PRE-HOSPITAL ANTIBIOTIC USEIN THE RIVERS STATE UNIVERSITY TEACHING HOSPITAL PAEDIATRIC OUTPATIENT CLINIC

ABSTRACT

Background

Antibiotics are prescription-only medications but can be procured over thecounter.This over the counter use of antibiotic is of global health concern as it has led to antibiotics resistance, increased severe side effects, increased cost and a cycle of abuse/misuse.

Objective of the study

To determine the prevalence of pre-hospital use of antibiotics.

Methodology

An observational study involving 401caregiver/child pair seen at the Paediatric Outpatient clinic of a tertiary health facility over six months. Data on the children's demography, clinical symptoms, and weight were obtained using a semi-structured questionnaire and informed consent obtained from the caregivers.

Results

A total of 401 caregiver/child pairs participated in the study with male predominance. Eighty nine(22.2%) of the children received antibiotics before presentation. The most common reasons for administering antibiotics were fever and cough. The majority(69.9%) gave syrup formulation. The reasons for the choice of formulation were the age, the availability of formulation at home and its been more efffective. Amoxicillin, augmentin and cefpodoxime were the most common antibiotics given and, in 75% of cases, were not prescribed by a doctor.

They also received vitamin C , antimalarials and cough syrup before presentation. About 62% of the children received the appropriate doses, 32.4% underdosed and 5.6% received an overdose. Most of the children were diagnosed with malaria and respiratory tract infections in the hospital.

Conclusion

Pre-hospital antibiotic use and abuse/misuse is a common practice among the respondents. Education of the populace is advocated to curb this menace of antibiotic abuse with its attendant development of drug resistance.

Key words

Abuse, antibiotics, Paediatric, Pre-hospital

Introduction

Antibiotics are medications used to infections caused by bacteria, thus playing a crucial role in reducing morbidity and mortality in children. They are commonly used, especially in developing countries, as infectious diseases account for one of the most common causes of morbidity and mortality[1]. Rational use of these drugs is of utmost concern as overuse or misuse has led to the growth of antimicrobial resistance (AMR) globally, which threatens its ability to treat common infections. The World Health Organization (WHO) has documented that over 50% of antibiotic use globally is inappropriate. [2] It is noteworthy that antibiotics could be misused through self-medication/pre-hospital administration with/without poor adherence to treatment. [3]

Pre-hospital antibiotic use refers to the practice of using antibiotics without prior formal consultation and prescription by a doctor. These antibiotics are purchased overthe counter or the left overs of a previous prescription. This practice is common in adults and even children

in both developed and developing countries with prevalence rates between 1% and 69%. [4-11] Surprisingly, more than 50% of antibiotics which are meant to be prescription drugs are purchased overthecounter, without a doctor's prescription, from pharmacies, patent medicine stores and from even street vendors worldwide. [12] Pre-hospital use of antibiotics thus lack professional supervision leading to its inappropriate use or misuse. These drugs are either given unnecessarily, in over-dose or in under-dose. Various studies carried out in Jordan [13] and Europe [14] documented that pre-hospital antibiotics were used for treating viral infections for which antibiotics are actually ineffective. [15] The integrated management of childhood illnesses (IMCI) discourages the use of antibiotics for children with infections of viral causes such as the common cold and acute watery diarrhoea.

Pre-hospital antibiotic use by parents on their children could have far-reaching consequences which span from side effects from the antibiotics to the promotion of the spread of antimicrobial resistance which therefore, could lead to treatment failure, deteriorating clinical conditions and even death. [16,17] It could also lead to unnecessary medical costs and delays in seeking proper medical care resulting in increased morbidity and mortality. The pre-hospital use of antibiotics has therefore, become a major public health problem. [18]

Various factors have been associated with pre-hospital use of antibiotics. These include high cost of medical consultation, long waiting times in hospitals, limited supply of medicines, unacceptable practices/behaviours of health care professionals, long distance to hospitals, high cost of transportation to health care facilities, numerous hospitalbottlenecks, lack of health insurance and poverty. [19,20] In addition, inadequate regulation of the distribution and sale of drugs, including antibiotics, especially in low- and middle-income countries account for this practice. [21]

The type of pre-hospital antibiotics used varies depending on geographic location, age and the prevalent symptom(s). A cross-sectional population-based survey carried out in Indonesia

[22] reported the commonest pre-hospital antibiotics as amoxicillin and ampicillin, whereas in Uganda, [8] amoxicillin, erythromycin and metronidazole were the most common pre-hospital antibiotics given to their febrile children. In Ibadan, [23] south-west Nigeria, the ampicillin-cloxacillin drop was the commonest pre-hospital antibiotic given by mothers to their under-5 children followed by ampicillin and cefuroxime whereas an earlier study carried out in the same centre showed cotrimoxazole as the most common pre-hospital antibiotics followed by penicillins and cephalosporins. [9]

