, of Bihar.

Materials & Methods: To ensure reasonable limit of precision target sample size of approximate 3742 children, upto 12 years of age were selected for the study. The survey consisted of 30 clusters and each cluster consists of about 125 children. The association of diarrhoea in children were studied in relation to some factors, like source of drinking water, defecating practices and excreta disposal, and habits of cleaning hand.

Result: It was observed in our study that the incidence of diarrhoea was more in those children who were using wells (22.7%) in comparison to those children who were using tube-wells (16.6%) for drinking water source. The incidence of diarrhoea in children excreting outside the household premises was lower (13.5%) than the children excreting inside the household premises (32%). Incidence of diarrhoea in children having the habits of cleaning hands was lower (10.2%) than the children not having the habits of cleaning their hands (21.8%).

Conclusion: The incidence of diarrhoea was found to be low in the children whose drinking water source was tube wells. Also, it was found to be low in children excreting outside the household premises and having the habits of cleaning hands.

Keywords: Diarrhoea, Sanitation, Factors

INTRODUCTION

Diarrheal diseases are amongst the top three killers of children in the world today.¹ It is the second leading cause of death in children under five years old. Together, they account for approximately one in six deaths among children younger than five years.² Each year diarrhoea kills around 760000 children under five. Globally, there are nearly 1.7 billion cases of diarrhoeal disease every year. Of India's more than 2.3 million annual deaths among children, about 334000 are attributable to diarrhoeal diseases.^{2,4} Despite the substantially declining mortality rate from diarrhoea in developing countries, diarrhoea

still accounts for approximately 11% of all mortality in children under 5 years of age.⁵ Rotavirus is the leading cause of severe diarrhoea in children in developed and developing countries.⁶ Diarrhoea is a symptom of infections which can be defined as "defecation frequency of three or more loose/liquid stools in a day (or more frequent passage than is normal for the individual)".⁷ There are three clinical types of diarrhoea – a) acute watery diarrhoea- Lasts several hours or days, and includes cholera, b) acute bloody diarrhoea - also called dysentery, and c) persistent diarrhoea - Lasts 14 days or longer. Diarrhoeal infections are caused by a host of bacterial, viral, and parasitic organisms, most of which are spread by faeces-

contaminated water. Infection is more common when there is a shortage of adequate sanitation, hygiene and safe water for drinking, cooking and cleaning. Because diarrhoeal diseases are of faecal origin (i.e contaminated water from sewage, septic tanks and latrines) interventions that prevent faecal material entering the domestic environment of the susceptible child are likely to be of greatest significance for public health.⁸ The key primary barriers to the transmission of enteric pathogens are safe stool disposal and adequate handwashing, especially after contact with faecal material during anal cleansing of adults and children.⁹ In developing countries, 1.1 billion people still defecate in the open and handwashing with soap is practiced, on average, only after 17% of toilet uses.^{10,11} Reductions in diarrhoea incidence have reached 5% for watery supply at source, 19% for water quality interventions (results after 12 months), 36% for sanitation interventions and 47% for handwashing with soap and water (estimates from pooled analyses).^{12,13} Diarrhoea incidence remains a tremendous burden on children in low and middle income countries,¹⁴ due to multiple determinants.¹⁵ These countries are particularly affected by deficient water systems and services, poor sanitation and hygiene.^{16,10} These determinants of diarrhoeal diseases are strongly linked to poverty and social inequalities.¹⁷ Clean fresh water, free from contamination is essential for positive health. Consumption of contaminated water leads to various water borne diseases, like amoebiasis, bacillary dysentery, cholera, typhoid, infective hepatitis, etc. The mode of excreta disposal has also an important bearing on diarrhoeal morbidity sanitary excreta disposal plays an important role in breaking of faeco-oral transmission chain.

MATERIALS AND METHODS

Present study was conducted in Kishanganj district of Bihar, from the period Sept-2013 to Oct-2013 (two months). A pre-designed, pre-tested study schedule was used for collecting data. Privacy of the parents and children were maintained. Children selected for this study belonged to the age group of newborn to 12 years, who were mostly the permanent residents of this area or who are residing in this zone for more than 6 months. The survey has been conducted as per standard WHO/CDD case management process, cluster sampling method as described in WHO/CDD household survey manual (CDD/SER/86.2, REV.1989). The survey consisting of 30 clusters by and large from rural and few from sub and semi-urban population. The sample size has been collected using standard method in CDD household survey manual. To ensure reasonable limit of precision target sample size of approximate 3742 children upto 12 years of age was selected. Thus each cluster consists of about 125 children. The study was done stage by stage depending on a number of blocks in the district chart enclosed. Primarily two queries

were made in each household – (1) is there one or more than one resident child under 12 years of age in the household, and if so (2) whether or not any of the child is a victim of diarrhoea or any of the children had diarrhoea within the last 2 weeks. The diagnosis was confirmed after detailed and thorough interrogation of the patients and their parents or guardians, clinical examination of the patient and by required pathological examination like routine examination of stool of the sufferer child. Finally, the relation of diarrhoea in children in relation to some factors, related with the sanitation practices like source of drinking water, defecation practices and habit of cleaning hand were established.

