www.c-jhs.com

Calabar Journal of Health Sciences

Original Article

An assessment of antibiotic use practices among caregivers of under-5 children in Kaduna Metropolis, Northwest Nigeria

Victoria Nanben Omole[1], Zainab Aliyu Ibrahim[2], Abdulrazak A. Gobir[3], Mohammed Jimoh Ibrahim[1], Lawal Haliru[4], Abdulfatai A. Jimoh[5]

[1]Department of Community Medicine, Kaduna State University, Kaduna, Nigeria, [2]Barau Dikko Teaching Hospital, Kaduna, Nigeria, [3]Department of Community Medicine, Ahmadu Bello University, Zaria, Nigeria, Departments of [4]Pediatrics, and [5]Pharmacology, Kaduna State University, Kaduna, Nigeria.

***Corresponding author:**
Victoria Nanben Omole, Department of Community Medicine, Kaduna State University, Kaduna, Nigeria.

nvable110@yahoo.com

Received : 29 July 2021
Accepted : 03 November 2021
Published : 29 April 2022

DOI
10.25259/CJHS_36_2021

Quick Response Code:

ABSTRACT

Objective: The objective of the study was to assess the practices of caregivers of under-5 children in the study area, regarding the use of antibiotics.

Material and Methods: A descriptive, cross-sectional study was conducted among 270 respondents selected by multistage sampling technique. Data were collected using interviewer-administered questionnaires and analyzed with Statistical Package for the Social Sciences software (version 25.0).

Results: Majority (81.8%) of the caregivers were within the ages of 20–39 years. Most (78.1%) were female and 82.2% were married. Most (88.9%) of the caregivers were the biological parents of the children. About 97% of them were assessed to have good antibiotic use practices; although a few poor practices were also reported. These include home use of antibiotics without prescription, prematurely discontinuing courses of antibiotics and directly requesting for antibiotics from physicians.

Conclusion: Public health education and enlightenment regarding the demerits of poor stewardship of antibiotic use coupled with strict regulatory control measures in the dispensing and sale of antibiotics as over-the-counter medications are recommended to improve antibiotic use practices among caregivers of young children.

Keywords: Antibiotics, Caregivers, Practices, Under-5 children

INTRODUCTION

Antibiotics are medicines used for the treatment of bacterial infections. The discovery of antibiotics remains a significant and highly beneficial landmark in the history of medical science and health care. However, the inappropriate use or administration of antibiotics is identified and recognized by the World Health Organization (WHO) as well as the general health community and governments of nations as a major public health challenge.[1,2] Described by numerous terminologies such as misuse, abuse, overuse, and/or even under-use, this menace comes with many consequences and carries a number of implications on global health.[3] A significant one being antibiotic resistance, which is a phenomenon where bacteria, which usually were susceptible and sensitive to certain antibiotics gradually, become non-responsive to them; thus, making such antibiotics less efficacious and the bacterial diseases they cause no longer amenable

to treatment.[1,2] This has been largely attributed to the inappropriate use of antibiotics including the indiscriminate prescription of the same, although it could also occur naturally.[2,3]

Globally, it is reported that certain bacterial infections are increasingly becoming difficult to treat with hitherto conventional antibiotics.[1-3] These include diseases such as pneumonia, tuberculosis, and gonorrhea caused by bacteria such as *Streptococcus pneumoniae*, *Mycobacterium tuberculosis,* and *Neisseria gonorrhoeae* among others.[1-3] This results in longer durations of treatment (including in-patient hospital stay), heavier morbidity, and mortality burdens and also higher costs of treatment, as newer and more expensive brands of antibiotics become the only alternatives to resort to.[1,3-5] These consequences carry both economic and clinical implications for individuals, families, communities, and health systems.[2,3,5] Moreover, they certainly do not augur well for many national economies, particularly in the resource-constrained contexts of many developing countries alongside myriad other competing demands from both health-related and other sectors.[5,6]

