

Everything is not on track in management of diarrhoea in under-five children: Evidence from rural area of India

Prerna Srivastava¹, C. P. Mishra¹, Gopal Nath²

Departments of ¹Community Medicine, and ²Microbiology, Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh, India

ABSTRACT

Context: Diarrhea is one of the leading causes of death and morbidity in under-five children. Effective management can significantly influence survival of children with diarrhea. **Objectives:** This study was carried out to assess extent of diarrhea, its source of treatment, and type of therapy. **Settings and Design:** This snapshot study was conducted in rural setting of India. **Methods and Material:** This study was conducted on 217 under-five children selected through multistage sampling procedure. **Statistical analysis used:** Statistical association of diarrhea with age and gender of children was established by computing Chi-square. **Results:** Period prevalence (Recall period 2 weeks of visit) of diarrhea in rural under-five children was 35.9% (95% C.I. 29.3–42.2%). Highest prevalence in age group 0–12 months (47.8%) and lowest in 49–59 months (18.2%). Number of episode per child is 1.08. Diarrhea was watery in 69.4%. Quacks were treatment provider for 36.4% cases. In 17.6% episodes, no treatment was taken. Only 9.4% episodes were treated in government facilities. For the treatment of diarrhea, antibiotic was used in 71.8% cases, ORS use was 33.3% cases, and zinc was used 21.8% of diarrhea episodes. **Conclusions:** Diarrhea is a significant problem in under-five children from a rural area of India. In spite of existence of National Program for Control of Diarrheal Diseases (NPCDD) since four decades, management of diarrhea is not on track. Focusing on primary care provision to under-five children can help in bringing the management of diarrhea on track.

Keywords: Diarrhea, dysentery, ORS, primary care, under-five children, zinc

Introduction

It is envisaged in UN Sustainable Development goals to reduce mortality in under-five children less than 25 per 1,000 live births. Further attempts should be made to end avoidable deaths in this group.^[1] There are 1.26 million deaths in children every year because of diarrhea which is ranked as second leading cause of deaths in under-five children.^[2] Diarrhea is commonest in countries with poor environmental conditions. Even in developed countries it is an important reason for outpatient consultations and indoor admissions. Several factors (viz., socioeconomic, environmental, political, nutritional, and programmatic)

make prevention and treatment of diarrhea is a challenging task.^[3] Management of diarrhea is not confined to correction of electrolyte imbalances and dehydration. It should take into account considerable growth retardation in children mainly because of feeding problems. Post-acute phase mortality because of diarrhea needs a multipronged strategy. WHO targets to drop diarrhea to less than 1 in 1,000 by 2025.^[4] An estimated 1.7 billion episodes of diarrhea created health systems costs of about 7 billion US dollars. If the total episodes of diarrhea are translated into number of episodes per child per year, it approximates to 2.9 episodes per child per year.^[5] According to Family and Health Survey (NFHS) done in 2015–16, 52% urban and 44% rural seek treatment in private sector. According to National Sample survey done in 2014, the average treatment cost is 88\$ and 340\$ in public and private sector in rural area and 120\$ and 507\$ for public and private sector in urban area, respectively.^[6]

Address for correspondence: Dr. Prerna Srivastava,

Department of Community Medicine, Institute of Medical Sciences, Banaras Hindu University Varanasi, Uttar Pradesh - 221 005, India.
E-mail: aslidocor@gmail.com

Received: 13-08-2020

Revised: 06-10-2020

Accepted: 01-12-2020

Published: 29-04-2021

Access this article online

Quick Response Code:



Website:
www.jfmpc.com

DOI:
10.4103/jfmpc.jfmpc_1641_20

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Srivastava P, Mishra CP, Nath G. Everything is not on track in management of diarrhoea in under-five children: Evidence from rural area of India. J Family Med Prim Care 2021;10:1582-6.

