Knowledge, Attitude and Practice on Antibiotic Consumption for Acute Respiratory Tract Infections of Community Residents in Quezon City*

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ABSTRACT

The main purpose of this study was to assess the knowledge, attitude, and practice on antibiotic consumption for acute respiratory tract infections on the community residents at Quezon City. This cross-sectional study was assessed through the use of an online questionnaire via Google Forms. Through snowball technique and Cochran sampling, a total of 385 participants were needed for this study. The link (URL) of the online questionnaire was disseminated via mobile chat applications (e.g., Messenger) and social media (e.g., Facebook) to the target respondents in April 2021 for one week. Male community residents in Quezon City with high educational attainment, age ranging from 26- 35, were most likely to practice self-medication. Significant correlations were found in knowledge and practice of antibiotic consumption of respondents ((r= -0.449, p-value of 0.000), attitude and knowledge ((r= -0.331, p-value of 0.000), and practice and attitude (r= 0.676, p-value of 0.000). The results obtained in this study demonstrate that residents of Quezon City had good knowledge, positive attitude, and appropriate practice towards antibiotic consumption for acute respiratory tract infections. However, minor gaps were also discovered due to misconceptions and misbeliefs on the use of antibiotics. Hence, these results indicate that public awareness of proper antibiotic use as well as the rise of antimicrobial resistance should be strengthened.

Key words: Antibiotics, acute respiratory tract infection

Antimicrobial Resistance (AMR) is a major health threat that risks the life of everyone. Aside from the increasing infections caused by microorganisms such as bacteria, viruses, parasites, and fungi, most of them also have the power to be capable of preventing antimicrobial drugs to inhibit or kill them. The overuse of antibiotics affects selection restrictions, leading to the development of resistance traits in bacterial populations. . This inappropriate use of antibiotics had led to the emergence of antimicrobial resistance. These scenarios alarmed important organizations especially the World Health Organization (WHO) and declared this resistance as a ―global public health concern. It is then crucial for this problem to be resolved as this may be accompanied with devastating consequences.

Several plans and actions were proposed and implemented starting with the investigation and analysis of the contributing factors for the growth of this resistance. Then, it was found out that the abuse and misuse of antimicrobials were the starting points of the resistance. In the Philippines, prescriptions and sales for antibiotics are unregulated and extensive, regardless of the current legal framework that defines and regulates the use of antibiotics. Even low-income people can afford to take cheap generic antibiotics without medical advice. Extensive use of antibiotics before and without medical advice can

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lead to a reduction in the production of pathogens in microbiological tests. This leads to misdiagnosis, poor monitoring of resistance, and delay in appropriate treatment. Improper use of antimicrobial drugs has been identified as the main driving force behind this resilience due to management and concerns of healthcare providers. Through these, the resistance keeps on spreading and the infections they cause emerge and strengthen.

Acute respiratory tract infections (ARTI) include common cold, acute uncomplicated bronchitis, and pharyngitis, and are the most common causes of prescribing antibiotics to adults worldwide. The frequent and inappropriate prescription of antibiotics for patients with ARTI is a major contributor to antibiotic resistance. Most of these infections are primarily caused by viral infections; hence, antibiotics may not be effective because these are to be used for bacterial infections. The insisting of antibiotics to these viral infections just leads to antibiotic resistance. In the Philippines, acute respiratory infection is the leading cause of morbidity as of 2018 based on a data from the Department of Health. Although they can still be treated with appropriate antimicrobial agents, most respiratory infections are self-limiting. Due to the lack of public knowledge, most of these infections are still treated with self- medication of antibiotics, brought by misconceptions about these treatments.

Accordingly, the goal of this study was to assess the knowledge, attitude, and practice (KAP) towards the use of antibiotics for acute respiratory tract infections among the community residents in Quezon City. It was used together with a cross-section related study design as presented by quantitative statistics. In addition to that, this study also aimed to: 1) identify the socio-demographic profile of the community residents in Quezon City in terms of their age, sex, educational attainment, employment, and monthly income; 2) know the sources of information that affect the knowledge, attitude, and practice on antibiotic consumption for acute respiratory tract infections; 3) correlate the socio-demographic profile on knowledge, attitude, and practice; 4) and associate knowledge, attitude, and practice towards each other. The findings and conclusions of this study can be used as an aid for future researches that will be dealing with antibiotic resistance. Therefore, it is imperative that this study was done in order to capacitate the occurring antibiotic stewardship programs which could eliminate antibiotic resistance in the future.

MATERIALS AND METHODS

This cross-sectional study used an online questionnaire via Google Forms. This was conducted in Quezon City which has largest population among the cities in the National Capital Region. The link (URL) of the online questionnaire was disseminated via mobile chat applications (e.g., Messenger) and social media (e.g., Facebook) to the target respondents in April 2021 for one week. Residents, who lived in Quezon City, had common colds, bronchitis, or pharyngitis and used antibiotics for these infections were eligible to participate. In addition, residents who were above 18 years up to 55 years of age regardless of the sex, educational attainment, employment, and monthly income were also allowed. Questions confirming the occurrence of the mentioned infections and usage of antibiotics were asked before the respondents were directed to the questionnaire page. The verification of age was in the 2nd part of the questionnaire.

