Use of Self Medicated Antibiotics in the Population of Peelamedu City, Tamil Nadu

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ABSTRACT

Background: One of the major consequences of Self-medication with antibiotics is Antibiotic resistance. Poor community knowledge and attitude towards antibiotic use is a major concern. This study aimed at assessing and improving the knowledge and attitude towards antibiotic use in the community of Peelamedu city, Coimbatore. **Methods:** A descriptive observational study was conducted in the community population of Peelamedu city, Coimbatore. The study interview was based on an evaluated questionnaire, which included the knowledge, attitude and practice-based questions to assess the SMA use in the community and they were educated on SMA, based on a validated pamphlet, a feedback was obtained. Results were analyzed and concluded. **Results:** Among the 150 respondents, nearly 60% had moderate knowledge on SMA. The practice of SMA was influenced by education, attitude, previous experience and suggestions from family members and friends. The main source of antibiotics for self-medication was found to be the community pharmacies. The most common reason cited for taking antibiotics was cold and flu (50.7%) followed by urinary tract infection (14.0%), Eye, ear and GI related infections (8.7%) and the least for dental infections (4%). A positive correlation was noted between the number of family members and the attitude statement about using self-medicated antibiotics for self-healthcare (p value < 0.0063). Also there existed a positive correlation between the education provided to the respondents and the knowledge and attitude respectively. **Conclusion:** The study has generated information on the knowledge, attitude and practice of self-medication in the community of Peelamedu city, Coimbatore. The study also remarks the essentiality and requirement of public based educational programme to improve their knowledge on SMA and their maleficent effects.

Keywords: Antibiotics, Self medication, Antibiotic resistance, Community Pharmacy, Community awareness.

INTRODUCTION

Self-medication of antibiotics has a negative impact on the overall treatment outcome in various countries. In developing countries infectious diseases are becoming the most common cause of death, where antibiotics are an essential treatment option.[1] Self-Medication practice includes purchasing antibiotics without the prescription of a physician, reusing the leftover prescription, sharing the prescription or antibiotics with other family members, friends or relatives. Self-medication has a major pitfall where patients fail to adhere to the dose, duration, frequency and sometimes even indication to use antibiotics.[2] In continuation with this SMA has lead to a major risk of resistance. Other than resistance SMA can also lead to drug interaction, masking of disease, which in turn can increase the hospital stay and cost.[3] Studies reveal that there are only limited medicines available to treat the infections since several different microbes cause the infection.[4] Some of the major drivers of self-medication with antibiotics are found to be high cost, limited access to

health care facilities, no regulations in distribution of drugs.[5] Use of antibiotics can vary according to their availability, individual patient characteristics, existing laws, socio-economic factors, cultural factors, convenience; location etc.[6] Resistance to commonly prescribed antibiotics is remarkably high in the community of developing countries. This insists on the necessity of developing effective interventions and identification of factors contributing to SMA.[7] Despite the fact that SMA is a serious communal issue, very few studies are performed to understand the community level practice of SMA. Here we report on a study that is focused to identify the factors contributing to SMA and to assess the knowledge, attitude and practice of SMA in the local population which plays a major role in the inappropriate and ineffective use of antibiotics.[8] Adding to it, providing the public with sufficient knowledge and education is crucially important to reduce the maleficent effect of SMA.[9]

MATERIALS AND METHODS

A community based descriptive, observational study was performed for a period of six months with the approval of IHEC of PSGIMS&R to assess the socio-demographic factors, knowledge, attitude and practice regarding the use of self-medicated antibiotics (SMA) in the populations of Peelamedu and implicating community counseling. The Sample size was calculated according to RAO software with a Confidence Interval of 95%, error of 0.5% and the sample size was found to be 150 for the population of 97,233 people residing in Peelamedu city according to population census 2020. A KAP based questionnaire was used to gather public responses. A four-part questionnaire was adopted and modified from previous studies. Part I recorded a total of 4 demographic characteristics and part II was made up of 12 knowledge statements covering some relevant aspects including: antibiotics indication, course completion, self-medication practices, antibiotic resistance and storage of antibiotics for future uses. Part III contained 8 attitude statements and respondents were required to answer according to a five-point likert scale (1=strongly agree, 2= Agree, 3= Neutral, 4= Disagree, 5=strongly disagree). Part IV documented respondents' recent antibiotic consumption (defined as antibiotic use within the past six month). The questionnaire included a combination 'of closed ended Dichotomous questions, Likert scale questions and some open- ended questions in its parts.

