

**Meremikwu M
Udoh E
Esu E
Chibuzor M
Effa E
Oduwole O
Arikpo D
Odey F**

Facility-Based treatment of under five diarrhoea in Cross River State: A clinical audit

DOI:<http://dx.doi.org/10.4314/njp.v42i4.6>

Accepted: 29th June 2015

Meremikwu M (✉)
Esu E, Effa E, Odey F
College of Medical Sciences,
University of Calabar, Calabar, Nigeria.
Email: mmeremiku@yahoo.co.uk

Udoh E
Paediatrics Department,
University of Uyo Teaching Hospital,
Uyo, Akwa-Ibom State, Nigeria.

Chibuzor M, Oduwole O
Arikpo D
Calabar Institute of Tropical Diseases
Research and Prevention, University of
Calabar Teaching Hospital, Calabar,
Nigeria.

Abstract: *Introduction:* Diarrhoea is the second leading cause of under-five mortality globally and ranks second among the top 10 priority child health problems in Nigeria. The World Health Organization (WHO) has recommended some cost-effective, evidence-based interventions for diarrhoea case management. It is needful to evaluate the current practice in the treatment of diarrhoea in under-fives in health facilities in the country.

Objective: To determine the extent to which current treatment practice for diarrhoea in under-fives conforms to the WHO recommendation.

Method: A clinical audit was conducted between May and June 2013 in 32 health facilities in the Southern Senatorial district of Cross River State, Nigeria.

Trained field workers extracted information from patients' case records using a validated audit tool. Treatment was checked as appropriate, inappropriate, wrong or none, based on prescription on patients' case records.

Result: Of the 370 case records audited, prescription for diarrhoea was appropriate in 40 (10.8%), inappropriate in 231 (62.4%), wrong in 82 (22.2%) and no prescription was made in 17 (4.6%).

Conclusion: Treatment of diarrhoea in under-fives in health facilities in the State is sub-optimum. Retraining of health workers on the current WHO and UNICEF treatment guidelines is highly recommended.

Key words: Diarrhoea, under-fives, health facilities, prescription, clinical audit

Introduction

Diarrhoeal disease is currently second to pneumonia as the leading cause of under-five mortality globally¹. It is estimated to account for eight million hospitalizations and 800 000 deaths among under-fives annually². In Nigeria, diarrhoea ranked second among the top 10 priority child health problems³.

Childhood diarrhoea is a preventable and treatable illness. In a bid to reduce the burden of diarrhoea disease, the World Health Organization (WHO) has recommended some evidence-based cost-effective intervention strategies. The therapeutic components of the strategy are zinc supplementation, oral rehydration salt solution, nutritious diets and appropriate antibiotic therapy on professional consultation in children with septicaemic illnesses, persistent diarrhoea or dysentery.^{4,5}

Most under-fives with diarrhoea are treated at home or

health facilities. The implementation of the evidence-based diarrhoea treatment strategies and guidelines by health care professional at the facility level will go a long way in improving childhood survival. Unfortunately, not all effective healthcare interventions are translated into clinical practice. The gap between available research evidence and clinical practice partly explains the persistent high burden of childhood illnesses in developing countries.

With diarrhoea disease ranking high among the top 10 priority childhood illnesses in Nigeria, it is imperative that a clinical audit be conducted on the current treatment practice for under-fives in health facilities in the country³. This study therefore aimed to determine the extent to which current treatment of under-fives diarrhoea in health facilities in Cross River State conform to WHO recommendations.

Methods

Design of the study

This was a clinical audit of diarrhoea treatment conducted on patient case records in health facilities in Cross River State, Nigeria between May and June 2013.

Setting of the study

Cross River State comprises of three Senatorial districts each of which is made up of 5-7 Local Government Areas (LGAs). The audit was conducted in primary and secondary health facilities in Calabar Municipality and Calabar South Local Government Areas of Cross River State. For the purpose of this audit, primary health Centres were categorized as Primary health facilities while Private hospitals/clinics and General hospitals were categorized as secondary health facilities.