In India, more than 2.3 million children die every year and diarrheal diseases contribute about 334,000 of these deaths. Diarrhea contributes to 13% of death in under-five children.^[7] According to report (2015–16), 9% of under-five children were victim of diarrhea in this year.^[8] Despite of significant decline in mortality and morbidity in this age group, its proportion because of diarrhea remains high. It has been more than four decades since NDDCP was initiated in India (1978). In view of competing diseases, due attention has not been paid by the beneficiaries as well as health care providers in diarrhea management. There is conspicuous gap in prevention of diarrhea and urbanization and change in climate has raised consequences of diarrhea.^[9]

The introduction of oral rehydration therapy (ORT) in 1975 has reduced mortality because of diarrhea. Rehydration, continued feeding of normal diet, and replacement of continuous fluid loss are critical intervention in diarrhea management. In synergy with WHO/UNICEF, Indian Academy of Pediatrics has endorsed reduced osmolarity oral rehydration salt (ORS) as well as zinc supplementation (20 mg of zinc/day for children ≥ 6 months and 10 mg of zinc per day for children 2–5 months of age) for 14 days.^[10]

Diarrhea is described as the passing of loose/liquid stools. Passage of ≥ 3 loose or watery stools within a day characterizes diarrhea. Decrease in the consistency of the stool from normal is also considered as diarrhea.^[11] During diarrhea, presence of blood in stool calls for judicious use of antimicrobials. Indiscriminate and irrational use of anti-microbials is quite prevalent in different settings and contributing to the rising anti-microbial resistance. Primary care physician commonly deals with under-five children and diarrhea is significant problem in this age group, thus primary care has important role to play. With this background, this study was undertaken (A) to find out the extent of diarrhea in under-five children and (B) to assess current status of management of diarrhoea in under-five children.

Subjects and Methods

This is an observational, community-based cross-sectional study. The study subjects were 0–59 months children from rural area of India. This study was conducted in Chiraigaon Community Development (C.D.) Block of Varanasi Uttar Pradesh, India. Sample size was calculated by taking the prevalence (P) of diarrhea as 15% in rural under-five children of Uttar Pradesh India,^[12] permissible level of error (L) of 5% (Absolute), and non-response of 10%. By using the formula for Sample-size $N = Z^2 P(1-P)/L^2$, and taking $Z = 1.96$ the sample-size worked out to be 217.

Selection of study villages was done adopting multistage sampling method: (A) Out of eight blocks of Varanasi, Chiraigaon CD block was randomly selected as the study block; (B) In this step, stratification of all 134 villages of Chiraigaon was done in 3 strata on the basis of their distance from block headquarter as

within 5 km, 5–10 km, and >10 km. One village from each strata was selected by stratified random sampling. The selected villages were *Bariyasanpur*, *Pahadiya*, and *Rajnahiya*; and (C) In the selected villages, total enumeration of under-five children was done serving as sampling-frame and the study subjects were selected by adopting simple random sampling. With predesigned and pretested proforma, information to the occurrence of diarrhea on the day of visit or within last 2 weeks from the day of visit was noted. Information regarding diarrhea, nature of diarrhea, its severity, source of treatment, and type of therapy was collected.

Ethical Committee of Institute of Medical Sciences at Banaras Hindu University, Varanasi, India provided ethical clearance and consent of parents taken using Bilingual (English and Hindi version) Consent Form. Data entry and analysis was done using SPSS 23-trial-version. Prevalence of diarrhea and 95% confidence interval were computed. Statistical association of diarrhoea with age and gender of children was established by computing Chi-square. Yes approval of Ethical committee was obtained on 3.01.2018. Ethical Committee of Institute of Medical Sciences at Banaras Hindu University, Varanasi, India provided ethical clearance and consent of parents taken using Bilingual (English and Hindi version).

Results

As much as 47.8%, 43.9%, and 21.9% children belonging to age group 0–12, 13–24, 25–36 months had diarrhea in previous 2-weeks; corresponding value for children having age group 37–48 and 49–59 months were 38.7% and 18.2%, respectively. There existed significant ($P = 0.013$) association between age and period prevalence of diarrhea in children included in study [Table 1]. Out of 217 children, 78 (35.9%) had diarrhea in the previous 2 weeks. Thus, period prevalence of diarrhea (with recall less than 2 weeks) in the study subjects was 35.9% (95% C.I. 29.3–42.2%). Period prevalence of diarrhea for male and female children was 37.2% and 34.4% [Table 2].

Frequency of stool in diarrheal episodes were 3–4 in 35.3%, 5–6 in 38.8%, and ≥ 7 in 25.9% subjects [Table 3]. There were 78 children with diarrhoea in period of 2 weeks and total number of diarrheal episodes were 85. Thus, number of episodes per child was 1.08. Out of 85 diarrheal episodes, 69.4% were watery whereas blood or/and mucous were present in 19 (22.4%) episodes. Seven (8.2%) diarrheal episodes had increased in frequency of stools without any change in consistency of stool [Table 4].

