EVALUATION OF ACUTE DIARRHEA TREATMENT IN UNDER-FIVE CHILDREN IN COMMUNITY PHARMACIES IN A STATE IN SOUTHEAST NIGERIA: A SIMULATED CLIENT APPROACH

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ABSTRACT

Acute diarrhoea causes avoidable death in children worldwide. Community pharmacists are stakeholders in the treatment of self limiting conditions and are readily accessible for consultations to the patients in communities and neighbourhoods. This study was designed to evaluate the treatment of acute diarrhoea by community pharmacists through patient simulated approach. The study was carried out in three largest urban settlements, namely Awka, Onitsha and Nnewi in Anambra state, Nigeria using 84 registered community pharmacies. Six adequately trained data collectors who worked in pairs were dispatched to designated community pharmacies to collect the data. The data collectors mimicked clients with under five children showing signs and symptoms of acute diarrhoea and recorded their interactions without the knowledge of the pharmacists. The recorded interactions was transcribed and data was summarised with descriptive statistics and Chi-square. Majority of community Pharmacies' practices in Anambra state 44(52.4%) were not compliant with the standard treatment guideline (STG). Out of the 45 community pharmacies in Onitsha, only 2(22.2%) was complaint with STG. Better compliance with STG was seen in Awka community Pharmacies 7(77.8%). No compliance was recorded in Nnewi. Chi-square test revealed a statistically significant association among the compliance of community Pharmacies in the three locations ($\chi^2 = 11.439$; $p = 0.022$). Based on World Health Organization's standard for treatment of acute diarrhea, the treatment of acute diarrhoea by the community pharmacists was inadequate. However, they were knowledgeable in some of the protocols.

Keywords: acute diarrhoea, under-five, community pharmacies, simulation.

INTRODUCTION

Globally, diarrhea remains the second leading cause of death in children below the age of five years. About 1.5 million deaths that occur annually among children under-five years old are due to diarrhea and unfortunately 80% of these deaths occur in developing countries like Sub-Saharan African and South Asia with India and Nigeria topping the charts (UNICEF,2011; Woldu et al., 2016). In Nigeria, acute diarrhea accounts for about 10% of morbidities among children less than 5 years (NPC, 2013). This diarrhea epidemic in the country can be attributed to poor prevention through personal hygiene, inadequate skilled man power to treat the epidemic and inadequate proper medications (Oyetunde et al., 2018).

Diarrhea can be considered to be the discharge of loose stools more than three times per day for not more than 3 weeks

(Seth, 2012). Diarrheal disease have been classified into four clinical types namely acute watery diarrhea, acute bloody diarrhea (dysentery), persistent diarrhea and diarrhea with severe malnutrition (Ogbu et., 2014). Diarrhoea reduces transit time in the gastrointestinal tract, depletes nutrients absorption and predisposes children to malnutrition and inhibition of their developmental mile stones (WHO, 2005**;** Grenov et al., 2019; Patwari et al., 1999). This is further compounded by the poor active immunity of children at this stage (NRC,1985; Koster et al., 1887; Black et al., 1989; Baqui et al., 1993; Azim et al., 1999)

The World Health Organization (WHO) recommends strict fluid replacement therapy with low-osmolarity oral rehydration solution (ORS) for the treatment of dehydration or intravenous electrolyte solution in cases of severe dehydration. Elemental zinc supplementation for 10–14 days is also recommended with increased fluids and continued feeding for all exposed children with diarrhea at the dose of 10mg/day for infants less than 6 months and 20mg/day for infants and children greater than 6 months. Ciprofloxacin at an oral dose of 15mg/kg is recommended for the treatment of bloody diarrhea in all exposed infants and children. Daily multiple micronutrients for 2 weeks are also recommended for all exposed children with persistent diarrhea (WHO, 2005).

Community pharmacies are stakeholders in diarrhoea treatment at the community level and they are strategically positioned to give advice and provide therapy for the prevention and management of diarrhea as well as associated problems such as dehydration. Hence, it is extremely important for community pharmacists to be fully armed in the management of such common condition like acute diarrhea in children and be able to refer severe cases as quickly as possible to hospitals where patients could access better care especially in complicated cases or emergencies (Moorthi et al., 2011; Diwan et al., 2015; Abegaz et al., 2016).