There is a lack of information in Nigeria regarding the pre-hospital use of antibiotics in children by mothers/caregivers and in Rivers State, no study has been carried out in this regard considering the fact that the rise in the use of pre-hospital antibiotics is now a major global health problem. [24] The present study was therefore carried out to ascertain the prevalence and pattern of pre-hospital antibiotic administration to their sick children attending the Paediatric Outpatient Clinic of Rivers State University Teaching Hospital(RSUTH) in south south Nigeria. Findings from this study will not only add to the body of knowledge in Nigeria and the world at large but will give useful information that will help formulate policies for educational interventions on the ills of pre-hospital antibiotic use, which would, in turn,assist to curb this menace.

Materials and Methods

It was a descriptive cross-sectional study design carried out over six months from January 1st toJune 30th 2023, among mothers/caregivers attending the Paediatric outpatient clinic of the Rivers State University Teaching Hospital (RSUTH) in Port Harcourt, south-south Nigeria. The RSUTH, a State-owned tertiary hospital located in the Government reserved area of the State is a 375-bed hospital which receives referrals from all the Primary Health Care centres and general hospitals in the 23 local government areas of the State as well as from private

hospitals and neighbouringStates. The hospital consists of both non-clinical and clinical departments.

The Paediatric department is one of the hospital's clinical departments of the hospital and consists of the Paediatric outpatient clinic, children emergency room, special care baby unit and the childrens' ward. The Paediatric outpatient clinic is open five days, Mondays to Fridays from 8am to 4pm and consists of the specialist clinics and the general paediatric clinics. Each clinic day is run by two to three consultants, resident doctors, house officers, nurses of various cadres, other non- medical support staff and sees 42 patients on average daily. Health talks are usually given on each clinic day by the nurses before the commencement of each clinic day. Thereafter, vital signs and anthropometric measurements are taken.

A research assistant was recruited for the study and was trained on thestudy's aim and objectives, inclusion and exclusion criteria as well as the proper questionnaire administration to participants. A convenient sampling method was deployed for the study.

All mothers/caregivers whose children were within the age group ofone month to 16 years were consecutively recruited for the study. The inclusion criteria included all mothers/caregivers of children one month to 16 years irrespective of their symptoms who gave consent to participate in the study whereas mothers/caregivers who did not give consent to participate in the study were excluded.

A pre-tested structured questionnaire developed by the researchers was administered by the researchers andresearch assistant to the mothers/caregivers. Data collected included the biodata of the patients and mothers/caregivers and questions on the pattern of pre-hospital antibiotic administration to their children. Socioeconomic class of the participants were determined using Oyedeji's classification. [25]

Data was entered into an Excel sheet and analysed using SPSS software version 23. Data was presented as percentages, tables and figures.

RESULTS AND DISCUSSION

SOCIO-DEMOGRAPHIC CHARACTERISTICS

Table 1: Socio-demographic Characteristics of Child

Variable	Frequency (n = 401)	Percent
Sex		
Male	235	58.6
Female	166	41.4
Child Age Group (months)		
1 – 10	89	22.2
11 – 20	51	12.7
21 – 30	43	10.7
31 – 40	41	10.2
41 – 50	24	6.0
>50	153	38.2
Mean age: 28.26 ± 3.80 months		
Childs Weight Group (Kg)		
<4	12	3.0
4.1 – 14.0	176	43.9
14.1 – 24.0	121	30.2
24.1 – 34.0	32	8.0
>34.0	60	15.0
Mean weight: 14.94 ± 2.06 Kg		

Table 2: Parents' Socio-demographic Characteristics

Variable	Frequency (n = 401)	Percent
Mother's Age Group (years)		
<30	80	20.0
30 – 40	225	56.1
>40	96	23.9
Mean Age: 35.48 ± 1.26 years		
Mothers' Occupation		
Business/trader	166	41.4
Civil servant	59	14.7
Public Servant	58	14.5
Student	19	4.7
Hose wife/Unemployed	30	7.5
Artisan	33	8.2
Professional	36	9.0
Mothers' Level of Education		
Primary	5	1.2
Secondary	123	30.7
Tertiary	273	68.1

Father's Age Group (years)		
28 – 37	125	31.2
38 – 47	186	46.4
>47	90	22.4
Mean age: 42.11 ± 7.43 years		
Father's Occupation		
Business/ Trader	146	36.4
Civil servant	88	21.9
Public servant	34	8.5
Professional	52	13.0
Artisan	40	10.0
Unemployed	6	1.5
Private company employee	35	8.7
Level of Education		
Primary	4	1.0
Secondary	111	27.7
Tertiary	286	71.3
Socioeconomic Class (OYEDEJI)		
Class 1	102	25.5
Class 2	195	48.6
Class 3	86	21.5
Class 4	17	4.2
Class 5	1	0.2
Socioeconomic Class (OLUSANYA)		
Class 1	274	68.4
Class 2	126	31.4
Class 3	1	0.2

