

Medication Practices in the Management of Upper Respiratory Tract Infections among Undergraduates of University of Jaffna, Sri Lanka

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Abstract - Upper respiratory tract infections (URTIs) are one of the most commonly encountered diseases in both paediatric and adult populations and they represent a significant cause of antibiotic abuse which contributes to antibiotic resistance. This study mainly aimed to evaluate the medication practices of URTIs among undergraduates at the University of Jaffna. A descriptive cross-sectional study was conducted among 382 undergraduates of University of Jaffna from July 2019 to November 2020. Stratified random sampling was performed to recruit the participants and the data were collected using a self-administered questionnaire and analysed using SPSS version 23. The response rate was 82.1% (n=314) for this survey. The majority of the respondents were female (64.0%) and unmarried (97.1%). Almost 45.0% of participants had URTIs at least once in the last three months and the common cold was the most frequently reported URTI symptom. Most of the students had antipyretics (74.8%), Vitamin C (73.8%), herbal remedies (72.0%), antibiotics (63.7%), cough syrups (55.0%) and antihistamines (54.4%) to treat their URTIs. A considerable number of students, 42.0% had self-medicated with antibiotics. Compared to Health Science students, Non- Health Science students significantly shared their antibiotics with friends or family members ($p < 0.05$) and kept leftover antibiotics to be used in similar disease conditions in the future ($p < 0.05$). This study concluded that majority of the undergraduates at the University of Jaffna had inappropriate antibiotic usage in URTIs and it suggested that educational programs should be designed to educate undergraduates irrespective of course of study regarding rational usage of antibiotics.

Keywords: URTIs, Practices, Undergraduates, University of Jaffna

I. INTRODUCTION

Acute URTIs refers to acute infections of the nose, sinus, pharynx, middle ear, larynx and epiglottis, airway and bronchus (Simoes et al., 1995). URTIs are one of the most commonly encountered diseases in both pediatric and adult populations, who generally experience an acute URTIs 2-5 times a year (Yoon *et al.*, 2017; Shuhayb, Al and Khawaja, 2018). Although URTIs are rarely fatal, they compose a great economic burden on health systems. 20–30% of all hospital admissions and 30–60% of practitioner visits in the developing countries are related to respiratory tract infections. URTIs are leading to unnecessary absence from school and unnecessary medical care (Shuhayb, Al and Khawaja, 2018).

Treatment of URTIs can be classified as symptomatic treatment, antibiotics treatment, complementary and alternative treatment and other practical interventions. Antipyretics, anti-inflammatory agents, first generation antihistamines, expectorants, antitussives and decongestants are some of medications which are used in the symptomatic treatment. Antibiotics usage in URTIs remains contentious since more than 90% of the infections are of viral etiology (Cotton, Innes and H Rabie, 2011). Herbal remedies are used as complementary and alternative treatments of URTIs (Cotton, Innes and H Rabie, 2011). Although URTIs are usually self-limiting and numerous over the counter medications used for URTIs have no effect on outcome (Shuhayb, Al and Khawaja, 2018).

Antibiotics are effective in bacterial infections but not in viral infections. As viral invaders are responsible for most of acute URTIs, early antibiotic treatments for URTIs are not recommended. But it is recommended when symptoms are worsening and existing for a long time period. But there is an evidence that URTIs are the reason for 60% of all antibiotic prescribing in general practice. So misuse

and overuse of antibiotics in URTIs leads to loss of bacterial sensitivity to antibiotic agents and emergence of antibiotic resistance bacterial strains, which is current global crisis (National institute for health and clinical science, 2008; O'Connor et al., 2019).

In Sri Lanka, only a few studies were carried out on university students focusing on their drug treatment patterns (Rathnayake *et al.*, 2016; Sakeena *et al.*, 2018). Irrational use of antibiotics has been a common problem among university students and is supported by previous studies conducted in Sri Lanka (Gunawardhana, Sakeena and Sivayoganthan, 2015; Rathish and Wijerathne, 2017; Sakeena *et al.*, 2018). This study mainly aimed to evaluate the knowledge and practices regarding medication usage in URTIs, in order to develop educational and awareness programmes for university students, as they are representing the educated adult population which may help them in promoting the proper practices in URTIs. The proper knowledge and practice regarding the management of URTIs among undergraduate students will significantly reduce the misuse of the drugs especially antibiotics and also reduce antibiotic resistance crisis in near future.

