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ORIGINAL ARTICLE

Prescribing Practices in the Management of Childhood Diarrhoea in Primary Health Care Centres in a Sub-Urban Community in Nigeria

Ogbo PU, Soremekun RO, Oyetunde OO, Aina BA

Department of Clinical Pharmacy & Biopharmacy, Faculty of Pharmacy, University of Lagos, PMB 2033, Lagos

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ABSTRACT

Background: Childhood diarrhoea remains the second leading cause of morbidity and mortality among children under the age of five. Oral rehydration therapy and zinc tablets are the cornerstone for its management both at home and in the health facilities. Primary health care is the first level of contact of individuals and communities with the health care system and appropriate prescription is crucial for sustainable health benefits. This study assessed the prescribing pattern for childhood diarrhoea management and determined the appropriateness of treatment for acute watery diarrhoea without comorbidities in Primary Health Care (PHC) facilities in a sub-urban community in Nigeria.

Methods: This descriptive study was done in 19 PHC facilities in Ikorodu Local Government Area of Lagos State, Nigeria. A retrospective review of 1271 prescriptions for diarrhoeal cases of children between 6 to 59 months was done using the records from the Outpatient Department register for a period of one year. Descriptive analysis was done.

Results: From the cases reviewed, 1239 (97.5%) had acute watery diarrhoea (AWD), either alone 819 (64.4%), or with malaria/fever 347 (27.3%), cough/URTI 59 (4.6%), and other conditions 14 (1.1%). For cases of AWD alone, there were 499 (60.9%) prescriptions for ORS/Zinc, 249 (30.4%) for antibiotics and 203 (28.4%) for antimalarials. Antibiotic and antimalarial injections were also included in the prescriptions.

Conclusion: This study found the prescription pattern for childhood diarrhoea to be inadequate with suboptimal prescriptions of ORS/Zinc. The prescriptions of antibiotics and antimalarials for acute watery diarrhoea was high and unnecessary.

Correspondence to:
Patricia Uche Ogbo
Email: ucogbo@yahoo.com; pogbo@unilag.edu.ng
Telephone: +2348029439696

INTRODUCTION

Childhood diarrhoea remains the second leading cause of morbidity and mortality among children under the age of five with more than 3,000 children dying daily across the world.[1, 2] Currently, Nigeria and India account for 42% of global mortality from diarrhoea.[3] The burden of diarrhoea in Nigeria has been persistently high over the years. This could be due to the quality of management which has been found to be poor irrespective of source of management. This is also in spite of the existence and adoption of a proven and effective treatment in the national policies.[4] Oral rehydration therapy (ORT) consisting of oral rehydration salts (ORS), continued feeding and other home fluids such as salt-sugar solution (SSS) or salted rice water is considered the hallmark of good quality diarrhoeal management practices.[5] Apart from rehydration, low osmolarity ORS shortens the duration of diarrhoea. The use of zinc tablet

was included in the management of childhood diarrhoea in 2004. Zinc reduces the severity and duration of diarrhoea and when given for 10 to 14 days lowers the incidence of diarrhoea in the following two to three months.[6] The use of ORS and zinc is now the gold standard for the care of diarrhoea as recommended by World Health Organization (WHO) and United Nations Children's Fund (UNICEF).[6]

Current statistics on annual deaths due to diarrhoea suggest possible gaps in the use of this available effective treatment option (ORS/Zinc). The Nigerian national coverage for ORS and zinc is low, with the use of ORS at about 25% and less than 1% for zinc in children under the age of five with diarrhoea.[7] Many factors contribute to this low use of ORS and zinc among which are the caregivers' treatment seeking pattern for diarrhoea and inadequate use of ORS and zinc by healthcare providers to manage acute watery diarrhoea.[8] The 2013 National Demographic and Health Survey results indicated that there was a slight decline in mothers' health-seeking behaviour for children with diarrhoea from 32 percent in 2008 to 29 percent in 2013.[7] By the design of the Nigerian health system, the Primary Health Care (PHC) facility is the first point of call for caregivers seeking treatment for their children. PHC facilities are instituted to provide treatment already proven as effective based on clinical presentations to enhance quick treatment since laboratory tests may not be readily available in resource limited areas. The availability of treatment guidelines for Primary Health Care facilities should make it effortless to choose appropriate treatment for specific disease conditions such as childhood diarrhoea.