In all 36.4% diarrheal episodes, quacks were treatment provider and 17.6% episodes received no treatment. Government facilities (PHC, CHC) were source of treatment for 9.4% diarrheal episodes. For treatment purpose of 17.6% diarrheal episodes, medical shops were directly consulted. Private practitioners were the treatment provider for 18.9% diarrheal episodes [Figure 1].

Table 1: Age-wise period-prevalence (recall <2 weeks) of diarrhea

Age-group in month	Diarrhoea-status				Total	
	Present		Absent		No.	%
	No.	%	No.	%		
0-12	22	47.8	24	52.2	46	100
13-24	29	43.9	37	56.1	66	100
25-36	11	21.2	41	78.8	52	100
37-48	12	38.7	19	61.3	31	100
49-59	4	18.2	18	81.2	22	100
Total	78	35.9	139	64.1	217	100

$\chi^2=12.711$; $df=4$; $P<0.05$ (0.013)

Table 2: Gender wise period prevalence (recall <2 weeks) of diarrhoea

Gender	Diarrhoea-status				Total	
	Present		Absent		No.	%
	n	%	n	%		
Male	45	37.2	76	62.8	121	100
Female	33	34.4	63	65.6	96	100
Total	78	35.9	139	64.1	217	100

$\chi^2=0.184$, $df=1$, $P>0.05$ (0.668)

Table 3: Distribution of diarrhoeal episodes according to frequency of stool

Frequency of stool	No.	%
3-4	30	35.3
5-6	33	38.8
≥ 7	22	25.9
Total	85	100.0

Table 4: Distribution of episodes of diarrhoea according to consistency of stool

Types of stool	No.	%
Textural stool consistency as normal	7	8.2
Loose watery	59	69.4
Blood in stool	7	8.2
Mucous in stool	10	11.8
Blood and mucous	2	2.4
Total	85	100

Out of 78 subjects experiencing diarrhea, 23 (12.8%) had prescription at the time of survey. Out of 78 subjects experiencing diarrhea in 56 (71.8%) cases antibiotic was used. Twenty six (33.3%) cases were given oral rehydration salt solution in the event of diarrhea [Figure 2]. ORS was administered for less than 3 days in 16 (61.5%), 3-4 days in 7 (26.92%), and 5 days in 3 (11.5%) subjects. Out of 78 subjects with diarrheal, 14 (17.9%) and 3 (3.8%) received zinc for <7 and 7-14 days, respectively. In all, 17 (21.8%) subjects were given zinc therapy during diarrhea [Table 5].

Discussion

Recognizing the impact of diarrhea on child's survival and optimum growth and development, considerable efforts have

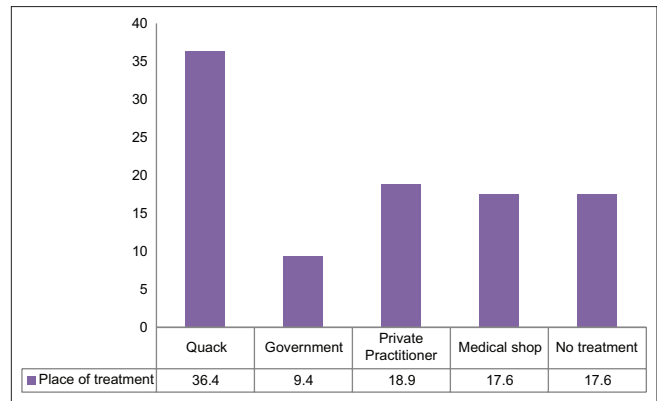


Figure 1: Distribution of diarrhoeal episode according to the place of treatment.

been made under-program to reduce extent of diarrhea. The significant inputs in this direction were to create awareness among rural population about importance of safe water and measures to improve access to safe water sanitation. However, finding of this study clearly reflects that diarrhea is a significant problem in <5 children of rural Varanasi. This is substantiated by the fact that seven out of 20 children had diarrhea in the previous 2 weeks. In comparison to present observation, studies from South India^[13] and outside India^[14] at Sudan, Africa, Doba-Woreda, Ethiopia^[15] and at Yaya Gulele,^[11] have reported lower figures than the present study. However, a study from West India has reported higher prevalence of diarrhea in comparison to current study.^[16] Variation in occurrence of diarrhea maybe because of difference in study design, time of survey, and access of preventive and promotive services as well as geographical and climatic condition. In this study, nearly half-subjects in age group of 0-12 months had diarrhea in the previous 2 weeks, whereas prevalence period of diarrhea was least in children in 5th year of life. It is interesting to note that gender wise differences in extent of diarrhea do not prevail in study area. In one out of 10 episodes, frequency of diarrhea was more than 7.

