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Research Article

Parental Knowledge, Attitudes and Practices on Antibiotics Use for Childhood Upper Respiratory Tract Infections in Kicukiro District, Rwanda

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Abstract

Parents' attitudes and expectations towards antibiotics use for children's Upper Respiratory Tract Infections are among major causes of antibiotics misuse and the latter leads to the antimicrobial resistance. Thus, this study aimed at assessing parents' knowledge, attitude and practices on antibiotics use for childhood URTIs in Kicukiro District. A cross-sectional study was conducted and a questionnaire was used to collect data from a sample size of 384 parents with under 12 years of age attending selected Health Centers in Kicukiro District. (SPPS) version 21 was used for data analysis; Chi-square test and regression analysis were used to examine the association between variables. The study findings indicated that 88.5% of parents were female, 39.6% aged from 25 to 34 years, 81.8% were married, 42.2% completed secondary education, 50% had 2 to 4 children and 57% of them were in economic class 2. The study revealed that 40.4% of parents had low level of knowledge of antibiotics use towards antibiotics use and 62% of them had poor practices regarding antibiotics use for childhood URTIs. Parents with increased level of education, higher economic position, with high knowledge and positive attitude use were more likely to have good practices towards antibiotics use than their corresponding counterparts. In conclusion, parents from Kicukiro District had poor knowledge and poor practices regarding antibiotics use for children's URTIs. Hence, the study recommended that educational interventions for parents are needed to reduce antibiotics misuse by raising awareness on indications of antibiotics, their side effects and the emergence of antimicrobial resistance.

Keywords: Antibiotics Use; Attitudes and Knowledge; Children, Parents

Abbreviations

AB: Antibiotic; AMR: Antimicrobial Resistance; AOR: Adjusted Odds Ratio; CI: Confidence Interval; SPSS: Statistical Package for Social Sciences; StD: Standard Deviation; URTIs: Upper Respiratory Tract Infections.

Introduction

Childhood Upper Respiratory Tract Infections (URTIs) are prevalent occurrence in primary health care settings [1]. These illnesses are taught to be the leading cause of children's or parents' absenteeism from school or from work, consequently posing a financial burden on parents and the health systems [2]. Children become infected as a result of their exposure to a range of ailments and, in general, acquire 6 to 8 URTIs episodes yearly [3]. Evidence from literature showed that bacteria are responsible for less than 10% of URTI cases, yet antibiotics are frequently used to treat them and children get more antibiotics than any other age group, respiratory tract infections accounting for over 20% of pediatric antibiotic prescriptions [4]. It is believed that ten million needless antibiotics are provided each year, with broad-spectrum antibiotics being utilized in the majority of situations; this translates to over forty million US$ for antibiotic expenditures for treating the URTIs [5].

Excessive usage or misuse of antibacterial has resulted in higher health-care costs, greater adverse reactions such as diarrhea, and emergence of Antibacterial Resistance (AMR) [6]. According to the World Health Organization (WHO), 20-50% of antibiotic prescriptions are erroneous, which is a substantial contributor to the imminence of AMR universally [7].

Prescription of antibiotics too frequently, for too long or at too low a dose, stopping medication before it is completed are among human factors that have contributed to the development of AMR in bacteria [8]. Resistance to antibiotics is a severe and an increasing public health concern worldwide [9], severely in countries with increased rate of antibiotic consumption [10]. Literature estimates that ten million deaths will occur each year as a result of AMR [11] and 40% of these deaths will happen in Africa [12]. As a result, the WHO has classified drug resistance as being one of the world's top ten public health threats that human society has been facing over the last decade [13].

A study that aimed at assessing the prevalence of AMR among common bacterial isolates in a tertiary healthcare facilities in Rwanda, revealed that AMR rates were high, posing a great therapeutic challenge in managing common infectious diseases [14]. According to a recent analysis, 1 out of 3 people in Low Middle Income Countries

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(LMICs) has serious gaps in knowledge of antibiotics utilization [18]. Physicians' doubt about diagnosis, parental preferences, misperceptions, unrestricted access to antibiotics, knowledge deficit regarding antibiotic indications, and an unawareness of AMR were all linked to greater rates of antibiotic prescriptions [16,17]. The views and expectations of parents play a big role in whether or not an antibiotic is prescribed. Fear of acute illnesses among parents results in many pediatrician visits for URTIs and, as a result, inappropriate antimicrobial utilization [15]. According to numerous studies conducted in African and beyond, factors that influence antibacterial use include parental educational level, age, economic position, number of children, gender, residence location among others [19,20]. Literature also revealed a correlation between parental knowledge, attitudes and practices regarding antibiotics use [21].

