Original Research Article

Self-medication with antibiotics among patients attending a Malaysian primary care clinic: a preliminary study

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ABSTRACT

Background: Research on self-medication with antibiotic in Malaysian primary care clinics are limited. This study aimed to assess the practice of self-medication with antibiotic, self-recognized complaints to self-medicate, antibiotic knowledge, attitudes towards antibiotic and potential association to self-medicate in a primary care clinic.
Methods: This was a community-based pilot study using a self-administered questionnaire among 281 respondents. Chi square test and independent T test were performed to identify potential associations to self-medication.
Results: The prevalence of self-medication with antibiotic was 13.3%. The most common complain to self-medicate was for upper respiratory tract infection (58.8%). Majority of them were able to self-purchased antibiotics (55.9%). 70.6% of respondents who SMA understood that overuse of antibiotic results in antibiotic resistance. Interestingly, antibiotic knowledge among respondents who self-medicate was higher (6.50 ± 1.93) compared to those who did not (5.85 ± 2.46) albeit not statistically significant. However, respondents who self-medicate had poorer attitude towards antibiotic compared to those who did not and this was statistically significant, t (254)=0-4.25, p=0.0001. 95% CI (-4.653, 1.709). This includes keeping antibiotics at home and using leftover antibiotics for respiratory illness.
Conclusions: Self-medication with antibiotic in this population is low. Inappropriate attitude towards antibiotic is associated with self-medication with antibiotic. Antibiotic campaigns should focus on improving the community's attitude towards antibiotic especially pertaining to educating the public against keeping antibiotic at home and using leftover antibiotics for upper respiratory tract infection. The findings demonstrated the need and feasibility of the study protocol for future research.

Keywords: Antibiotic, Attitude, Knowledge, Primary care, Self-medication

INTRODUCTION

Self-medication is defined by the World Health Organization (WHO) as a practice whereby a patient voluntarily treats a self-recognized illness with medicine that is approved to be used as professionally directed.[1] Appropriate self-medication has gradually become an integral part of patient self-care as it promote patient empowerment in decision making.[1] Self-medication is a common practice in developing countries and to a certain extent approved by local health authorities, as economic capabilities and accessibilities to health facilities are restricted.[2] However, self-medication practice should only encompass the use of non-prescription drugs and this should never include antibiotics. Nevertheless, previous study has demonstrated that more than 50% of total antibiotic consumptions are self-purchased over the counter (OTC).[3] Self-medication with antibiotics (SMA) is defined as self-administering antibiotics with the aim of treating a perceived infection without consultation by a qualified medical practitioner.[4] This may include purchasing antibiotics OTC from the pharmacy without prescription, purchasing antibiotics from a private clinic without doctor's consultation, consuming left over antibiotics and using other people's antibiotic prescription such as from family members.[5]

SMA is rampant across Malaysia's neighbouring countries such as Indonesia, Vietnam and Thailand.[6] The most common reported conditions to SMA is viral upper respiratory tract infection (URTI) which commonly presents in primary care clinics.[7] Therefore, 80% of SMA occurs in the community setting.[7] However, the incidence of SMA among Malaysian in primary care clinics is unknown. Research on SMA is essential as it is the most common inappropriate usage of antibiotic in developing countries. Patients who SMA with antibiotics often chose an incorrect group of antibiotics that is not targeted to the infection. They also commonly take antibiotics with insufficient dosage, shorten the duration of treatment and most importantly, consume antibiotics for a viral aetiology.[6]

Therefore, SMA is one of the most significant causes to the growing antimicrobial resistance around the world.[8] Antimicrobial resistance is a phenomenon whereby an antibiotic, which at its therapeutic level was once able to eradicate bacteria, has lost the ability to do so. SMA which is commonly misused coupled with antibiotic inevitable transmissible loss of efficacy over time will hasten the development of resistance.

SMA can also expose patients to harmful consequences such as anaphylactic shock, drug-drug interaction and antibiotic side effects. It can also mask a sinister underlying diagnosis such as malignancy. SMA has also been associated with the delay in the diagnosis and treatment of pulmonary tuberculosis from patients self-treating for chronic cough.[9,10] Such delay may not only worsen prognosis but also spread the infections to individuals who are in close contact. To halt the progression of injudicious use of antibiotics, factors associated with SMA should be identified to design a targeted antibiotic campaign. Poor attitude towards antibiotic has been associated with poor health seeking behavior.[11]

Lack of antibiotic knowledge has also been shown to be a major factor responsible for the inappropriate usage of antibiotic.[12] However, good antibiotic knowledge have also been found to be associated with SMA whereby patients felt a false sense of confidence that they do not require a physician's assessment.[8]

To date, research on SMA among primary care patients in the Malaysian population is limited. Therefore, this preliminary study aimed to assess the practice of SMA in a primary care clinic, common self-recognized complaints to SMA, antibiotic knowledge, attitude towards antibiotics and potential associated factors to SMA.