The questionnaire was originally developed in English, which was then translated into Tamil language (the regional language of Coimbatore, Tamil Nadu). Face and content validation of the questionnaire was undertaken by a panel of senior faculties and community medicine physician. Feedback was gathered to improve the questionnaire presentation, clarity and congruency of meaning.

A Pamphlet was used in delivering information, advice and assistance to the communal population focusing on the adverse effects of SMA and their disposal as an aid in providing community-based counseling. The pamphlet was mainly divided into six parts. Part one included the basic introduction to the topic of self-medication of antibiotics. Part II contained information on what antibiotics are. Part III focused on the information that antibiotics are not meant to be randomly taken for cough. Further part IV had information on AMR and five statements focusing on prevention is better than cure. Part V and VI focused on some important facts about SMA, its maleficent effects and procedure to dispose of unused antibiotics.

Feedback was gathered to improve the pamphlet presentation, readability and clarity. The Flesch reading ease scale was used to access the readability of the pamphlet. The Flesch reading ease score was found to be 81.45 and the estimated reading grade level was 6th grade.

First a validated questionnaire was distributed and collected from the communal population to assess the knowledge and attitude score respectively, followed by counseling and distribution of pamphlets. Feedback was obtained to assess for any improvement in knowledge and attitude score after counseling.
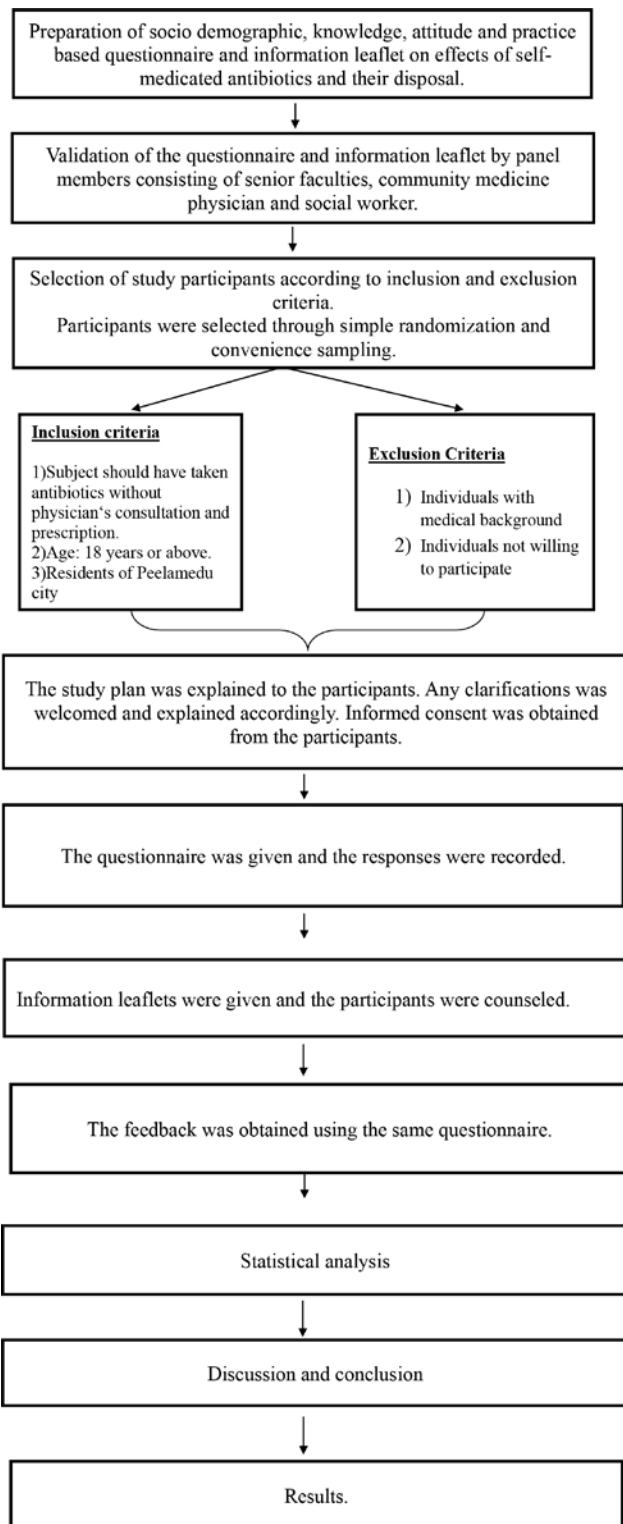
Information included in the pamphlet