RESULTS

Incidence of Diarrhoea among children of each age group according to source of Drinking Water.

In the present study, 3355 children (89.6%) used tube well as their source of drinking water, whereas 387 children (10.4%) used well as their source of drinking water. The incidence of acute and persistent diarrhoea in these two groups i.e Tube well and well groups was 418 (12.4%) and 142 (4.2%) and 70 (18%) and 18 (4.7%) children, respectively.

Incidence of Diarrhoea among children of each age group according to defecating practices and excreta disposal of children.

In the present study, majority of the cases 2976 (79.5%) children were defecating outside the household premises whereas in 766 (20.5%) children were defecating somewhere within the household premises. The incidence of acute and persistent diarrhoea in children excreting outside the household premises was 299 (10%) and 104 (3.5%). The incidence of acute and persistent diarrhoea in children excreting inside the household premises was 189 (24.7%) and 56 (7.3%) respectively.

Incidence of Diarrhoea among children of each age group according to habit of cleaning hand.

In the present study, 1441(38.5%) children had the habit of cleaning their hand, whereas 2301 (61.5%) children did not have any habit of cleaning their hand before taking food or after defecation (where children did not take food themselves, their mother were enquired about habit of cleaning hand). The incidence of acute and persistent diarrhoea in children having the habit of cleaning their hand was 113 (7.8%) and 34(2.4%) respectively. The incidence of acute and persistent diarrhoea in children not having the habit of cleaning their hand was 375(16.3%) and 126(5.5%).

DISCUSSION

In the present study, 3742 children under the age of 12 years residing in the 30 villages of Kishanganj district were surveyed with a view of finding out the incidence of diarrhoea in the child population. Children were divided into four groups, i.e 0-5 months, 6-11 months, 13-35 months and 36th months to 12 years. The frequency of each of these age group was 149(4%), 175(4.7%), 684(18.3%) and 2734(73%), respectively.

- i. In the present study, the incidence of diarrhoea was low in the children groups, using drinking water from tube-well. It was about 12.4% and 4.2% and 18% and 4.7% for acute and persistent diarrhoea in children whose source of drinking water were tube well and well, respectively (Table 1). Saran M et al.(1981)¹⁸ reported the incidence of diarrhoea as 21.5% and 50.83% respectively, in children utilizing well water as a prime source for drinking and eating purposes. Contamination of drinking water, by sewage through pump failure or blockage of a sewage system¹⁹ and outbreaks of viral gastroenteritis resulting from sewage contamination of water supplies have been previously described.^{20,21}
- ii. In the present study, in majority of the cases, 2976 (79.5%) children excreta were thrown outside the house whereas in 766 (20.5%) children were defecating somewhere in house boundary. In my study group only 3 houses had sanitary latrine. Unfortunately, even in that household, children were found to be defecating in open. In the present study, the incidence of diarrhoea was much higher where the children defecating inside the

house premises whereas the incidence was much lower in children who defecated outside the house hold premises (Table 2).

The influence of defecation practices and excreta disposal to the incidence of diarrhoea had been observed by many observers. Rao (1976)²², Saran(1981)¹⁸ and Agarwal (1981)²³ who had reported that incidence of diarrhoea was more in those who were habituated either open field or door yard defecation. A previous study conducted in an urban poor setting in Indonesia also reported an increased risk of having diarrhoea in children with unavailability of sewage and/or a place to dispose the child's stools.²⁴ Martens T.E et al (1992) observed that children from the families where excreta disposal was practiced properly in latrines were showed much less incidence of diarrhoea in comparison to those families where excreta disposal of the children was done improperly. He also emphatically stated that childhood diarrhoeal episode would be lessened by 12 percent, if the improper excreta disposal could be reduced to 50 percent. Dikassa L et al (1993)²⁵ showed the close association of disposal particles of child faeces, household garbage and lack of proper sanitation to the increased risk of diarrhoea in children.