Since the discovery of penicillin by Alexander Fleming in 1928, the inappropriate and unnecessary use of antibiotics has steadily risen over the years with accentuated increases reported in the past four decades.[2-5] Globally, it is estimated that up to 50% of antibiotic use is inappropriate with both prescribers and end-users contributing to the burden by either over-prescribing or over-demanding, respectively.[4,6-8] Antibiotics remain freely available, over-the-counter drugs virtually worldwide and are even hawked in public places in some parts of the world such as Africa (including Nigeria), Asia, and Latin America.[2,4-6,9] Many studies have reported that the inappropriate use of antibiotics is relatively predominant in relation to children.[4,8,10,11] This is of utmost concern.[8] Part of the strategies employed in addressing and resolving the misuse of antibiotics includes behavioral change, and the individual and corporate commitment to discontinue the untoward practice,[1,3] which will involve the identification and recognition of the root and remote factors that drive and propel the inappropriate administration of antibiotics within communities, based on empirical evidence.[3] When this is successfully achieved, and such evidence is applied in the fight against antibiotic misuse, then this global combat would become a feasible conquest. This study's objective is to assess the practices of caregivers of under-5 children in Unguwan Dosa area of Kaduna metropolis in Northwest Nigeria, regarding the use of antibiotics.

MATERIAL AND METHODS

Study area

Unguwan Dosa community is located in Kaduna metropolis (the state capital) in Kaduna North Local Government Area (LGA) of Kaduna State, in Northwest Nigeria. It is an urban area which consists of a mixed population of Muslims and Christians and represents people of different social classes. The LGA consists of other settlements such as Kawo, Malali, Hayin Banki, Unguwan Rimi, and Unguwan Shanu. It covers an area of about 72 km^2 with an estimated population of 364,575 (in 2006) and a current projected population of 492,100. The LGA's estimated under-5 population is about 83,657 children.

Study design

This was a descriptive, cross-sectional study.

Study population

All consenting caregivers of children under the age of 5 years resident in Unguwan Dosa for at least 2 years preceding the study.

Sample size

The sample size was calculated using the formula:

$$n = \frac{z^2 p\, q}{d^2}$$

Where,

n = The desired (minimum) sample size
z = The standard normal deviate which corresponds to 95% confidence interval (normally set at 1.96)
p = The prevalence as obtained from a previous, similar study[10] = 78.9% (i.e., 0.789)
q = 1—p = 21.1% (i.e., 0.211)
d = degree of precision (0.05)

$$n = \frac{(1.96)^2 \times 0.789 \times 0.211}{(0.05)^2}$$

$$n = 255.82 \approx 256$$

10% adjustment for non-response:

$$\frac{10}{100} \times 256 = 25.6$$

Adjusted sample size = 25.6 + 256
= 281.6 ≈ 282

Sampling method

Multistage sampling technique was employed.

1. In the first stage, Unguwan Dosa was bisected into two sections using the major road (College Road) that diagonally cuts across it into north-west (north of the road) and south-east (south of the road). The

northwestern section was selected using simple random sampling method by balloting

2. Second stage: The National Population Commission house numbering system (enumeration area demarcation) was adopted for house numbering; giving a total number of 3670 houses in the selected section of the study area. This served as the sample frame. In the second stage, the houses enlisted for the study were selected using systematic sampling method. The sampling interval was obtained by dividing the total number of houses in the selected section by the minimum sample size (i.e., 3670 houses/282 = 13.01, which was approximated to 13). The first house was selected using a table of random numbers; subsequently, every 13th house was selected
3. Third stage: In each selected house, the predominant caregiver was determined by the family (being the person most involved in caring for under-5 children by playing the roles of feeding, bathing, administering medications, etc.) and was selected for the survey. The questionnaire for the study was administered to them by the interviewers.

Data management

Data collection was achieved by means of pre-tested, semi-structured, interviewer-administered questionnaires. Practice was assessed by scoring 0, 1, or 2 points for responses of "always," "sometimes," and "never" engaging in diverse aspects of antibiotic misuse, respectively, in the past. These scores were then converted to percentages (%). Total grades of ≥50% were adjudged as "good practice" while <50% was assessed as "poor practice." Data were analyzed using Statistical Package for the Social Sciences software (version 25.0). Results were presented in tables.

