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RESEARCH ARTICLE

Knowledge and Perceptions Regarding the use of Antibiotics and Self-diagnosis: A Comparative Study of the Urban and Suburban Communities in Karawang, Indonesia

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Abstract:

Background:

To avoid antibiotic resistance, acute respiratory infections (ARIs) require the use of appropriate antibiotics. As a result, having the appropriate knowledge and perceptions is critical for achieving successful clinical outcomes.

Objective:

The purpose of this study was to determine the relationships and differences in knowledge and perceptions about antibiotics and ARI in urban and suburban communities in the Karawang Regency of West Java Province, Indonesia.

Methods:

We used a validated questionnaire approach to conduct a cross-sectional study in primary health care facilities. We surveyed 440 respondents from urban areas and 464 respondents from suburban areas.

Results:

Respondents in both urban and suburban areas agreed that self-diagnosis should not be used to prescribe antibiotics. False knowledge and perceptions about antibiotic use were more prevalent in suburban respondents than urban respondents. Additionally, a significant correlation between education levels and knowledge and perception was observed in both areas. Furthermore, significant correlations between age and occupation, as well as knowledge and perceptions, were identified in urban areas.

Conclusion:

Our study suggests that additional efforts are needed to increase awareness and ensure appropriate antibiotic use in the community.

Keywords: Acute respiratory infections, Antibiotics, Knowledge, Perceptions, Urban, Suburban areas.

Article History

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1. INTRODUCTION

In 2013, the prevalence of acute respiratory infection (ARI) was approximately 25% [1], and the incidence of ARI in West Java Province, Indonesia's most populous province, is

currently the highest among other diseases, with a prevalence of 33.44% in the Karawang Regency [2]. According to the data from disease eradication programs, there were 14,397 patients diagnosed with ARI in Karawang Regency in 2014 and 175,891 in 2016 [3]. Even without a prescription, antibiotic use is common in patients with respiratory tract infections [4]. Increased antibiotic consumption in patients with ARI results in a 50%–100% increase in excessive and irrational antibiotic

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use in various countries [5]. Additionally, antibiotics comprised 33% of the total prescriptions that were prescribed to outpatients at Abepura General Hospital [6]. It is, therefore, critical to evaluate inappropriate and excessive antibiotic use to avoid drug resistance, as 90% of antibiotics used were amoxicillin, ciprofloxacin, and cefadroxil [7]. This is because improper antibiotic use can increase mortality, morbidity, and financial costs while contributing to antibiotic resistance [8]. This is a major global concern and a persistent problem in several developing countries, including Indonesia [9, 10], where 84% of hospitalized patients are prescribed antibiotics, with 46% of the prescription being inappropriate [11].

Antibiotic misuse indicates a general lack of education and knowledge on the subject [12]. Knowledge regarding antibiotics has been found to be significantly associated with demographic characteristics such as gender, race, education level, and health care occupation [13]. In comparison, inadequate antibiotic knowledge has been associated with inappropriate and erroneous antibiotic use behaviors and perceptions regarding ARI [14]. Additionally, education, occupation, age, interests, experiences, culture, and information have the potential to improve knowledge [15].

The purpose of this study was to examine the relationships and differences in knowledge and perception regarding antibiotics for ARI in urban and suburban communities in the Karawang Regency of Indonesia.

2. METHODS

2.1. Study Design

2.1.1. Knowledge and Perception Regarding Antibiotics - Measurements

The data was collected using questionnaires adapted from Fredericks *et al.*'s study [14]. Validation of the questionnaire indicated that all items had a validity coefficient > 0.30 , a p -value < 0.05 , and Cronbach's alpha coefficient > 0.700 ,

indicating that our approach was reliable and valid. The research collected data on the demographics, knowledge, and perceptions of respondents.

2.2. Statistical Analysis

A univariate analysis was performed to evaluate respondents' demographics, knowledge, and perceptions. Bivariate analysis was used to determine the differences and correlations between these variables. The Kolmogorov-Smirnov test was used to determine the data normality, and the Chi-square test was used to determine the group differences. Furthermore, the Kruskal Wallis test was performed to determine potential correlations between groups regarding antibiotic knowledge and perceptions.