II. METHODOLOGY

A. Study design and setting

This study was an institutional based descriptive cross sectional study conducted from July 2019 to November 2020, investigating the knowledge and practices on the management of URTIs among undergraduate students of University of Jaffna, Srilanka. This study was conducted in eight faculties of University of Jaffna including Faculty of Medicine, Faculty of Allied Health Sciences, Faculty of Arts, Faculty of Management studies and Commerce, Faculty of Science, Faculty of Engineering, Faculty of Agriculture and Faculty of Technology. In this study, students who were studying in Faculty of Medicine, Faculty of Allied Health Sciences were considered as "Health Science students" and those who were studying in Faculty of Arts, Faculty of Management studies and Commerce, Faculty of Science, Faculty of Engineering, Faculty of Agriculture and Faculty of Technology were considered as "Non-Health Science students".

B. Sample size

The sample size for this study was calculated based on p value (0.34) from a previous study conducted among Pakistan university students (Saleem *et al.*,

2016). From this, a total of 382 undergraduates of University of Jaffna from various degree programmes were enrolled for the study. Second year students (2016/2017 intake) of University of Jaffna were included in this study. Students who were not willing to take part in this survey, voluntarily excluded from the study.

C. Sampling technique

Among the 2586 second year students of University of Jaffna, stratified random sampling method was performed to select the undergraduate students from each course.

D. Study instrument

The data was collected by using a self-administered questionnaire. The questionnaire was developed in English and it was translated into Tamil and Sinhala by trilingual experts. Again the questionnaire was back translated into English and equivalency of questions was ensured. The content and format of the questionnaire used in this study were evaluated using a pre-test involving 25 students from University College of Jaffna. According to the feedback of the students, questionnaire was modified with the help of supervisors without affecting the objectives of this study.

The questionnaire consisted of three sections. Section A was designed to collect socio- demographic factors (Gender, age, marital status, ethnicity, religion, faculty, course of study, current living status) of undergraduates. Section B and C were designed to collect data on knowledge and practice in the management of URTIs respectively. The section B consisted of ten questions. It was designed in a view of assessing the ability of undergraduates on identification of drugs used in the management of symptoms of URTIs, the ability to identify the cause of URTIs and the knowledge on antibiotic usage in URTIs. The section C consisted of sixteen questions regarding the practices on the management of URTIs.

E. Data collection method and ethical considerations

Data collection was done after obtaining the ethical clearance from the Ethics Review Committee, Faculty of Medicine, University of Jaffna. After the ethical clearance, the permission for data collection was obtained from Vice Chancellor, University of Jaffna and Deans of respective faculties. Data collection was done among selected undergraduate students from July 2020 to September 2020. The voluntary participation was ensured. Before sending the questionnaire, consent form was sent to the selected

undergraduate students and after obtaining their informed written consent, the questionnaire was sent to the respective student via google forms through E-mail.

F. Data analysis

The collected data was entered in to Statistical Package for Social Sciences (SPSS-23 version) and data was analyzed based on research specific objectives. Results were presented as frequency, percentage, mean, median and standard deviation and the results were elucidated as tables and diagrams.

When analyzing knowledge section, score of one was given for correct response while zero was given for wrong and “don’t know” responses. Total knowledge score was calculated in percentage. The level of knowledge was determined by pre-determined cut-off marks and it was categorized as “Good knowledge” and “Poor knowledge”. A total of 14 marks was given for section B. The score from 8 to 14 was considered as “Good knowledge” and score from 0 to 7 was considered as “Poor knowledge”.