RESULTS

Majority of the caregivers were in their twenties (44.4%) and thirties (37.4%). Most (78.1%) were female and the predominant occupations were civil servants (34.8%), housewives (26%), and traders (22.2%). About half (51.1%) of them had tertiary level of formal education and majority (82.2%) were married. Most (88.9%) of the caregivers were the biological parents of the children (mothers = 63% and fathers = 25.9%).

The predominant inappropriate practices of antibiotic use reported as always being practiced among the respondents include storing (or keeping) of antibiotics at home for future use (23%), discontinuing courses of antibiotics when the health of children improves (17%), reusing antibiotics previously used, if children present with similar symptoms (16%), and directly requesting for antibiotics from physicians (16%). Furthermore, about 15% of the caregivers admitted to the habit of keeping "leftover" antibiotics at home for future use and reducing the frequency of antibiotics administration when their children's health improves.

Majority of the respondents (97%) were assessed to have good practices with regard to antibiotic usage, scoring at least 50%.

DISCUSSION

Antibiotics ought to be judiciously and responsibly used, to address the insidious development of antibiotic resistance, a global public health menace threatening the erstwhile conquest over bacterial infections in the early half of the 20th century.[1-9] To curtail the spread and persistence of this phenomenon, the involvement and commitment of individuals, families and communities, as well as health professionals, institutions, and systems are indispensable.[1,3-6,11] The WHO recognizes this and has stipulated interventions to mitigate it's burden, which includes roles and responsibilities at different levels for these aforementioned stakeholders.[3] However, a relative paucity of data regarding antibiotic use and resistance exists in many developing countries (including Nigeria) as compared to the plethora of such information in most of the Western world, particularly with regard to children.[4,6-8,11] Furthermore, many studies have focused on the appropriateness and rationality of antibiotic use from the prescribers' and/or health facility angles.[4,7] However, antibiotic misuse could also occur at the level of the end-users within community settings.[11] These aspects range from issues regarding access to and purchase of antibiotics as well as user compliance to the standard and appropriate use and administration of the same.[6]

Some of the preventive and control measures proffered by the WHO as well as the Nigerian government at individual (and by extension, family, and community) levels include the procurement of antibiotics only following prescription by qualified health professionals, the use of antibiotics based on and according to medical counsel and guidance, the avoidance of sharing of or using "leftover" antibiotics and eschewing the habit of demanding (or requesting for) antibiotics from prescribers, among others.[3,6] In this study, the poor practices noted among them contravened many of the WHO strategies for the prevention and control of antibiotic misuse, and the ensuing resistance.[2] They include storing (or keeping) of antibiotics at home for future use (23%); including leftover antibiotics (15%), sharing of antibiotics among children presenting with similar symptoms (16%), discontinuing courses of antibiotics (17%) or reducing the frequency of administration (15%) when the health of children improves, obtaining antibiotics for children without prescription (14%), and directly requesting for antibiotics prescribers (16%) [Table 2]. Such poor practices may not be entirely unconnected from the fact that majority (88.9%) of

Table 1: Sociodemographic profile of respondents (*n*=270).

Variables	Frequency (%)	Variables	Frequency (%)
Age group (in years)		Level of education	
10–19	5 (1.9)	None	11 (4.1)
20–29	120 (44.4)	Primary	48 (17.8)
30–39	101 (37.4)	Secondary	71 (26.3)
40–49	35 (13.0)	Tertiary	138 (51.1)
50–59	8 (3.0)	Others (Qur'anic)	2 (0.7)
60–69	1 (0.4)		
		Marital status	
Sex		Single	30 (11.1)
Male	59 (21.9)	Married	222 (82.2)
Female	211 (78.1)	Separated	3 (1.1)
		Divorced	7 (2.6)
Ethnic group		Widowed	8 (3.0)
Hausa	166 (61.5)		
Fulani	43 (15.9)	No. of under-5 in respondents' care	
Yoruba	23 (8.5)	1	131 (48.5)
Igbo	2 (0.7)	2	114 (42.2)
Others (Igbira, Nupe, and Kanuri)	36 (13.3)	3	18 (6.7)
		4	4 (1.5)
Occupation		≥5	3 (1.1)
Civil servant	92 (34.8)		
Farmer	11 (4.1)	Relationship with child/children	
Trader	60 (22.2)	Father	70 (25.9)
Military personnel	13 (4.8)	Mother	170 (63.0)
Health care worker	22 (8.0)	Brother	7 (2.6)
Housewife	72 (26.0)	Sister	11 (4.1)
		Grandparents	12 (4.4)