In simulated client approach, the researcher or data collector interacts to mimic an aspect of clinical care (Cheng et al., 2014). In other words, patient simulation can be used to reproduce real-life events so that it can be studied (Lamé et al., 2020). Irrational Drug Use (IDU), poor fluid replacement, and delay in accessing care have been identified as the leading causes of treatment failure in under-five diarrhoea (Wardlaw et al., 2010). Hence, this study evaluated the quality of acute diarrhea treatment by community pharmacists through simulated patient approach.

METHODS

Study area

The study was carried out in the three largest urban settlements, namely Awka, Onitsha and Nnewi in Anambra state.

Community pharmacies

Community pharmacies dispense medicines in conformity with a prescription. They can also dispense medicines without a prescription when legally permitted. As at 2018, 133 registered pharmacies scattered around the major cities were identified in Anambra state through the Anambra State office of the Pharmacist Council of Nigeria. They comprised of 94, 34 and 5 pharmacy layouts in Onitsha, Awka and Nnewi respectively. Some of the community pharmacies are located very close to the health centers, hospitals and markets.

Study design

This study was a cross-sectional observational study conducted among community pharmacies in Anambra.

Study population
This study was carried out among registered community pharmacies in Anambra state, located in all the key cities of the state, mainly Awka, Onitsha and Nnewi.

Eligibility criteria:
Inclusion criteria

- All registered community pharmacy premises in Anambra state
- Only registered pharmacists on duty

Exclusion criteria

- All Patent medical stores/All unregistered community pharmacy premises
- All Pharmacy interns, IT students, nurses and technicians working at the community pharmacy

Sampling method
A total of one hundred and thirty-three (133) registered pharmacies were conveniently selected for the study.

Data collection
Data was collected between May and October, 2018 using simulated client approach in Anambra state. Six data collectors that worked in pairs were recruited and trained on simulated patient case i.e. they were trained on how to mimic parents or close relatives who have children presenting with identified symptoms of diarrhea. They were also trained on how tointeract with the pharmacists and the answers to give for anticipated evaluation questions on the history of present illness **(Table 1).** The simulated clients also asked the pharmacists questions bordering on drug utilization, patient care process and demanded medications for their children.As the pharmacists answers the mock client who has an under-five child with diarrhoea, the partner quietly dubbed the interaction with a phone recorder in their pocket. They visited each community pharmacy in pairs to enable proper recording.All the activities performed and recorded were documented accordingly in a questionnaire immediately after leaving the pharmacy premises. The simulated clients socialized with the pharmacists to obtain sociodemographic information thereafter.Uttermost confidentiality was maintained throughout the entire process.

Table 1: Anticipated evaluation questions on the history of present illness

Questions by the pharmacist	Answers
Age of the child?	3 years
Sex of the child?	Female
How long has the child been stooling?	Since yesterday
Consistency of stool?	Loose
Blood/mucus in stool?	Not noticed
Any fever?	Not sure
Any vomiting?	No
Any weakness?	Little

Bias
The bias associated with interaction, response, procedure, and protocol of the pharmacists was eliminated by not obtaining informed consent from the participating pharmacies. Hence, the aim of the study was concealed. The data collectors presented at the community pharmacies without prior notification to the pharmacist and asked questions on medicine administration for their children in order to mimic a real-life

scenario. The recording of the interactions was also hidden from them.

Data analysis

The data was analysed with descriptive statistics, percentages, and Chi square. Values of $p<0.05$ was considered significant.

Ethical considerations

Ethical approval to carry out this study was obtained from Nnamdi Azikiwe University Teaching Hospital Ethics Committee. The confidentiality and anonymity of the study participants were fully maintained by excluding all means of identification in the questionnaire.