When analyzing practices section, data was analyzed descriptively and the responses of each questions in practice section were described in frequency and percentage individually. Chi- square test and Fisher’s exact test were used to determine the significant association between socio-demographic factors and level of knowledge and practices. $p < 0.05$ was used as level of significance.

III. DISCUSSION AND ANALYSIS

A. Distribution of sociodemographic factors

A total of 314 students completed the study with a response rate of 82.1%. Table 1 depicts a descriptive summary of students’ socio demographic characteristics. The students’ age range was between 21 to 26 years and were predominately female (64.0%) and unmarried (97.1%). This is similar to other differential studies conducted earlier (Parimi et al., 2004; Saengcharoen, Lerkiatbundit and Kaewmang, 2012; Saleem et al., 2016).

B. Knowledge on identification of drugs used in the management of symptoms of URTIs

Students were given with five drugs including antihistamines, antibiotics, antipyretics, cough syrups and Vitamin C and were asked to identify the

drugs which can be used to treat URTIs. Only 2.5% had correctly identified all five drugs while 4.8% of them were not able to distinguish none of the drugs.

Table 1. Students’ sociodemographic characteristics

Sociodemographic factors	Categories	Frequency (N=314)	Percentage (%)
Age	21-23 yrs	225	71.7
	24-26 yrs	89	28.3
Gender	Male	114	36.0
	Female	200	64.0
Marital status	Unmarried	305	97.1
	Married	9	2.9
Ethnicity	Sinhalese	71	22.6
	Sri Lankan Tamil	210	66.9
	Sri Lankan Moors	33	10.5
Religion	Buddhism	68	21.7
	Hinduism	177	56.4
	Christianity	36	11.5
	Islam	33	10.4
Faculty	Agriculture	14	4.5
	AHS	30	9.6
	Arts	94	29.9
	Engineering	17	5.4
	Management	54	17.2
	Medicine	23	7.3
	Science	45	14.3
	Siddhamedicine	10	3.2
	Technology	27	8.6

C. Knowledge on the antibiotic usage in URTIs:

Table 2 shows the statements related to antibiotic usage in URTIs which were analysed using X^2 test among Health Science and Non-Health Science students. It illustrates that overall Health Science students scored remarkably better than Non-Health Science students on knowledge regarding antibiotic usage in URTIs ($X^2= 119.093$, $p < 0.0001$). The same pattern of results was observed for most of the statements related to the antibiotic usage.

Table 2. Students' knowledge on antibiotic usage

Statements (Correct responses)	Total% (n/N)	Whole %			
		Health Science %	Non-Health Science %	X ²	p
Antibiotics speedup the recovery of acute URTIs (No)	25.6 (79/309)	26.7 (16/60)	25.3 (63/249)	0.047	0.828
Antibiotics cure bacterial infections (Yes)	49.5 (154/311)	93.5 (58/62)	38.6 (96/249)	60.057	< 0.0001*
Antibiotics cure viral infections (No)	49.2 (154/313)	67.7 (42/62)	44.6 (112/251)	10.634	0.001*
Antibiotics for URTIs can be taken from a pharmacy without prescription of a doctor (No)	48.1 (151/314)	77.8 (49/63)	40.6 (102/251)	27.827	< 0.0001*
Leftover antibiotics of URTIs from previous course can be used if I have the same condition in the future (No)	56.1 (174/310)	61.9 (39/63)	54.7 (135/247)	1.071	0.301
The prescribed course of antibiotics can be stopped if the symptoms are improved (No)	42.9 (134/312)	71.0 (44/62)	36.0 (90/250)	24.791	< 0.0001*
Inappropriate use of antibiotics leads to antibiotic resistance (Yes)	41.5 (130/313)	92.1 (58/63)	28.8 (72/250)	82.935	< 0.0001*

D. Level of knowledge of study participants

Table 3 depicts the categorized distribution of level of knowledge among the participants. Majority of the respondents 194 (61.8%) had poor knowledge and 120 (38.2%) of the entire participants had good knowledge on the management of URTIs. It is in line with a study conducted among Thai students, where the 66% of the participants had inappropriate knowledge (Saengcharoen, Lerkiatbundit and Kaewmang, 2012).