Table 3: History of Antibiotics Usage

Variable	Frequency (n = 401)	Percent
Administered Antibiotics		
Yes	89	22.2
No	312	77.8
Reason for Antibiotics (Multiple response, n = 147)		
Rash	8	9.3
Pain	11	12.8
Catarrh	13	15.1
Cough	42	48.8
Vomit	7	8.1
Fever	54	62.8
Diarrhoea	12	14.0
Type of Antibiotics formulation (n = 162)		
Tablet	18	20.2
Syrup	62	69.7
Capsule	8	9.0

Injection	1	1.1
Name of Antibiotic Administered (n = 89)		
Amoxyl/Augmentin	44	49.5
Azithromicin	5	5.6
Oral Cephalosporins	21	23.5
InjCeftriaxone	1	1.1
Septrin	4	4.5
Ampiclox	7	7.9
Erythromycin	2	2.2
Ciprofloxacin	2	2.2
Ampicilin	3	3.3

Table 4: Reason for Choice of Formulation

Variable	**Frequency (n = 211)**	**Percent**
Reason for Choice of Formulation		
Age of child	154	73.0
Available medication	26	12.3
Most effective	14	6.6
Prescribed	8	3.8
Previous Experience	5	2.4
Other reasons	4	1.9
Other reasons (n = 4)		
Weight of Child	1	25.0
No reason	2	50.0
Has not administered drug to child before	1	25.0

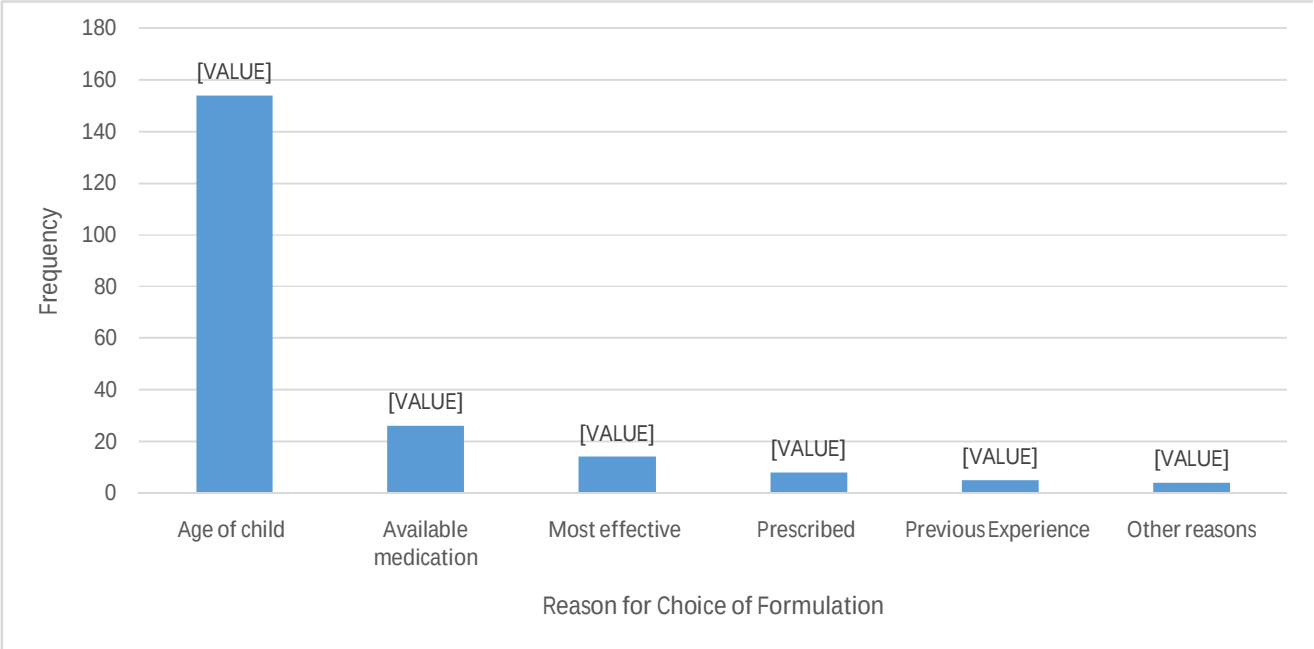

Figure 1: Reason for Choice of Formulation Used

Table 5: Duration of Medication

Variable	Frequency (n =84)	Percent
Duration of Antibiotic Medication (n = 84)		
< 7 days	64	76.2
≥ 7 days	20	23.8