Results

Forty-nine (49) pharmacies were excluded because they had no pharmacist on duty except nurses and cashiers. There were more female pharmacists (57.1%) than male pharmacists (42.9%). Majority of the pharmacists had bachelor of pharmacy as their first degrees, 6% had Pharm.D and 6% had Masters in Pharmacy degree (Table 2).When simulated clients visited the pharmacies, the questions asked by the pharmacists as well as the proportion that asked the respective questions during history taking towards the management of diarrhea in children is depicted in Table 3. Most pharmacists asked about the age of the child (94%). The pharmacists least inquired about presence of blood in the stool (69%). However, the results of the Chi- square test for history taking towards the management of diarrhea in children in the three towns did not vary significantly. Table 4 shows the medications prescribed for pediatric diarrhea at the pharmacies. Majority of the medications prescribed were ORS (71.4%) and the pattern of ORS prescription in the three towns did not vary significantly (χ^2= 3.384; P = 0.184). Flagyl (metronidazole) was the second most prescribed drug (67.9%). Septrin (4.8%) was the least prescribed drug in the three towns. With respect to the kind of drug information given to the simulated clients, only advice on duration of action of the drugs vary significantly (Table 5).Table 6 shows compliance of community pharmacies in the three locations with the standard treatment guideline. The study revealed more compliance in Awka community Pharmacies (77.8%) followed by Onitsha (22.2%). No compliance was recorded in Nnewi. Similar trend was observed in higher partial compliance in Awka (51.6%), Onitsha (42.0%) and Nnewi (6.5%).Majority of the community Pharmacies' practices in Onitsha was not compliant (68.2%) when compared to Pharmacies in Awka (25.0%) and Nnewi (6.8%). Chi-square test revealed a statistically significant association among the compliance of community Pharmacies in the three locations (χ^2= 11.439; p = 0.022).

Table 2: Sociodemographic characteristics of the community pharmacists

Variable	Frequency (%)			
	Awka(n=34)	Onitsha (n=45)	Nnewi (n=5)	Total (n=84)
Gender				
Male	12(33.3)	20(55.6)	4(11.1)	36(42.9)
Female	22(45.8)	25(52.1)	1(20.8)	48(57.1)
Age (years)				
20-40	31(41.3)	40(53.3)	4(5.3)	75(89.3)
41-60	3(37.5)	4(50.0)	1(12.5)	8(9.5)
>60	0(0.0)	1(100.0)	0(0.0)	1(1.2)

Years of practice				
<5	20(42.6)	25(53.2)	2(4.26)	47(56.0)
6-10	12(41.4)	15(51.7)	2(6.9)	29(34.5)
>10	2(25)	5(62.5)	1(12.5)	8(9.5)
Qualification				
B.Pharm	31(41.9)	39(52.7)	4(5.4)	74(88.1)
Pharm.D	1(20.0)	3(60.0)	1(20.0)	5(6.0)
M.Pharm	2(40.0)	3(60.0)	0(0.0)	5(6.0)
Religion				
Christian	34(41.5)	43(52.4)	5(6.1)	82(97.6)
Muslim	0(0.0)	2(100.0)	0(0.0)	2(2.4)
Marital status				
Single	17(36.2)	27(57.4)	3(6.4)	47(56.0)
Married	17(46.0)	18(48.6)	2(5.4)	37(44.0)
Ethnicity				
Igbo	33(44.0)	37(49.3)	5(6.7)	75(89.3)
Yoruba	0(0.0)	4(100.0)	0(0.0)	4(4.8)
Hausa	1(20.0)	4(80.0)	0(0.0)	5(6.0)