The respondents were sampled using snowball technique. Professional and personal networks of the researchers were used to maximize participation. The estimation of sample size was through the use of Cochran sampling. This was appropriate to generate a minimum sample size required for very large and unknown populations. With a precision of 0.05, a total of 385 participants were needed for this study.

The investigators made the questionnaire in the national language (Filipino) with referencing to relevant literatures. It consisted of seven parts: i) consent form, ii) eligibility questions for the respondents, iii) socio-demographic profile (5 items), iv) sources of information for antibiotic consumption (1 item), v) knowledge on antibiotic consumption for acute respiratory tract infections (12 items), vi) attitude on antibiotic consumption for acute respiratory tract infections (10 items), and vii) practice on antibiotic consumption for acute respiratory tract infections (8 items). Responses in the knowledge were categorized into “true”, “false”, and “unsure”. In the attitude, it was measured based on a 5-point likert scale from “Strongly agree”, “Agree”, “Neither agree nor disagree”, “Disagree”, and “Strongly disagree”. 5-point likert scale were also used in the practice with the category of “Always”, “Often”, “Sometimes”, “Rarely”, and “Never”.

Prior to the proper data collection, the questionnaire underwent pre-testing on 30 random individuals from the general public to check clarity and understanding.

Comments from the respondents were gathered and further modifications were made. Cronbach's alpha was used to assess the reliability and validity of the questionnaire. The survey questionnaire's Cronbach's alpha for knowledge, attitude, and practice were 0.781682, 0.734818, and 0.75333, respectively. The tool demonstrated good internal consistency since the results are considered acceptable. The questionnaire was finalised after the pilot test.

Ethics approval was obtained from the Far Eastern University – Nicanor Reyes Medical Foundation – Institutional Ethics Review Committee (IERC) prior to the start of the study. Interviewed and examined participants accessed the online questionnaire through a unique URL. Participants were directed first to the consent form, which consists of details regarding the study prior to answering the questionnaire. All of them were informed that their participations were voluntary and their answers would be confidential. Those who disagreed to participate were directed to the exit page. Those who consented voluntarily and agreed to participate were directed to the online questionnaire. Each participant was expected to complete the questionnaire in 10 to 15 minutes. All responses were saved and destroyed only after the accomplishment of this study.

RESULTS

Socio-demographic Profile of the Respondents

The study had a total of 385 respondents, majority of whom (116 out of 385, 30.1%), were from the 26-35 years old bracket, mostly were male (60.5%) (Tables 1 & 2). Most of the respondents attained college education (244 out of 385, 63.4%), were employed (129 out of 385, 33.5%), and have a monthly income of below 10,000 (157 out of 385, 40.8%) (Tables 3 - 5).

Table 1. Respondents' frequency and percentage distribution in terms of age

Age	Frequency	Percentage (%)
18-25 years old	116	30.1
26-35 years old	122	31.7
36-45 years old	102	26.5
46-55 years old	45	11.7
Total	385	100

Table 2. Respondents' frequency and percentage distribution in terms of sex

Sex	Frequency	Percentage (%)
Male	233	60.5
Female	152	39.5
Total	385	100

Table 3. Respondents' frequency and percentage distribution in terms of educational attainment

Educational Attainment	Frequency	Percentage (%)
Does not attend school	18	4.7
Elementary	16	4.2
Junior High School	59	15.3
Senior High School	48	12.5
College	244	63.4
Total	385	100

Table 4. Respondents' frequency and percentage distribution in terms of employment status

Employment Status	Frequency	Percentage (%)
Employed	129	33.5
Self-employed	116	30.1
Unemployed	72	18.7
Student	68	17.7
Total	385	100

Table 5. Respondents' frequency and percentage distribution in terms of monthly income

Monthly Income	Frequency	Percentage (%)
Below 10, 000	157	40.8
11,000- 20,000	105	27.3
21,000- 30,000	79	20.5
31,000- 40,000	32	8.3
Above 40,000	12	3.1
Total	385	100

Table 6 shows that most respondents chose doctors (32.0%) as their main source of antibiotics.

Table 6. Sources of knowledge for antibiotic consumption of the respondents

Sources of Information	Frequency	Percentage (%)
Doctor	308	32.0
Nurse	131	13.6
Pharmacist	181	18.8
Old Prescription	91	9.4
Prescription of Family or Acquaintance with the Same Disease	68	7.1
Family	77	8.0
Commercials / TV Shows	61	6.3
Internet	46	4.8

Table 7. Have you ever had a cough, cold or sore throat?