METHODS

This was a community based, descriptive pilot study conducted among patients attending a primary care clinic situated in a semi-urban population in the state of Selangor, Malaysia. Sample size calculation was done using proportion formula from OpenEpi, Version 3, open source calculator. According to a latest systemic review and meta-analysis, the prevalence of SMA in developing countries was 38.8% with 5% absolute precision, a total of 255 patients are needed to achieve 95% confidence level.[6] 10% non-response rate was incorporated in the calculation giving a total of 280 samples.

Respondents were recruited using a non-probability sampling. Respondents who were more than 18 years old, able to understand English and Malay and have heard the term "antibiotics" were included in the study. Respondents who were medical students, health care worker, mentally challenged and acutely unwell were excluded.

Data collection was conducted between June until August 2017. The questionnaire used for this study originates from Lim et al and was previously translated and validated into Malay language which is the national language of Malaysia.[5]

The questionnaire consists of four parts which consist of sociodemographic (part 1), source of antibiotic (prescribed or SMA) and reasons to consume antibiotics (part 2), antibiotic knowledge (part 3) and attitude towards antibiotics (part 4). Respondents who reported SMA may include purchasing OTC antibiotics without prescription at the pharmacy or any private clinics without consulting the doctor, using some else's antibiotics, or consuming leftover antibiotics.

Part three of the questionnaire test the respondents' antibiotic knowledge which consists of 12 questions. Respondents were asked to answer either yes, not sure or no to each of the statements. Each correct answer was given 1 mark and respondents could score from '0' to '12'. Part four tests the respondents' attitude towards antibiotic and it consists of eight statement items. The response to each item follows a 5 points Likert Scale i.e. strongly agree, agree, not sure, disagree and strongly disagree.

The Cronbach's alpha for Part three (antibiotic knowledge) and Part four (attitude towards antibiotic) were acceptable at 0.68 and 0.74, respectively.[5] Data was entered and analysed using SPSS version 23. Descriptive analysis was expressed using frequency (n), percentages (%) and mean with standard deviation. Data normality checking was performed. Independent t-test and Chi square test were carried out for continuous and categorical data respectively to identify potential association between SMA and independent variables. The level of significance was set at $p < 0.05$.

The study was approved by the institutional research committee. All respondents who consented to the study were given a patient information sheet and informed consent was taken. Participation is voluntary.

RESULTS

A total of 256 samples were obtained for analysis. The prevalence of SMA in this population was 13.3%. The mean age of the participants was 53.6±13.9 years old.

Table 1: Sociodemographic characteristics.

Variables	SMA (n=34) N (%)	Non-SMA (n=222) N (%)	Total (n=256) N (%)
Age group (year)			
18-30	4 (17.4)	19 (82.6)	23 (9)
31-40	4 (14.3)	24 (85.7)	28 (10.9)
41-50	2 (5.6)	34 (94.4)	36 (14.1)
51-60	12 (16.7)	60 (83.3)	72 (28.1)
>60	12 (12.4)	85 (87.6)	97 (37.9)
Gender			
Male	17 (13.6)	108 (86.4)	125 (48.8)
Female	17 (13)	114 (87)	131 (51.2)
Highest education level			
None	0 (0)	2 (100)	2 (0.8)
Primary school	3 (13)	20 (87)	23 (9)
Secondary school	13 (12.7)	90 (87.3)	103 (40.2)
College	18 (14)	110 (86)	128 (50)
Employment status			
Employed	14 (14.4)	83 (85.6)	97 (37.8)
Unemployed	20 (12.6)	139 (87.4)	159 (62.1)
Family member as HCW			
Yes	14 (18.4)	62 (81.6)	76 (29.7)
No	20 (11.1)	160 (88.9)	180 (70.3)
Chronic disease			
Yes	23 (13.6)	146 (86.4)	169 (66)
No	11 (12.6)	76 (87.4)	87 (34)

There was almost an equal distribution between genders among respondents who SMA and who did not. 18.4% of respondents who SMA had a first-degree family member working as a health care worker. However, no statistical significance was found between the sociodemographic characteristics between respondents who SMA and did not. Table 1 summarizes the sociodemographic characteristics of respondents who SMA, did not SMA and the whole study population. However, this was found not to be statistically significant, t (254)=1.47, p=0.143. 95% CI (-0.220,1.518). Table 5 summarizes the mean scores of antibiotic knowledge and attitude towards antibiotic among respondents who SMA and those who did not.

