

Community Knowledge and Practices Regarding Antibiotics use Across Five States in Nigeria

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ABSTRACT

The rational use of drugs is mandatory and properly captured by the World Health Organization (WHO). This study was aimed at assessing the knowledge and practices of community members regarding antibiotic use. This was a cross-sectional study conducted across six states in Nigeria. The study included 8,370 respondents drawn from Taraba, Benue State, Enugu State, Nasarawa State, Osun State, and Rivers States. The participants were stratified into such as; community members, in-school and out-of-school youths and patient groups. The study revealed significant gaps in understanding the behaviors related to antibiotics use and antimicrobial resistance.

Key findings indicated a lack of awareness about antimicrobials among a substantial proportion of participants, suggesting the need for educational campaigns and awareness. Misconceptions about the uses of antimicrobials were evident, with participants associating them with a range of diseases, sometimes inaccurately. The issue of partial compliance to antibiotic treatment was also note, with participants discontinuing treatments prematurely. Participants indicated some awareness of the concept of antimicrobial resistance, highlighting a potential starting point for education on this topic.

The study underscored the role of community pharmacies and patent store owners in antibiotic distribution, often without proper education on safety protocols. This emphasizes the importance of regulatory measures and training for responsible dispensing for proper patient care. To address these issues, recommendations include comprehensive public awareness campaigns, educational initiatives in schools and communities, healthcare provider training, and promoting adherence to treatment guidelines. Multisectoral collaboration, cultural sensitivity, and ongoing research and evaluation are also recommended to address the gaps identified and combat antimicrobial resistance effectively.

INTRODUCTION

Antimicrobial resistance is rising to dangerous high levels in all parts of the world including Nigeria (WHO, 2020). A driving force behind the rise in antibiotic resistance can best be understood in two ways: The supply side, owing to the practice of excessive prescription, uncontrolled or uneven access and, on the demand side, to the use of antibiotics (Bax et al., 1998; Costelloe et al., 2010; Céspedes et al., 2006; Omulo et al. 2015 and Combaco et al., 2022). Considering the demand side otherwise known as the users of antimicrobial, this group are usually influenced by several aspects, including: consumers' lack of knowledge about appropriate antimicrobial use and its implications, as well as beliefs, expectations and personal experiences with antibiotics (Omulo et al. 2013; Aljadhey et al. 2015; Viberg et al. 2010; Cars & Nodperg, 2005; Bin Abdulhak 2005; Volpato et al. 2005; Butle et al. 1998; Franco et al. 2009; McNulty et al. 2009'

Awad et al. 2015; Napolitano et al. 2013). Where antibiotics can be bought for human use without a prescription or without guidelines, the emergence and spread of resistance is eminent. Studies have documented various ways of using medicines irrationally some of which include: polypharmacy or the prescribing of too many medicines for a patient (Routledge et al., 2004); inadequate dosage, and sometimes medicines are prescribed for non-bacterial infections; failure to prescribe following established clinical procedures (Younis et al., 2009) such as, national treatment guidelines and hospital policies; inappropriate self-medication (Kaushal et al., 2012), often of prescription-only medicines; and incidences relating to various types of non-adherence to dosing regimens by patients (van Dulmen et al., 2007). These irrational use of medicines across communities have led to a growing number of infections that are becoming harder, and sometimes impossible, to treat as antimicrobials are rendered ineffective (WHO, 2020). Evidence suggests that about half of all patients who take these medicines for their ailments fail to take them correctly (Holloway and van Dijk, 2011)

An extensive literature review on rational use of medicines in Nigeria shows that significant proportion of rational use medicines were carried out in hospital settings (77.0%) neglecting other settings such as community pharmacies, Patent and proprietary medicine vendors and patients across communities (Alfa & Adigwe, 2014).

Without urgent action, we are heading for a post-antibiotic era, in which common infections and minor injuries can once again kill (WHO, 2021).

It is against this backdrop that this study aimed at accessing knowledge and practices of community members regarding antibiotic use across six States in Nigeria to better understand the existing evidence in this area, as well as critically review them with a view to identifying fresh perspectives to addressing RUM in Nigeria.

