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Risk factors, pre-presentation management and clinical state of children with diarrhoea presenting in a community cottage hospital

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Abstract*:* Diarrhoael disease ranks second as the cause of under-five mortality worldwide and is particularly important in the developing world. Risk factors include water source, poor human and domestic waste disposal, poor hand washing and breastfeeding practices. Outcome depends on appropriate oral rehydration therapy, continued feeding and rational use of drugs. This work was designed to identify ongoing risk factors for diarrhoae presenting in a Cottage Hospital serving a well-defined catchment community in the Niger Delta region of Nigeria. It also aimed at identifying modalities of treatment before presentation at the hospital, clinical state at presentation and outcome of treatment on the children.
A prospective study recruiting all children admitted for diarrhoae disease in the hospital between January and June 2016. Socio-demographic data, risk factors, place and modalities of pre-presentation management, clinical state on admission and outcome were recorded. Simple proportions, percentages and tables were used to analyze the data using stata 10 (stata corp. Texas).
Fifty-four children representing 11.11% of 468 paediatric admissions to the hospital in the period were admitted into the study. The age range was 3 – 96months (median 11 months; 1QR 6 – 18 months). Identified risk factors were lack of Exclusive Breastfeeding (85.19%), use of feeding bottles (20.37%), questionable or poor sources of water (92.59%), poor hand washing practices with; 33.62% not washing hands always before feeding child and 35.91%, not always washing hands after cleaning infant/child's faeces. Most of the children (35 or 64.82%) first presented at Patent Medicine Stores and 38 or 70.37% had some oral fluids. While 9 (16.67%) had dysentery 31(57.41) had anti-microbials and 18 (33.33%) had anti-emetics. Twelve (33.33%) of the children had severe dehydration and 2(3.70%) had extrapyramidal crisis from use of anti-emetics. None died, but one child developed cortical damage from hypoglycaemia.
Diarrhoae is an important children problem in this catchment community. Major risk factors are lack of exclusive breastfeeding, unsatisfactory hand washing practices, questionable water sources and use of feeding bottles. These children are largely mismanaged at patent medicine stores before presentation at hospital. Provision of potable water should be a priority in this and similar communities. Good hygiene practices and Exclusive Breast Feeding(EBF) should be consistently taught in ante-natal clinics and immunization centres. Training and retraining of patent medicine dealers is essential.

Introduction

Despite significant reduction in diarrhoea deaths in recent years, diarrhoea ranks second as the cause of under-five mortality globally. It is responsible for eleven percent of child deaths in the world.2Diarrhoeal disease also contributes significantly to the burden of childhood malnutrition.3
Reduction of morbidity and mortality from diarrhoea is based on provision of clean water sources, basic hygiene

particularly hand washing before preparing and giving meals, after defecation and cleaning infant child faeces. When diarrhoea occurs, use of appropriate oral rehydration fluids, zinc, vitamin A, selective use of antibiotics, avoidance of antimotility and anti-diarrhoea drugs are the principles of management.2-4 Most of these activities are expected to be carried out at home or Primary Health Care setting close to the people.4

In the Niger Delta area of Nigeria, the Shell Petroleum and Development Company supports a number of Cottage Hospitals that cater for communities. The Obio Cottage Hospital (OCH) located at the Obio/Akpor Local Government Area of Rivers State, caters for the Local Government Area and surrounding communities. Obio/Akpor Local Government Area has anestimated population of about 584,030 as at 2011 projected from the 2006 census.

The OCH has a community Health Insurance Scheme for the catchment community, making it highly accessible and highly patronized.5 Events here may therefore reasonably reflect the situation in the community.

Materials and methods

This was a prospective study of under-five year old children presenting with diarrhoea at the Obio Cottage Hospital, Obio/Akpor Local Government Area, Rivers State of Nigeria between January and June, 2016. This facility hasan Out-Patient facility, Emergency Care Area and In-Patient facility for children. Children managed at the three points with diarrhoea were consecutively recruited into study.

Biographical data, diarrhoea prevention practices of the care giver, place and modalities of initial management, clinical state at presentation, management, and outcome were documented. Data was entered into spreadsheet and analyzed with stata 10 (stata corp. Texas) using frequencies and simple proportions and presented in tables.

Ethical approval was obtained from the Research Ethics Committee of the University of Uyo Teaching Hospital Uyo, Akwa Ibom State, Nigeria.