Indicator	Frequency	Percentage (%)
Yes	385	100
No	-	-

Table 8. Have you used antibiotics (medicine for infections caused by bacteria) when you had a cough, cold, or sore throat?

Using Antibiotics	Frequency	Percentage (%)
Yes	385	100
No	-	-

Tables 7 and 8 show that all of the respondents (100%) participated in the study have acquired cough, colds, or sore throat, and have taken antibiotics for the stated infections.

Table 9 shows the frequency and % of participants who answered true, false, or no idea for each statement under knowledge. Seven out of 12 statements were correctly answered, 5 out of 12 were incorrectly answered by the majority of respondents. The highest accumulated percentage is 86.5% (TRUE) for the statement "Bacteria are the cause of colds", despite it being an incorrect statement. Interestingly, majority of the respondents (286 out of 385, 74.3%) were aware about antibiotic resistance, however, it has been shown that there were gaps in the knowledge of respondents regarding the difference of bacterial and viral infections, identification, as well as the proper use of antibiotics, which may contribute to the rise in antimicrobial resistance.

Table 9. Knowledge of the community residents about antibiotic consumption for acute respiratory tract infections

Knowledge	TRUE		FALSE		NO IDEA	
	N	%	N	%	N	%
1. Bacteria are the cause of colds.	333	86.5%	20	5.2%	32	8.3%
2. Dry cough without sputum is often the cause of the virus.	315	81.8%	31	8.1%	39	10.1%
3. Sore throat is a bacterial infection.	294	76.4%	34	8.8%	57	14.8%
4. Amoxicillin is an antibiotic.	314	81.6%	36	9.4%	35	9.1%
5. Salbutamol is an antibiotic.	209	54.3%	102	26.5%	74	19.2%
6. Antibiotics are only effective in infections caused by bacteria.	254	66.0%	54	14.0%	77	20.0%
7. Antibiotics speed up the recovery of a cold.	269	69.9%	65	16.9%	51	13.2%
8. It is not necessary to use antibiotics for cough caused by the virus.	209	54.3%	85	22.1%	91	23.6%
9. Antibiotic can be used only in sore throat if it can be proven to be caused by a bacteria.	232	60.3%	72	18.7%	81	21.0%
10. Antibiotic can be used in all types of infections.	222	57.7%	86	22.3%	77	20.0%
11. There is so -called antibiotic resistance which are bacteria that cause infection have the ability to destroy or nullify the effect of the antibiotic.	286	74.3%	49	12.7%	50	13.0%
12. Misuse of antibiotic is one of the causes of antibiotic resistance.	243	63.1%	77	20.0%	65	16.9%

(Statements in gray font are false or incorrect statements)

The majority of respondents agreed with the statements under attitude and conveyed a positive attitude, especially the statements about getting a prescription before obtaining antibiotics (highest mean score = 4.20) and not using antibiotics unless advised or recommended by a doctor (mean score = 4.10). Based on the current results, respondents have misconceptions about the price and effectiveness of drugs, are uncertain if it is okay or not to discontinue treatment even though the schedule has not yet been completed and believe that taking multiple antibiotics is more effective. (Table 10).

Respondents often carried out the correct practice when it comes to asking and listening to what doctors says about antibiotic use (mean score =4.12), consulting a doctor about an illness before taking an antibiotic for respiratory infections (mean score =4.03), and making sure to purchase an antibiotic with a prescription (mean score =4.19). The only statement that demonstrated poor practice was that they often distribute leftover antibiotics to family members or sick people. This incorrect practice of distributing leftover antibiotics was an indication of irrational drug use by patients, which may contribute to antimicrobial resistance (2016 Action Plan published by Celia Carlos, Research Institute for Tropical Medicine, DOH).

Age (r=-0.186, p=0.000, very weak negative correlation), employment status (r=0.118, p=0.020, very weak positive correlation) and monthly income (r=-0.170, p=0.001, very weak negative correlation) of the respondents have a significant relationship with regards to their knowledge on antibiotic consumption. While sex (r=0.073, p=0.150, very weak positive correlation) and educational attainment (r=-0.016, p=0.756, very weak negative correlation) showed no significance. (Table 12)

Age (r=0.293, p=0.000, weak positive correlation), educational attainment (r=-0.135, p=0.008, very weak negative correlation), employment status (r=-0.172, p=0.001, very weak negative correlation), and monthly income (r=0.263, p=0.000, very weak positive correlation) were significantly correlated with the respondents' attitude on antibiotic consumption, while only sex (r=0.036, p=0.479, very weak positive correlation) was found to be insignificant. (Table 13)

Age (r=0.255, p=0.000, very weak positive correlation), employment status (r=-0.183, p=0.000, very weak negative correlation) and monthly income (r=0.313, p=0.000, weak positive correlation) of the respondents have a significant relationship with regards to the respondents' practice on antibiotic consumption. While sex (r=-0.011, p=0.835, very weak negative correlation) and educational attainment

Table 10. Attitude of the community residents about antibiotic consumption for acute respiratory tract infections