MATERIALS/METHODS

This was a Community based Antimicrobial Stewardship interventional studies conducted across six states in Nigeria (Taraba, Enugu, Rivers, Nasarawa, Osun and Benue). A total of 8,370 community members/in-school youths were interviewed to collect data with respect to KAP. The questionnaire was structured and scripted into ODK in a way to obtained data with respect to; Section 1 – Demographic characteristics, Section 2 – Knowledge on RUD practice, Section 3 – Attitude towards the practice of RUD, Section 4 – Community practice, Section 5 – Barriers to RUD in community settings. Descriptive statistics was used to summaries the data and organize them into groups according to the sections of the questionnaires. It was also designed using point like response format consisting of yes and no and a few open ended questions. Simple percentages were used.

Prior to the commencement of the survey, training was conducted followed by the field work. Survey on Knowledge, Attitudes and Practices of rational use/dispensing of Antimicrobials among community members/in-school youths on 30th of June, 2022 to 2st of July, 2022 in all the target states.

RESULTS

RUD Analysis for Taraba		Taraba		Benue		Enugu		Nassarawa		Osun		Rivers	
Sex		Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
	Male	729	55	704	50	499	49	735	44	631	57	983	53
	Female	590	45	706	50	527	51	937	56	474	43	855	47
		1319	100	1410	100	1026	100	1672	100	1105	100	1838	100
Edcational level													
	No formal education	171	13	53	4	80	8	207	12	75	7	179	10

	Primary	58	4	13	1	41	4	55	3	15	1	17	1
	Junior Secondary	178	13	56	4	50	5	68	4	18	2	67	4
	Senior Secondary	580	44	374	27	374	36	224	13	254	23	326	18
	Tertiary	225	17	493	35	247	24	768	46	345	31	703	38
	University	106	8	421	30	234	23	350	21	398	36	546	30
		1318	100	1410	100	1026	100	1672	100	1105	100	1838	100
Target group													
	Community members	595	45	838	59	386	38	811	49	522	47	677	37
	In-school-Youth	466	35	193	14	45	4	303	18	343	31	267	15
	Out-of Schoo-Youths	198	15	350	25	218	21	507	30	198	18	371	20
	Patient Group	60	5	29	2	377	37	51	3	42	4	523	28
		1319	100	1410	100	1026	100	1672	100	1105	100	1838	100
Average monthly income of respondents													0
	<20,000	991	75	634	45	423	41	836	50	451	41	601	33
	20,000-50,000	249	19	492	35	403	39	677	40	470	43	939	51
	51,000-80,000	51	4	186	13	182	18	120	7	118	11	205	11
	>80,000	28	2	98	7	18	2	39	2	66	6	93	5
		1319	100	1410	100	1026	100	1672	100	1105	100	1838	100
01. Have you ever heard of a type of medicine called an antimicrobial medicine?	Response	Frequency	Percentage										
	Yes	710	54	235	17	191	19	226	14	344	31	109	6
	No	609	46	1175	83	835	81	1446	86	761	69	1729	94
		1319	100	1410	100	1026	100	1672	100	1105	100	1838	100
02b. I am going to mention some antimicrobial(s) (medicines) and I want you to let me know if you have heard of them.													
ANTIBACTERIALS													
a. Have you ever heard of Penicillin?	Yes	730	55	1176	83	942	92	1058	63	946	86	1611	88
	No	589	45	233	17	74	7	614	37	154	14	227	12
		1319	100	1409	100	1016	99	1672	100	1100	100	1838	100
b. Have you ever heard of Tetracycline?													
	Yes	892	68	849	60	719	70	951	57	884	80	1549	84
	No	427	32	561	40	307	30	721	43	221	20	289	16
		1319	100	1410	100	1026	100	1672	100	1105	100	1838	100
c. Have you ever heard of Amoxicillin?													
	Yes	718	54	808	57	763	74	1211	72	910	82	1558	85
	No	601	46	602	43	263	26	461	28	195	18	280	15
		1319	100	1410	100	1026	100	1672	100	1105	100	1838	100
ANTIMALARIALS													
d. Have you ever heard of Chloroquine?													
	Yes	1207	92	1268	90	952	93	1370	82	1023	93	1602	87