Table 3. Level of knowledge among students

Level of knowledge	Frequency (n)	Percentage (%)
Good knowledge	120	38.2
Poor knowledge	194	61.8

E. Influence of socio demographic factors on level of knowledge

Table 4 describes the influence of socio demographic factors on level of knowledge regarding the management of URTIs among the students. Among the Health Science students, 85.7% had good knowledge and only 14.3% had poor knowledge. Among the Non-Health Science students, only 26.3% had good knowledge and 73.7% had poor knowledge. So that the faculty of the participant showed

stastically significant influence on level of knowledge (p < 0.001).

Table 4. Students' level of knowledge and socio demographic factors

Socio demographic factors	Level of knowledge		statistical test
	Good knowledge N (%)	Poor knowledge N (%)	
Age			
21-23 years	80 (35.6)	145 (64.4)	Chi-square test X ² = 2.381 df = 1 p = 0.123
24-26 years	40 (44.9)	49 (55.1)	
Gender			
Male	37 (32.5)	77 (67.5)	Chi-square test X ² = 2.515 df = 1 p = 0.113
Female	83 (41.5)	117 (58.5)	
Marital status			
Married	2 (22.2)	7 (77.8)	Fisher's exact test X ² = - df = - p = 0.491
Unmarried	118 (38.7)	187 (61.3)	
Faculty			
Health Science	54 (85.7)	9 (14.3)	Chi-square test X ² = 75.30 df = 1 p < 0.001*
Non-Health Science	66 (26.3)	185 (73.7)	

F. Distribution of practice among participants

1) *Distribution of recent history of URTIs among participants:* Table 5 describes the recent history and associated symptoms of URTIs. Majority of the participants, 44.9% had URTIs atleast once for the last three months. Common cold was the most frequently reported URTI symptoms (74.1%) followed by cough (33.7%) and sneezing (27.0%). It is incoherent with another study conducted in Pakistan which revealed that cough (51.9%) was most commonly observed symptom followed by fever (32.3%) (Saleem et al., 2016).

Table 5. Recent history of URTIs among students

Questions	Responses	N	n	%
How many times did you have URTIs in past 03 months	None	314	59	18.8
	Once		141	44.9
	Twice		44	14.0
	Three times		28	8.9
	More than three times		42	13.4
Symptoms that you had during the last episode of URTIs	Common cold	255	189	74.1
	Cough		86	33.7
	Runny nose		67	26.2
	Sneezing		69	27.0
	Sorethroat		31	12.1
	Nasal blockage		53	20.7
Fever	55	21.5		

2) *Distribution of practices regarding the symptomatic and alternative treatment of URTIs:* Most of the students had taking antipyretics (74.8%) followed by Vitamin C (73.8%), cough syrup (55.0%) and antihistamines (54.4%) to treat their URTIs.

When considering the alternative treatment of URTIs, majority of them tried steaming (87.6%), herbal remedies (72.0%) and gargling with salt water (61.5%).

3) *Distribution of practices regarding the antibiotic usage in URTIs:* Majority, 63.7% had taking antibiotics to treat their symptoms of URTIs. However, a previous study conducted among Pharmacy and Non-Pharmacy students in Pakistan stated that 79.5% of the participants took antibiotics for their URTIs (Saleem et al., 2016). In this study, almost 42.0% of them got the antibiotics from pharmacy without prescriptions and 71.3% of them completed their antibiotic course as prescribed by the doctor. The present study stated that there was irrational usage of antibiotics for URTIs among the undergraduates.