- iii. In the present study, the incidence of acute and persistent diarrhoea in children having the habit of cleaning their hand was 113 (7.8%) and 34 (2.4%), respectively. The incidence of acute and persistent diarrhoea in children not having the habit of cleaning their hand was 375 (16.3%) and 126 (5.5%), respectively (Table-3). It has also been observed in

Table 1: Incidence of diarrhoea among children of each age group according to source of drinking water

Age group in month	Drinking water sources							
	Tubewell				Well			
	Mode of onset							
	Normal	Acute	Persistent	Total	Normal	Acute	Persistent	Total
0-5	128	10	1	139	9	0	1	10
6-11	87	38	32	157	11	4	3	18
12-35	396	169	36	601	52	24	4	80
36 th & above	2156	201	78	2455	227	42	10	279
Total	2767	418	142	3355 (89.6%)	299	70	18	387 (10.4%)
Percentage	83.4	12.4	4.2	100	77.3	18	4.7	100

Table 2: Incidence of diarrhoea among children of each age group according to defecating practices & excreta disposal of children

Age in months	Method of disposal of excreta : Home				Method of disposal of excreta : Outside			
	Mode of onset							
	Normal	Acute	Persistent	Total	Normal	Acute	Persistent	Total
0-5	137	10	2	149	0	0	0	0
6-11	98	42	35	175	0	0	0	0
12-35	264	130	18	412	187	63	22	272
36 th & above	22	7	1	30	2386	236	82	2704
Total	521	189	56	766 (20.5%)	2573	299	104	2976 (79.5%)
Percentage	68	24.7	7.3	100	86.5	10	3.5	100

Table 3: Incidence of diarrhoea among children of each age group according to habit of cleaning hand

Age group in months	Habit of cleaning hand							
	Yes				No			
	Mode of onset							
	Normal	Acute	Persistent	Total	Normal	Acute	Persistent	Total
0-5	60	4	0	64	77	6	2	85
6-11	41	11	7	59	57	31	28	116
12-35	205	43	6	254	246	150	34	430
36 th & above	988	56	21	1064	1420	188	62	1670
Total	1294	113	34	1441 (38.5%)	1800	375	126	2301 (61.5%)
Percentage	89.8	7.8	2.4	100	78.2	16.3	5.5	100

different studies that various enteric pathogens causing diarrhoeal diseases can survive on the hands. The best studied hygiene practice with consistent evidence in developing countries is hand washing.²⁶ Evidence from the randomized controlled trials (RCTs) on hand washing showed reductions in diarrhoea of around 30% and of 43-53% of soap is used.²⁷⁻²⁹ Our study found that mother and child who reported washing their hands with water and soap had lower percentage of diarrhoea than who did not. High rate of incidence of diarrhoea amongst children who and whose mother are ignored about hygiene and did not wash their hands, and utensils regularly before feeding were found by Saran et al (1981)¹⁸ and Agarwal et al (1981).²³

CONCLUSION

The present study has been carried out to find the incidence of diarrhoea in children under 12 years of age, in rural area of Kishanganj district of Bihar, and to collect data on various hygienic and sanitation practices of the children of this area in relation to diarrhoea among them. Conclusions of our present study are:

- i. The incidence of diarrhoea is less in children using tube well water (16.6%), as compared to children using well water (22.7%).
- ii. The incidence of diarrhoea is less in children defecating outside the house hold premises (13.5%), as compared to children defecating the house hold premises (32%).
- iii. The incidence of diarrhoea was less in children where these children and their mother had the habit of cleaning their hands before taking food or after defecation (10.2%) as compared to where children and their mother did not have the habit of cleaning their hand before taking food or after defecation (21.8%).