Results

Fifty-four children with diarrhoeal disease were admitted in the period, accounting for 11.11% of childhood admissions in the period. The age range was 3-96months with a median of 11months (IQR 6 -18). Thirty four (62.96%) were males and 20 (37.04%) females giving a male: female ratio of 1.7:1.

Risk factors for diarrhea

Feeding Practices: Eighteen (33.33%) had no exclusive breast feeding (EBF) at any time, 28 (51.85%) had EBF for less than six months while eight (14.81%) practiced or were practicing exclusive breast feeding in the first-six months of life. Eleven (20.37%) used infant feeding bottle.

Source of Water and hygiene Practices: Table 1 shows the sources of water for the families. The majority (39 or 72.22%) used bore hole water while only four (7.41%) used pipe-borne water.

Table 1: Source of water

Source	No.	Percentage
Borehole	39	72.22
Bottled/Sachet water	16	29.63
Piped water	4	7.41
Boiled water (source not stated)	3	5.56
Shell company water	1	1.85
No information	4	7.41

*Some used more than one source of water

Table 2 demonstrates hygiene practices among care givers. Only 65.38% of the care givers washed their hands always before preparing feeds while only 64.81% always washed their hands after cleaning child faeces.

Table 2: Hygiene Practices among care-givers at children with diarrhoea (n = 54)

Practice	Always n (%)	Sometimes n (%)	Never n(%)	No information n(%)
WHBPF	34 (65.38)	18 (34.62)	0 (0)	2 (0)
WHBF	35 (64.82)	17 (32.08)	1 (1.85)	0(0)
WHAF	36 (66.67)	11 (20.37)	5 (9.26)	2 (370)
WPIBF	35 (64.82)	1(1.85)	15 (27.78)	3 (5.56)
WPIAF	33 (61.11)	17(32.08)	0(0)	3(7.41)
WHIACB	35 (64.82)	19 (35.19)	1(1.85)	3(5.56)

KEY:
WHBPF = Washes hands before preparing food.
WHBF = Washes hands before feeding
WHAF = Washes hands after feeding
WPIBF = Washes plate immediately before feeding
WPIAF = Washes plates immediately after feeding
WHIACB = Washes hands immediately after cleaning buttocks

Human waste disposal

Thirty-two (59.26%) of the children belonged to households using water closet for human waste disposal (table 3) while 4 (7.41%) each used pit and the surrounding bushes.

Table 3: Human waste Disposal systems

Type	No	Percentage
Water closet	32	59.26
Pit	4	7.41
Bush	4	7.41
Bucket	1	1.85
No Information	3	24.07

Pre-presentation management

Table 4 illustrates place of initial management of the children before presentation at OCH. The majority (35 or 64.82%) first presented at chemists/patent medicine stores. The next most frequently used facility was pharmacy (score 20%).

Table 4: Place of initial management of diarrhea episode (n=54)

Facility	No.	Percentage
Chemists/Patient Medicine store	35	64.82
Pharmacy	5	9.26
Private Hospital	3	5.56
General Hospital	2	3.70
Primary Health centre	2	3.70
Herbal home	1	1.85

Table 5 shows the modalities of pre-presentation treatment. Most of the children (38 or 70.37%) had oral fluids with 37 or 68.52% having standard ORS solution and 1(1.85%) having low osmolarity ORS solution. A majority of the children (31 or 57.41%) also had antimicrobials. Eighteen (33.33%) were given anti-emetics.

Table 5: Pre presentation treatment of children with diarrhoea

Treatment	No.	%
Fluid	37	68.52
Standard ORS		
IV fluids	3	5.56
Low osmolanty ORS	1	1.85
Drugs		29.63
Zinc	16	
Vitamin	5	9.26
Antimicrobials (Tetracycline, Amoxicillin, Metronidazole, amoxicillin-clavilunate)	31	57.41
Anti-emetic (promethiazine, chorpheniramine)	18	33.33

Clinical state

Thirty eight (70.37%) had acute watery diarrhoea, 9 (16.67%) dysentery and 4(7.41%) persistent diarrhoea. There was no information for three (5.56%). Twelve (22.22%) had no signs of dehydration, 30 (55.56%) moderate dehydration while 12 (22.22%) had severe dehydration.

Thirteen children (24.07%) were drowsy from use of anti-emetics. Two (3.70%) had extra-pyramidal crisis from repeated intra-muscular promethiazine.