Table 6. Students' antibiotic usage in URTs

Variables (Responses)	n	%
I get antibiotics from pharmacy without prescriptions for my URTIs (always, often)	132	42.0
I complete my antibiotic course as prescribed by the doctor (always, often)	224	71.3
I suggest antibiotics which cured my disease to my friends in similar conditions (always, often)	143	45.5
I share antibiotics with my friends or family members if they have similar disease conditions that I had in the past (always, often)	126	40.1
I keep leftover antibiotics to be used in similar disease conditions in the future (always, often)	100	31.8

IV. CONCLUSION

The findings of the study revealed that the knowledge on the management of URTIs was inadequate among the undergraduates of University of Jaffna and faculty of the participant had significantly influenced the level of knowledge. Furthermore, irrational usage of antibiotics in URTIs among the undergraduates irrespective of faculty of study was observed. This findings of the study suggested that educational programs should be designed to educate the undergraduate students irrespective of course of study regarding the hazards of self medication, duration of antibiotic therapy in URTIs and significance of antimicrobial resistance.

REFERENCES

- Abujheisha, K.Y., Al-Shdefat, R., Ahmed, N. and Fouda, M.I., 2017. Public knowledge and behaviours regarding antibiotics use: A survey among the general public. *Int. J. Med. Res. Health Sci*, 6, pp.82-88.
- Al-Shibani, N., Hamed, A., Labban, N., Al-Kattan, R., Al-Otaibi, H. and Alfadda, S., 2017. Knowledge, attitude and practice of antibiotic use and misuse among adults in Riyadh, Saudi Arabia. *Saudi medical journal*, 38(10), p.1038.
- Buke, C., Hosgor-Limoncu, M., Ermertcan, S., Ciceklioglu, M., Tuncel, M., Köse, T. and Eren, S., 2005. Irrational use of antibiotics among university students. *Journal of infection*, 51(2), pp.135-139.
- Centre for Clinical Practice at NICE (UK). *Respiratory Tract Infections - Antibiotic Prescribing: Prescribing of Antibiotics for Self-Limiting Respiratory Tract Infections in Adults and Children in Primary Care*. London: National Institute for Health and Clinical Excellence (UK); 2008 Jul. (NICE Clinical Guidelines, No. 69.)