3. RESULTS

3.1. Respondent Demographics

As indicated in Table 1, the following demographic variables were collected: gender, age, education level, occupation, income, and health insurance status. The highest percentage of respondents was females ($p > 0.05$). The age group of 25–44 years had a significantly higher response rate ($p < 0.05$). In urban areas, the highest percentage of respondents (42.05%) had completed senior high school, compared to suburban areas, where the highest percentage (56.03%) had completed elementary school ($p < 0.05$). This report corroborates the findings of the 2015 Karawang Performance Report, which indicated that the level of education in Karawang is quite low (elementary school level). According to Indonesian statistics from 2015, people over the age of ten with a lower or elementary school education or equivalent made up 57.92% of the total population (1,094,940 out of 1,890,426 people) [16, 17]. Urban and suburban respondents had significantly different occupations and incomes ($p < 0.05$), with respondents in urban areas having significantly higher incomes than those in suburban areas.

Table 1. Urban and suburban respondent demographics in Karawang Regency.

Characteristics	Urban (n = 440)		Suburban (n = 464)		p
	n	%	n	%	
Gender					0.328
Female	299	68.0	300	64.66	
Male	141	32.0	164	35.34	
Age					0.002
18–24 years	81	18.41	53	11.42	
25–44 years	238	54.09	244	52.59	
45–54 years	69	15.68	119	25.65	
55–64 years	32	7.27	32	6.90	
65–74 years	16	3.64	14	3.02	
>75 years	4	0.91	2	0.43	

(Table 1) contd.....

Characteristics	Urban (n = 440)		Suburban (n = 464)		p
	n	%	n	%	
Education level					0.000
Not completed primary school	0	0	21	4.53	
Elementary School	101	22.95	260	56.03	
Junior High School	111	25.23	94	20.26	
Senior High School	185	42.05	77	16.59	
Vocational School	21	4.77	8	1.72	
Bachelor and Postgraduate Degree	18	4.09	4	0.86	
Others	4	0.91	0	0	
Occupation					0.000
Student	8	1.82	2	0.43	
Teacher/Lecturer	11	2.50	4	0.86	
Private employee	68	15.45	23	4.96	
Employer/Self-Employed	74	16.82	65	14.01	
Civil servant/Police/Military	10	2.27	3	0.65	
Not working	242	55.00	251	54.09	
Laborer	0	0	58	12.50	
Others	27	6.14	58	12.50	
Monthly Income					0.000
≤ 85.99 USD	151	34.32	264	56.90	
85.99–240.76 USD	179	40.68	155	33.41	
≥ 240.76 USD	110	25	45	9.70	
Health insurance					0.363
Yes	265	60.2	291	62.72	
No	175	39.8	173	37.28	

3.2. Antibiotics Knowledge and Perception

Table 2 shows the respondents’ knowledge and perception of ARI. We observed differences in knowledge and perceptions between urban and suburban areas ($p < 0.05$) that were related to physicians’ diagnoses before antibiotic use. Furthermore,

our results showed that there was no statistically significant difference in knowledge and perception regarding what constitutes a correct therapy ($p > 0.05$). We also categorized respondents into groups (Table 2) based on their knowledge and perceptions related to self-diagnosis or non-self-diagnosis and correct or incorrect self-diagnosis (Fig. 1).