	No	112	8	142	10	74	7	302	18	82	7	236	13
		1319	100	1410	100	1026	100	1672	100	1105	100	1838	100
e. Have you ever heard of Sulfadoxine-Pyrimethamine or SP?													
	Yes	191	14	339	24	213	21	214	13	265	24	587	32
	No	1128	86	1071	76	813	79	1458	87	840	76	1251	68
		1319	100	1410	100	1026	100	1672	100	1105	100	1838	100
f. Have you heard of Artemisinin Combination Therapy or ACT?													
	Yes	590	45	639	45	624	61	842	50	457	41	814	44
	No	729	55	771	55	402	39	830	50	648	59	1024	56
		1319	100	1410	100	1026	100	1672	100	1105	100	1838	100
ANTIVIRALS													
g. Have you heard of AZT or ARVs?													
	Yes	216	16	479	34	275	27	528	32	277	25	580	32
	No	1103	84	931	66	751	73	1144	68	828	75	1258	68
		1319	100	1410	100	1026	100	1672	100	1105	100	1838	100
ANTIFUNGALS													
h. Have you ever heard of Fluconazole?	Yes	284	22	914	65	491	48	656	39	375	34	945	51
	No	1035	78	496	35	535	52	1016	61	730	66	893	49
		1319	100	1410	100	1026	100	1672	100	1105	100	1838	100
i. Have you ever heard of Ketoconazole?	Yes	228	17	671	48	410	40	554	33	290	26	862	47
	No	1091	83	739	52	616	60	1118	67	815	74	876	48
		1319	100	1410	100	1026	100	1672	100	1105	100	1738	95
ANTIPROTOZOALS													
j. Have you ever heard of Metronidazole?													
	Yes	694	53	501	36	538	52	760	45	597	54	843	46
	No	625	47	909	64	388	38	912	55	508	46	995	54
		1319	100	1410	100	926	90	1672	100	1105	100	1838	100
03a. What diseases (illnesses) are these antimicrobials (medicines), which we just discussed, used to treat?	Response	Frequency	%										
	a. STI/STD	229	17	809	57	444	43	1127	67	263	24	1025	56
	b. PNEUMONIA	164	12	160	11	330	32	465	28	140	13	192	10
	c. BLOODY DIARRHEA OR DYSENTERY	195	15	144	10	156	15	310	19	313	28	80	4
	d. HIV/AIDS	207	16	288	20	91	9	561	34	201	18	169	9
	e. TB	73	6	233	17	102	10	349	21	150	14	149	8
	f. MALARIA	1099	83	1097	78	770	75	1337	80	822	74	1235	67
	g. Cold		0	189	13	363	35	839	50	281	25	343	19

	h.1 DIARRHEA	476	36	100	7	371	36	641	38	402	36	257	14
	i. others	213	16	1	0	11	1	68	4	39	4	16	1
	h.2 Do you mean bloody diarrhea or watery diarrhea?												
	Bloody diarrhea	110	23	69	69	77	21	82	13	53	13	35	14
	Watery diarrhea	366	77	31	31	293	79	556	87	340	85	221	86
05. Do you believe that some of these antimicrobials (medicines) we discussed are useful in treating a cold?													
	Yes	425	32	392	28	621	61	207	12	229	21	752	41
	No	894	68	542	38	405	39	1465	88	574	52	1086	59
		1319	100	934	66	1026	100	1672	100	803	73	1838	100
07. Do you believe that some of these antimicrobials (medicines) we discussed are useful in treating watery diarrhea?													
	Yes	938	71	616	44	633	62	946	57	540	49	1018	55
	No	381	29	791	56	393	38	726	43	566	51	820	45
		1319	100	1407	100	1026	100	1672	100	1106	100	1838	100
08. Have you ever been sick and had to visit a health professional such as a doctor, nurse, or pharmacist?													
	Yes	1092	83	1321	94	739	72	1470	88	963	87	1418	77
	No	227	17	89	6	287	28	202	12	139	13	420	23
		1319	100	1410	100	1026	100	1672	100	1102	100	1838	100
09. When you have visited a health professional, such as a doctor, nurse, or pharmacist, have you ever asked for any of these antimicrobials (medicines)?													
	Yes	628	48	932	66	650	63	1076	64	771	70	1170	64
	No	691	52	478	34	376	37	596	36	335	30	668	36
		1319	100	1410	100	1026	100	1672	100	1106	100	1838	100
010. Have you ever taken any of these medicines that we have been discussing. I am referring to the antibiotics, antimalarials, or antivirals (antimicrobials), which are used to fight infections?													