Sources of antibiotic to SMA

60% of respondents who SMA purchased OTC antibiotic at the pharmacy. This is followed by consuming left-over antibiotic (20.6%) and purchasing antibiotics from private clinics without seeing the doctor (17.6%). Only 6% of them SMA by using someone else's antibiotics such as from family members or friends.

Table 2: Self-recognized complaints to SMA.

Complaints	Frequency N (%)
Urinary tract infection	2 (5.9)
Fever	18 (52.9)
Upper respiratory tract infection	20 (58.8)
Skin problems / wound	5 (14.7)
Pain / inflammation	2 (5.9)
Others	2 (5.9)

Table 3: Antibiotic knowledge among respondents who SMA.

Knowledge domain	Statements	Correct (%)	Incorrect N (%)
Identification of antibiotic	Antibiotics are the same as medications used to relieve pain and fever such as aspirin and paracetamol. (Panadol)	23 -67.6	11 -32.4
	Penicillin is an antibiotic	9 -26.5	25 -73.5
Role of antibiotic	Antibiotics are medicine that kill bacteria	30 -88.2	4 -11.8
	Antibiotics can be used to treat viral infections	7 -20.6	27 -79.4
	Antibiotics work on most colds and cough	8 -23.5	26 -76.5
Good bacteria	Antibiotics can kill bacteria that normally live on the skin and gut	19 -55.9	15 -44.1
	Bacteria that normally live on your skin and gut, are good for your health	18 -52.9	16 -47.1

Continued.

Knowledge domain	Statements	Correct (%)	Incorrect N (%)
Adverse effects	Antibiotics may cause allergy reactions	27	7
		-79.4	-20.6
	Antibiotics do not cause side effect	18	16
		-52.9	-47.1
	Overuse of antibiotics can cause the antibiotics to lose effectiveness in long term	24	10
		-70.6	-29.4
Administration of antibiotic	It is okay to stop taking an antibiotic when symptoms are improving	16	18
		-47.1	-52.9
	Taking less antibiotic than prescribed is more healthy then taking the full course prescribed	22	12
		-64.7	-35.3

Table 4: Attitude towards antibiotic among respondents who SMA.

Statements	Appropriate N (%)	Inappropriate N (%)
When I get a cold, I will take antibiotics to help me get better more quickly	11 (32.4)	23 (67.6)
I expect antibiotic to be prescribed by my doctor if I suffer from common cold symptoms	5 (14.7)	29 (85.3)
I normally stop taking antibiotic when I start feeling better	15 (44.1)	19 (55.9)
If my family member is sick I usually will give my antibiotics to them	28 (82.4)	6 (17.6)
I normally keep antibiotic stock at home in case of emergency	25 (73.5)	9 (26.5)
I will use leftover antibiotic for a respiratory illness	21 (61.8)	13 (38.2)
I will take antibiotic according to the instruction on the label	31 (91.2)	3 (8.8)
I normally will look at the expiry date of antibiotic before taking it	28 (82.4)	6 (17.6)

Table 5: Association between antibiotic knowledge and attitude with SMA.

Variables	SMA Mean (SD)	Non-SMA Mean (SD)	P value
Attitude towards antibiotic	26.76(4.25)	29.95(4.03)	0.0001
Knowledge on antibiotic	6.50(1.93)	5.85(2.46)	0.143

Antibiotic knowledge among respondents who SMA

Unfortunately, only 20.6 % of respondents who SMA were aware that antibiotics cannot treat viral infection and 23.5% do not think that antibiotics are used for cough and colds. 64.7% would finish their course of antibiotics. Interestingly, despite self-medicating themselves with antibiotic, 70.6% understood that overuse of antibiotic results in antibiotic resistance. Table 3 summarizes the antibiotic knowledge among respondents who SMA.

Attitude towards antibiotic among respondents who SMA

When looking at the attitude of respondents who SMA, 67.6% felt that if they get a cold, antibiotics will help them recover faster. Meanwhile, 17.6% would give their antibiotics to unwell family members and 26.5% would keep antibiotics stock at home just in case they ever get sick. 38.2% would use leftover antibiotics to self-treat respiratory illnesses. Table 4 summarizes the percentages of appropriate and inappropriate attitude response for each statement.