Table 3: Overview of pharmacist history-taking during simulation

History taking	**Location**			**Total**	**χ^2 (*P*-value)**
	Awka	**Onitsha**	**Nnewi**		
Chief compliant (c/o)					
Yes (%)	32 (41.6)	40 (52.0)	5 (6.5)	77 (91.7)	1.176 (0.555)
No (%)	2 (28.6)	5 (71.4)	0 (0.0)	7 (8.3)	
Age					
Yes (%)	33 (41.8)	41 (51.9)	5 (6.3)	79 (94.0)	1.560 (0.458)
No (%)	1(20.0)	4 (80.0)	0 (0.0)	5 (5.95)	
Weight					
Yes (%)	28 (37.7)	30 (49.2)	3 (4.9)	61 (72.6)	2.822 (0.244)
No (%)	6 (26.1)	15 (65.2)	2 (8.7)	23 (27.4)	
Medication history					
Yes (%)	30 (39.0)	42 (54.5)	5 (6.5)	77 (91.7)	1.142 (0.565)
No (%)	4 (57.1)	3 (42.0)	0 (0.0)	7 (8.3)	
Past medication history					
Yes (%)	30 (41.1)	40 (54.8)	3 (4.1)	73 (86.9)	3.389 (0.184)
No (%)	4 (36.4)	5 (45.5)	2 (18.2)	11 (13.1)	
Onset and duration					
Yes (%)	31 (41.9)	38 (51.4)	5 (6.8)	74 (88.1)	
No (%)	3 (30.0)	7 (70.0)	0 (0.0)	10 (12.0)	1.555 (0.459)
Frequency of stools					

Yes (%)	31 (40.3)	42 (54.5)	4 (5.2)	77 (91.7)	1.065 (0.587)
No (%)	3 (42.9)	3 (42.9)	1 (14.3)	7 (8.3)	
Presence of blood in stool					
Yes (%)	23 (39.7)	31 (53.4)	4 (6.9)	58 (69.0)	
No (%)	11(42.3)	14 (53.8)	1 (3.8)	26 (31.0)	0.312 (0.855)
Fever					
Yes (%)	29 (39.2)	40 (54.1)	5 (6.8)	74 (88.1)	0.957 (0.620)
No (%)	5(50.0)	5 (50.0)	0 (0.0)	10 (11.9)	

Table 4: Medications prescribed at the community pharmacies

Class of medication	**Location**			**Total**	**χ^2 (*P*-value)**
	Awka	**Onitsha**	**Nnewi**		
ORS					
Yes (%)	28 (46.7)	29 (48.3)	3 (5.0)	60 (71.4)	3.384 (0.184)
No (%)	6 (25.0)	16 (66.7)	2 (8.3)	24 (28.6)	
Zinc					
Yes (%)	19 (54.3)	14 (40.0)	2 (5.7)	35 (41.7)	4.895 (0.086)
No (%)	15 (30.6)	31 (63.30	3 (6.1)	49 (58.3)	
Flagyl (Metronidazole)					
Yes (%)	22 (38.6)	31(54.4)	4 (7.0)	57 (67.9)	0.151 (0.773)
No (%)	12 (44.4)	14 (51.9)	1 (3.7)	27 (32.1)	
Diastop					
Yes (%)	6 (33.3)	12 (66.7)	0 (0.0)	18 (21.4)	2.386 (0.303)
No (%)	28 (42.4)	33 (50.0)	5 (7.6)	66 (78.6)	
Septrin (Cotrimoxazole)					
Yes (%)	1 (25.0)	2 (50.0)	1 (25.0)	4 (4.8)	2.819 (0.244)
No (%)	33 (41.3)	43 (53.8)	4 (5.0)	80 (95.2)	
Floranorm					4.040 (0.133)
Yes (%)	4 (25.0)	12 (75.0)	0 (0.0)	16 (19.0)	
No (%)	30 (44.1)	33 (48.5)	5 (7.4)	68 (81.0)	
Others include (Augmentin suspension (Amoxicillin+Clavulanic Acid) Lomotil suspension, Loperamide suspension, Albendazole suspension)					
Yes (%)	8 (44.4)	10 (55.6)	0 (0.0)	18 (21.4)	1.470 (0.480)
No (%)	26 (39.4)	35 (53.0)	5 (7.6)	66 (78.6)	

***ORS = Oral rehydration salts**

Table 5: Medication information provided by community pharmacists during acute childhood diarrhea management