	Yes	1100	83	1238	88	892	87	1466	88	822	74	1481	81
	No	219	17	165	12	134	13	206	12	284	26	357	19
		1319	100	1403	100	1026	100	1672	100	1106	100	1838	100
011. Did you ever stop taking these antimicrobials (medicines) before completing the full course?													
	Yes	843	64	930	66	512	50	903	62	517	47	502	27
	No	476	36	480	34	514	50	561	38	589	53	1336	73
		1319	100	1410	100	1026	100	1464	100	1106	100	1838	100
012. Why did you stop taking the antimicrobial (medicine)?													
	a. Don't have enough money to buy the entire course	53	6	100	11	232	45	371	41	41	8	83	5
	b. WASN'T GIVEN ENOUGH	25	3	32	3	137	27	81	9	24	5	41	2
	c. RAN OUT	23	3	40	4	127	25	107	12	24	5	59	3
	d. WAS TOLD TO STOP BY A HEALTH PROFESSIONAL	20	2	56	6	187	37	52	6	44	9	28	2
	e. CONDITION DID NOT IMPROVE	47	6	79	8	229	45	120	13	38	7	55	3
	f. CONDITION IMPROVED	366	43	331	36	173	34	377	42	337	65	176	10
	g. THERE WERE SIDE EFFECTS/MEDICINE MADE HIM/HER SICK	40	5	106	11	162	32	91	10	37	7	68	4
	h. DON'T LIKE TO TAKE MEDICINES	133	16	163	18	75	15	76	8	169	33	91	5
	i. i. DIDN'T THINK IT WAS WORKING	26	3	49	5	34	7	51	6	32	6	23	1
	x. OTHER	21	2	6	1	0	0	20	2	12	2	2	0
	z. DON'T KNOW	29	3	8	1	3	1	28	3	6	1	4	0
013. Some of these medicines that used to work in the past for fighting infections are no longer working. This problem is called drug resistance (antimicrobial resistance). Have you ever heard of this problem where medicines no longer work?													
	Yes	776	59	854	61	600	58	1077	64	244	22	1383	75
	No	543	41	549	39	426	42	595	36	862	78	455	25
		1319	100	1403	100	1026	100	1672	100	1106	100	1838	100

014. Where did you hear about this problem of medicines no longer working (antimicrobial resistance)?													
a. HEALTH WORKER/CLINIC	18	2	273	32	172	29	648	60	82	34	659	48	
b. ON THE RADIO	21	3	68	8	116	19	49	5	9	4	100	7	
c. ON THE TV	10	1	55	6	24	4	47	4	7	3	133	10	
d. IN A NEWSPAPER OR MAGAZINE	6	1	28	3	29	5	13	1	3	1	99	7	
e. COMMUNITY/FRIEND/RELATIVE	74	10	317	37	221	37	231	21	80	33	238	17	
x. OTHER OTHER	16	2	55	6	18	3	47	4	39	16	59	4	
z. DON'T REMEMBER	631	81	58	7	17	3	39	4	24	10	97	7	
015. Can you name some of these antimicrobials (medicines) that used to work in the past for fighting infections that are no longer working? (medicines for which antimicrobial resistance or drug resistance has occurred?)													
a. PENICILLIN	29	4	20	2	17	3	20	2	18	7	137	10	
b. TETRACYCLINE	43	6	13	2	16	3	15	1	32	13	30	2	
c. AMOXICILLIN	51	7	17	2	14	2	17	2	17	7	44	3	
d. CHLOROQUINE	84	11	26	3	40	7	28	3	18	7	65	5	
e. SULFADOXIME-PYRIMETHAMINE/SP	6	1	6	1	8	1	6	1	6	2	35	3	
f. ARTEMISININ COMB. THERAPY/ACT	18	2	2	0	11	2	3	0	5	2	9	1	
g. ZIDOVUDINE/AZT/ARVs	1	0	6	1	8	1	2	0	2	1	0	0	
h. FLUCONAZOLE	1	0	8	1	5	1	5	0	7	3	13	1	
i. KETOCONAZOLE	2	0	7	1	4	1	3	0	3	1	18	1	
j. METRONIDAZOLE	21	3	2	0	2	0	3	0	11	5	11	1	
k. IBUPROFEN	16	2	4	0	4	1	7	1	15	6	9	1	
l. PARACETAMOL	40	5	13	2	6	1	26	2	20	8	21	2	
y. OTHER	5	1	2	0	1	0	10	1	9	4	2	0	
z. DON'T KNOW	459	59	175	20	32	5	181	17	209	86	37	3	
16. Can you name some diseases or infections for which some of these antimicrobials (medicines) no longer work? In other words, antimicrobial resistance or drug resistance has occurred?													