Association between antibiotic knowledge and attitude when handling antibiotic with SMA

The mean attitude and knowledge score among respondents who SMA were 26.76±4.25 and 6.50±1.93 respectively. Respondents who SMA were found to have more inappropriate attitude when handling antibiotics compared to those who did not and this was found to be statistically significant t (254)=-4.25, p=0.0001. 95% CI (-4.653, 1.709). Interestingly, respondents who SMA were found to be more knowledgeable on antibiotics (M=6.50, SD=1.93) compared to those who received their antibiotics from prescription (M=5.85, SD=2.46).

Table 6: Attitude items associated with SMA.

Attitude statement	SMA Inappropriate Response n (%)	Non-SMA Inappropriate Response n (%)	x^2 (df)	P value
When I get a cold, I will take antibiotics to help me get better more quickly	23 (67.6)	118 (53.2)	2.503 (1)	0.114
I expect antibiotic to be prescribed by my doctor if I suffer from common cold	29 (85.3)	165 (74.3)	1.933 (1)	0.164
I normally stop taking antibiotic when I start feeling better	19 (55.9)	105 (47.3)	0.870 (1)	0.351
If my family member is sick I usually will give my antibiotics to them	6 (17.6)	17 (7.7)	3.598 (1)	0.058
I normally keep antibiotic stock at home in case of emergency	9 (26.5)	15 (6.8)	13.487 (1)	0.001
I will use leftover antibiotic for a respiratory illness	13 (38.2)	21 (9.5)	21.198 (1)	0.001
I will take antibiotic according to the instruction on the label	3 (8.8)	13 (5.9)	0.443 (1)	0.506
I normally will look at the expiry date of antibiotic before taking it	6 (17.6)	19 (8.6)	2.764 (1)	0.096

Attitude items associated with SMA

Inappropriate attitude towards antibiotic appeared to have a significant relation with SMA. When dissecting each attitude statements among respondents, it was found that respondents who SMA were significantly associated with stocking up antibiotics at home to self-treat themselves later and using left over antibiotics to self-treat URTI symptoms. Table 6 summarizes the association between each attitude item and SMA.

DISCUSSION

Low prevalence of SMA

The preliminary findings of SMA in this population was found to be low compared to other Malaysian neighbouring countries (13.3%). Nevertheless, it is approximately one third of the prevalence in Asian countries (38%).[6] Previous studies have described inconsistent results on the prevalence of SMA ranging from 19.1% in European countries and as high as 91.4% in Nigeria.[13]

The difference in prevalence of SMA may be due to the difference in education level, health literacy, socio-economic status and study design. However, SMA was found to be generally higher in lower income population. For an example, Yemen reported 60% prevalence of SMA among parents to young children.[14] While in New York, 67.2% of urban dwelling Latinas were found to SMA.[15]

The low prevalence of SMA in this study population might be explained by the health care system in Malaysia which is heavily subsidized by the government. Universal health access allows for the country to impose a minimum of RM1 (0.24 USD) to receive a full package of consultation, investigations and medications in government primary care clinics.

While in the local pharmacies, a strip of a broad-spectrum antibiotics such as Amoxicillin Clavulanate may cost up to RM70 (17USD) to RM80 (19.53USD). The marked difference in cost may have discouraged patients from purchasing antibiotics OTC. Nevertheless, because the health care system is financially accessible to everyone, long waiting time has been a frequent complaint.[16] This may encourage some patients to purchase antibiotics OTC to save time and avoid the trouble of waiting long hours.

In low income countries, user fees is an important source of financing the public health care services.[17] A user fee is a payment imposed on a patient to use the health care facility. Poor economic opportunities and lack of government subsidization may cause health care access to become a financial burden.[17] Therefore, in lower income countries SMA by purchasing OTC antibiotic is far more affordable compared to a consultation visit. Poor geographical accessibility to health care is also another factor to the high prevalence of SMA in low-income countries. The urban-rural disparity of health care access results in long travelling hours to health care facility.[17,18]

Transportation also imposes a challenge as these countries are not usually connected by roads making clinic visits to become expensive due to transportation cost and pay cuts from days off from work. Local drug store is often located in closer proximity compared to their healthcare services.[17] In most of these countries,

local pharmacist are the only health care personnel that they could afford to make contact with.[17]