the care-givers in this study are the direct biological parents of the respondents [Table 1]; thus, sentimental attachments to the children would not be completely ruled out in their decision-making processes. These findings are corroborated by other studies across Nigeria and in other countries.[4,8,12-14] For instance, a study in Southwest Nigeria reported that about 24.4% of caregivers of under-5 children administered self-recommended antibiotics (without any prescription) to children, largely based on previous experience of effectiveness of use in their older children.[12] Furthermore, another study in Northern Nigeria reports that about 46.7–71.1% of under-5 children receive antibiotics without prescription in the country.[13] Similar findings have also been reported by other Nigerian studies among diverse (other) subgroups in the population.[15-17]

Another study conducted in Southeast Nigeria also reported the administration of antibiotics without prescription to under-5 children by their caregivers (88.6%) as well as other poor practices such as the use of "leftover" antibiotics (20%) and demanding for antibiotics from physicians (92.9%).[18] Such practices in relation to children expose them to unnecessary varieties and quantities of antibiotics, as well as suboptimal doses and/or durations of therapy. Children represent a vulnerable subgroup; in the sense that, being minors, they are incapable of making decisions for themselves and are, therefore, dependent on their caregivers, who are often uninformed regarding such matters, for decision-making. Secondly, their organ systems and metabolic processes are at varying stages of development and may not be able to handle the adverse effects and consequences resulting from such uncensored antibiotic exposures.[8]

Furthermore, several authors in Nigeria have reported the inappropriate use of antibiotics in children for conditions such as diarrheal diseases and upper respiratory tract infections,[18-21] which are often self-limiting and of viral origin.[5,6,8,11] Similar practices have also been reported in other countries within Asia, Latin America, and sub-Saharan Africa as well as some high-income countries in the Western hemisphere.[4,5,8,11,22,23] These practices would ultimately lead to the development of antimicrobial resistance, which will not augur well for the already high childhood morbidity and mortality indices in developing countries, which are largely accounted for by infectious diseases.[4-6] Moreover, many developing countries, such as Nigeria, still grapple with issues such as poor sanitary conditions which make the environment rife for the multiplication of infectious disease agents and vectors as

Table 2: Antibiotic use practices among respondents (*n*=270).

Variables	Responses		
	Always (%)	Sometimes (%)	Never (%)
Do you give your child antibiotics without previous doctors' consult?	32 (12)	152 (56)	86 (32)
Do you change your doctor because he/she does not prescribe antibiotics often (enough) for your child?	30 (11)	82 (30)	158 (59)
Do you reuse antibiotics previously used (in the past) if your child presents with similar symptoms?	43 (16)	139 (51)	88 (33)
Do you trust (your) doctor's decision for not prescribing antibiotics for your child?	22 (8)	91 (34)	157 (58)
If ever you wish your child to receive antibiotics, do you directly request for them from your doctor?	42 (16)	148 (55)	80 (29)
Do you ever get your child's antibiotics from the pharmacy without a prescription?	38 (14)	153 (57)	79 (29)
Do you store (keep) antibiotics at home for when they will be needed in the future (by your children)?	61 (23)	124 (46)	85 (31)
Do you keep "leftover" antibiotics at home for when they will be needed in the future (by your children)?	41 (15)	123 (46)	106 (39)
Do you discontinue (stop) a course of antibiotics when your child's health improves?	45 (17)	98 (36)	127 (47)
Do you reduce the dosage of antibiotics when your child's health improves?	30 (11)	86 (32)	154 (57)
Do you reduce the frequency of antibiotics administration when your child's health improves?	41 (15)	73 (46)	156 (39)
Do you continue the use of antibiotics for your child beyond the prescribed duration?	27 (10)	68 (25)	175 (65)
Do you increase the dosage of antibiotics if your child's health does not improve?	16 (6)	62 (23)	192 (71)
Do you increase the frequency of antibiotics administration if your child's health does not improve?	17 (6)	68 (25)	185 (69)
Have you used antibiotics prescribed for others because your child presents with similar symptoms?	18 (7)	115 (43)	137 (51)

Table 3: Grading of antibiotic use practices among respondents' (*n*=270).