Calabar is the capital of Cross River State which is one of the 36 political administrative states in the Federal Republic of Nigeria. It is located in the south-south geopolitical zone of the country within the tropical rain forest belt. The State has an annual rainfall of over 3500 millimetres.⁶

Target population

The target population was under-five children managed for diarrhoea disease in primary and secondary health facilities 3 – 6 months prior to the study.

Sampling methods

A purposive sampling technique was used to select one of the three senatorial districts in the State. The Southern senatorial district was chosen from which two LGAs, Calabar Municipality and Calabar South were selected. Twelve primary health facilities and six secondary health facilities (two General hospitals and four private hospitals) were selected from Calabar Municipality while nine primary health facilities and five secondary facilities (one General hospital and four private hospitals) were selected from Calabar South LGA. The selection was by a simple random sampling technique using the list of health facilities in the areas as sampling frame. In each of the selected health facilities, the case records of 15 under-fives managed for diarrhoea disease 3 – 6 months prior to the audit were randomly selected and evaluated.

Tool for data collection

The research team developed the audit tool which was pre-tested using case records of under-fives that were treated for diarrhea at the University of Calabar Teaching Hospital. Field workers (medical doctors, nurses, medical laboratory scientists and community health officers) were trained on how to extract the necessary information from patients' case records into the tool.

Ethical issues

The proposal for the audit was reviewed and approved by the Cross River State Health Research Ethics Committee. Consent to audit diarrhoea case management records was sought from the heads of the selected health facilities. Identification numbers were assigned to the field workers and patients' case records for the purpose of confidentiality.

Data extraction

Information extracted from the patients' case records included a record of the age, sex, temperature, weight and treatment. Treatment was classified as appropriate if oral rehydration salt solution with oral zinc was prescribed, inappropriate if oral rehydration salt solution was prescribed with antibiotics or antidiarrheal, wrong if antibiotic or antidiarrhoeal or antiemetic or anti-helminthic was prescribed with no rehydration solution and no treatment if nothing was prescribed.

Data management

The data collected was collated and entered into Microsoft Excel 2007. Data analysis was also done using this package. Proportions were compared using two-sample z-test and p-values reported in the tables with p-values 0.05 regarded as statistically significant.

Results

Record of general characteristics of children

A total of 370 case records of under-fives managed for diarrhoea diseases were audited. Sex was documented in 352 (95.1%), temperature in 299 (80.8%) and weight in 269 (72.7%) case records. The difference in report of sex of children was significantly higher in the primary than secondary health facilities while that of the temperature was significantly higher in the secondary health facilities as shown in Table 1.

Table 1: Report on general characteristics of children

| Characteristics of Children | Number (%) with record of characteristics | | | p-value |
|-----------------------------|---|-----------------------------|------------------------|---------|
| | Primary facilities (n=279) | Secondary facilities (n=91) | All Facilities (n=370) | |
| Sex | 270(96.8%) | 82(90.1%) | 352(95.1%) | 0.0098 |
| Temperature | 218(78.1%) | 81(89.0%) | 299(80.8%) | 0.0219 |
| Weight | 201(72.0%) | 68(74.7%) | 269(72.7%) | 0.6158 |

Classification of prescription for diarrhoea management

The audit shows that Oral Rehydration Salts (ORS) was prescribed in 271 (73.2%) case records while oral zinc was prescribed in 23 (6.2%). Appropriate prescription for diarrhoea treatment was made in 40 (10.8%) case records. ORS alone was prescribed in 38 (10.3%) case

records while ORS with oral zinc was prescribed in 2 (0.01%) in two case records. Inappropriate prescription was made in 231 (62.4%), wrong prescription in 82 (22.2%) and no prescription in 17 (4.6%) case records. The difference in the prescription type between the primary and secondary health facilities was not statistically significant.