	a. STI/STD	139	18	574	67	334	56	847	79	90	37	982	71
	b. PNEUMONIA	140	18	108	13	290	48	248	23	61	25	199	14
	c. BLOODY DIARRHEA OR DYSENTERY	93	12	113	13	157	26	207	19	105	43	152	11
	d. HIV/AIDS	159	20	0	0	155	26	230	21	86	35	144	10
	e. TB	84	11	155	18	145	24	135	13	61	25	82	6
	f. MALARIA	619	80	683	80	600	100	1020	95	221	91	1112	80
	g. WATERY DIARRHEA	113	15	188	22	303	51	422	39	91	37	526	38
	y. Others	219	28	0	0	0	0	60	6	0	0	125	9
	z. DON'T KNOW	454	59	463	54	125	21	485	45	582	239	54	4
17. What can cause some of these medicines [ANTIMICROBIALS] that used to work in the past to stop working? [IN OTHER WORDS, FOR ANTIMICROBIAL RESISTANCE OR DRUG RESISTANCE TO OCCUR?]													
	a. POOR QUALITY ANTIMICROBIAL	431	56	559	40	416	69	845	78	247	22	894	65
	b. WHEN ONE STOPS TAKING IT BEFORE COMPLETING THE FULL COURSE	527	68	455	32	3374	562	818	76	311	28	922	67
	c. INSUFFICIENT AMOUNT OF ANTIMICROBIAL	204	26	182	13	260	43	205	19	143	13	279	20
	d. WHEN ONE USES ANTIMICROBIALS THAT ARE PRESCRIBED FOR SOMEONE ELSE	227	29	403	29	327	55	354	33	248	22	316	23
	e. WHEN ONE USES THE WRONG ANTIMICROBIAL	264	34	446	32	197	33	448	42	274	25	204	15
	x. OTHER	76	10	39	3	6	1	71	7	28	3	49	4
	z. DON'T KNOW	408	53	359	25	113	19	515	48	346	31	135	10
		2137	275	2443	173	4693	782	3256	302	1597	145	2799	202
18. Today or yesterday, during the day or night, did you take any medicines? (NOTE: MAKE IT CLEAR TO RESPONDENT THAT YOU ARE SPEAKING OF PRESCRIPTION OR OVER-THE-COUNTER MEDICINES, NOT HERBAL OR TRADITIONAL MEDICINES.)													
	Yes	280	21	264	19	232	23	143	9	170	15	422	23

	No	1039	79	1136	81	794	77	1529	91	935	85	1416	77
		1319	100	1400	99	1026	100	1672	100	1105	100	1838	100
019. Can you show me the medicines themselves, the packaging, or bottles for the medicines that you are taking?'													
	Yes	280	36	74	28	9	4	29	20	60	35	32	8
	No	1039	134	190	72	223	96	114	80	110	65	390	92
		1319	170	264	100	232	100	143	100	170	100	422	100
20. Medicine 1													
	Eligible	38	76	70	95	8	89	25	86	31	70	17	77
	Not eligible	12	24	4	5	1	11	4	14	13	30	5	23
Medicine 2													
	Eligible	15	83	27	93	1	100	4	80	17	55	7	58
	Not eligible	3	17	2	7	0	0	1	20	14	45	5	42
Medicine 3													
	Eligible	8	100	14	93	0	2	100	2	12	3	100	
	Not eligible	0	0	1	7	0	0	0	15	88	0	0	
021a. Who recommended or prescribed that you take that medicine 1 above													
	1. HEALTH PROFESSIONAL AT HEALTH FACILITY/MOBILE OUTREACH UNIT	12	19	25	34	1	11	10	34	8	1	8	36
	2. COMMUNITY HEALTH WORKER	8	13	11	15	1	11	2	7	4	0	0	0
	3. COMMUNITY HEALTH	3	5	1	1	1	11	1	3	0	0	0	0
	4. GENERAL STORE WORKER	4	6	6	8	0	0	1	3	14	1	2	9
	5. DRUG STORE WORKER	12	19	8	11	2	22	3	10	0	0	6	27
	7. TRAD. HEALER	2	3	0	0	0	0	1	3	1	0	0	0
	8. FRIEND/NEIGHBOR	4	6	4	5	1	11	4	14	3	0	2	9
	9. RELATIVE	3	5	1	1	0	0	1	3	1	0	3	14
	9.5 Respondnet him/herself	13	21	13	18	3	33	5	17	11	1	1	5
	9.6 Others	1	2	0	0	0	0	0	0	0	0	0	0
		62	100	69	93	9	100	28	97	42	4	22	100
22. Where did you buy the drudgs													
	Health professional, Clinic, drug store, Pharm/chemist	38	76	60	81	9	100	24	83	28	74	20	91
	Fiends, hawkers,	4	8	14	19	0	0	5	17	10	26	2	9