Nearly in 7 out of 10 diarrheal episodes, children experienced watery diarrhea. Watery diarrhea is generally caused by viruses where use of antibiotics is not necessary. However, results presented in the study reveal irrational use of antibiotics. Furthermore, ORT in general and ORS use in particular during diarrhea have not been up-to the mark. One out of three cases were given ORS which is very less compared to one out of two as per NFHS 4 for India and 13 out of 20 as per study conducted in South India.^[17] Associated conditions (viz., vomiting and fever) may further retard use of ORS. In present study, zinc use one out of five has been slightly more than NFHS data.^[8] Despite of emphasis on zinc therapy during diarrhea, use of zinc has been far from satisfactory. Adequate zinc supplementation for 14 days prevailed in less than 1 out of 20 children which is similar to zinc supplementation in Doba-Woreda, Ethiopia.^[15]

In present study, antibiotics use prevailed in seven out of 10 cases consistent with the study conducted in Ethiopia^[18] and contrary to this, three out of four subjects from a study conducted in Bangladesh

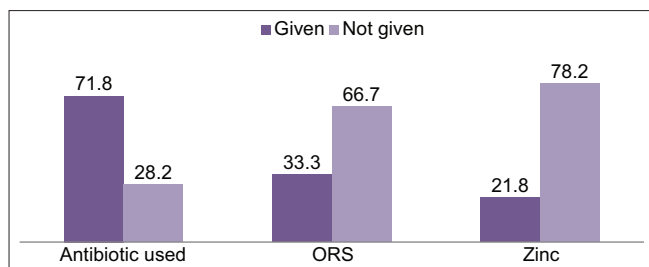


Figure 2: Treatment of diarrhoea

Table 5: Information related to treatment of diarrhoea (n=78)

Particulars		No.	%
Antibiotics used	Yes	56	71.8
	No	22	28.2
ORS use	Yes	26	33.3
	No	52	66.7
Number of days ORS was given	0 day	52	66.7
	1 day	5	6.4
	2 day	11	14.1
	3 day	5	6.4
	4 day	2	2.6
	5 day	3	3.8
Zinc	Given	17	21.8
	Not given	61	78.2
Number of days zinc given	<7 days	14	17.9
	7-14 days	3	3.8
	>14 days	0	78.2

had antibiotic or drugs other than WHO recommendation.^[19] Injudicious and inappropriate use of antibiotics for infectious diseases has created threat of antibiotic resistance.^[20]

As far as utilization of health facilities is concerned, contribution of Public health system (*viz.*, PHCs and CHCs) and their subcenters has been only in one out of 10 cases in the study area and nearly in 3 out of 4 cases treatment has been provided by non-government facilities which includes Quacks, private sector, and medical shops. Contrary to this, six out of 10 cases went for treatment of diarrhea in under-five children from a healthcare provider. Utilization of public services in childhood diarrheal illness are not up-to the mark, majority of the people preferred private sector for easy access as they out-number the other sectors and timely availability.^[21]

This study amply highlights that not only prevalence of diarrhea in rural under-five children is high but also management of diarrhea is not on the track despite of existence of NPCDD for several decades. Scaling-up of compliance with ORS and use of zinc for 14 days in community is needed for efficient diarrhoea management through primary care and is the need of hour.

Conclusion

Diarrhea is a significant problem in under-five children from a rural area of India. In spite existence of National Program for

Control of Diarrheal Diseases since 4 decades, management of diarrhea is not on track. Focusing on primary care provision to under-five children can help in bringing the management of diarrhea on track.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Key Messages

This study was carried out on a representative and statistically valid sample of rural under-five children amply highlights that in spite of several measures pertaining to safe water, sanitation, and behavioral modification, diarrhea remains a significant public health problem. Further management of diarrhea is not on track in spite existence of National Program for Control of Diarrheal Diseases (NPCDD) for several decades.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