Studies conducted in Rwanda were mainly focused on AMR and the suitability of antibiotic prescription. A study conducted in 3 Health Centers in Gisagara District that was assessing found that 54.2% of medication prescription was antibiotics, main indication was URTIs at 40.6% and only 38.6% of these antibiotics were rational. This study indicated that children took numerous antibiotics for URTIs at 21.4% compared to others [22]. A very little is known about parents' awareness, attitudes and practices towards antibiotics use for Rwandan children's URTIs, specifically in Kicukiro District. Therefore, this study looked at the relationships among socioeconomic characteristics and parents' knowledge, attitudes, and practices on antibiotic usage and childhood URTIs. The findings of this study will be beneficial for decision makers to design strategies for health education especially for susceptible parents for antimicrobial abuse. It will also be used to improve parents' understanding on URTIs and antibiotic use, thus, elements that influence long-term behavior changes regarding antibiotic usage.

Materials and Methods

The study was based on cross-sectional research design and quantitative data were obtained from parents with under 12 years old children attending who attended selected Health Centers, namely Masaka and Kabuga Kicukiro and Gikondo in Kicukiro District, Rwanda. A sample size of 384 respondents was obtained using Fisher formula and convenience sampling technique was used. A structured questionnaire was used for data collection; It was initially written in English and then translated into Kinyarwanda in order to facilitate

Table 1: Socio-Demographic Characteristics of Respondents.

Variables		Frequency (n=384)	Percent (%)
Gender of respondents	Male	44	11.5
	Female	340	88.5
Age group of respondents in years	<25	83	21.6
	25-34	152	39.6
	35-44	132	34.4
	45 and above	17	4.4
Marital Status of Respondents	Single	15	3.9
	Married or cohabiting	313	81.5
	Divorced or Separated or Widow (er)	56	14.6
Educational attainment	No formal education	9	2.3
	Primary	166	43.0
	Secondary	163	42.7
	Higher education	47	12.0
Employment status of respondents	Employed	124	32.3
	Not employed	260	67.7
Economic status (Ubudehe categories)	Ubudehe Category 1	53	13.8
	Ubudehe Category 2	219	57.0
	Ubudehe category 3 or 4	112	29.2
Health Insurance of respondents	None	10	2.6
	Mutuelle de Santé	301	78.4
	Rwanda Social Security Board (RSSB)	50	13.0
	Other HI	23	6.0
Number of children	1 child	159	41.4
	2 to 4 children	192	50.0
	5 or more children	33	8.6
	1 child	159	41.4

Source: *Primary data (2022).* ***Ubudehe Category 1:*** *Very poor and vulnerable citizens;* ***Category 2:*** *Citizens who were able to afford some form of rented or low-class owned accommodation etc.;* ***Category 3:*** *Citizens who were gainfully employed or were even employers of labour;* ***Category 4:*** *for the richest people. Source [23].*

better understanding and easy use by respondents.

Data Analysis was performed using SPSS software version 21, using descriptive statistics and presented as associated frequencies, mean and standard deviation. Chi-square test was used to test for association between variables and regression analysis was used to test the strengths of association between dependent and independent variables which were previously identified by Chi-square test. The level of significance (α) was set at 0.05 for all statistical tests and data were presented using tables and figures. For ethical aspects, researchers obtained approval letters from Mount Kenya University and from each of selected Health Centers as a permission for data collection and researchers received signed consent from each participant before participating in the study.

Results

Socio-demographic data presented in the (Table 1) were obtained from 384 respondents who were reached and completed research questionnaires.

Findings in (Table 1) indicated that majority of respondents were female (88.5%), 39.6% aged from 25 to 34 years old, 81.8% were married, 42.2% completed secondary education while only 12.2% of them completed university education. The majority, (67.7%) of respondents was not employed, more than half of them were in Rwandan economic category 2 (ubudehe category two). More than a three-quarter (78.4%) of respondents had Mutuelle de Santé (Community-Based Health Insurance) as Health Insurance and 50% of respondents had 2 to 4 children while minority (8.6%) had 5 or more children.