Inappropriate attitude towards antibiotic is associated with SMA

Inappropriate attitude towards handling antibiotic is associated with SMA in this population. Similar findings were also found in China and Northwest Nigeria.[12,19] Stocking antibiotic at home potentiates SMA. Similar finding was also demonstrated in other studies.[20,21] In Wuhan, female respondents, having parents who are educated with medical background and residing in urban areas were associated with keeping antibiotics at home.[13] Among 19 European countries, the combination of stocking antibiotics and intended self-medication was found to be a strong independent predictor to SMA in the previous one year.[4] Left over antibiotic may originate from unfinished previous prescription due to patient non-compliance to the advised dosage and frequency.[22] In developed countries, most of the left over antibiotics kept by patients are from previous prescription by doctors.[23] However in developing countries, the scenario is unique in that left over antibiotics may originate from previous prescription as well as OTC purchases due to absence of prescription only policies or lack of enforcement.[24] This is reflected in this study population whereby 60% of respondents were able to purchase antibiotic OTC without prescription and 20.6% SMA with left over prescription. Patients may also obtained left-over antibiotic from over-dispensing such as receiving a whole package of blister packaging from the pharmacist.[21]

In Lithuania and Italy, where antibiotics are dispensed in whole packages, more people are in possession of left-over antibiotics. As a result, the prevalence of SMA among the population are alarming in these countries.[25] Blister packaging is less expensive to produce, protects each tablet from environmental hazards and it facilitate compliance as it helps patients to keep track of their medication. However, the disadvantage of blister packaging is patients are more likely to receive more antibiotic capsules than the precise amount.[21]

URTI symptoms are one of the most common illness for patients to SMA in South East Asia.[8] In this study, 60% of the respondents SMA for symptoms related to URTI. This is alarming as most URTI infections are viral in origin. 79.4% of respondents believe that antibiotic is effective to treat viral infections and 76.5% of them thinks that antibiotic is the treatment of choice for common colds. Respondents who SMA was found to have better antibiotic knowledge compared to those who did not albeit not having statistical significance. Many antibiotic campaigns addresses the theoretical aspect of the knowledge on antibiotics.[26,27] However, knowledge alone may not be sufficient enough to promote appropriate attitude when handling antibiotic.[26] Previous study has demonstrated that good antibiotic knowledge among the general population is associated with increased usage of antibiotic.[11] There are also evidence stating that patients may have this notion that they do not require professional consultation for common illnesses such as URTI as they perceive to have good antibiotic knowledge and doctors will prescribe antibiotics anyway.[8,25]

Clinical recommendations

Legislation enforcement

Despite the availability of regulation against selling antibiotics OTC in Malaysia, the legislation is not widely enforced as patients are able to purchase non-prescribed antibiotics without much impediment. In China, several drug stores continue to illegally sell antibiotics because they are driven by profits and demand from customers. They claim to be unaffected by the light punishment imposed by the country.[13] In Romania, lack of strict national regulation on selling antibiotic OTC was found to be significantly associated with the high prevalence of SMA.[28] In many low income countries, the situation is almost similar whereby there are lack of monitoring and law enforcement.[29] The initial step towards legislation enforcement is detection. Systematic auditing should be conducted by local authorities to monitor antibiotic dispensing in pharmacies especially in private owned drug stores. A centralized electronic data base should be implemented to supervise all antibiotics that are being prescribed and sold OTC in the country.

Returning unused antibiotics

Antibiotics that have not been used should be collected to avoid patients keeping left over antibiotics. Inappropriate disposal may also cause ocean pollution.[30] For example, returning unused antibiotics to the pharmacy is a common practice among the Portuguese and Swedish population.[31,32]

Highlighting SMA in antibiotic stewardship programmes

In Malaysia, SMA is not given much emphasis in stewardship programmes. This is most probably because local data on SMA is scarce. But this does not mean that it is not happening. The community should be made aware that SMA is potentially dangerous and significantly contributes towards antibiotic resistance. Antibiotic campaign should be targeted on improving the community's attitude toward handling antibiotics especially against keeping antibiotics at home and using left over antibiotics to self-treat URTI.

CONCLUSION

SMA among patients attending this primary care clinic in this population is low compared to its neighbouring countries. Inappropriate attitude towards antibiotic is associated with SMA whereby patients are more likely to keep antibiotic at home and using left-over antibiotics to self-treat URTI. The findings from this study may

contribute to preliminary ideas in the planning of educational and regulatory interventions to curb irrational use of antibiotics. The study protocol demonstrated feasibility to conduct a more robust sample size in multiple study setting that is more representative of the Malaysian population. This may allow for the identification of predictors to patients who would SMA.

ACKNOWLEDGEMENTS

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