- World Health Organization. United Nations Sustainable Development Summit: Sustainable Development Goals. UN Head-quarters, New-York. 2015. Available from: <http://www.who.int/sdg/en/>.
- Zelege AT, Alemu ZA. Determinants of under-five childhood diarrhoea in Kotebe Health centre, Yeka Sub-City, Addis Adaba Ethopia: A case control study. *Glob J Med Res* 2017;14.
- Wazny K, Zipursky A, Black R, Curtis V, Duggan C, Guerrant R, *et al.* Setting research priorities to reduce mortality and morbidity of childhood diarrhoeal disease in the next 15 years. *PLoS Med* 2013;10:e1001446.
- World Health Organization. Ending Preventable Child Deaths from Pneumonia and Diarrhoea by 2025: The integrated Global Action Plan for Pneumonia and Diarrhoea (GAPPD); 2013. Available from https://www.who.int/maternal_child_adolescent/documents/global_action_plan_pneumonia_diarrhoea/en/.
- Hutton G, Haller L. Evaluation of the Cost and Benefits of Water and Sanitation Improvements at the Global Level. Geneva: World Health Organization; 2004.
- National sample survey. Ministry of statistics and programme implementation 2014.
- Lakshminarayanan S, Jayalakshmy R. Diarrheal diseases among children in India: Current scenario and future perspectives. *J Nat Sci Biol Med* 2015;6:24-8.
- Indian Institute for Population Sciences (IIPS) and MoHFW.

- National Family Health Survey-4. National fact sheet India. 2017.
9. Alexander KA, Carzolio M, Goodin D, Vance E. Climate change is likely to worsen the public health threat of diarrheal disease in Botswana. *Int J Environ Res Public Health* 2013;10:1202-30.
 10. Reis EC, Goepf JG, Katz S, Santosam M. Barriers to use of oral rehydration therapy. *Paediatrics* 1994;93:708-11.
 11. Degebasa MZ, Weldemichael DZ, Marama MT. Diarrhoeal status and associated factors in under five years old children in relation to implemented and unimplemented community led total sanitation and hygiene in Yaya Gulele in 2017. *Pediatrics Health Med Ther* 2018;9:109-21.
 12. Indian Institute for Population Sciences (IIPS) and MoHFW. National Family Health Survey-4. Uttar Pradesh, 2015-16.
 13. Rajegowda RM, Basti BD, Pichandi J, Sindhu L, Bharani AR. Magnitude and factors influencing diarrhoea among under 5 children in rural area of Chittoor, Andhra Pradesh. *Natl J Community Med* 2018;9:216-9.
 14. Siziya S, Muula AS, Rudatsikira E. Correlates of diarrhoea among children below the age of 5 years in Sudan. *Afr Health Sci* 2013;13:376-83.
 15. Fufa WK, Gebremedhin GB, Gebregergs GB, Mokonnen TM. Assessment of poor home management practice of diarrhea and associated factors among caregivers of under-five years children in urban and rural residents of Doba Woreda, Ethiopia: Comparative cross-sectional study. *Int J Pediatr* 2019. doi: 10.1155/2019/8345245.
 16. Avachat SS, Phalke VD, Phalke DB, Syed MMA, Kalakoti P. A cross-sectional study of sociodemographic determinants of recurrent diarrhoea among children under five of rural area of Western Maharashtra. *Australas Med J* 2011;4:72-5.
 17. Stanley AM, Sathiyasekaran BWC, Palani G. A population based study of acute diarrhoea among children under 5 years in rural community in South India Sri Ramachandra J Med 2019;1.
 18. Tsige AG, Nedi T, Bacha T. Assessment of the management of diarrhoea among children under five in Addis Ababa, Ethiopia. *Pediatric Health Med Ther* 2020;11:135-43.
 19. Alam MB, Ahmed FU, Rehman MF. Misuse of drugs in acute diarrhoea in under-five children. *Bangladesh Med Res Council Bull* 1998;24:27-31.
 20. Moharana SS, Panda RK, Dash M, Chayani N, Bokade P, Pati S, *et al.* Etiology of childhood diarrhoea among under five children and molecular analysis of antibiotic resistance in isolated enteric bacterial pathogens from a tertiary care hospital, Eastern Odisha, India. *BMC Infect Dis* 2019;19:1018. doi: 10.1186/s12879-019-4501-6.
 21. Larson CP, Saha UR, Islam R, Roy N. Childhood diarrhoea management practices in Bangladesh: Private sector dominance and continued inequities in care. *Int J Epidemiol* 2006;35:1430-9.