Parents' Knowledge of Antibiotic use for Childhood URTIs

The first objective of the current study was to determine parents' knowledge regarding antibiotics use for childhood URTIs and the researcher explored this by asking 8 knowledge-related questions as demonstrated in the (Table 2).

In the Table 2, findings demonstrated that 57.3% of parents incorrectly confirmed that every feverish child should be treated by antibiotics, 68.2% falsely confirmed that there is a quick recovery when antibiotic is give for URTIs with flu-like symptoms. Only 80 (20.8%) of parents correctly confirmed that antibiotics should not be given for URTIs since most of them are of viral origin and self-limited, 31.3% of them were aware of side effects that can be caused by antibiotics while 40.4% of them do not know whether or not side effects can occur during antibiotic therapy, and 74.5% of them don't know that antibiotic can cause secondary infection after killing normal flora.

Parental Level Knowledge of Antibiotic Use

Total questions for knowledge evaluation were 8 and parents who correctly answered to 6 or more questions out of 8 scored at ≥70% and were qualified as having 'high level of knowledge of antibiotics. Parents who correctly answered to 4-5 questions out of 8 scored at 50-69% and were qualified as having with 'moderate level of knowledge of antibiotics while those who correctly answered to less than 4 questions out of 8 got <50% scores and were qualified as having 'low level of knowledge of antibiotics.

The (Figure 1) indicates that 40.4% of parents have low level of knowledge of antibiotic use, 36.5% of them have moderate and only 23.2% of them have high level of knowledge of AB use.

Parents' Attitudes Towards Antibiotic Use for Childhood URTIs

The second objective was to determine parents' attitudes towards antibiotics use for childhood URTIs and the researcher explored this by asking 8 attitude-related questions as demonstrated in the (Table 3).

From the Table 3, it was revealed that 56% of respondents would like to request antibiotics if their child suffers from frequent URTIs, the same number (56.6%) agreed that they prefer expensive antibiotics to accelerate the recovery while 53.9% confirmed that they prefer buying antibiotics in private pharmacy when the physician refuses to prescribe them. On the other hand, 56.2% confirmed that they would feel unsatisfied with doctors' visits if no antibiotics

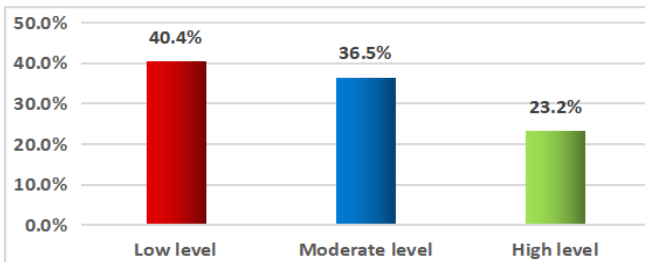

Figure 1: Parental level of knowledge antibiotics use.

Table 2: Parents' knowledge of antibiotic use for childhood URTIs.

Variables	Yes		No		Don't Know	
	Freq	%	Freq	%	Freq	%
Use of antibiotic for every feverish child	220	57.3	98	25.5	66	17.2
Quick recovery when antibiotic is given for flu-like symptoms	262	68.2	80	20.8	42	11
Antibiotics should not be given for URTIs since most of them are of viral origin and self-limited	80	20.8	149	38.8	155	40.4
Antibiotic do not have any side effects	109	28.4	120	31.3	155	40.3
Inappropriate use of antibiotic reduces their efficacy and leads to AMR	159	41.4	79	20.6	146	38.0
Scientists can produce new antibiotics for resistant bacteria	195	50.8	50	13.0	139	36.2
Antibiotics can cause secondary infection after killing normal flora	98	25.5	87	22.7	199	51.8
Many infections are becoming resistant to anti-biotherapy	118	30.7	54	14.1	212	55.2

Source: *primary data (2022)*

Table 3: Parents' attitudes towards antibiotic use for childhood URTIs.