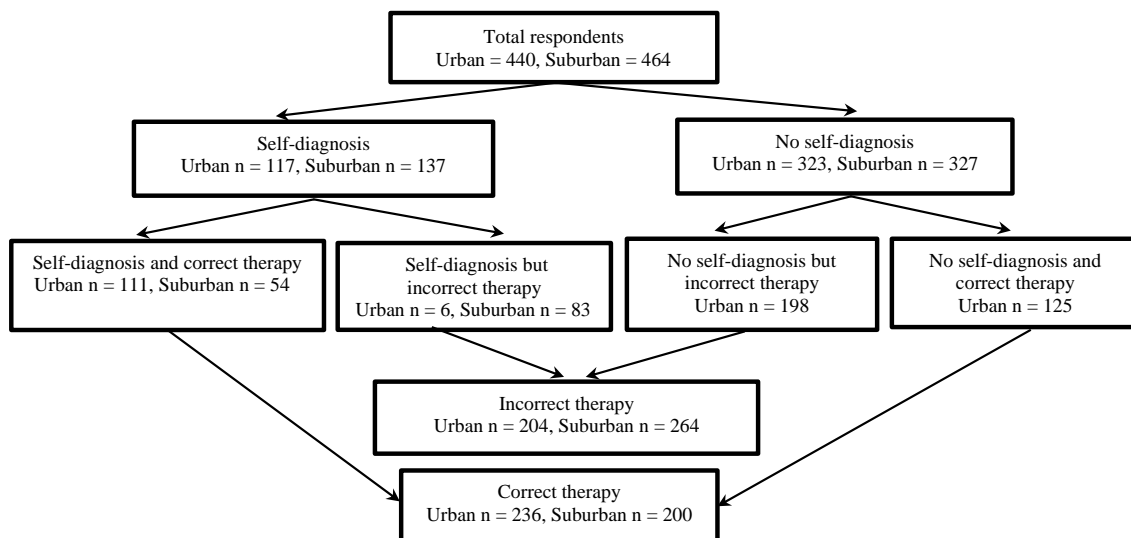


Fig. (1). Respondents’ distribution based on knowledge and perception.

We also recorded data on incorrect ARI knowledge and perceptions from 204 and 264 respondents in urban and suburban areas, respectively, whereas correct ARI knowledge and perceptions were identified in 236 and 200 respondents, respectively, thus highlighting significant differences between

urban and suburban areas ($p < 0.005$). Table 3 demonstrates differences in knowledge and perception regarding self-diagnosis or non-self-diagnosis in urban and suburban areas (Table 3).

Table 2. Knowledge and perception of respondents regarding antibiotics.

Statement	Area	Responses and number of respondents (percentages)					p-value
		Strongly agree	Agree	Not sure	Disagree	Strongly disagree	
I know I need antibiotics before I visit my doctor*	Urban (n = 440)	12 (2.73%)	105 (23.86%)	41 (9.32%)	271 (61.59%)	11 (2.5%)	0.000
	Suburban (n = 464)	15 (3.23%)	122 (26.29%)	49 (10.56%)	195 (42.03%)	83 (17.89%)	
I will recover faster if I take antibiotics when I have a cold or flu ⁺	Urban (n = 440)	97 (22.05%)	180 (40.91%)	48 (10.91%)	102 (23.18%)	13 (2.95%)	0.310
	Suburban (n = 464)	88 (18.97%)	176 (37.93%)	50 (10.78%)	136 (29.31%)	14 (3.02%)	

*Knowledge and perception statements of self-diagnosis or no self-diagnosis ⁺Knowledge and perception statements that are correct or incorrect

Table 3. Differences in knowledge and perception in respondent groups.