Statement	Std. Deviation	Mean	Verbal Interpretation
1. There is no benefit to be gained from using of antibiotic for cold.	1.45	3.36	Neither Agree nor Disagree
2. Antibiotics should not be used for cough if it is not entirely a type of pneumonia.	1.09	3.88	Agree
3. Antibiotics are not the main cure for the disease in the throat.	1.01	3.91	Agree
4. Simple cough, cold, and sore throat will go away even if it is not used antibiotic.	0.99	3.96	Agree
5. Each antibiotic has a required prescription from a doctor.	0.92	4.20	Agree
6. If not advised by a doctor or not prescribed for antibiotic, it should not be used.	0.96	4.10	Agree
7. Antibiotics can give us side effects.	1.16	3.77	Agree
8. Use of antibiotic may be discontinued even if the full time or "schedule" that it requires is not yet done.	1.39	3.38	Neither Agree nor Disagree
9. The higher the price of the antibiotic, the more effective it is.	1.04	3.84	Agree
10. Drinking two or more antibiotics will be more effective and fast in the treatment of infection.	1.08	3.77	Agree
Overall	0.74	3.82	Agree

Legend: "Strongly Disagree (1.00-1.50)", "Disagree (1.51-2.50)", "Neither Agree nor Disagree (2.51-3.50)", "Agree (3.51-4.50)", "Strongly Agree (4.51-5.00)"

(r=-0.040, p=0.439, very weak negative correlation) showed no significance. (Table 14)

According to these findings, knowledge on antibiotic consumption is significantly correlated with the practice of the respondents (r= -0.449, p-value of 0.000), attitude on antibiotic consumption is significantly correlated with the knowledge of the respondents (r= - 0.331, p-value of 0.000), and practice on antibiotic consumption is significantly correlated with the attitude of the respondents (r= 0.676, p-value of 0.000), having positive and negative relationships.

Table 11. Practice of the community residents about antibiotic consumption for acute respiratory tract infections

Statement	Std. Deviation	Mean	Verbal Interpretation
1. Consults a doctor before using antibiotics for respiratory infections.	0.97	4.03	Often
2. Asks and listens to the advice and what the doctor says about antibiotic use in an illness or infection.	0.90	4.12	Often
3. Buys an antibiotic with a prescription from doctor.	0.89	4.19	Often
4. Finishes or completes the doctor's prescribed schedule for taking antibiotics.	1.03	4.05	Often
5. Feels relieved or the pain disappears when you drink of antibiotic for cold, cough or sore throat.	0.89	4.00	Often
6. Distributes remaining antibiotics to family members or other people sick.	1.26	3.57	Often
7. Complies with antibiotic policies stewardship program regarding proper antibiotic use.	1.18	3.61	Often
8. Participates in Antibiotic conducted platforms Stewardship Programs.	1.32	3.47	Sometimes
Overall	0.76	3.88	Often

Legend: "Never (1.00-1.50)", "Rarely (1.51-2.50)", "Sometimes (2.51-3.50)", "Often (3.51-4.50)", "Always (4.51-5.00)"

Table 12. Spearman Rank Correlation Test: Correlation between the respondents' knowledge on antibiotic consumption for acute respiratory tract infections and their socio-demographic profiles

	Knowledge				
Demographic Profile	Correlation Coefficient	Interpretation	p-value	Decision	Remarks
Age	-0.186	Very Weak Negative Correlation	0.000	Reject Ho	Significant
Sex	0.073	Very Weak Positive Correlation	0.150	Failed to Reject Ho	Not Significant
Educational Attainment	-0.016	Very Weak Negative Correlation	0.756	Failed to Reject Ho	Not Significant
Employment Status	0.118	Very Weak Positive Correlation	0.020	Reject Ho	Significant
Monthly Income	-0.170	Very Weak Negative Correlation	0.001	Reject Ho	Significant

Note: Reject Ho if p-value is less than or equal to 0.05, otherwise Failed to Reject Ho.

Table 13. Spearman Rank Correlation Test: Correlation between the respondents' attitude on antibiotic consumption for acute respiratory tract infections and their socio-demographic profiles

	Attitude				
Demographic Profile	Correlation Coefficient	Interpretation	p-value	Decision	Remarks
Age	0.293	Weak Positive Correlation	0.000	Reject Ho	Significant
Sex	0.036	Very Weak Positive Correlation	0.479	Failed to Reject Ho	Not Significant
Educational Attainment	-0.135	Very Weak Negative Correlation	0.008	Reject Ho	Significant
Employment Status	-0.172	Very Weak Negative Correlation	0.001	Reject Ho	Significant
Monthly Income	0.263	Very Weak Positive Correlation	0.000	Reject Ho	Significant

Note: Reject Ho if p-value is less than or equal to 0.05, otherwise Failed to Reject Ho.