- Cotton, M., Innes, S., Jaspan, H., Madide, A., & Rabie, H., 2008. Management of upper respiratory tract infections in children. *South African family practice: official journal of the South African Academy of Family Practice/Primary Care*, 50(2), 6–12.
- Huang, Y., Gu, J., Zhang, M., Ren, Z., Yang, W., Chen, Y., Fu, Y., Chen, X., Cals, J.W. and Zhang, F., 2013. Knowledge, attitude and practice of antibiotics: a questionnaire study among 2500 Chinese students. *BMC medical education*, 13(1), pp.1–9.
- Jairoun, A., Hassan, N., Ali, A., Jairoun, O. and Shahwan, M., 2019. Knowledge, attitude and practice of antibiotic use among university students: a cross sectional study in UAE. *BMC public health*, 19(1), p.518.
- Kung, K., Wong, C.K.M., Wong, S.Y.S., Lam, A., Chan, C.K.Y., Griffiths, S. and Butler, C., 2014. Patient presentation and physician management of upper respiratory tract infections: a retrospective review of over 5 million primary clinic consultations in Hong Kong. *BMC family practice*, 15(1), p.95.
- Lv, B., Zhou, Z., Xu, G., Yang, D., Wu, L., Shen, Q., Jiang, M., Wang, X., Zhao, G., Yang, S. and Fang, Y., 2014. Knowledge, attitudes and practices concerning self-medication with antibiotics among university students in western China. *Tropical Medicine & International Health*, 19(7), pp.769–779.
- Mutalik, A.V. and Raje, V.V., 2017. Study to assess the knowledge, attitude, and practice about acute respiratory infections among school going children and their parents in rural Maharashtra. *International Journal of Medical Science and Public Health*, 6(11), pp.1584–1588.
- O'Connor, R., O'Doherty, J., O'Regan, A., O'Neill, A., McMahon, C. and Dunne, C.P., 2019. Medical management of acute upper respiratory infections in an urban primary care out-of-hours facility: cross-sectional study of patient presentations and expectations. *BMJ open*, 9(2), p.e025396.
- Ocan, M., Aono, M., Bukirwa, C., Luyinda, E., Ochwo, C., Nsambu, E., Namugonza, S., Makoba, J., Kandaruku, E., Muyende, H. and Nakawunde, A., 2017. Medicine use practices in management of symptoms of acute upper respiratory tract infections in children (≤ 12 years) in Kampala city, Uganda. *BMC public health*, 17(1), p.732.
- Panagakou, S.G., Spyridis, N., Papaevangelou, V., Theodoridou, K.M., Goutziana, G.P., Theodoridou, M.N., Syrogiannopoulos, G.A. and Hadjichristodoulou, C.S., 2011. Antibiotic use for upper respiratory tract infections in children: a cross-sectional survey of knowledge, attitudes, and practices (KAP) of parents in Greece. *BMC pediatrics*, 11(1), p.60.
- Parimi, N., Pereira, L.M.P. and Prabhakar, P., 2004. Caregivers' practices, knowledge and beliefs of antibiotics in paediatric upper respiratory tract infections in Trinidad and Tobago: a cross-sectional study. *BMC family practice*, 5(1), p.28.
- Saengcharoen, W., Lerkiatbundit, S. and Kaewmang, K., 2012. Knowledge, attitudes, and behaviors regarding antibiotic use for upper respiratory tract infections: a survey of Thai students. *Southeast Asian Journal of Tropical Medicine and Public Health*, 43(5), p.1233.
- Sakeena, M.H.F., Bennett, A.A., Jamshed, S., Mohamed, F., Herath, D.R., Gawarammana, I. and McLachlan, A.J., 2018. Investigating knowledge regarding antibiotics and antimicrobial resistance among pharmacy students in Sri Lankan universities. *BMC infectious diseases*, 18(1), p.209.
- Saleem, Z., Saeed, H., Ahmad, M., Yousaf, M., Hassan, H.B., Javed, A., Anees, N. and Maharjan, S., 2016. Antibiotic self-prescribing trends, experiences and attitudes in upper respiratory tract infection among pharmacy and non-pharmacy students: a study from Lahore. *PloS one*, 11(2), p.e0149929.
- Shah, S.J., Ahmad, H., Rehan, R.B., Najeeb, S., Mumtaz, M., Jilani, M.H., Rabbani, M.S., Alam, M.Z., Farooq, S. and Kadir, M.M., 2014. Self-medication with antibiotics among non-medical university students of Karachi: a cross-sectional study. *BMC Pharmacology and Toxicology*, 15(1), p.74.
- Shuhayb, Z. Al, Al, Y. K. and Khawaja, R., 2018. 'Parents' Management of Acute Upper Respiratory Tract Infections in Children, Al Ahsa, Saudi Arabia', 6(5).
- Simoes, E.A., Cherian, T., Chow, J., Shahid-Salles, S.A., Laxminarayan, R. and John, T.J., 2006. Acute respiratory infections in children. In *Disease Control Priorities in Developing Countries*. 2nd edition. The International Bank for Reconstruction and Development/The World Bank.
- Suaifan, G.A., Shehadeh, M., Darwish, D.A., Al-Ije, H., Yousef, A.M.M. and Darwish, R.M., 2012. A cross-sectional study on knowledge, attitude and behavior related to antibiotic use and resistance among medical and non-medical university students in Jordan. *African Journal of Pharmacy and Pharmacology*, 6(10), pp.763–770.
- Ventola, C.L., 2015. The antibiotic resistance crisis: part 1: causes and threats. *Pharmacy and therapeutics*, 40(4), p.277.
- Yoon, Y.K., Park, C.S., Kim, J.W., Hwang, K., Lee, S.Y., Kim, T.H., Park, D.Y., Kim, H.J., Kim, D.Y., Lee, H.J. and Shin, H.Y., 2017. Guidelines for the antibiotic use in adults with acute upper respiratory tract infections. *Infection & chemotherapy*, 49(4), pp.326–352.
- Zawahir, S., Hettiarachchi, C. and Morrissey, H., 2017. Assessing knowledge, perception and attitudes about antibiotics among final year pharmacy undergraduates in Sri Lanka

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