- Introduction to antibiotics

- Self-medication of antibiotics (SMA)

- Antibiotic resistance

- Prevention of antibiotic resistance

- Facts about self-medicated antibiotic (SMA) use and its maleficent effects

- Disposal procedure of unused antibiotics.

METHODOLOGY
Statistical Analysis

Only fully completed questionnaires were included in the analysis. Part I was expressed as descriptive data in terms of frequencies. Appropriate responses for Part II, III were given 1 score as opposed to 0 score for "inappropriate responses", defined as either incorrect

Preparation of socio demographic, knowledge, attitude and practice based questionnaire and information leaflet on effects of self-medicated antibiotics and their disposal.

Validation of the questionnaire and information leaflet by panel members consisting of senior faculties, community medicine physician and social worker.

Selection of study participants according to inclusion and exclusion criteria.
Participants were selected through simple randomization and convenience sampling.

Inclusion criteria

1) Subject should have taken antibiotics without physician's consultation and prescription.
2) Age: 18 years or above.
3) Residents of Peelamedu city

Exclusion Criteria

1) Individuals with medical background
2) Individuals not willing to participate

The study plan was explained to the participants. Any clarifications was welcomed and explained accordingly. Informed consent was obtained from the participants.

The questionnaire was given and the responses were recorded.

Information leaflets were given and the participants were counseled.

The feedback was obtained using the same questionnaire.

Statistical analysis

Discussion and conclusion

Results.

"Schematic flow of Methodology"

answers or "Not sure". The knowledge and attitude statements were scored accordingly for each subject and categorized in three/two different categories. Knowledge was scaled from i) 0 to 4 (Poor knowledge) ii) 5 to 8 (moderate knowledge) iii) 9 to 12 (good knowledge), similarly attitude statements were scored and scaled as i) 0 to 4 (Poor attitude) ii) 5 to 8 (good attitude) respectively.

All data were analyzed using SPSS version 28.0.0.0. Demographic characteristics and practice were summarized using descriptive statistics. Demographic details that contributed significantly to knowledge and attitude were identified using a general linear model (GLM). Odds ratio was obtained for sociodemographic details and attitude statements using multiple logistic regressions. Pearson's correlation was used to examine the relationship between antibiotic knowledge and attitude statements. In all statistical analysis, a *p*-value of <0.05 was considered to be statistically significant.

The data after the counseling was also collected during the feedback interview. The knowledge and attitude before and after counseling was compared and analyzed. Both the domains of Knowledge and attitude were again scored and classified in different classes.

RESULTS

The total sample collected was 150. Respondents' demographic characteristics are summarized in Table 1. Most of the Respondents were under the age group of 18 to 34 contributing to 80% of the total sample followed by 35 to 64 years (17.3%) and >=65 (2.7%). Most respondents were females (65.3%) and few male contributing to 34.7%, with an education college diploma and above (81.3%)

The knowledge score ranged from 0 to 12 points, with a mean of 2 ± 0.53 and median of 2.00. The knowledge score category was divided as 0-4 (poor knowledge), 5-8 (moderate knowledge), 9-12 (sufficient knowledge) (Table 2).

Highest inappropriate answer was obtained on the statement of "different antibiotics are used to treat different diseases", followed by irregular duration of antibiotic usage period. Majority of respondents believe that it is okay to use antibiotics that were prescribed to someone else as long as they were used to treat the same disease (68%). Most of the respondents were unaware about antibiotic resistance (69%) and did not know that antibiotics do not work for viral infections (64%). On the other hand, the majority seemed to be aware that antibiotics may cause allergic reactions and unwanted side effects. Overall knowledge on antibiotics was found to be low. The attitude score ranged from 0 to 8 points, with a mean score of 1.39 ± 0.49 and a median of 1.00. The attitude score was divided into 2 categories as 0-4 (poor attitude) and 5-8 (acceptable attitude). The percentage of responses for the eight attitude statements are summarized in Table 3.