Scores/grades (category)	Frequency (%)
0–49% (poor practice)	8 (3)
50–100% (good practice)	262 (97)

well as a prevailing low uptake of routine immunization against vaccine-preventable, childhood diseases.[5,6,8] All these factors carry a number of implications; some of which include their setting the stage for a "post-antibiotic era," a terminology coined and predicted by a number of experts; which is a situation where antibiotics are no longer effective for their intended curative purposes.[2,3,5,9] Secondly, they also interplay to create a vicious cycle of higher disease burdens and costly health-care services (with newer and more expensive antibiotics becoming the next options) in the resource-constrained settings of most low- and medium-income nations.[5] Fortunately, the antibiotic use practices among majority (97%) of the respondents in this study was assessed to be good, which is commendable [Table 3].

CONCLUSION

This study reported a commendably high level of good antibiotic use practices among caregivers of under-5 children with a few poor practices also noted. In view of this, the rational use of drugs by not only prescribers but also end-users within community settings remains the better and more cost-effective option amidst other competing demands. This is particularly so, in the context of most developing countries, where the morbidity pattern of high burdens of communicable diseases is gradually transiting to depict an additional trend of non-communicable diseases. This could be attained through coordinated and concerted efforts targeted at continuous public health education and enlightenment regarding the demerits of poor stewardship of antibiotic use coupled with

strict regulatory control measures in the dispensing and sale of antibiotics as over-the-counter medications.

Limitations

The study is largely based on information obtained from the respondents and is, therefore, subject to a number of biases; such as recall bias. Information obtained may be affected by the respondents' memories of the incidences involved. Furthermore, the possibility of (consciously or unconsciously) distorting information, to respond in a manner that is perceived to be acceptable to the researchers, exists. This has been addressed (as much as possible) by ensuring the anonymity of the respondents and assuring them of the confidentiality of the information given by them.