Table 2: Types and appropriateness of treatment given to children with diarrhea

| Type of treatment given to children with diarrhoea | Primary facilities (n=279) | Secondary facilities (n=91) | All facilities (n=370) | p-value |
|---|----------------------------|-----------------------------|------------------------|---------|
| Oral rehydration solution alone or given with Zinc ¹ | 28 (10.0%) | 12 (13.2%) | 40 (10.8%) | 0.3928 |
| Oral rehydration solution given with Antibiotics | 167 (59.9%) | 64 (70.3%) | 231(62.4%) | 0.0752 |
| OR Antidiarrhoeal ² | | | | |
| Antibiotic OR Antidiarrhoeal | 68(24.4%) | 14 (15.4%) | 82 (22.2%) | 0.0728 |
| OR Antiemetic | | | | |
| OR Anthelmintic without Oral rehydration ³ | | | | |
| No record of treatment | 16(5.7%) | 1 (1.1%) | 17 (4.6%) | 0.068 |

Appropriate: treated with Oral rehydration solution ± Zinc
 Inappropriate: use of antidiarrhoeals or antibiotics along with ORS
 No rehydration, wrongly treated with antidiarrhoeals or antibiotics

Discussion

To the best of our knowledge, this is the first clinical audit on current practice in the case management of under-five diarrhoea in health facilities in the country. The study shows that a high proportion of health workers reported on the general characteristics of the children. The presence of fever in children with diarrhoea could be a pointer to an invasive pathogen or the occurrence of a co-existing febrile illness.⁷ Change in body weight on the other hand is often related to volume of fluid loss in stool or fluid replacement. Failure to measure the weight of children with diarrhoea could lead to an under estimation of dehydration which could contribute to diarrhea death or an over estimation of dehydration with concomitant inappropriate fluid therapy respectively.⁸ The fact that a large proportion of health workers measured the temperature and weight of the children is quite commendable considering the importance of these parameters in the diagnosis, treatment and outcome of childhood diarrhoea.

This study shows a major deficiency in the treatment of diarrhoea disease among under-fives seen in health facilities in the State when compared to the current World Health Organization (WHO) treatment guidelines as only about 10% of the children received ORS with oral zinc. Children seen in the primary health facilities were more likely to receive wrong treatment or no treatment for diarrhea when compared to those seen in the secondary facilities. This observation may be explained by

stock out of the medications in primary health care centres which often are not readily restocked⁹.

Fluid replacement remains the main stay in the management of childhood diarrhoea. The oral route is known to be the most appropriate route for fluid replacement except in cases of severe dehydration where intravenous infusions are indicated for correction of shock.¹⁰ The WHO currently recommends the use of oral rehydration salt (ORS) solution and oral zinc supplement in the case management of diarrhoea with mild or moderate dehydration. Whereas ORS is a well-known intervention, oral zinc supplementation is a relatively new intervention in diarrhoea management. Zinc acts by modulating the host resistance to infectious agents, thereby reducing the risk, severity and duration of diarrhoeal illness.¹¹ There is sufficient research evidence to support the use of this intervention in the case management of childhood diarrhoea.¹²

The overall prescription of ORS in this audit is comparable to the finding of Lofgren et al¹³ in Uganda and Kalahasthi et al¹⁴ in India but that of oral zinc supplementation was markedly low. Whereas the overall prescription of oral zinc was 6.2% in this audit it was 68.0% in the Indian study but was not prescribed at all in the Ugandan study. The observed disparity in the prescription of oral zinc supplementation in the treatment of childhood diarrhoea may indicate a difference in the knowledge of the current WHO diarrhoea treatment guidelines among health care providers in the different study settings. The translation of knowledge into clinical practice is another factor that may have contributed to the observed difference in utilization of this life-saving intervention. For instance, in the Ugandan study where oral zinc was not prescribed, over 50% of the health care providers in the facilities audited were aware of programmes initiated by the government to promote oral zinc supplementation in the treatment of diarrhoea in children.¹³ Strategies on behavioural change communication to promote utilization of evidence-based health care interventions among health care providers are therefore necessary to reduce morbidity and mortality from common childhood illnesses like diarrhoeal diseases.