Drug information and instruction	Location			Total	χ^2 (*P*-value)
	Awka	Onitsha	Nnewi		
Dose					
Yes (%)	23 (37.1)	36 (58.1)	3 (4.8)	62 (73.8)	2.053 (0.358)
No (%)	11 (50.0)	9 (40.9)	2(9.1)	22 (26.2)	
Frequency					
Yes (%)	25 (40.3)	33 (53.2)	4 (6.5)	62 (73.8)	0.106 (0.948)
No (%)	9 (40.9)	12 (54.5)	1 (4.5)	22 (26.2)	
Duration					
Yes (%)	15 (79.0)	4 (21.1)	0 (0.0)	19 (22.6)	15.287 (0.0005)
No (%)	19 (29.2)	41 (63.1)	5 (7.7)	65 (77.4)	
Drug action					
Yes (%)	1 (50.0)	1 (50.0)	0 (0.0)	2 (2.4)	0.173 (0.917)
No (%)	33 (40.2)	44 (53.7)	5 (6.1)	82 (97.6)	
Advice on fluid intake					
Yes (%)	31(42.5)	37(51.0)	5(6.8)	73(87.0)	2.166(0.339)
No (%)	3(27.3)	8(72.7)	0(0.0)	11(13.1)	
Advice on food intake					
Yes (%)	27(39.1)	37(53.6)	5(7.2)	69(82.1)	1.260(0.533)
No (%)	7(46.7)	8(53.3)	0(0.0)	15(17.90)	

Table 6: Compliance with standard treatment guideline

Standardtreatment guideline	Location			Total	χ^2 (*P*-value)
	Awka	Onitsha	Nnewi		
Compliant	7 (77.8)	2 (22.2)	0 (0.0)	9 (10.7)	11.439 (0.022)
Partially compliant	16 (51.6)	13 (42.0)	2 (6.5)	31 (36.9)	
Non-compliant	11 (25.0)	30 (68.2)	3 (6.8)	44(52.4)	

DISCUSSION

With ever increasing demand for healthcare especially at primary healthcare level (Manolakis et al., 2010), policies of many developing countries have incorporated the treatment of minor ailments in community pharmacies to promote access to healthcare and prevent avoidable morbidity and mortalities associated with late referral of patients for specialist care (Campbell et al., 2005; Cardol et al., 2005; Coelho et al., 2014). Decreased numbers of primary care physcians at the community level coupled with ever increasing population growth have underscored the need for community pharmacies as centeres of public healthcare

services (Colwill et al., 2008; IOM, 2008; Rosenbaum, 2008). Many scientific publications have demonstrated the reduction in disease burden through collaboration with community pharmacists (Witt et al., 2005; Gilmartin et al.,2007; March et al., 2007; Smith et al., 2007; Wubben et al., 2008). Collaborations in medication therapy management (MTM) and immunization services is now obtainable in community pharmacies (Beale et al., 2013). Hence, the need to promote regular trainings and postgraduate studies for community pharmacists in developing countries to meet up with the dynamics of the practice and patient care in the twenty-first century
Community pharmacies, therefore, remain the first port of call for many patients and they've been able to solve so many public health problems in developing countries because of their proximity to the patients in the community (Abegaz et al., 2016; Golnaz et al., 2015). This study revealed the current practices of community pharmacies in the management of acute childhood diarrhea in Anambra through simulated cases.

The community pharmacists from the three major cities in Anambra state were knowledgeable with respect to history taking in the management of diarrhea in children less than five years. The different components of history taking in diarrhea management include; chief complaint, age of the patient, weight of the patient, medication history, past medication history, onset and duration of diarrhea, frequency of stools, presence of blood in the stool and lastly fever. The pharmacists properly investigated the reason for the patient's visit to the pharmacy i.e. chief complaint of cases (91.7%). This is in contrast to the simulated client case study conducted in five towns in Ethiopia where community pharmacies poorly investigated the chief complaint of cases (16.5%) (Abegaz et al., 2016).In this study, the pharmacists effectively enquired about the age of the child (94%) Similarly, the findings of Hussain et al (2012), Golnaz et al (2015), Diwan et al (2015) and Abegaz et al (2016) reported that the child's age was enquired in more than 83.3%, 98%, 98.1% and 90% respectively of visits to pharmacies. With regards to the presence of blood in the stool, our findings show that 69% of the pharmacists inquired for this indicator whereas Abegaz et al reported that 49.6% and 9.1% cases were asked in Ujjain (Diwan et al., 2015; Abegaz et al., 2016). The differences in the practice of history taking could be due to differences in standard guidelines and lack of update training.