Outcome

The children were managed according to standard protocol for diarrhoae with low osmolarity ORS solution, intra-venous fluids for those with severe dehydration and unable to drink from drowsiness, zinc and cephalosporins for those with bloody diarrhoea.[3,4] All the children recovered with zero mortality.
One, who also had several anti-emetics and severe hypoglycaemia, recovered from severe dehydration but with signs of cortical necrosis.

Discussion

With diarrhoael disease still ranking high as cause of morbidity and mortality in under-fives, this work was designed mainly to identify ongoing risk factors and management of this condition in the community. The age range affected and the gender distribution are both expected.[4] Almost three quarters of the respondents used bore hole water while about a third used sachet water (water prepackaged in sachets). The quality of these boreholes in Nigeria is often questionable.[6,7] The quality of sachet water in many parts of the country has also been demonstrated to be poor particularly in regards to coliform count.[8,9]

The poor hand washing practices seen among caregivers obviously contributed to the diarrhoael episodes[2,4] and may reflect of difficulties with accessing potable water. About two thirds of the households used water closet system for human waste disposal while the rest, for whom information was available, used systems ranging from open disposal in the bush to pit latrines and bucket. The consequences are predictable. With limited access to water, it is debatable how even the water closet systems are managed.

The low rate of exclusive breast feeding among the subjects is a reflection of the generally low EBF rates in Nigeria[10,11] and represents a major difficulty in the control of diarrhoeal disease. The prominent role played by patent medicine dealers in the management of those diarrhoael episodes and their abuse of drugs in these children have been well documented in the country. More than half of the children had anti-microbials ranging from tetracycline to metronidazole, many of them obviously needlessly but not without possible consequences. More than a third had anti-emetics with two presenting with extra-pyramidal crisis from repeated intramuscular promethiazine. The side effect of these needlessly given drugs including diverting attention from and interfering with Oral Rehydration Therapy (ORT) and feeding, have been discussed elsewhere.[14]

Most of the children had standardOral Rehydration Salt Solution, though the constitution and volumes more not investigated. However only one had low osmolarity ORS. Low osmolarity ORS has been demonstrated to reduce the volume of diarrhoae stools, reduce vomitting and shorten the duration of episodes when compared to standard ORS, and is currently the recommended ORS.[15]The low rate of zinc administration is also not satisfactory.

The predominance of acute watery diarrhoae among the children is expected.[4] The majority of the children had dehydration with more than a fifth presenting with severe dehydration. This is not surprising in view of the inappropriate pre-hospitalization management in most of

them, with the widespread use of anti-emetics.
Gratifyingly, there was zero mortality among the children. One child, who had several anti-biotics, anti-emetics and severe dehydration and hypoglycaemia, developed signs of cortical necrosis. This had been earlier reported.[14]

Conclusion

Childhood diarrhoeal disease is a major problem at OCH and may reflect the situation in the catchment community. Limited access to pipe-borne water, low EBF rates, use of feeding bottles and poor personal and environmental hygiene are the common risk factors in these children. The majority of children first present at Patent Medicine Stores. Pre-presentation management practices are unsatisfactory with the widespread abuse of anti-biotics and anti-emetics contributing to poor clinical states at presentation. The profile may not be different in similar communities in the region and country.

Recommendations

While this is a facility based study with obvious limitations, it may be a fair reflection of the situation in the catchment community of this cottage hospital and beyond. Diarrhoeal disease control should remain a top priority in this environment and the whole of Nigeria. With the municipal governments unable to provide pipe-borne water to most of the population, bore-hole has become the mainstay of water supply. Municipal governments should monitor the quality of this water and assist owner of bore-holes to maintain recommended standards. Provision of potable water should be considered a top priority of governments and corporate entities in the region. Exclusive Breast Feeding should be relentlessly encouraged not only through Baby Friendly Hospital Initiative but also Baby Friendly Community Initiative as earlier recommended.[16] This is highly feasible in this community with a highly functional Community Health Insurance Scheme.[5]

Education of patent medicine dealers on the management of important childhood diseases and good referral practices should be continuing and compulsory, since they are the first points of call for many. They should be strongly discouraged from using anti-emetics and persuaded to refer very ill children, including those with dysentery, immediately to regular health facilities. Education of care givers on good hygiene practices, with emphasis on hand washing, should continue at every opportunity including ante-natal clinics and immunization sessions.

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