Statements	SA N (%)	A N (%)	U N (%)	D N (%)	SD N (%)	Mean	StD
Request antibiotics if suffers from frequent URTIs like flu or cold	37(9.6)	178(46.4)	70(18.2)	59(15.4)	40(10.4)	2.29	1.15
Preferring expensive antibiotics to accelerate the recovery from URTIs like flu or cold	45(11.7)	172(44.8)	80(20.8)	56(14.6)	31(8.1)	2.38	1.12
Buying antibiotics in private pharmacy when the physician refuses to prescribe them	47(12.2)	160(41.7)	31(8.1)	67(17.4)	79(20.6)	2.08	1.38
Change pediatrician and look for another one who can prescribe antibiotics for URTIs like flu or cold	65(16.9)	117(30.5)	41(10.7)	105(27.3)	56(14.6)	2.08	1.36
I feel unsatisfied with a Doctor's visit if no antibiotics prescribed for my child's URTIs	86(22.4)	118(30.7)	53(13.8)	80(20.8)	47(12.3)	2.30	1.34
Prefer giving antibiotics for child's flu or cold to prevent getting more serious illness	89(23.2)	189(49.2)	39(10.2)	33(8.6)	34(8.8)	2.69	1.18
Prefer giving antibiotics that may not be needed than waiting for recovery without them	69(18.0)	117(30.5)	61(15.9)	96(25.0)	41(10.6)	2.20	1.29
Antibiotics are safe, hence they can be commonly used for childhood URTIs	106(27.6)	97(25.3)	66(17.2)	65(16.9)	50(13.0)	2.38	1.38

Source: Primary data (2022), SD: *Strongly Disagree,* ***D:*** *Disagree,* ***U:*** *Undecided,* ***A:*** *Agree,* ***SA:*** *Strongly Agree,* ***StD:*** *Standard Deviation*

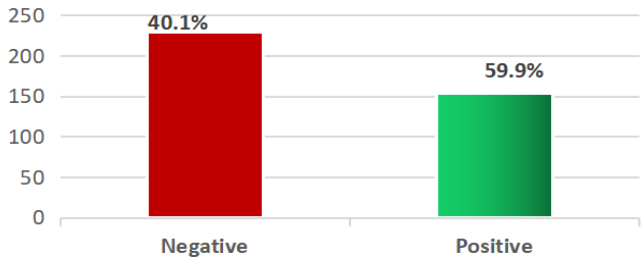

Figure 2: Level of parental attitude towards antibiotics use.

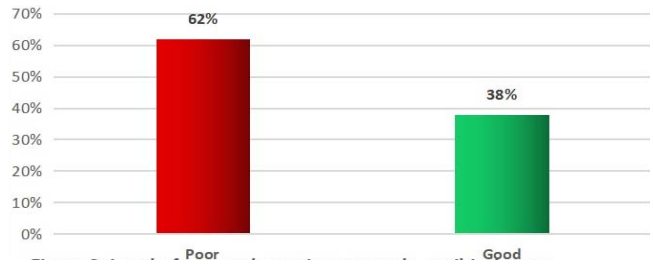

Figure 3: Level of parental practices towards antibiotics use.

Table 4: Parental practices regarding antibiotic utilization for childhood URTIs.

Statements	Yes	No
	N (%)	N (%)
To get a quick recovery of my child, I always give more antibiotics than the clinicians recommended.	173(45.1)	211(54.9)
I usually do not check expiry date of antibiotic before giving it to my child	233(39.3)	151(60.7)
I will stop giving antibiotics if I think my child is starting to recover	199(51.8)	185(48.2)
I reuse the remaining antibiotics when similar symptoms of URTIs are present (like Sneezing, runny nose, cough, sore throat)	173(45.1)	211(54.9)
I gave antibiotics without a prescription to my child who had a high fever a few days in the past	168(43.8)	216(56.2)
I usually store leftover antibiotics at home for a long period in case they may be needed in the future.	172(44.8)	212(55.2)
I use antibiotics more frequently if they are more widely available and less expensive	220(57.3)	164(42.7)

Source: *primary data (2022)*

prescribed for their children's URTIs while they were expecting to receive them. A big number (73.4%) of respondents expressed that they prefer giving antibiotics for child's flu or cold to prevent getting more serious illness.

Parental Level of Attitude towards Antibiotic Use

The maximum total score was 40 (100%), and minimum total score was 8 (20%). Parents with positive attitude were those who responded to all questions and scored at least at 28 (≥70%) and above; while those with negative attitude got 27 score or below (<70%).