Respondent Groups		I know I need antibiotics before I visit my doctor*		I will recover faster if I take antibiotics when I have a cold or flu ⁺		Antibiotics cure most bacterial infections		Antibiotics cure all viral infections		Antibiotics have side effects		Resistant bacteria are difficult to treat with antibiotics		Resistant bacteria are found in hospitals and the general public	
		Urban	Sub Urban	Urban	Sub urban	Urban	Sub urban	Urban	Sub urban	Urban	Sub urban	Urban	Suburban	Urban	Suburban
Self-diagnosis	Mean ± SD	-	-	22.82 ± 11.73	24.82 ± 12.13	23.50 ± 10.53	20.15 ± 8.31	24.70 ± 10.63	23.80 ± 8.92	29.06 ± 10.34	33.58 ± 11.16	24.96 ± 12.84	28.39 ± 11.00	24.79 ± 11.42	25.62 ± 9.92
No self-diagnosis	Mean ± SD	-	-	24.98 ± 11.43	26.42 ± 11.63	25.51 ± 9.75	21.87 ± 8.09	26.47 ± 8.66	25 ± 10.38	31.08 ± 11.27	31.16 ± 11.66	21.95 ± 10.35	26.18 ± 10.58	21.86 ± 9.37	24.28 ± 9.10
Differences between self-diagnosis and no self-diagnosis	Mean difference p-value**	-	-	2.16 0.06	1.60 0.182	2.01 0.03**	1.72 0.039**	1.77 0.03**	2.04 0.045**	2.02 0.07	2.42 0.040**	3.01 0.05**	2.21 0.042**	2.93 0.02**	1.34 0.160
Incorrect therapy	Mean ± SD	32.44 ± 8.16	34.36 ± 11.55	-	-	23.27 ± 7.31	20.57 ± 7.95	25.66 ± 9.14	24.43 ± 9.77	31.85 ± 9.88	33.41 ± 11.12	25.37 ± 9.47	29.43 ± 11.14	23.80 ± 7.22	25.80 ± 9.83
Correct therapy	Mean ± SD	30.04 ± 12.99	34.7 ± 11.51	-	-	24.85 ± 7.35	22.40 ± 8.40	23.74 ± 9.41	26.30 ± 10.24	30.04 ± 11.27	29.85 ± 11.84	23.45 ± 10.15	23.40 ± 9.16	22.64 ± 9.51	23.20 ± 8.49
Differences between correct and incorrect therapy	Mean difference p-value**	2.40 0.05**	0.34 0.751	-	-	1.56 0.003**	1.83 0.013**	1.91 0.041**	1.37 0.046**	1.81 0.08	3.56 0.001**	1.92 0.03**	6.03 0.000**	1.17 0.039**	2.60 0.003**
Self-diagnosis and incorrect therapy	Mean ± SD	-	-	-	-	22.18 ± 9.82	19.88 ± 7.24	23.68 ± 9.29	22.77 ± 8.16	29.43 ± 9.07	35.54 ± 9.53	24.14 ± 11.77	31.57 ± 10.76	21.95 ± 9.75	27.47 ± 9.98
Self-diagnosis and correct therapy	Mean ± SD	-	-	-	-	23.60 ± 8.29	20.56 ± 9.79	26.67 ± 7.30	25.37 ± 9.85	31.17 ± 9.02	30.56 ± 12.80	26.67 ± 8.98	23.52 ± 9.55	20.99 ± 7.86	22.78 ± 9.20
No self-diagnosis and incorrect therapy	Mean ± SD	-	-	-	-	24.41 ± 8.12	20.88 ± 8.25	26.78 ± 9.33	25.19 ± 10.36	29.07 ± 10.70	32.43 ± 11.67	23.05 ± 11.51	28.45 ± 11.20	26.02 ± 10.14	25.03 ± 9.7

(Table 4) contd....

Characteristics	Respondent groups									
	Self-diagnosis and correct therapy		No self-diagnosis but incorrect therapy		Self-diagnosis but incorrect therapy		No self-diagnosis and correct therapy		<i>p-value</i>	
	Urban	Suburban	Urban	Suburban	Urban	Suburban	Urban	Suburban	Urban	Suburban
Student	0	0	4	0	3	0	1	2	0.036	1. 0.235
Teacher/Lecturer	2	1	3	2	2	1	4	0		
Private Employee	12	4	13	3	15	9	28	7		
Employers/Self-Employed	21	11	20	7	13	34	20	13		
Civil Servants/Police/Military	0	0	5	1	1	1	4	1		
Housewife	73	49	64	29	46	87	59	86		
Laborer	0	7	0	9	0	23	0	19		
Others	3	11	9	3	7	26	8	18		
Income										
<Rp 1,250,000	42	47	35	32	34	95	40	90	0.401	0.380
Rp 1,250,000–Rp 3,500,000	44	24	57	18	29	70	29	43		
≥Rp 3,500,000	25	12	26	4	25	16	35	13		
Health insurance										
Yes	62	53	64	32	60	116	79	90	0.106	0.910
No	49	30	54	32	27	65	45	56		

In urban areas, we observed significant correlations ($p < 0.005$) between age and occupation and knowledge and perception, whereas, in suburban areas, no differences were found. In both areas, the education level was significantly correlated with knowledge and perception, as opposed to gender, income, and insurance status.

4. DISCUSSION

It is critical to conduct community studies to ascertain public knowledge and perceptions about antibiotics in ARI. According to a recent study, 79% of 203 patients taking ARI antibiotics used their medication incorrectly [18]. This erroneous use, likely to result in antibiotic resistance and exacerbate disease severity [19, 20], appears to be defined by community knowledge and perceptions on the subject [13].