The medications dispensed by the community pharmacists in the management of acute diarrhea include ORS, zinc, flagyl, diastop, floranorm. The results of this study show that ORS (71.4%) and flagyl (67.9)were the most commonly dispensed drugs in the three towns, whereas zinc was occasionally given (41.7%). Our findings showed high level of ORS dispensing compared to earlier studies conducted in Nigeria where ORS recommendations were scanty (Okeke et al., 1996; Ogbu et al., 2014). This underutilization of ORS for diarrhea management in previous studies in Nigeria could be associated with outdated knowledge and information, inability to consult or access current official references as well as practice gap that exists among community pharmacists (Gurbani et al., 2011; Rezal et al., 2015).

Currently, the facilitators of ORS use are improved patients'/caregivers' awareness of ORS and its availability in community pharmacies whereas barriers to the use of ORS have been identified to include, patients'/caregivers' belief that diarrhea is as a result of bacterial infection. Thus, the need for antibiotics and community pharmacists

succumb by specifically dispensing flagyl (Oyetunde et al., 2018). The high prescription pattern of antibiotics (flagyl) in this study is a component of the global burden of irrational use of antibiotics in the management of diarrhea (Misganaw et al., 2020). For instance, Lanyero et al (2021) reported overuse of antibiotics in children under 5 years with non-bloody diarrhea in a cross-sectional study aimed at determining the prevalence of antibiotic use in managing diarrhea in children under 5 years of age in rural communities of Gulu district, northern Uganda. In another study, Rhee et al (2019) assessed inappropriate antibiotic prescription for childhood diarrhea in two primary healthcare facilities in Kenya. The researchers noticed that inappropriate antibiotic prescription for childhood diarrhea was common in both rural and urban sites in Kenya. This overuse of antibiotics has led to increased drug resistance as well as increased costs and side effects for patients and their caregivers. Various interventions to mitigate the excessive use of antibiotics include the use of antimicrobial stewardship programmes, implementation of policies that restrain the over-the-counter sale of antibiotics, the promotion of delayed antibiotic prescribing strategies, improved communication skills with patients with the help of information catalogues etc (Llor et al., 2014).

This study revealed that drug information given to the mock parents at the community pharmacies was not very satisfactory. Drug information such as dose, frequency, duration, drug action given by the community pharmacists at the three locations was found to vary. However, only the information on drug duration varied significantly (χ^2 = 15.287, p = 0.0005). Mock parents were given information about the dose and frequency, but the percentage compaliance (73.8%) was lower than 90.3% reported by Abegaz et al (2016). Sadly, important information such as side effect/precaution were not given to the mock patients. Jimma et al (2015) in their analysis of dispensing practices at community pharmacy setting in Ambo Town, West Shewa, Ethiopia reported that community pharmacists provided wrong strength, frequency and total quantity of medications. WHO recommended that appropriate instructions on fluid and food intake are indispensable part of the dispensing as they are needed to restore the nutrients lost during diarrhea episodes (WHO, 2005). It was observed that the community pharmacists in this study counseled appropriately on fluid and food intake, 87.0% and 82.1% respectively.

Overall, only 10.7% of prescriptions in this study were found to include both ORS and Zinc, without flagyl whereas 52.4% of prescriptions were not compliant. This deviation from the standard guideline clearly reveals the need for continuous professional development programmes (Pathak et al)..

CONCLUSION

The management of acute diarrhea in children among community pharmacies in Anambra partially complied with the standard treatment guidelines. Overall, their knowledge of the management of acute diarrhoea based on the standard protocol was inadequate. There is the need for regular training updates and obtaining postgraduate fellowships should be encouraged for community pharmacists to properly prepare them for the dynamics of the twenty-first century pharmacy practice considering the place of community pharmacies in public health care services.

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