The objectives of this study were to assess the prescribing pattern for childhood diarrhoeal conditions and to determine the appropriateness of treatment for acute watery diarrhoea without comorbidities in a resource limited setting.

METHODOLOGY

This study was carried out in Primary Health Care (PHC) facilities in Ikorodu Local Government Area (LGA), Lagos. Ikorodu is a semi-urban town located at a distance of approximately 36km north of Lagos metropolis. The population of children under-five years in Ikorodu is estimated to be 159,602 while the PHC centers cater for approximately 112,166 under five children.[9] Ikorodu LGA has six Local Council Development Areas (LCDAs) namely Ikorodu North, Ikorodu West, Ikorodu Central, Igbogbo/Baiyeku, Imota and Ijede. Its 23 functional PHCs located within the LCDAs cater for Ikorodu's highly mixed and mobile population, as well as the hard-to-reach riverine dwellers.

This study was a descriptive retrospective review of prescribing records for all diarrhoea cases in children between 6 and 59 months of age, encountered within a period of one year from July 2016 to June 2017. The study population included all cases of diarrhoea in children from 6 months to below 5 years that presented and were treated in the 23 PHC facilities within the study period. Data were collected from 19 health centres. Four centres were excluded from the study due to incomplete record-keeping. A standardized data collection proforma developed by World Health Organization was adopted for this study.[10] Information was extracted from the general outpatient department registers where all prescribing details were recorded. Information collected included date of prescription, age of child, diagnoses and medicines prescribed as indicated in the registers.

Collected data were coded and analyzed using SPSS version 22.0. Results were presented as frequencies and percentages. Appropriateness

of prescription for cases of AWD alone was defined as the prescription of ORS/Zinc without addition of antibiotics, antimalarials and antidiarrhoeals. Ethical approval was obtained from the Lagos University Teaching Hospital (LUTH) Health Research and Ethics Committee (ADM/DCST/HREC/APP/705). Approval to work and have access to data in the health facilities was obtained from the Lagos State Primary Health Care Board (LS/PHCB/MS/1128/VOL.1/272).

RESULTS

A total of 1271 records of diarrhoea cases were extracted from the registers. The number of diarrhoea cases per Primary Health Care centre for the period of one year ranged from 3 in a Primary Health Care centre located in Ikorodu North LCDA to 149 in another centre located in Ikorodu West LCDA. The age range of children under five years who were treated for diarrhoea during the study period was 6 to 54 months. Mean age was 15.7±10.154 months. The diagnoses of diarrhoeal diseases were categorized as acute watery diarrhoea 1239 (97.5%) and dysentery 32 (2.5%). Of the acute watery diarrhoea (AWD) cases, 819 (64.4%) occurred alone, 347 (27.3%), with malaria/fever, 59 (4.6%) with upper respiratory tract infections (URTI)/cough while 14 (1.1%) with other conditions such as sepsis, boils and skin rash (Table 1).

Out of the 1271 cases, 1165 (91.7%) were prescribed with a total of 2394 oral medicines ranging from 1 medicine to 7 medicines per case; average number of medicines was 2.05 ± 1.010. One hundred and fourteen injections were prescribed. Out of 819 cases of AWD, 598 (73.0%) received prescriptions for ORS and/or zinc. Four hundred and ninety-nine (60.9%) of these were prescriptions for ORS/Zinc (combination), 52 (6.3%) for ORS only and 47 (5.7%) for zinc only (Table 2).