The (Figure 2) demonstrates that more than half, (59.9%) of parents have negative attitudes towards antibiotic use while 40.1% of them have positive attitude.

Parental Practices regarding Antibiotic Utilization for Childhood URTIs

The third objective was to determine parents' practices towards antibiotics use for childhood URTIs and the researcher explored this by asking 7 practice-related questions as demonstrated in the (Table 4).

Based on the Table 4, 60.7% of respondents confirmed that they do not usually check expiry date of antibiotic before giving it to their children, 51.8% would stop giving antibiotics if they think their children start recovering from disease while 45.1% of them confirmed the reuse of remaining antibiotics when similar flu-like symptoms of URTIs are present among family members. Almost a half (44.8%) confirmed that they usually store leftover antibiotics at home for a long period in case they may be needed in the future while 57.3% confirmed that they antibiotics more frequently if they are more widely available and less expensive.

Parental Level of Practice regarding Antibiotic Use

Parents with good practice were those who responded to all

Table 5: Factors associated with practice of antibiotic use for childhood URTIs.

Variables		Level of parental practices		p-value
		Good, N (%)	Poor, N (%)	
Gender	Male	19(4.9)	25(6.5)	
	Female	127(33.1)	213(55.5)	0.455
Marital status	Single	4(1.0)	11(2.9)	
	Married or cohabiting	114(29.7)	199(51.8)	
	Divorced or Separated or Widow (er)	28(7.3)	28(7.3)	**0.026**
Number of children	1 child	77(20.1)	82(21.4)	
	2-4 children	61(15.9)	131(34.1)	
	5 or more children	25(6.5)	8(2.1)	**<0.001**
Ubudehe categories	Categories 1	13(3.4)	40(10.4)	
	Categories 2	95(24.7)	168(43.8)	
	Categories 3 &4	38(9.9)	30(7.8)	
Employment status	Employed	87(22.7)	37(9.6)	
	Not employed	72(18.8)	188(49.0)	**<0.001**
Educational level	Primary level	17(4.4)	157(40.8)	
	Secondary level	103(26.8)	59(15.4)	
	Higher education	26(6.8)	22(5.7)	
Health Insurance	None	2(0.5)	7(1.8)	**<0.001**
	Mutuelle de santé	69(18)	181(47.1)	
	RSSB (RAMA)	47(12.2)	38(9.9)	
	Other	28(7.3)	12(3.1)	**<0.001**
Level of Knowledge	Low level	32(8.3)	143(37.2)	
	Moderate level	73(19.0)	54(14.1)	
	High level	77(20.1)	5(1.3)	
Attitude	Negative	2 (0.5)	228 (59.4)	**<0.001**
	Positive	144 (37.5)	10 (2.6)	

p<0.05 is statistically significant

questions and scored at least at 5 (≥70%), corresponding to at least 5 out 7 possible appropriate responses; while those with poor practice got less than 5 score (<70%), corresponding to less than 5 out 7 possible appropriate responses.

The (Figure 3) demonstrates that a majority (62%) of respondents scored less than 70% of desired responses on practice towards AB use and was classified as demonstrating poor practice. On the other hand, 38% of respondents scored from 70% and above of desired responses and were classified as demonstrating good practice.

From the table 4.8, it was revealed that married or cohabiting parents with more than one child (p<0.026) parents belonging to ubudehe category 2 and above (p<0.001), employed parents (p<0.001) with secondary and university educational (p<0.001),parents with RSSB (RAMA) as HI (p<0.001),and parents with moderate and high level of knowledge of antibiotics (p<0.001), parents with positive attitude (p<0.0001) had significantly good practice towards antibiotics than their corresponding counterparts. However, the gender of the parents, age of parents did not have an effect on the level of parental practice or use of antibiotics.

Multivariate Analysis for Factors Aassociated with Aantibiotic Use for Childhood URTIs

Researchers also wanted to analyse the identified association between variables using logistic regression with (AOR, 95% CI and p-value) as showed in (Table 5).