This audit shows that appropriate treatment for diarrhoea was instituted in 40 (11%) children with only two of them receiving ORS with oral zinc supplementation. The benefit of using these medications together outweighs using them singly as it is more likely to reduce the severity, duration and mortality from the illness.¹⁵ The low rate of prescription of ORS and oral zinc in this audit suggest that many health care providers may lack knowledge of the current WHO treatment recommendations for the treatment of diarrhoea. The non-prescription of oral zinc in the Ugandan study was partly attributed to the fact that the intervention was not included in the clinical guidelines of the Uganda's Ministry of Health and that the medication was not available in the health facilities.¹³ Therefore, beyond incorporating the current WHO recommendations on diarrhoea case management in under-fives into national guidelines,

efforts should be made at country levels to include oral zinc in the treatment algorithm and to make it available at an affordable price in the health facilities.

Over 60% of the prescriptions for diarrhoea case management were inappropriate. The prescriptions were made up of different antibiotics, anti-diarrhoeals, antiemetics and antihelminthics that are not indicated in the WHO recommendations for management of diarrhoea. The proportion of inappropriate prescriptions observed in this audit is similar to reports from Thailand and India.^{16,17} Irrational antibiotic prescription was the main contributor to the overall inappropriate prescriptions. Antibiotics are of limited indication in the management of childhood diarrhoea. There indications include bacillary and amoebic dysentery, cholera, pseudomembranous colitis and some special circumstances¹⁸. There was no evidence to support antibiotic prescription in this study as all the children had acute watery diarrhoea. Inappropriate prescription of antibiotics and other medications in the case management of diarrhoea could lead to drug resistance, treatment failure, adverse effects and increase cost of diarrhoea management.¹⁹

There was no prescription for treatment of diarrhoea in 4.6% of the children seen at the facilities. This observation is worrisome because in the absence of appropriate fluid replacement, dehydration may set in or progress in severity in those that were already dehydrated at the time of presentation at the facility. Thus, failure to institute appropriate fluid therapy increases the risk of death from the illness. Sumon et al²⁰ have reported poor judgment of diarrhoea severity and perceived high cost of treatment by caregivers as factors that militate against treatment-seeking for diarrhoea in under-fives. The study showed that only about one-third of the caregivers visited formal health facilities for subsequent care when the children failed to improve on home treatment.²⁰ Since caregivers infrequently patronize formal health facilities for diarrhoea case management, it is imperative that adequate attention and proper treatment be given to the few who do. Most of the children that had no treatment for diarrhoea were seen at the primary health facilities. This disparity in practice may indicate a knowledge or attitudinal gap between health care providers in the primary and secondary facilities. There is therefore a need for training of health care providers especially those in the primary health facilities on the current WHO guidelines on case management of diarrhoea in

under-fives.

The use of a purposive sampling technique for selecting the senatorial district in this study is acknowledged as a limitation to the generalization of the findings of the study. Future studies using appropriate probability sampling techniques in the selection of study areas are therefore indicated.

Conclusion

This audit shows that the current prescription practice in the case management of diarrhoeal diseases in under-fives in health facilities in the State is sub-optimum. Regular training and retraining of health care providers on the current WHO diarrhoea treatment guidelines is required. The current WHO guidelines should be incorporated into national treatment guidelines.

Author's Contribution

The study was conceived by M Meremikwu who provided overall supervision of the project and made critical inputs in the final version of the manuscript. F Odey, E Effa, O Oduwole and E Udoh participated in developing the study design and tool. The study tool was validated by E Udoh, M Chibuzor, D Arikpo and O Oduwole. E Udoh and E Esu supervised the data analysis. Data interpretation and write up of manuscript was done by E Udoh with contributions from D Arikpo, M Chibuzor and O Oduwole. All authors made input to the final and approved version of the manuscript.

Conflict of interest: None

Funding: This project was support by the Effective Health Care Research Consortium which is funded by UKaid from the UK Government Department for International Development. The UKaid neither played a role in the conduct of the study nor influenced the preparation of the manuscript.

Acknowledgement

We hereby express our profound gratitude to the field workers for extracting data from the patients' case records as well as the staff of the selected health facilities for their co-operation.