Table 1: Basic characteristics of cases of diarrhoeal diseases in U-5 children

Variable	Frequency (n=1271)	Percent
Age group (months)		
<12	438	34.5
12 – 23	551	43.4
24 – 35	227	17.9
36 -47	3	0.2
48 – 59	52	4.1
Diagnoses		
AWD alone	819	64.4
AWD/malaria/fever	347	27.3
AWD/cough/URTI	59	4.6
Dysentery	32	2.5
AWD/others	14	1.1

Table 2: Prescription pattern for Acute Watery Diarrhoea only

Variable	Frequency (n=819)*	Percent
Prescriptions containing ORS and/or zinc	**598**	**73.0**
ORS only	52	6.3
Zinc only	47	5.7
ORS/Zinc	499	60.9
Prescriptions containing Antibiotics	**249**	**30.4**
1 oral antibiotic	195	23.8
2 oral antibiotics	29	3.5
Antibiotic injections	17	2.1
Oral and antibiotic injection	8	1.0
Prescriptions containing Antimalarials	**203**	**24.8**
Oral Antimalarial	178	21.7
Antimalarial injection	15	1.8
Oral and antimalarial injection	10	1.2
Prescriptions containing Antidiarrhoeals (Loperamide)	**4**	**0.5**

*Multiple responses

Two hundred and forty-nine (30.4%) cases received 286 antibiotic prescriptions. Some cases received more than one oral antibiotic, others received prescriptions for injections and a combination of both. Two hundred and three

(24.8%) cases received antimalarial prescriptions. Fifteen (1.8%) of these were injections (Table 2). Seven classes of antibiotics were prescribed with the Penicillins being the highest (45.8%), followed by metronidazole at 27.3% (Table 3).

There were also 148 (8.1%) prescriptions for analgesics and 156 (19.0%) for 'others' such as vitamins and antihistamines. Only 330 (40.3%) cases of AWD received appropriate prescriptions for ORS/Zinc without antibiotics, antimalarials and antidiarrhoeals. Four hundred and eighty-nine cases (59.7%) received prescriptions that were inappropriate for AWD (Figure 1).

Table 3: Class distribution of antibiotics prescribed

Class of Antibiotics	Frequency (n=286)**	Percent
Penicillins	131	45.8
Nitroimidazoles	78	27.3
Cephalosporins	31	10.8
Aminoglycosides	22	7.7
Sulfonamides & Trimethoprim	15	5.2
Macrolides	8	2.8
Fluoroquinolones	1	0.4

**286 antibiotics were contained in 249 antibiotic prescriptions with some prescriptions having more than 1 antibiotic.

DISCUSSION

This study shows that most of the children who were managed at the PHCs for diarrhoeal diseases were within the age group 12–23 months. Eight hundred and nineteen cases (64.4%) presented with AWD alone out of which only 499 children received prescription for a combination of ORS and Zinc. Two hundred and forty-nine children received one or two oral antibiotics, injectable antibiotics and a small proportion (2.1%) received a combination of oral and injectable antibiotics in addition to ORS and zinc.

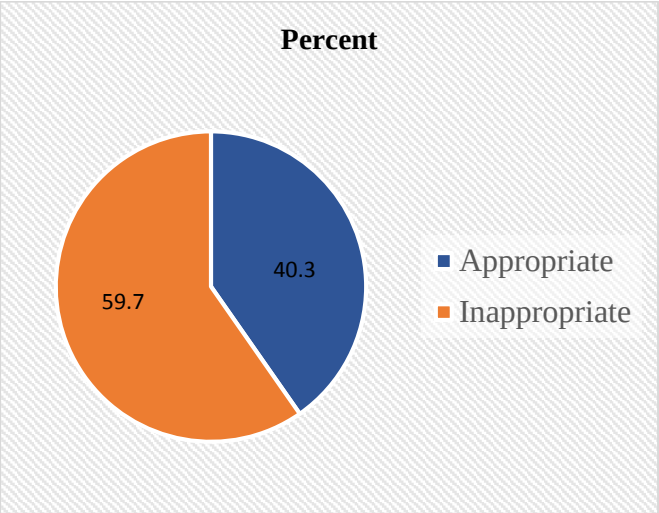

Figure 1: Summary of Prescription Practice in the Management of Acute Watery Diarrhoea

This study also confirmed the prescription of antimalarials in both oral and injectable forms. In addition, findings from the study suggest that the relevance of ORS/Zinc in the management of childhood diarrhoea of any etiology is de-emphasized.