24. Do you receive any safety netting protocol after buying medicines from community pharmacist/patient store owner (providing information for patient and follow up after contact with patient)														
Yes	422	32	678	48	163	16	612	37	295	27	1091	59		
No	897	68	732	52	863	84	1053	63	811	73	747	41		
	1319	100	1410	100	1026	100	1665	100	1106	100	1838	100		

RESULTS DESCRIPTION

A total of 8,370 respondents were interviewed, out of which 1,319, 1410, 1026, 1672, 1105, and 1838 were drawn from Taraba, Benue State, Enugu State, Nasarawa State, Osun State, and Rivers States, respectively.

The target populations were stratified into Community members, In-school youths, out-of-school youths, and patient groups, and participants across target proportions were Taraba (595, 466, 198, and 60), Benue (838, 193, 350, 29), Enugu (386, 45, 298, 377), Nasarawa (811, 303, 507, 51), Osun (522, 343, 198, 42), and Rivers (677, 267, 371, 523).

Most of the sampled populations had Secondary, tertiary, or non-formal education and had an average monthly income of less than N20,000. Taraba: 75%; Benue: 45%; and Nasarawa: 50%.

Results show that most participants have never heard about the term antimicrobials: Taraba (50%), Benue (83%), Enugu (81%), Nasarawa (86%), Osun (69%), and Rivers (94%).

Results also show that these antimicrobials were used in diseases like Malaria, Diarrhea (mostly watery), HIV/AIDS, and dysentery, among others.

A small number of participants were of the opinion that antimicrobials are used in treating watery diarrhea, for example, Taraba (71%, Enugu (62% and Nasarawa (57%).

The majority of the participants responded that they have taken one form of antimicrobial or another. However, many reported that they have ever stopped taking the full course of these antimicrobials because their conditions suddenly improved or that they do not like taking the medications again: Taraba (64%), Benue (66%), Enugu (50%), and Nasarawa (52%).

Many respondents claimed that they had heard of a condition where medicines no longer work but that they had forgotten the exact channel where they got such information. Participants, however, mentioned Artemisinin Comb., Paracetamol, and Metronidazol as some of these antimicrobials that no longer work.

On the recommendation of medicines that participants take, most of them reported that their antimicrobials are being recommended by patent store owners in their communities and that the patent store owners do not provide them with education or safety net protocols.

DISCUSSION OF RESULTS

The aim of the study was to assess the knowledge and practices of community members in six states across Nigeria regarding antibiotic use. The study employed a cross-sectional design and collected data from a

substantial number of respondents across different states and target populations, including community members, in-school and out-of-school youths, and patient groups. The study primarily focused on gaining insights into the existing evidence concerning antibiotic use and resistance in Nigeria and aimed to identify potential new perspectives for addressing the issues related to Rational Use of Medicines (RUM).

The study sample consisted of 8,370 respondents drawn from Taraba, Benue State, Enugu State, Nasarawa State, Osun State, and Rivers States. The target populations were further categorized into different groups, and participants were divided across these categories in each state. The majority of the sampled population had secondary, tertiary, or non-formal education and earned an average monthly income of less than N20,000 in several states.

The results of the study revealed several important findings:

Awareness and Knowledge: A significant proportion of participants across all states had never heard about the term “antimicrobials.” This lack of awareness is a cause for concern, as it reflects a gap in knowledge about the proper use of antibiotics and their potential risks.

Perceived Uses of Antimicrobials: The study found that participants associated antimicrobial use with a range of diseases including Malaria, Diarrhea (particularly watery diarrhea), HIV/AIDS, and dysentery. This perception indicates that there might be misconceptions about the appropriate use of antibiotics, leading to their overuse or misuse.