Findings in the Table 5 indicate that there is a strong association between the fact of having 5 and more children where AOR=3.683, 95% CI=[1.062-12.771], p<0.046; being employed, where AOR=5.464, 95% CI=[1.870-15.969], p<0.002; being in ubudehe category 3 and 4 where AOR=2.840, 95% CI=[1.237-6.523], p<0.039, increased educational level (secondary and university) where AOR=0.855, 95% CI=[0.65-1.25], p<0.030 and AOR=4.371, 95% CI=[1.725-11.077], p<0.002 respectively with good parental practices regarding antibiotics utilization. Parents' high level of knowledge of antibiotics and positive attitude towards antibiotics had also statistically significant association with good practices on antibiotics where AOR=13.371, 95% CI=[3.604-49.617], p<0.001, and ARO=0.309, 95% CI=[0.96-0.489], p<0.001 respectively.

Discussions

The aim of the study was to assess parental knowledge, attitudes,

Table 6: Multivariate analysis for factors associated with antibiotic use for childhood URTIs.

Variables		AOR	95% CI	p-value
Marital status	Married or Cohabiting	Reference		
	Divorced or separated	1.2	0.642-1.745	0.125
Number of children	Widow (er)	0.82	0.245-1.445	0.253
	1 child	Reference		
	2-4 children	0.285	0.090-0.906	0.083
	5 or more children	3.683	1.062-12.771	**0.046**
Employment status	Employed	5.464	1.870-15.969	**0.002**
	Not employed	0.271	0.060-1.212	0.088
Ubudehe category	Ubudehe category 1	Reference		
	Ubudehe category 2	0.44	0.11-1.66	0.082
	Ubudehe category 3 or 4	2.840	1.237-6.523	**0.039**
Educational level	No formal education	Reference		
	Primary level	0.521	0.36-0.87	0.999
	Secondary level	0.855	0.65-1.25	**0.030**
	Higher education	4.371	1.725-11.077	**0.002**
Health insurance	None	Reference		
	Mutuelle de Santé	0.610	0.08-1.84	0.965
	RSSB(RAMA)	0.669	0.278-1.611	0.370
	Other private HI	0.553	0.281-1.085	0.085
Level of knowledge	Low knowledge	Reference		
	Moderate knowledge	1.272	0.313-5.163	0.736
	High knowledge	13.371	3.604-49.617	**<0.001**
Level of attitude	Negative	Reference		
	Positive	0.309	0.96-0.489	**<0.001**

Field data. ***AOR****:Adjusted Old Ratio****; CI****: Confidence Interval;* ***p-value****: probability value; p=<0.05 is* ***s****tatistically significant*

and practices on antibiotic use for children' Upper Respiratory Tract Infections URTIs) in Kicukiro District in Rwanda. Regarding knowledge of antibiotics, our study revealed that majority (40.4%) of parents had low level of knowledge of antibiotics use for childhood URTIs. Highlights on low levels were observed on not knowing indications of antibiotics, awareness of potential side effects and AMR concern. Many similar studies discovered the same concern especially in LMICs. For instance, our study revealed that more than three-quarter of parents don't know that antibiotics should not be given for all URTIs since most of them are of viral origin and self-limited. Similarly, a study conducted Nigeria revealed the same poor knowledge where only about 1 out 3 parents knew that antibiotics could not cure diseases caused by viruses [24]. Our findings are slightly less than what was found in Ethiopian (83%) [25], however, it was higher than findings from Peru (50.2%) and of Namibian (64%) [26,27].

In the current study, almost a three-quarter of parents were not aware of side effects that can be caused by antibiotic therapy. Not knowing potential side effects and other consequences of inappropriate use of antibiotics implies that parents can abuse antibiotics believing that there will be the replacement of ineffective antibiotics resulting from AMR. This also implies the need of health education on the usage of antibiotics among children and parental awareness on negative impact of their irrational use. Evidence from literature showed that antibiotics can produce side effects like gastrointestinal symptoms linked to gut flora disruption [28].

Regarding parental attitudes, our study indicated that slightly a half (59.9%) of parents had negative attitude towards antibiotics use among children suffering URTIs. The misconception were linked to poor knowledge of antibiotics where more than half would request antibiotics for their children's frequent URTIs with flu-like symptoms, (56.2%) would feel unsatisfied with doctors' visits if no antibiotics prescribed while 73.4% would prefer giving antibiotics for child's flu or cold to prevent getting more serious illness. Likewise, the study conducted in Nepal indicated that 88.2% of parents would change a physician if they were not prescribed an antibiotic whenever they were expecting to receive them from their physicians [29]. Similarly, according to [24], 92.9% of Nigerian parents had directly requested ABs and 84.3% of them agreed to have obtained them from physicians. Parent' attitudes and expectations can result in pressure on clinicians pushing them to prescribe unnecessary antimicrobial or leading cause of self-medication hence one of leading causes of antibiotic overuse worldwide [30]. Experts have proposed for simple education on antibiotic stewardship practices especially in resource-limited settings where misuse and overuse of antibiotics need to be reduced [24].