Ethical Approval

Ethical clearance was obtained from the Ethics Committee of Barau Dikko Teaching Hospital, Kaduna, Nigeria. Each participant was assured of anonymity and the confidentiality of the information provided; informed consent was also obtained from them.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. World Health Organization. Stop Overuse and Misuse of Antibiotics: Combat Resistance. Available from: https://www.who.int/westernpacific/news/detail/10-11-2017-stop-overuse-and-misuse-of-antibiotics-combat-resistance [Last accessed on 2020 Dec 29].
2. Ventola CL. The antibiotic resistance crisis, part 1: Causes and threats. Pharm Ther J 2015;40:277-83.
3. World Health Organization. Antibiotic Resistance. Available from: https://www.who.int/news-room/fact-sheets/detail/antibiotic-resistance [Last accessed on 2020 Dec 29].
4. Alnemri AR, Almaghrabi RH, Alonazi N, Alfrayh AR. Misuse of antibiotics: A systematic review of Saudi published studies. Curr Pediatr Res 2016;20:169-73.
5. van Boeckel TP, Gandra S, Ashok A, Caudron Q, Grenfell BT, Levin SA, *et al*. Global antibiotic consumption 2000 to 2010: An analysis of national pharmaceutical sales data. Lancet Infect Dis J 2014;14:742-50.
6. Federal Republic of Nigeria: Nigeria Centre for Disease Control, Federal Ministries of Agriculture and Rural Development, Environment and Health; Global Antibiotic Resistance Partnership Project. Antimicrobial Use and Resistance in Nigeria: Situation Analysis and Recommendations. Nigeria: Nigeria Centre for Disease Control; 2017.
7. Abubakar U. Antibiotic use among hospitalized patients in Northern Nigeria: A multi-center point-prevalence survey. BMC Infect Dis 2020;20:86.
8. Li R, Xiao F, Zheng X, Yang H, Wang L, Yin D, *et al*. Antibiotic misuse among children with diarrhea in China: Results from a national survey. Peer J 2016;4:1-11.
9. Naveed S, Qamar F, Maqsood A, Ayub A, Kauser H, Malik H, *et al*. Prevalence and consequences of misuse of antibiotics, survey-based study in Karachi. J Bioequiv Bioavailabil 2015;7:202-4.
10. López-Ortiz BJ, Puig G, Rodríguez-Matos FJ, Acevedo-Cajigas CE, Merced-Román J, Gorbea-Fuxench G, *et al*. Incidence of antibiotic overuse in pediatric patients admitted to hospital due to an asthma exacerbation. Pediatr J 2019;144:493-505.
11. Resi D, Milandri M, Moro ML, The Emilia Romagna Study Group on the Use of Antibiotics in Children. Antibiotic prescriptions in children. J Antimicrob Chemother 2003;52:282-6.
12. Adisa R, Orherhe OM, Fakeye TO. Evaluation of antibiotic prescriptions and use in under-five children in Ibadan, south-western Nigeria. Afr Health Sci 2018;18:1189-201.
13. Salihu-Dadari HI. Antibiotics use, knowledge and practices on antibiotic resistance among breastfeeding mothers in Kaduna State (Nigeria). J Infect Public Health 2019;13:1-8.
14. Jasim AL. Parental self-medication of antibiotics for children in Baghdad city. Int J Pharm Pharm Sci 2014;6:485-9.
15. Sanya TE, Titilayo OF, Adisa R, Segun JS. Use of antibiotics among non-medical students in a Nigerian university. Afr Health Sci 2013;13:1149-55.
16. Auta A, Banwat SB, David S, Dangiwa DA, Ogbole E, Tor-Anyiin AJ. Antibiotic use in some Nigerian communities: Knowledge and attitudes of consumers. Trop J Pharm Res 2013;12:1087-92.
17. Awosan KJ, Ibitoye PK, Abubakar AK. Knowledge, risk perception and practices related to antibiotic resistance among patent medicine vendors in Sokoto metropolis, Nigeria. Niger J Clin Pract 2018;21:1476-83.
18. Okide CC, Grey-Ekejiuba O, Ubaka CM, Schellack N, Okonta M. Parents' knowledge, attitudes and use of antibiotics in upper respiratory infections in Nigerian children. Afr J Biomed Res 2020;23:213-20.
19. Uchendu UO, Ikefuna AN, Emodi J. Medication use and abuse in childhood diarrhoeal diseases by care-givers reporting to a Nigerian tertiary health institution. SA J Child Health 2009;3:83-9.
20. Omole VN, Wamyil-Mshelia MT, Nmadu GA, Usman NO, Andeyantsu EA, Adiri F. Knowledge, attitude and practice of home management of diarrhoea among mothers of under-fives in Samaru, Kaduna State, Nigeria. Port Harcourt Med J 2019;13:19-25.
21. Ekwochi U, Chinawa JM, Osuorah CD, Odetunde OI, Obu HA,

Agwu S. The use of unprescribed antibiotics in management of upper respiratory tract infection in children in Enugu, South-East Nigeria. J Trop Pediatr 2014;60:249-52.
22. Alkaff RN, Kamigaki T, Saito M, Ariyanti F, Iriani DU, Oshitani H. Use of antibiotics for common illnesses among children aged under 5 years in a rural community in Indonesia: A cross-sectional study. Trop Med Health 2019;47:1-9.
23. Rogawski ET, Platts-Mills JA, Seidman JC, John S, Mahfuz M, Ulak M, *et al*. Use of antibiotics in children younger than two years in eight countries: A prospective cohort study. Bull World Health Organ 2017;95:49-61.

How to cite this article: Omole VN, Ibrahim ZA, Gobir AA, Ibrahim MJ, Haliru L, Jimoh AA. An assessment of antibiotic use practices among caregivers of under-5 children in Kaduna Metropolis, Northwest Nigeria. Calabar J Health Sci 2022;6:44-50.