Table 14. Spearman Rank Correlation Test: Correlation between the respondents' practice on antibiotic consumption for acute respiratory tract infections and their socio-demographic profiles

	Practice				
Demographic Profile	Correlation Coefficient	Interpretation	p-value	Decision	Remarks
Age	0.255	Very Weak Positive Correlation	0.000	Reject Ho	Significant
Sex	-0.011	Very Weak Negative Correlation	0.835	Failed to Reject Ho	Not Significant
Educational Attainment	-0.040	Very Weak Negative Correlation	0.439	Failed to Reject Ho	Not Significant
Employment Status	-0.183	Very Weak Negative Correlation	0.000	Reject Ho	Significant
Monthly Income	0.313	Weak Positive Correlation	0.000	Reject Ho	Significant

Note: Reject Ho if p-value is less than or equal to 0.05, otherwise Failed to Reject Ho.

Correlations of the knowledge, attitude, and practice towards each other based from the community residents

	Knowledge				
Indicator	Correlation Coefficient	Interpretation	p-value	Decision	Remarks
Practice	-0.449	Weak Negative Correlation	0.000	Reject Ho	Significant

Note: Reject Ho if p-value is less than or equal to 0.05, otherwise Failed to Reject Ho

Attitude					
Indicator	Correlation Coefficient	Interpretation	p-value	Decision	Remarks
Knowledge	-0.331	Weak Negative Correlation	0.000	Reject Ho	Significant

Note: Reject Ho if p-value is less than or equal to 0.05, otherwise Failed to Reject Ho.

Practice					
Indicator	Correlation Coefficient	Interpretation	p-value	Decision	Remarks
Attitude	0.676	Moderate Positive Correlation	0.000	Reject Ho	Significant

Note: Reject Ho if p-value is less than or equal to 0.05, otherwise Failed to Reject Ho.

DISCUSSION

Cough, colds, and sore throat are some of the most common acute respiratory tract infections that afflict majority of people. These infections are mostly misunderstood and erroneously treated with antibiotics as they are believed to be caused by microorganisms. Bronchitis, common cold, and pharyngitis are viral infections in which antibiotics will not be effective. But with the improper knowledge and beliefs of some community residents, antibiotics are still being used for these infections.

In the current study, most of the respondents were male (60.5%), due to the reason that this research focuses on respiratory tract infections and it was found in a study by Falagas, et al., (2007)[1] that men are more susceptible to acute respiratory tract infections than women, and that male cases are also more severe, with the exception of sinusitis, otitis externa, and tonsillitis, which are more common in women. It is shown that most of the respondents' ages ranged from 26-35 years old, most of them attained college (63.4%), 129 of the respondents are employed and the majority of them earn less than 10,000 PHP per month. These socio-demographic characteristics of the respondents in Quezon City can be an indicator for practicing self-medication. According to a study by Jansen et al. in Netherlands (2018), people with a higher level of education have better health literacy, making them more aware of their own health and safety. However, a study conducted in Iraq by Ahmed, et al. (2016), contradicts the result of the previous study, stating that despite having a better understanding of their health, people with higher educational attainment are more prone to the practice of self-medication because people with higher educational attainment appear to believe that they are educated enough about certain illnesses and medications, to the point where they are more confident with their own research rather than the advice of doctors. In addition, a recent study published in 2019 by Ekambi, et al. claimed that men often self- medicate by obtaining antibiotics without a prescription from doctors, perhaps because men are busier because they are more likely to have steady activity as a result of their employment, they have less time to see doctors, while women have more time going to the doctor and consulting, given that most women stay at home. Justifying the statement that males consume more antibiotics (209) than females (193) and that males often self- medicate(11).

Moreover, community residents with low income are more prone with the practice of self-medication for a variety of reasons: 1) cannot afford a doctor's appointment due to financial difficulty, so they do not consult with physicians before obtaining antibiotics to save money[2] 2) cannot afford a doctor's consultation due to insufficient income, so they tend to ask their neighbours or relatives for leftover antibiotics.[3] Other factors related to self-medication of low-income residents are not completing the full course of treatment once they feel better or due to financial reasons, and recycling prescriptions or prescription sharing; this can be explained using the concept of "hiyang" in the Philippines. According to a study by Emmanuel Dy[4] titled "Inappropriate Antibiotic Use in the Philippines", hiyang is described as "when a medication is perceived as

useful or effective for a particular patient's illness, resulting in its repeated use", since the individual who took the antibiotic first is "hiyang" with the medication, most antibiotic consumers depend on the advice of others that an antibiotic would also work on them. Often, people who are normally "hiyang" with an antibiotic stop using it after their symptoms have subsided.