Regarding parental practices, our study revealed that the majority (62%) of parents have poor level practices regarding antibiotic use for childhood URTIs. Stopping antibiotics, using leftover and keeping antibiotics for long time for the future use were highlighted as indicators of parental poor practices. More than half of parents claimed that they would stop giving antibiotics if they think that their children start recovering from diseases, almost a half of them confirmed that they reuse the remaining antibiotics when similar flu-like symptoms of URTIs are present while 43.8% have given antibiotics to their children without medical prescription in the past few days prior to our study. Likewise, in the same vein, only 66.4% Ethiopian parents claimed to have completed the regimen of antibiotics and those parents claimed that they would give the leftover antibacterial, sharing them with others, and only bring their children to clinicians if there was no improvement [25]. On the other hand, 27.6% of Palestinian parents reused the leftover and shared antibiotics between their children, while 15% of Malaysian parents reused leftovers and 24% shared antibiotics [31]. According to the World Health Organization, the prevalence of self-medication varies between 2 and 20 per 100 respondents across nations in the European Union [9].

For factors associated with parental practices on antibiotic use, the current study discovered that having 5 and more children with AOR=3.683, 95% CI=[1.062-12.771], p<0.046; being employed with AOR=5.464, 95% CI=[1.870-15.969], p<0.002; advanced economic position (ubudehe category 3 and 4) with AOR=2.840, 95% CI=[1.237-6.523], p<0.039, increased educational level (secondary and university) where AOR=0.855, 95% CI=[0.65-1.25], p<0.030 and AOR=4.371, 95% CI=[1.725-11.077], p<0.002 respectively were strongly associated with good practices regarding antibiotics utilization. In addition, parents' high level of knowledge of antibiotics and positive attitude had also statistically significant association with good practices on antibiotics with AOR=13.371, 95% CI=[3.604-49.617], p<0.001, and ARO=0.309, 95% CI=[0.96-0.489], p<0.001 respectively. Similarly, evidence from literature, age, educational status, and socio-economic positions, have been hypothesized to determine the type of antibacterial awareness and usage [20]. Furthermore, it was discovered that there is a correlation between knowledge and attitudes and practices regarding antibiotics use [20,21], therefore, parental education should be a basic step towards better attitudes and practices [32].

Conclusion

Based on the study findings, it can be concluded that majority of parents have low level of knowledge of antibiotics, negative attitudes and poor practices on antibiotics use for childhood URTIs in Kicukiro District, Rwanda. Factors affecting parental practices regarding antibiotics use include number of children, education level, employment status, employment status and economic status. The lack of knowledge and negative attitudes are leading causes of unjustified request of antibiotics, use of leftover ABs, self-medication and interrupting the course of antibiotics among children suffering from URTIs which reflect the connection between knowledge, attitude and practices. Educational interventions for parents would reduce unnecessary antibiotic use and resistance by raising awareness on indications of antibiotics, their side effects and consequences of their inappropriate utilization which include AMR.

Recommendations

The study recommended that educational interventions for parents are needed to reduce antibiotics misuse by raising awareness on indications of antibiotics, their side effects and consequences of their inappropriate use including antimicrobial resistance. Findings of this study are important to guide policy formulation, that can limit the acquisition of antibiotics without prescription in our setting, planning and implementation of antibiotic use and AMR related programs, especially those targeting community-based awareness, education and sensitization. Clinicians should encourage parents to not use antibiotics without prescription in their children and warn them about potential side-effects and the emergence of antibiotic resistance. The priority target for health education should be young parents, parents with low level of education and parents in lower economic class among others.

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Limitations of the Study

This study can be generalized, as it was a cross-sectional study conducted only in Kicukiro District, one of 30 Rwandan Districts.

Authors' Contributions

NM conceptualized the study, HM supervised the study. NM performed data collection, data entry, and analysis. All authors contributed to the development, proofreading and approval of the final version of the manuscript.

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