The appropriate prescription of ORS/Zinc in 330 (40.3%) cases in this study is much better than an earlier observation in a study done to assess the situation in Nigeria where 25% received ORS and less than 1% received zinc; although it is still far from the 80% target given by Federal Ministry of Health.[7] Appropriate prescription being adjudged as the prescription of ORS/Zinc without addition of antibiotics, antimalarials and antidiarrhoeals. Low appropriate prescription of ORS/Zinc in this study may be due to expectation of caregivers to get antibiotic prescriptions or other medicines, differences in clinical knowledge of prescribers and differential rates of diffusion and adoption of innovation.[11] Whatever the reasons may be, prescription of other medicines in addition to ORS/Zinc suggests correctness of those medicines and inhibits the entrenching of ORS/Zinc as cornerstone management for AWD in children. The separate prescription of ORS (6.3%) and zinc (5.7%) sends a confusing

message to the caregiver who might interpret it as the use of one or the other and not as a combination therapy. These findings reveal evidence of process variation from the Nigerian Standard Treatment Guideline and the WHO/UNICEF recommendation for the use of ORS and zinc in the management of childhood diarrhoea.[6,12] Process variation is typically represented by unwarranted variation in prescriptions of appropriate medicines which ultimately and inadvertently directly impacts equity of access to services, health outcome for populations and efficient use of resources.

A group of scholars in their audit of prescriptions for the management of diarrhoea in different levels of health institutions in Amritsar, Punjab, found that the government tertiary institution had 83% adherence to WHO guidelines for the use of ORS/Zinc; while the private tertiary, government secondary and private pediatric institutions were non-adherent to recommendation; they all had probiotics in 100% of the prescriptions and antibiotics in 25%, 78% and 97% of the prescriptions, respectively.[13] The adherence of 83% is commendable and much higher than this study where there was only 40% adherence, though this study considered only primary health care facilities. A systematic review of 114 studies done by another group of scholars between 1990 and 2013, most of them done in Asia and sub-Saharan Africa identified inappropriate medicine use, especially antibiotics as the most common harmful practice in the management of diarrhoea.[14] Inappropriate prescriptions contained antidiarrhoeals, antibiotics and antimalarials in both oral and injectable forms.

The findings for antibiotics use (30.4%) is similar to that found in the USAID/SHOPS assessment in Uganda (29.2%) [15] and close to that found in public health facilities in India (23%) [16] whereas in Northern Tanzania and Calabar, Nigeria, antibiotic use was at 80.9% and 79.9%, respectively for acute watery diarrhoea.[17-18] This inappropriate antibiotic use in health facilities could explain the bias caregivers have towards the use of antibiotics for the treatment of childhood diarrhoea when allowed to make their choice.[15] While this study found 23.8% and 3.5% of prescriptions containing one and two oral antibiotics, respectively, 51.1% of the prescriptions in the Calabar study contained one oral antibiotics while 48.9% contained between two to four antibiotics.[18] Penicillins (mostly Amoxicillin) were the most prescribed antibiotics (45.8%) in this study. This is unlike in India where Fluoroquinolones were the most prescribed antibiotics both in the public sector (91.5%) and the private sector (96%) for AWD.[16] Surveillance has shown that irrational use of Fluoroquinolones in the study community in India has resulted in resistant urinary tract infections. Penicillins are of high importance in our country Nigeria as Amoxicillin is the first-line antibiotic for pneumonia, which is still the leading cause of childhood mortality. The second most common class of antibiotics prescribed was Nitroimidazoles (specifically metronidazole) (27.3%); unlike the study in Calabar where metronidazole was the most common (46.6%) antibiotic prescribed for AWD followed by cotrimoxazole (22.7%).[18] The clinical importance of the variance identified in antibiotic use is the potentially inevitable development of antibiotic resistance. Apart from resistance, unnecessary exposure to these medicines puts the patients at the risks of side effects and adverse reactions associated with them.