It was also noted in the current study, that doctors were the main source of antibiotics in Quezon City, which is consistent with the past studies conducted by Zyoud, et al. in Palestine (2015)[3]; Nair, et al., in India (2019), Voidazan, et al., in Romania (2019), and Pavyde, et al., in Lithuania (2015). Pharmacists, also known as "drug experts", were also the most common source of information about antibiotics in addition to doctors. Pharmacists play a crucial role in helping people better understand antibiotic usage and resistance. In fact, pharmacists' roles provided by World Health Organization in a guideline for the training about reducing antimicrobial resistance are as follows: 1)provide accurate and comprehensive information about the correct use of antibiotics[5], 2)educate and counsel patients about proper drug use and treatment compliance, as well as possible adverse effects and side effects[6], 3)perform therapeutic drug monitoring[7], 4) track antibiotics supply and encourage patients to finish the prescribed course of medicine. Supporting the claim that pharmacists may help reduce antimicrobial resistance, a number of studies from around the world have yielded concrete evidence: A study by Northey, et al. in Australia (2014) found that after a pharmacist and patient verbal education about antibiotics, awareness about antibiotics improved (p value= 0.008) as compared to patients who did not obtain any verbal education about antibiotics; a study by Magendanz, et al. in Brazil (2012), showed that implementing an Antibiotic Stewardship Program (which involves pharmacists in the team), hospital antibiotic costs decreased(69%), while patient adherence increased by 64.1%; a study conducted by Brink, et al. in South Africa (2017), found that including a pharmacist in a post-intervention increased patient compliance from 66.8% to 83.3% (24.7% increase) and improved patient outcomes; and in a study conducted by Zhou, et al. in China (2015), pharmacist involvement in antibiotic stewardship programs resulted in significant reductions in antibiotic usage (from 100% to 7%), overall drug use (down by 58.8%), and total antibiotic cost (decreased by 27.7%).

Knowledge

Majority of the respondents were also knowledgeable about antibiotic consumption since 7 out of 12 statements were answered correctly, however, the respondents' other incorrect knowledge may still cause irrational antimicrobial use, that can attribute to the overuse and misuse of antibiotics. "Bacteria are the cause of colds" (86.5%) got the highest percentage, making it the truest statement for the respondents, despite the fact that it is false since bacteria do not cause colds, indicating that the majority of respondents are unaware that a common cold is a viral infection caused by rhinoviruses.[8] The current study also shows that respondents are uncertain of the medications (which are considered antibiotics and which are not), as 54.3% of respondents answered true to the statement "Salbutamol is an antibiotic," despite the fact that it is a form of medication known as a bronchodilator that helps asthma or COPD patients with their breathing difficulties.[9] Apparently, the majority of respondents (57.7%) believe that "antibiotics can be used in all types of infection" and that "antibiotics speed up the recovery of a cold" (69.9%). These results are similar to the study done by Aljayyousi, et al., in Qatar (2019), where approximately 60% of respondents said that antibiotics help them recover faster from coughs and colds[10]; in a study by Zulu, et al., in University of Zambia (2020), half of the students (50%) mentioned that antibiotics help them recover faster from a cold[11] and in a study by Crucis, et al. in San Jose Del Monte, Bulacan (2019), 62.75% of respondents said that antibiotics help them to recover from a cold.[2]

Furthermore, despite the fact that 243 out of 385 respondents correctly answered that "misuse of antibiotics is one of the causes of antibiotic resistance", and 63.1% are aware of the rise in antibiotic resistance[12]. They are unaware of what antibiotics to use as well as how it would affect their lives due to a lack of public information that would have corrected their beliefs. The respondents' incorrect knowledge contribute to the overuse and misuse of antibiotics, endangering the efficacy of antibiotics eventually adding up to the antibiotic crisis occurring worldwide, which may lead to AMR.[13] As long as this issue is not resolved, the misuse of antibiotics and rise in antimicrobial resistance will continue.

Attitude

In general, people in the community agreed with the statements under attitude and conveyed a positive attitude towards getting a prescription from a doctor before obtaining antibiotics (highest mean score = 4.20) and not using antibiotics unless recommended or advised by a doctor (mean score =4. 10). This indicates that the respondents are aware that antibiotics would not be distributed without a doctor's prescription.[14] However, result shows that residents in Quezon City agree on the misconception that "the higher the price of the antibiotic, the more effective it is." A majority of respondents (75.82%), in a similar study in San Jose Del Monte Bulacan, also believe that the more costly antimicrobials are, the more effective they would be.[2] Generic and branded medications are often misunderstood by Filipinos; consumers prefer branded drugs, which are typically more costly, over generic drugs because they believe the quality of the medication is linked to its price as well as its efficacy, which is a misconception (Shrank et al.). According to an online article written by Stephanie Nera, RPh, PharmD (2020), some of the common misconceptions about generic and branded drugs among Filipinos are as follows: 1) Generic drugs are less effective than branded drugs, 2) branded drugs have better ingredients due to their higher price, 3) branded drugs are of higher quality, and 4) branded drugs work faster than generic drugs. Debunking the misconception that branded medications are superior to generic drugs, as per FDA regulations[15], a generic drug must be 1) bioequivalent to its branded counterpart (same form, dose, strength, safety, and route of administration), thereby resulting in same efficacy and risk-benefit ratio; 2) must contain the same active ingredient and follow the same standards; 3) must undergo series of tests and should be manufactured in compliance with current GMPs. Filipinos should also be aware of Republic Act No. 6675, also known as Generics Drugs Act of 1988, which is "an act to promote, require, and ensure the production of an adequate supply, distribution, usage, and acceptance of drugs and medicines identified by their generic names".[16] This legislation was enacted in order to make medications more available for low-income patients while maintaining the same efficacy and consistency as the more expensive drugs. In addition, the majority of respondents incorrectly assume that treating an infection with two or more antibiotics will be more effective and fast but taking two or more antibiotics has shown no benefit of synergism, and it could only raise the drug's side effects, according to a 1960 article in Br Med J regarding antibiotic combinations, discrediting the respondents' incorrect assumption.[17]