REFERENCES

1. W.H.O World Health Report 2000. Geneva: World Health Organization, 2000: 164.

2. Black RE, Cousins S, Johnson HL, Lawn JE, Rudan I, et. al. Global, regional and national causes of child mortality in 2008: a systematic analysis. *Lancet*. 2010;375:1969-87. doi: 10.1016/S0140-6736 (10)60549-1 Pmid: 20466419.
3. Million Death Study Collaborators, Bassani DG, Kumar R, Awasthi S, Morris SK, Paul VK, et al. Causes of neonatal and child mortality in India: a nationally representative mortality survey. *Lancet* 2010;376:1853-60. doi: 10.1016/S0140-6736 (10)61461-4 Pmid: 21075444.
4. Parashar UD, Burton A, Lanata C, Boschi-Pinto C, Shibuya K, Steele D, et al. Global mortality associated with rotavirus disease among children in 2004. *J. Infect Dis* 2009;200:S9-15. doi:10.1086/605025 Pmid: 19817620.
5. Liu L, Johnson HL, Cousens S, Perin J, Scott S, Lawn JE, Rudan I, Campbell H, Cibulskis R, Li M, et al. Global, regional and national causes of child mortality: an updated systematic analysis for 2010 with time trends since 2000. *Lancet* 2012;379(9832):2151-2161.
6. Parashar UD, Hummelman EG, Bresee JS, Miller MA, Glass RI. Global illness and deaths caused by rotavirus disease in children. *Emerg Infect Dis* 2003;9:565-72. doi: 10.3201/eid0905.020562 Pmid: 12737740.
7. WHO/CDR/95.3: The treatment of diarrhoea: a manual for physicians and other senior health workers. Geneva: World Health Organization; 4th rev, 2005.
8. Curtis VA, Cairncross S, Yonli R. Domestic hygiene and diarrhoea, pinpointing the problem. *Trop Med Int Health*. 2000;5:22-32.
9. Bateman OM. Health and hygiene behaviour: hygiene behaviour in epidemiological perspective. In: Cairncross S, Kochar V, eds. Studying hygiene behaviour: methods, issues and experiences. New Delhi: Sage Publications, 1994: 26-35.
10. WHO/UNICEF Joint Monitoring Programme for water supply and sanitation. Progress on sanitation and drinking water 2010 update. Geneva, World Health Organization, 2010, accessed 31 March, 2011.
11. Curtis VA, Danquah LO, Auger RV. Planned, motivated and habitual hygiene behaviour: an eleven country review. *Health Education Research*. 2009;24(4):655-673.
12. Waddington H et al. water, sanitation and hygiene interventions to combat childhood diarrhoea in developing countries. The International Initiative for Impact Evaluation (3 ie), 2009, accessed 9 March 2010.
13. Jamison D et al., eds. Disease control priorities in developing countries. New York, World Bank and Oxford University Press, 2006, accessed 23 November 2009.
14. Fischer Walker C, Perin J, Aryee M, Boschi-Pinto C, Black R. Diarrhoea incidence in low and middle income countries in 1990 and 2010: a systematic review. *BMC Public Health*. 2012;12(1):220.
15. Boschi-Pinto C, Lanata CF, Black RE: 'The global burden of childhood Diarrhoea'. In Maternal and Child Health: Global challenges, Programs and Policies. Edited by Ehiri JE. New York: springer; 2009.
16. Pruss-Ustun A et al. Safer water, better health. Geneva, World Health Organization, 2008, accessed 23 November 2009.
17. WHO: co-ordinated approach to prevention and control of acute diarrhoea and respiratory infections. WHO SEARO; 2010; accessed 28 September 2010.
18. Saran M, Gour S.D: Epidemiologic correlates of diarrhoea in a slum community in Varanasi. *Ind. Jour. of Paed.*1981;48(4):441-446.
19. Lodder WJ, Husman AMD: Presence of noroviruses and other enteric viruses in sewage and surface waters in the Netherlands. *Appl Environ Microbiol*. 2005;71(3):1453-1461.

20. Haffiger D, Hubner P, Luthy J. Outbreak of viral gastroenteritis due to sewage contaminated drinking water. *Int. J. Food Microbiol.* 2000;54(1-2): 123-126.
21. Khan SA, Ahmed A, Khalid SM. Diarrhoea due to rotavirus and probability of sewage contamination. *J. Islamic Acad Sci* 1992;5(2):142-144.
22. R.K. Puri, K.K.Khanna, G.Ashok Kumar, D.C.V Prasad Rao. Infant feeding and child rearing methods in Pondicherry, South India. *Ind. J. Paed.* 1976;43(11):323-332.
23. Agarwal D.K., Katiyar G.P. Influence of environmental factors on under five morbidity. *Ind. Ped.* 1981;18(8):545-50.
24. Warrouw S. Hubungan faktor Lingkungan sosial Ekonomi dengan Morbiditas (Keluhan ISPA dan Diare). JKPKBPPK/Badan Litbang Kesehatan. 2002.
25. Dikassa L, Mock N, Magnani R, Rice J, Abdoh A, Mercer D, Bertrand W. Maternal behavioural risk factors for severe childhood diarrhoeal disease in Kinshasa, Zaire. *Int. J. Epidemiol.* 1993; 22 (2): 327-33.
26. Curtis V, Schmidt W, Luby S, Florez R, Toure O, Biran A. Hygiene: new hopes, new horizons. *Lancet Infect Dis.* 2011;11(4):312-321.
27. Ejemot RI, Ehiri JE, Meremikwu MM, Critchley JA: Hand washing for preventing diarrhoea. *Cochrane Database Syst Rev* 2008;1:CD004265.
28. Curtis V, Cairncross S. Effect of washing hands with soap on diarrhoea risk in the community: a systematic review. *Lancet Infect Dis* 2003;3(5): 275-281.
29. Semba RD, de Pee S, Ricks MO, Sari M, Bloem MW. Diarrhoea and fever as risk factors for anemia among children under age five living in urban slum areas of Indonesia. *Int J Infect Dis* 2008;12(1):62-70.

How to cite this article: Kashif Shahnawaz, Sanjay Kumar Choudhary, Gautam Sarker, Laxman Kumar. "Diarrhoea and Sanitation Practices In Children a Study from Kishanganj District, Bihar". *International Journal of Scientific Study.* 2014;1(6):41-45.

Source of Support: Nil, **Conflict of Interest:** None declared.