Premature, presumptive and indiscriminate use of antibiotics will jeopardize the gains made by the healthcare system and could accelerate the journey to post-antibiotic era. Although resistance to antibiotics is a well-known result of inappropriate antibiotic use,

other consequences have been highlighted. A study has linked the development of Inflammatory Bowel Disease by children to unnecessary exposure to antibiotics in childhood.[19] While all-encompassing risks might be challenging to report, studies done in mice at doses similar to paediatric doses, have showed that exposure to antibiotics at early age alters both host and microbiota development, leads to increase in weight and bone growth and to obesity.[20,21] These clinical implications call for caution in the use of antibiotics as the associated risks far outweigh the benefits of presumptive treatment. It also calls for the initiation of antibiotic stewardship program at all levels of healthcare.

The use of Artemisinin Combination Therapy (24.8%) for AWD could be explained by presumptive treatment of malaria, which sometimes manifests with diarrhoea as one of the symptoms in some patients. However, the PHCs carried out rapid diagnostic tests for malaria parasites on all febrile children no matter their complaint. The diagnoses after the tests were also clearly documented and therefore the issue of presumptive treatment for malaria is not tenable in this study. This management style is not recommended by WHO and not included in the Standard Treatment Guideline for Nigeria. The clinical implication of this is the exposure of children to unnecessary antimalarials and the possible experience of side/adverse effects associated with ACTs. It also increases the use of already scarce resources and may promote resistance to this group of drugs. Literature search did not reveal documented findings on the use of antimalarials for the management of AWD. This phenomenon may therefore be peculiar to our study setting.

Further observations from the registers from which data were extracted reveal the prescription of different medicines for AWD on the same day for different patients in the same facility. While one child receives prescription for ORS/zinc, another receives ACT only, yet another receives gentamicin injection. This practice annuls equity in access to medicines and creates a notion that the prescribed medicines are correct. Overall, our finding of appropriate management of AWD at 40% shows that there is need to intensify efforts to improve management of diarrhoea in children especially at the primary care level. This study shows a clear mismatch between policy recommendation on combined prescription of ORS and Zinc in the treatment of childhood diarrhoea and the actual practice. These findings connote a de-emphasis on the use of ORS/Zinc, which are part of the life-saving commodities that must be available in every health institution especially at the primary care level. The study was limited by the fact that only recorded data were used and there was no opportunity for the prescriber to explain the reasons for variations in prescriptions. Further studies would be required to uncover the perspective of the prescriber on variations in prescriptions.

This study highlights the sub-optimal appropriate prescription of ORS/Zinc in the management of acute watery diarrhea. The prescription pattern for the management of AWD involved the use of antibiotics, antimalarials, and other medicines either alone or in combination with ORS and zinc; and this is not in line with WHO guidelines and the Standard Treatment Guideline for Nigeria. This study clearly underscores the need for auditing of prescriptions and initiation of antibiotic stewardship program in primary health care facilities. To this end, a copy of the results of this study will be submitted to the Lagos State Primary Health Care Board to provide information on the prescription pattern in the Primary Health Care facilities; so the information can be utilized to guide the initiation of an antibiotic stewardship

programme and provide guidelines for the enforcement of STG in AWD management. Yearly prescription audit and feedback could be instituted to enhance adherence to policy recommendation in the management of diarrhoeal diseases in children.

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