Table 1: Demographic Details.

	Characteristics	Frequency	Percentage
Gender	Male	52	34.7
	Female	98	65.3
Age	18 - 34	120	80
	35-64	26	17.3
	>=65	4	2.7
Education	No formal education	2	1.3
	Primary education	3	2.0
	High school	23	15.3
	College /diploma and above	122	81.3
Total number of family Members	<=2	2	1.3
	3	18	12
	4	94	62.7
	>=5	36	24

Table 2: Knowledge Categorisation.

Sl. No	Knowledge Score	Category	Percentage of Respondents (%)
1	0 to 4	Poor Knowledge	39
2	5 to 8	Moderate Knowledge	60
3	9 to 12	Sufficient Knowledge	1

Table 3: Attitude statements.

Sl. No	Attitude statement	Appropriate response (%)	Inappropriate response (%)
1	I always complete the course of treatment with antibiotics even if I feel better	34.7	65.3
2	If I feel better after few days, I sometimes stop taking antibiotics before completing the course of treatment	32.0	68.0
3	I prefer to keep antibiotics at home in case there may be a need for them later	26.7	73.3
4	It is good to be able to get antibiotics from relatives or friends without having to see your medical doctor	47.3	52.7
5	I prefer to buy antibiotics from the pharmacy without prescription	35.3	64.7
6	I prefer to use antibiotics if I have a cough for more than a week	36.0	64.0
7	What do you think about self-medication with antibiotics for self-health care?	46.0	54.0
8	I can treat common infectious diseases with antibiotics successfully by myself	48.7	51.3

Among the 150-response collected, most of them obtained medicines from their previous experience and recommendation from friends and family. They prefer to get it from a nearby pharmacy (64.7%) and store it for future use. The most common reason cited for taking antibiotics was cold and flu (50.7%), followed by urinary tract infection (14.0%), Eye, ear and GI related infections (8.7%) and the least for dental infections (4%). 'Others' specified diarrhea, nail infections, skin infections, post-operative use and covid 19 precautionary use as their reasons for consuming antibiotics (Figure 1). More than half of the respondents (68.0%) would stop an antibiotic course when their symptoms improved and leave the course half in during the treatment course. Meanwhile 52.7 percent of the respondents reported sharing their antibiotics with family members and would store antibiotics at home (73.3%) for emergency use. Many respondents claimed that their selection of antibiotics was based on recommendation by a physician or pharmacist on their last visit (59.3%) and based on their own previous experience (12.7%) (Figure 2). And the important thing considered while selecting the antibiotics was its type (22.7%) and brand (16.7%), while "others" specify it as doctors choice on previous visit and some as pharmacist choice. Most of the respondents obtain their SMA from community pharmacies (52.7%) (Figure 3). And most claim to have

■ UTI ■ COLD AND FLU ■ EYE/EAR/GI INFECTIONS ■ DENTAL INFECTIONS ■ OTHERS
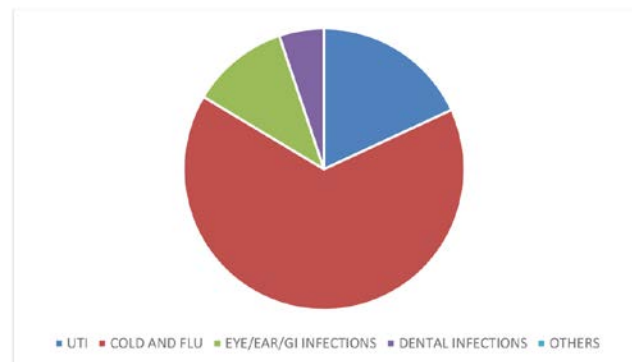
Figure 1: Common indications for self-medicated antibiotics.