References

1. UNICEF: Pneumonia and diarrhea, tackling the deadliest diseases of the world's poorest children. New York, NY: UNICEF; 2012.
2. Fawzy A, Arpadi S, Kankasa C, Sinkala M, Mwiya M, Thea DM, Aldrovandi GM, Kuhn L. Early weaning increases diarrhea morbidity and mortality among uninfected children born to HIV-infected mothers in Zambia. *J Infect Dis.* 2011; 203(9):1222-30.
3. Meremikwu M, Udoh E, Nwagbara B, Effa E, Oranganje C, Edet B, Nwagbara E, Bello S, Eke F. Priority setting for systematic review of health care interventions in Nigeria. *Health Policy.* 2011; 99(3):244-9.
4. Chiabi A, Monebenimp F, Bogne JB, Takou V, Ndikontar R, Nankap M et al. Current approach in the management of diarrhea in children: From theory and research to practice and pragmatism. *Clin Mother Child Health* 2010; 7 (1): 1243 – 51.
5. Dheeraj S, Panna C, Piyush G, Joseph LM, Tarun G, Siddhartha G et al. Promoting appropriate management of diarrhea: A systematic review of literature for advocacy and action: UNICEF-PHFI series on newborn and child health, India. *Indian Paediatrics* 2012; 49: 627 – 49.

6. Alaribe AAA, Ejezie GC, Ezedinachi ENU. Studies on mosquito distribution in Ekemkpon Village Cross River State of Nigeria. *J Med Lab Sci* 2002; 2: 45 – 51.
7. World Gastroenterology Organization: Acute diarrhea in adults and children: a global perspective. 2012: 1-24
8. Pruvost I, Dubos F, Chazard E, Hue V, Duhamel A, Martinot A. The value of body weight measurement to assess dehydration in children. *PLoS ONE* 8(1):e55063. Doi:10.1371/journal.pone.0055063
9. Yusuff KB, Tayo F. Drug supply strategies, constraints and prospects in Nigeria. *Afr J Med Sci*. 2014; 33: 389-94
10. Cutting WA. Diarrhea disease. In: S. Paget, B. Martin, C. Michael, P. Michael and W. Tony, Eds. Diseases of children in the Subtropics and Tropic, London: Edward Arnold, 1991: 455-95
11. Bhutta ZA, Bird SM, Black RE. Therapeutic effect of oral zinc in acute and persistent diarrhea in children in developing countries: pooled analysis of randomized controlled trials. *Am J Clin Nut* 2000; 72(6): 1516 – 22.
12. Lazzarini M, Ronfani L. Oral zinc for treating diarrhea in children. Cochrane Database of Systematic Reviews 2013, Issue 1. Art. No.: CD005436. DOI: 10.1002/14651858.CD005436.pub 4.
13. Lofgren J, Toa W, Larsson E, Kyakulaga F, Forsberg BC. Treatment pattern of childhood diarrhea in rural Uganda: a cross-sectional survey. *BMC International Health and Human Rights* 2012;12:19.
14. Kalahasthi P, Vishnu R, Sandasivam B. Audit of use of antibiotics and zinc supplement in childhood diarrhea. *J Pharmacol Pharmacother*. 2013; 4(3): 204 – 205.
15. CL, Black RE. Zinc for treatment of diarrhea: effect on diarrhea morbidity, mortality and incidence of future episodes. *International J. Epidemiol* 2010; 39: 163-169
16. Howteerakul N, Hogginbotham N, Dibley MJ. Antimicrobial use in children under five years with diarrhea in a central region province of Thailand. *Southeast Asian J Trop Med Public Health*. 2004;35:181–7.
17. Singh J, Bora D, Sachdeva V, Sharma RS, Verghese T. Prescribing patterns by doctors for acute diarrhea in children in Delhi, India. *J Diarrheal Dis Res*. 1995; 13:229 –31.
18. NICE: Diarrhea and vomiting caused by gastroenteritis. *Clinical Guideline*, RCOG Press, London; 2009: 1 – 174.
19. Grace JC. Dangers of indiscriminate antibiotic use. *Iowa State University Veterinarian* 1956; 18: 69-83
20. Sumon KD, Dilruba N, Shahnawaz A, Yukun W, Farzana F, Fahmida DF et al. Health Care-Seeking Behavior for Childhood Diarrhea in Mirzapur, Rural Bangladesh. *Am J Trop Med Hyg*. 2013; 89: 62 -68.