In urban areas, the proportion of respondents with incorrect knowledge and perception was lower than the proportion with correct responses, whereas, in suburban areas, the situation was completely reversed. This is in accordance with a previous study, wherein the respondents in suburban areas used antibiotics when they suffered from flu [4]. According to Oh *et al.*, 67.2% of their study respondents believed antibiotics could be used to treat viral infections and were unable to differentiate between viral and bacterial diseases [21].

Although antibiotics are not always necessary, they are frequently used in patients with respiratory infections [22, 23]. Our study found no correlation between respondents' age and their antibiotic knowledge and perceptions. An Australian study reported no significant correlations between age, public knowledge, and perception regarding antibiotic use [14]. Additionally, an Ecuadorian study found that mothers (respondents) aged 18–44 years had a higher level of knowledge about antibiotic use in children than mothers (respondents) aged <18 years [24]. Another study conducted in Jordan found that respondents aged 18–39 took improved self-medication measures, particularly concerning antibiotics, and

that age was associated with antibiotic use [25]. Conversely, education levels were found to be significantly associated with antibiotic knowledge and perceptions. In this regard, a recent study also reported similar correlations between education and knowledge regarding antibiotic use [26]. Similarly, our findings indicate that respondents with lower educational attainment and those living in rural areas had significantly lower levels of knowledge about antibiotics [27]. Additionally, a European study suggested that respondents with low levels of education harbor a decreased awareness regarding antibiotics [28].

Thus, the level of education of respondents was found to be associated with their knowledge and perceptions about antibiotics. Previous research has revealed a knowledge and perception gap between communities and health care providers [13]. One factor influencing knowledge is occupation, implying that individuals may gain experience and knowledge through their work environments [15].

However, there was no correlation between knowledge and perception, and income [29]. Additionally, we observed no correlation between health insurance status and knowledge and perceptions of antibiotic use. However, previous studies have demonstrated that patients without health insurance exhibited inappropriate behaviors concerning antibiotic use [30]. Thus, health insurance may play a significant role in determining antibiotic use and associated erroneous practices [11]. On the other hand, in rural communities in China, some parents demonstrated a lack of knowledge about antibiotics while harboring a high prevalence of self-medicating their children with antibiotics [31].

The current study also examined subjects' knowledge and perceptions regarding antibiotics, which can be influenced by geographical factors. Simandan (2016) explained that certain distances and geographic locations affect the subjectivity and objectivity of knowledge and perception. Additionally, the uncertainty of factors such as positionality, partiality,

reflexivity, crossing, and strongly politicalized positioning aided in subject knowledge. In another study, Simadan (2020) confirmed the role of geography and diversity in personal and social change [32 - 34].

LIMITATION OF STUDY

As is the case with the majority of studies that rely on self-reported measures, the accuracy of respondents' data is difficult to verify. Additional techniques, such as interviews, could be used to gain a complete understanding of the factors that influence students' attitudes. It is likely that a variety of different attitude responses remain undiscovered in this area. Furthermore, our study relied on a self-administered questionnaire, which could have introduced subjectivity bias.

CONCLUSION

Our study used a self-administered questionnaire, and data were derived from respondents' recall and memory. While this may introduce some subjectivity, the data indicated that respondents in both urban and suburban areas generally agree that antibiotics should not be taken based on self-diagnosis. Consequently, it is necessary to increase awareness and promote the proper use of antibiotics in the community.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study protocol was approved by the Ethical Board for Health Research of Universitas Padjadjaran (registration number: 876/UN6.C.10PN/2017), Indonesia.

HUMAN AND ANIMAL RIGHTS

No animals were used in this research. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or research committee and with the 1975 Declaration of Helsinki, as revised in 2013.

CONSENT FOR PUBLICATION

Written and informed consent was obtained from the participants.

STANDARDS OF REPORTING

STROBE guidelines were followed.

AVAILABILITY OF DATA AND MATERIALS

The data supporting the findings of the article is available from the corresponding author on request.

FUNDING

None.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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