Table 6: Person Responsible for Prescription

Person Responsible for Prescription	Frequency (multiple responses n = 199)	Percent
Doctor	50	25.1
Pharmacist	42	21.1
Chemist	14	7.0
Self-Experience	72	36.2
Nurse	17	8.5
others	4	2.0

Table 7: appropriate antibiotic dosing

Appropriate Antibiotic Dose (n = 71)		
Yes	44	62.0
Under-dose	23	32.4
Overdose	4	5.6

Majority of those recruited into the study were males (58.6%) similar to the report from Uganda where males made up 56.2% of the participants.[26] The prevalence of pre-hospital administration of antibiotics in the study was 22.2% which is similar to the 20.6% reported in Tunisia [27] but is lesser than the 39.5% reported in Uganda [8], 40.1% reported in Kenya[26], 46.7% reported in Enugu[28], 60% in Yemen[29] and 39.2% in Jordan [30]. In China, the prevalence was however lower at 14.32% [31]

The study in Uganda [8] and Kenya [26] were among children below five years of age while ours involved all children. Children less than five years old have lower immunity and are more likely to present with acute infections for which parents will give antibiotics. The study by Ekwuochi et al in Enugu[28] was among children with diarrhoea, a symptom which many ignorantly think should be treated with antibiotics. The study was much earlier in Yemen at

the turn of the century and may have reduced now. In Jordan, it was an online survey which nevertheless reflected a high level of pre-hospital antibiotics administration by parents [30].The high rate of antibiotic use before presentation in the hospital is likely due to the ease of procurement of antibiotics over the counter in Nigeria and other low income countries. The lesser prevalence in our study however, could be due to the present economic hardship whereby parents cannot afford to buy the medications on their own hence, wait to get a proper prescription from the hospital to avoid having to change antibiotics increasing cost. Another reason for the high rate of pre-hospital antibiotic us by parents may be due to the fact that there are many infectious diseases in developing countries making the widespread use of antibiotics common and this is shown by the fact that old and new studies still show the same trend.

The most common antibiotics used in this study were amoxicillin/amoxicillin -clavulacin acid, oral cephalosporins and Ampicillin-cloxacin combination which was similar to the report from Uganda[8], where the most commonly used antibiotic was amoxicillin 33/83 (39.8%), followed by erythromycin 18 (21.7%), metronidazole 14 (16.9%), ciprofloxacin 13 (15.7%) and ampicillin 6 (7.2%). The report from Yemen [29] identified trimethoprin sulfamethoxazole and amoxicillin-clavulanic acid as the most commonly prescribed antibiotics. In Jordan[30] a similar finding of amoxicillin and amoxicillin-clavulanic acid while in Tunisia[27] amoxicillin was used in 72.6% of persons.

The most common reasons for using antibiotics in these children included fever, cough and catarrh while diarrhoea, rash and vomiting were the least reasons. This is similar to the report from Uganda[8] where children with fever also had catarrh, cough, diarrhoea and vomiting, necessitating pre-hospital antibiotic therapy. In Enugu [28] it was given for diarhoea, Jordan [31], it was for fever and cough while in Tunisia [27], they were given for sorethroat, cough and flu-like symptoms. The above symptoms in children are often viral and do not usually

require antibiotic therapy however, ignorance may also be a contributing factor in making parents give antibiotic unnecessarily.

Among those who received antibiotics, 62% of them received an appropriate dose while 32.4% received an underdose and 5.6% got an overdose of administered medication. Inappropriate dose may worsen the present antimicrobial resistance. Under-dosing predisposes drug users to riske of side effects without the benefit of a therapeutic effect [4]. Other researches did not document on the appropraiteness or otherwise of drug dosages.

In some climes, self-medication occurs but not to antibiotics because of good government policies to ensure antibiotics are not abused [32] as reported in the study in Germany where self-medication among adolescents and children was 25.2% and antibiotic was not among the self-medicated drugs.[32**]**

Conclusion

Prehospital antibiotic use and abuse/misuse is a common practice among the respondents. Most of the drugs were procured from pharmacy shops and chemist shops without a prescription. Intervention by the different ministries of health through education of the populace to curb the menace of drug abuse with its attendant development of drug resistance as well as putting mercenaries in place to prosecute those selling and buying OTC drugs. The practice should be prohibited. The different ministries of health can carry out this public enlightenment.

Ethical approval and Consent:

Ethical clearance was obtained from the Rivers State Hospitals Management Board Ethics ResearchCommittee. Mothers and caregivers were duly educated about the research and a written consent whether or not to participate in the study was obtained.

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Declaration on non-usage of AI

Artificial intelligence was not used in any aspect of this research

Disclaimer (Artificial intelligence)

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Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

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Details of the AI usage are given below:

1.

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3.

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