	Physician opinion	Opinion by friends	Own expirience	Net citizens	Advertisement	Online sources	Others
■ Series 1	59.3	8.7	12.7	3.3	2.7	4.7	8.7
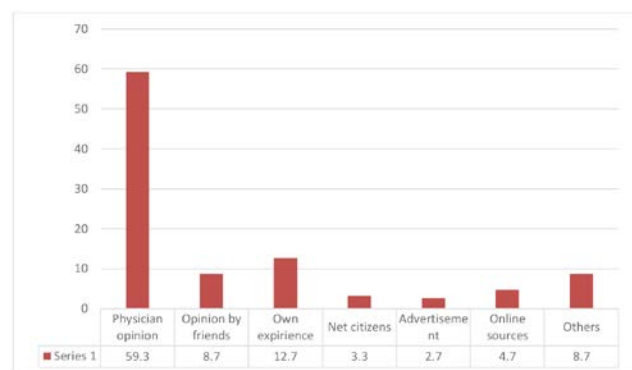
Figure 2: Factors affecting selection of antibiotics.
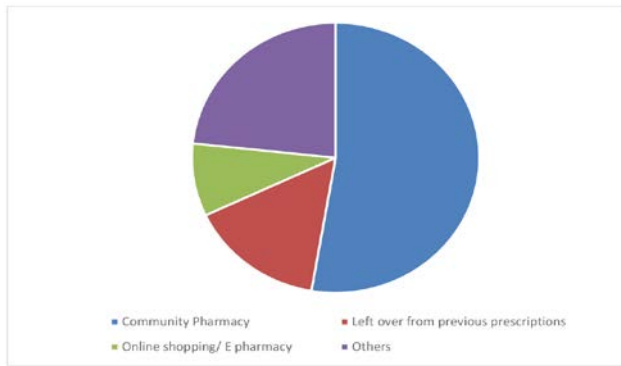
Figure 3: Source of antibiotics for self-medication.

Figure 4: Gender versus Knowledge.

checked the instructions that have been inserted in the package of antibiotics rarely (32.7%). Nearly 62.7% of the respondents agreed that they switch antibiotics during the course of self-treatment either because the former didn't work (20.0%), or to reduce the side effects. Very few claimed to have switched the antibiotics because they ran out (9.3%) and some because the latter one was cheaper (4.0%). Another 56% of the respondents did not respond to the question regarding the reason to switch antibiotics during the course. There exists a significant positive correlation between respondents antibiotic knowledge score with their attitude score (p<0.0102). The regression scale on education and attitude statement 'I always complete the course of treatment even if I feel better' shows a negative correlation (p value<0.01). Not so surprisingly the more educated population tends to use more SMA compared to the poor literate population. More access to the internet and other social means tends to be a contributing factor for self-medication in educated populations. Sometimes even lack of time to visit a doctor could be a contributing factor for self-medication.

A positive correlation was noted between the number of family members and the attitude statement about using self-medicated antibiotics for self-health care (p value<0.0063). As the number of members in the family increases there is a high chance of using SMA. This could be correlated with the practice of self-medicating from recommendations by family members' experience. Whenever a family member is prescribed an antibiotic, again reused by the members of the same family unless it is for the same indication, either by storing the leftover in home or by getting the same antibiotic by oneself from either community pharmacy or online sources. Based on the knowledge score from 0 to 12, the respondents were categorized as sufficient, moderate and poor knowledge. Most of the female participants had a moderate knowledge (61.2%), followed by poor knowledge (36.7%) and remaining with sufficient knowledge (2.04%) (Figure 4).
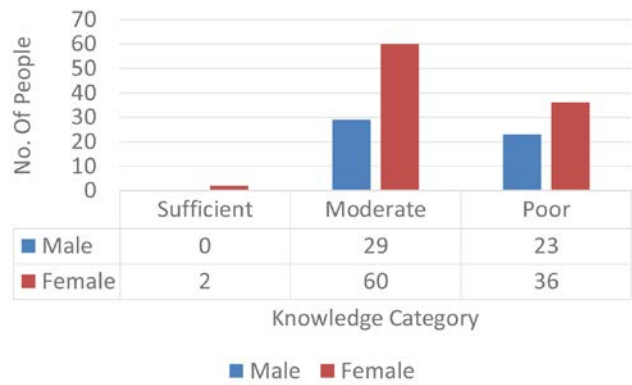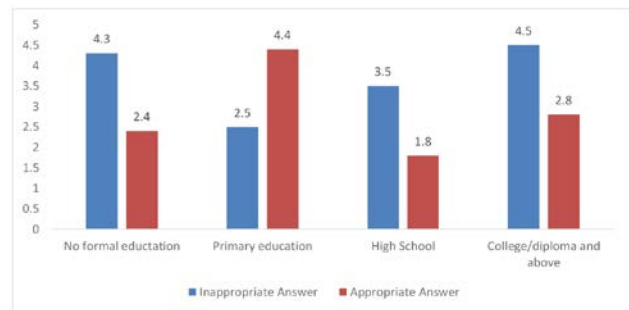