Understanding of Antimicrobial Function: A small percentage of participants believed that antimicrobials were used in treating watery diarrhea, which could indicate a lack of accurate knowledge about the role of antibiotics in specific conditions.

Adherence to Treatment: A significant portion of participants reported that they had taken antimicrobials at some point, but many had discontinued the full course of treatment prematurely. Reasons cited for discontinuation included improvement in their condition or a dislike for taking medications. This partial adherence to treatment can contribute to the development of antimicrobial resistance.

Awareness of Antimicrobial Resistance: Participants indicated awareness of a condition where medicines no longer work, suggesting some level of familiarity with the concept of antimicrobial resistance. However, they struggled to recall the source of such information.

Sources of Recommendations: A noteworthy finding was that most participants reported obtaining antimicrobials from patent store owners in their communities. These store owners often did not provide education or safety protocols, potentially leading to inappropriate antibiotic use.

Comparing these results with other studies is crucial to place the findings in a broader context. Other studies in Nigeria and globally have also reported similar issues with inadequate awareness of antimicrobial resistance, misconceptions about antibiotic use, and improper adherence to treatment courses. The cross-sectional nature of this study limits its ability to establish causal relationships or capture changes over time. However, the findings align with broader concerns about the growing problem of antimicrobial resistance and highlight the need for targeted educational interventions, policy measures, and community engagement to address these issues effectively.

CONCLUSION

The survey study revealed deficit in knowledge and practice of community members/students. There is also inadequate knowledge on the importance of drugs prescriptions couple with poor safety netting practice from the pharmaceutical care. Hence, an urgent need of action to conduct community sensitization, radio programs and patients education so as to reduce spread of AMR among community members

RECOMMENDATION

Based on the findings of the study, we recommend the following in order to address the gaps in knowledge and practices regarding antibiotic use in the community:

1. **Public Awareness Campaigns:** Develop and implement comprehensive public awareness campaigns about antibiotics, their appropriate use, and the risks of antimicrobial resistance. These campaigns should be culturally sensitive and accessible to all segments of the population.
2. **Educational Initiatives:** Launch educational programs in schools, communities, and healthcare facilities to raise awareness about antibiotics, their proper use, and the consequences of misuse. Tailor these programs to address misconceptions and provide clear information on conditions that require antibiotics.
3. **Antimicrobial Resistance Education:** Develop focused education modules about antimicrobial resistance, explaining the concept, causes, and implications. Highlight the role of individuals in preventing its spread and the importance of completing full courses of antibiotics.
4. **Healthcare Provider Training:** Provide training to patent store owners and other healthcare providers who distribute antibiotics. Equip them with knowledge about appropriate antibiotic use, the importance of adhering to treatment guidelines, and safety protocols.
5. **Promote Adherence to Treatment:** Create patient-centered strategies to promote adherence to antibiotic treatment, such as reminders and education about the dangers of discontinuing treatment prematurely.
6. **Regulation and Oversight:** Implement regulations to ensure that antibiotics are dispensed only with a valid prescription, limiting the ability of non-medical professionals to distribute these medications. This can help control inappropriate use.
7. **Multisectoral Collaboration:** Foster collaboration between healthcare authorities, educational institutions, community leaders, and relevant stakeholders to coordinate efforts in addressing antibiotic misuse and antimicrobial resistance.
8. **Cultural Sensitivity:** Tailor interventions to respect cultural beliefs and practices while promoting accurate antibiotic knowledge. Engage local leaders and influencers to support and disseminate information effectively.
9. **Data-Driven Strategies:** Continuously monitor and analyze antibiotic usage patterns, awareness levels, and adherence rates. Use this data to refine interventions and strategies over time.
10. **Behavioral Change Interventions:** Design behavior change interventions that focus on shifting attitudes and practices related to antibiotic use. Utilize evidence-based techniques to encourage responsible antibiotic behavior.
11. **Health Literacy Enhancement:** Improve general health literacy among communities to empower individuals to make informed decisions about their health and medication use.
12. **Research and Evaluation:** Conduct further research to assess the impact of interventions on knowledge, practices, and antimicrobial resistance rates. Use the findings to refine strategies and ensure their effectiveness.

CONFLICTS OF INTEREST

Conflicts of interest: All authors – none to declare.