Practice

According to the present study, almost all of the statements under practice were often carried out by respondents, especially when it comes to asking and listening to what doctors say about antibiotic use (mean score =4.12), consulting a doctor about an illness before taking an antibiotic for respiratory infections (mean score =4.03), and making sure to purchase an antibiotic with a prescription (mean score =4.19). Disturbingly, the statement "distribute remaining antibiotics to family members or other people who are sick" (mean score =3.57) was also often done by most of the respondents. Another study conducted by Barber, et al.[18] in Central Visayan Region, Philippines (2016) with a similar population, found that residents saved unused antibiotics for later use (77%), shared them with others (5%), and just threw them away (18%). The antibiotics were also often shared with family members (37%), children (33%), and neighbours (18%) in the same study; others include elderly family members, spousal partners, and others.[18] The Philippines had one of the highest rates of antibiotic sharing in the world because of this practice, which was particularly prevalent in low-income areas.[18] Prescription sharing and self-prescription were also indicators of irrational drug usage by patients that can lead to antimicrobial resistance, in addition to poor adherence and treatment interruptions, according to the 2016 Action Plan published by Celia Carlos (Research Institute for Tropical Medicine, Department of Health).[18] Non-compliance with antibiotic treatment contributes to antibiotic resistance, as well as a rise in the disease's economic cost, but when people follow their prescribed drug regimen, there is a significant reduction (15%) in medical costs (Dr. Wu et al. in Ohio, 2011). Antibiotic sharing and self- medication (58% in Philippines, 38% globally) are major factors to antimicrobial resistance, yet leftover antibiotic sharing is widespread in the Philippines and other countries.

Correlation of Sociodemographic Profile of Respondents and their Knowledge, Attitude and Practice in Antibiotic Consumption

Correlations among the socio-demographic profile and knowledge, attitude, and practice on antibiotic consumption for acute respiratory tract infection of community residents in Quezon City are described as very weak negative, very weak positive, and weak positive. For knowledge: significant correlations are age (r=-0.186, p=0.000, very weak negative correlation), employment status (r=0.118, p=0.020, very weak positive correlation) and monthly income (r=-0.170, p=0.001, very weak negative correlation); for attitude: significant correlations are age (r=0.293, p=0.000, weak positive correlation), educational attainment (r=-0.135, p=0.008, very weak negative correlation), employment status (r=-0.172, p=0.001, very weak negative correlation), and monthly income (r=0.263, p=0.000, very weak positive correlation); for practice: significant correlations are age (r=0.255, p=0.000, very weak positive correlation), employment status (r=-0.183, p=0.000, very weak negative correlation) and monthly income (r=0.313, p=0.000, weak positive correlation). In a study by Nepal, et al., (2019),[20] people with a high level of education are more likely to have a good attitude about antibiotic use. This may be because they have access to information about antibiotics and antibiotic resistance, making them more mindful of how to take an antibiotic and when to stop taking it. Poor compliance, on the other hand, may be caused by a lack of awareness as a result of low educational attainment; less knowledge results to less appropriate attitudes and poor practices regarding the appropriate use of antibiotics. People who are well-informed about antibiotics will often know what behaviours to observe, such as finishing the course or schedule of antibiotic therapy, not taking antibiotics until recommended by a doctor, and not treating an infection with two or more antibiotics. Since, it was mentioned in a study by Jansen, et al. in Netherlands (2018), people who are literate when it comes to health knows the do's and don'ts in medication use. However, employment status and monthly income are important factors in community residents' antibiotic consumption knowledge, attitude, and practice. Even those who are well educated and intend to adopt a positive attitude and good practices when it comes to antibiotic use are unable to do so due to financial reasons, such as a low income that prevents them from affording a complete course of antibiotics, resulting to poor medication adherence. According to a similar study population by Crucis, et al., the majority of the respondents (73.2%) have an annual income of less than PhP38,000, making it difficult for them to adhere to the recommended antibiotic regimen due to its high cost. Respondents of the same study self-medicate instead of paying for a doctor's visit and purchasing a complete course of antibiotics to save money. Poor antimicrobial use practices are also listed in the same report, considering the fact that the residents are not well-off in terms of economic status, educational attainment, or financial income.[2] When it comes to age as a significant factor, it has been stated that older generations lack information about antibiotics and their uses. Adults were also found to be more troubled, with misinterpretations about the purpose and classification of antibiotics, as opposed to younger generations, who have better understanding, attitudes, and practices about antibiotic usage.