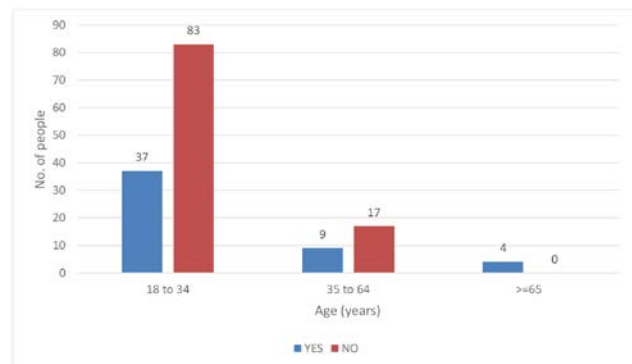**Figure 5: Education versus Knowledge on antibiotic indication.**

Figure 6: Completion of antibiotic course and age.

There exists a negative correlation between education and knowledge on antibiotic indication. More educated population tends to use antibiotics more inappropriately for self-medication than the populations with no formal education or high school education (Figure 5). The course of completion of SMA is majorly affected by age, being a major contributor. It is appropriately followed by elder population (100%) compared to the adults (65.3%) and younger respondents (69.1%) (Figure 6).

Feedback was obtained from the study participants after the provision of counseling. The feedback questionnaire mainly focused on the domains of knowledge and attitude before and after counseling. A positive correlation was obtained between the education provided to the

Table 4: Knowledge Score before and after counseling.

Knowledge Score	Mean	Sample count	Std. Deviation	Significance (*p* value)
Before counseling	9.60	150	2.802	<0.001
After counseling	4.95	150	1.731	

Table 5: Attitude Score before and after counselling.

Attitude Score	Mean	N	Std. Deviation	Significance (*p* value)
Before counselling	5.93	150	2.906	<0.001
After counselling	3.07	150	2.055	

respondents by counseling and the knowledge and attitude respectively. Paired *t*-test was used to analyze the effectiveness of counseling in knowledge and attitude. The *p* value was found to be significant (*p*<0.001) with the confidence interval being 95% for both attitude and knowledge (Table 4), (Table 5).

DISCUSSION

Self-medication with antimicrobial compounds is becoming a major health concern in developing countries. This study was done in the community of Peelamedu Coimbatore. Among the 150 respondents most of the participants were under the age group of 18 to 34 contributing to 80% of the total sample. In this study female respondents were more compared to male respondents. This is similar to the study conducted by Aida Bianco *et al*. in which more than half of respondents were female. Majority of respondents had an education of college, diploma and above. A questionnaire was used to gather public responses. A four part questionnaire was adopted and modified from previous studies. After analyzing the responses, found that most of the respondents were unaware about AMR and did not know that antibiotics do not work for viral infections. On the other hand, the majority seemed to be aware that antibiotics may cause allergic reactions and unwanted side effects. Overall knowledge on antibiotics was found to be low. Analogous to this, a study done by Alemtsehay Adam Bogale *et al*. concluded that respondents have inadequate knowledge and inappropriate practice toward rational use of antibiotics. This could be because of poor communal knowledge on the effects of SMA. Moreover, easy access to the internet has made many to follow the instructions that are randomly passed on social media platforms, and unreliable sources.