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Ethics approval and consent to participate

Ethics approval was received from the **National Health Research Ethics Committee with NHREC Protocol Number: NHREC/01/01/2007-01/11/2021**. Informed consent was obtained from each participants prior to the observation of any consultations. Consent was also obtained from Ministries of Health and Education in all the six target states,

REFERENCES

1. Alfa, J. and Adigwe, O.P. (2014). Rational Use of Medicines in Nigeria: A Critical Review, *Journal of Biology, Agriculture and Healthcare*, 16(4): 89-98. <https://core.ac.uk/download/pdf/234660039.pdf>
2. Cambaco, O., Alonso Menendez, Y., Kinsman, J. et al. Community knowledge and practices regarding antibiotic use in rural Mozambique: where is the starting point for prevention of antibiotic resistance?. *BMC Public Health* 20, 1183 (2020). <https://doi.org/10.1186/s12889-020-09243-x>
3. Bax RP, Anderson R, Crew J, Fletcher P, Johnson T, Kaplan E, et al. Antibiotic resistance: what can we do? *Nat Med*. 1998;4(5):545–6.
4. Costelloe C, Metcalfe C, Lovering A, Mant D, Hay AD. Effect of antibiotic prescribing in primary care on antimicrobial resistance in individual patients: systematic review and meta-analysis. *Bmj*. 2010;340:–c2096.
5. Céspedes A, Larson E. Knowledge, attitudes, and practices regarding antibiotic use among Latinos in the United States: review and recommendations. *Am J Infect Control*. 2006;34(8):495–502.
6. Omulo S, Thumbi SM, Njenga M, Call DR. A review of 40 years of enteric antimicrobial resistance research in eastern Africa: what can be done better? *Antimicrob Resist Infect Control*. 2015;4(1):1
7. Aljadhey H, Assiri GA, Mahmoud MA, Al-Aqeel S, Murray M. Self-medication in Central Saudi Arabia: community pharmacy consumers' perspectives. *Saudi Med J*. 2015;36(3):328–34.
8. Viberg N, Kalala W, Mujinja P, Tomson G, Lundborg CS. “Practical knowledge” and perceptions of antibiotics and antibiotic resistance among drugsellers in Tanzanian private drugstores. *BMC Infect Dis*. 2010;10:270.
9. Cars O, Nordberg P. Antibiotic resistance – the faceless threat. *Int J Risk Saf Med*. 2005;17:103–10.
10. Bin Abdulhak AA, Altannir MA, Almansor MA, Almohaya MS, Onazi AS, Marei MA, et al. Non prescribed sale of antibiotics in Riyadh, Saudi Arabia: a cross sectional study. *BMC Public Health*. 2011;11(1):538.
11. Volpato DE, de Souza BV, Dalla Rosa LG, Melo LH, Daudt CAS, Deboni L. Use of antibiotics without medical prescription. *Braz J Infect Dis*. 2005;9(3):288–91.
12. Butler CC, Rollnick S, Pill R, Maggs-Rapport F, Stott N. Understanding the culture of prescribing: qualitative study of general practitioners' and patients' perceptions of antibiotics for sore throats. *Bmj*. 1998;317(7159):637–42.
13. Franco BE, Martínez MA, Sánchez Rodríguez MA, Wertheimer AI. The determinants of the antibiotic resistance process. *Infect Drug Resist*. 2009;2(1):1–11.
14. McNulty CAM, Boyle P, Nichols T, Clappison P, Davey P. The public's attitudes to and compliance with antibiotics. *J Antimicrob Chemother*. 2007;60(SUPPL. 1):63–8.
15. Awad AI, Aboud EA. Knowledge, attitude and practice towards antibiotic use among the public in Kuwait. *PLoS One*. 2015;10(2):1–15.
16. Napolitano F, Izzo MT, Di Giuseppe G, Angelillo IF. Public knowledge, attitudes, and experience regarding the use of antibiotics in Italy. *PLoS One*. 2013;8(12):1–6. <https://www.who.int/news-room/fact-sheets/detail/antibiotic-resistance>

17. Holloway K, van Dijk L.(2011). Rational use of medicines in: The World Medicines Situation 2011, 3rd ed. Geneva, World Health Organization, 2011. Available at: http://who.int/medicines/areas/policy/world_medicines_situation/en/index.html