Correlation of Knowledge, Attitude and Practice to Each Other

According to present findings, knowledge on antibiotic consumption is significantly correlated with the practice of the respondents (r= -0.449, p-value of 0.000), attitude on antibiotic consumption is significantly correlated with the knowledge of the respondents (r= - 0.331, p-value of 0.000), and practice on antibiotic consumption is significantly correlated with the attitude of the respondents (r= 0.676, p-value of 0.000), having positive and negative relationships. Other studies that used same statistical test showed different result when it comes to the correlation of attitude to knowledge, and knowledge to practice. A study done by Huang, et al. in China (2013)[21] and Awad, et al. in Kuwait (2015)[22] found similar findings, indicating that knowledge is positively associated with respondents' attitudes, meaning an adequate knowledge will lead to appropriate attitude towards antibiotic use. While a study by Sirijoti, et al. in Thailand (2014) found a substantial weak positive correlation (r=0.474, p=0.001) between knowledge and practice, and the result of the correlation between their respondents' attitude and practice was found to have a moderately positive correlation, similar to the present study result.

The differences between the results of the current study and past studies can be attributed to different

socio-demographic factors (age, sex, educational attainment, employment status, and monthly income) of the respondents. The respondents' high educational attainment is likely to be the major contributing factor in the negative correlation between knowledge and practice, as well as their attitude to practice. Even if an individual has the required knowledge to exhibit positive attitudes and good practices regarding antibiotic use, as mentioned in a previous study by Ahmed, et al. in Iraq (2016), it is still possible for them to manifest the opposite. Instead of exhibiting positive attitudes and good practices when it comes to antibiotic use, what has happened is that they have become more confident in their knowledge of antibiotics and have stopped following doctors' advice, resulting in self- diagnosis and self-medication, all of which are considered poor attitudes and practices. Individuals who are knowledgeable about antibiotic use, according to Ekambi, et al., have a very high risk of self-medicating when they are males under 35 years old, implying that the current study's respondents can really exhibit poor attitude and practice despite their high educational attainment.

Significant relationships between knowledge, attitude, and practice can also be explained using Martin Fishbein and Icek Ajzencan's Reasoned Action Theory, which states that a person's belief can lead to their intention to demonstrate a certain attitude, which will then be a motivation to comply with an outcome. This means that having a high level of knowledge leads to having a high level of attitude and practice when it comes to antibiotic use, while having a low level of knowledge leads to having a low level of attitude and practice.

Limitations of the Study

There are a few limitations to this study. To begin with, since the authors only used a small sample size and only included three types of infections (cough, colds, sore throat), the findings should not be generalized to the entire population of Quezon City. Further research with larger sample sizes and additional types of infection, as well as respondents per location in Quezon City, is needed to obtain a greater understanding of their knowledge, attitudes, and practices regarding antibiotic use for acute respiratory tract infections. Another concern is that the sampling method used was snowball sampling, which is prone to sampling bias since the initial respondents were people the authors knew, and no attempt was made to obtain a random sample. Future researchers may use a variety of sampling methods to eliminate the possibility of sampling bias.

CONCLUSION

Misinterpretations regarding antibiotics as treatments to all kinds of infections such as ARTIs have led to the misuse and overuse of antibiotics that result to antimicrobial resistance (AMR). Unregulated and extensive consumption of antibiotics occurs in communities. Accordingly, the goal of this study was to assess the knowledge, attitude, and practice (KAP) towards the use of antibiotics for acute respiratory tract infections among the community residents in Quezon City. The results obtained in this study demonstrate that residents of Quezon City had good knowledge, positive attitude, and appropriate practice towards antibiotic consumption for acute respiratory tract infections. However, minor gaps in their knowledge were discovered as a result of misconceptions, with social media influence and lack of public information playing major roles. Despite having a positive attitude, there were a number of misunderstandings about the relationship of antibiotics to their pricing, quality, and efficacy, and misbeliefs about the effects of discontinuation of antibiotic treatment were noted. Furthermore, antibiotic sharing is common in the population, which is considered to be an indicator of irrational drug use by patients, that also contributes to antimicrobial resistance. Information gaps, incorrect behavioural trends, and inappropriate practices among community residents in Quezon City were exacerbated by other factors such as their educational attainment and financial capacities. Hence, these results indicate that public awareness of proper antibiotic use as well as the rise of antimicrobial resistance should be strengthened. Focusing on community residents' evident misconceptions and incorrect assumptions will help to improve their level of knowledge, attitude, and practice, which can also contribute to minimize the global antimicrobial resistance crisis.

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