Most of the respondents obtained medicines from their previous experience and recommendation from friends and family. They prefer to get it from a nearby pharmacy and store it for future use. This is comparable to a study done by Shaik Mohamed Shamsudeen *et al*. in which 80.2% of the study group opted selection of antibiotics from their previous prescription from dental or medical professional, while the remaining study group opted friends, family, online, and advertisements as other sources. The major reason contributing here could be that, during the recent pandemic (COVID 19) less access to hospitals led many to obtain medications from nearby pharmacies without consulting physicians. Moreover many find it convenient and time saving to get antibiotics by themselves either from previous experience or from friends and relatives instead of waiting in long queues in hospitals.

In the light of a study done by Hidayah Karuniawati *et al*. in which more than 45% of respondents considered taking antibiotics to speed up recovery from a cold, which was found to be similar to the results of this study. This may be because of easy availability of antibiotics from pharmacies as a result of poor dispensing regulations in our country. More policies targeting the surveillance of antibiotics and its use must be enforced to prevent SMA. The study concluded a significant positive correlation between respondents' antibiotic knowledge score with their attitude score (*p*<0.0102). The findings were homogenous to a study done by Ka Keat Lim *et al*. Poor knowledge about self-medication with antibiotics and its maleficent effects were found to be a major contributing factor for inappropriate attitude and practice. Greater access to the internet and other social means tends to be a contributing factor for SMA in educated populations. Sometimes even lack of time to visit a doctor could be a contributing factor for SMA. This was similar to a study conducted by Carla.F.Rodrigues.

Health care providers play an important role in controlling AMR such as improving patients' attitude towards use of antibiotics.

Through the use of patient information leaflets and counseling regarding SMA, the general public will be able to improve their knowledge and attitude and will be able to reduce AMR which is prevalent. The feedback after counseling was also useful to check whether there is improvement in their knowledge and attitude.

There are several limitations in this study. Similar to all self-administered public surveys, the accuracy of the results was heavily dependent on the honesty and understanding of the respondents. Selection bias might occur due to convenience sampling. As the study was conducted in a local community setting, the findings may not be generalized to the whole country or region.

CONCLUSION

The term self-medication with antibiotics refers to the use of antibiotics without prescription from an authorized physician. Self-medication with antibiotics is the main cause for antimicrobial resistance (AMR). This study identified the knowledge and attitude gaps in the public about the attitude of antibiotic use. Self-medications with antibiotics are increasing day by day which may be the result of poor health facilities, higher cost, accessibility etc. This study identified that the use is increasing majorly in educated populations, more exposure to internet and other media can be a major factor contributing to the use of antibiotics without prescriptions. Majority of the patients tend to use antibiotics that has been prescribed to them previously or getting opinions from friends and family. Time constraint and distance to reach a hospital or any other healthcare facility to get a prescription encourages a person to get an antibiotic from a nearby pharmacy without a prescription. Poor dispensing regulations and lack of guideline-based practices can also be considered as major factors towards the use of self-medicated antibiotics. These kinds of antibiotics misuses can only be restricted by implementing strict law and regulations for sale and purchase of antibiotics. And additionally recording the dispensed amount of antibiotics and tracking their use will help in limiting the self-medication with antibiotics. Among the interventions developed towards limiting the use of antibiotics without prescription educational awareness and counselling can be considered to have a major effect. Educational programmes can focus on the potential harms of self-medication with antibiotics and counselling the general public about the new pandemic "Antibiotics Resistance" Development of better tools and policies in collaboration with global data can help to tackle and track drug resistance patterns. In order to curb the practice of self-medication with antibiotics the 4 Ps approach can be implemented.

Physician based approach to limit superfluous prescriptions.

Pharmacist based approach to educate and rationalize antibiotic use and strictly stopping dispensing of antibiotics without a prescription from authorised physician.Policy based approach by strict implementation of laws.Patient based approach by not stocking antibiotics for future use and completing the course of antibiotics.

ACKNOWLEDGEMENT

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

SMA: Self-Medicated Antibiotics; **KAP:** Knowledge, Attitude, Practice; **GLM:** General Linear Model; **AMR:** Anti-microbial Resistance.

SUMMARY

A strong association exists between knowledge and attitude of self-medicated antibiotics in the community setting. The major factors contributing towards SMA was found to be literacy level, prior experiences, lack of time and age. Significant interventions towards limiting the use of SMA and its maleficent effect should be given prior importance. This includes communal counselling by trained healthcare professionals, strict enforcement of laws and proper dispensing regulations.

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