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Evaluation of knowledge, attitude and practices of university students towards rational use of medicines

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ABSTRACT

Background: Rational use of medicines (RUM) requires that individuals get the correct medication, in the accurate dose, for an adequate period and at the lowest cost. Irrational drug use has a negative impact both on health and the economy. Hence, this study aimed to assess the knowledge, attitude and practice for the rational use of medicine among university students in a public university in Malaysia. *Methods:* The cross-sectional descriptive study was piloted using a validated self-administered questionnaire to collect the needed data from students. All data were checked for completeness and accuracy and then coded for analysis. Descriptive statistics were used to present the data on demographic characteristics, knowledge, attitudes, and practice towards RUM. The influence of demographic characteristics on knowledge and attitude was tested using Fishers exact tests or Chi-square, Mann-Whitney test and Kruskal-Wallis test wherever appropriate considering a p value <0.05 as statistically significant. *Results*: Overall, 418 questionnaires were distributed to university students. The results of the study revealed that 54.9% of the students had a moderate; 38.2% had poor and only 6.9% had a good level of knowledge towards RUM. A high percentage (64.4%) knew that all medicines have side effects; however, (66.4%) thought that multivitamins are safe without any side effect. Half of the respondents could not differentiate a medicine by either its generic or brand name. Most of the respondents (77.9%) incorrectly stop taking medicines when they feel better. Respondents (67.9%) purchased medications only upon physicians' prescriptions. *Conclusion*: The

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outcomes revealed gaps in terms of knowledge, attitude and practice regarding the RUM among students. Educational strategies should target these gaps aiming at increasing awareness on RUM. Training on the proper use of medicines and reducing the practice of self-medication should be a part of the curriculum to enable informed decision-making at the individual, family, and community levels.

Keywords: Rational use of medicines; RUM, knowledge; attitude; practice; students; Malaysia

1. INTRODUCTION

Rational use of medicine (RUM) requires that individuals get the correct medication, in the accurate dose that fulfills their individual needs, for an adequate period and at the lowest cost (Mahmood *et al.,* 2016). RUM brings healthcare resources within the range of the deprived population by decreasing costs; hence, providing access to essential medications that are a basic right of every human. The RUM contributes significantly in high-quality healthcare provision; however, irrational use leads to associated health risks and depletion of resources. As per a report by the World Health Organization (WHO), approximately half of the medications are recommended, dispensed, or sold inaccurately, whereas half of the patients do not take their medications adequately as prescribed to them (Jain *et al.,* 2015). The rise in irrational usage of drugs is due to specific reasons that include; ambiguous/incorrect beliefs, insufficient knowledge of the users, prescribing burdens on physicians, the profit-driven attitude of prescribers, advertising events by the pharmaceutical industry, and absence of implementation of protocols by regulatory authorities. Providing education to all concerned in the correct use of medications is a significant strategy to resolve an issue of irrational use (Bajait *et al.,* 2014). Essential medicines, a keystone of RUM are defined as those drugs that fulfill the healthcare requirements of the mainstream population. The concept was introduced by the WHO in 1975; as a major step to encouraging RUM. Essential medicines lists have been shown to advance the quality and cost-effectiveness of healthcare provision when united with appropriate procurement strategies and correct prescribing practices (Kar *et al.,* 2010).

RUM interventions focusing on healthcare professional prescribing can partially increase the appropriate use of medications. Since some common types of patient behavior likewise, play a major role in promoting the irrational use of drugs. Self-medication is among the most common drift, and individuals often trust informal drug distribution networks equally as on the drugs prescribed and provided by skilled healthcare professionals. Self-medication is mainly an issue in under developed nations in which pharmacies without restrictions supply prescription drugs, as do informal drug shops and small groceries (Ranganathan *et al.,* 2015). Besides, individuals retain stocks of left over medications in their households, and re-use them or provide them to relatives or neighbors who demand them. The option of purchasing drugs through the Internet is likewise a common practice and provides means by which medications that are accessible only on prescription in one state can be purchased online from another state where drug regulations are not as strict (Sumaila *et al.,* 2018). Users have their individual motives for consuming medications the way they do; based on health beliefs, social and cultural rules, experience, financial earnings, and psychological aspects (Bajait *et al.,* 2017). To identify the scope of irrational use of medications, we must recognize the awareness of the matter among the young population. Hence, the current study aimed to assess the knowledge, attitude and practice for the RUM among university students of a public university in Malaysia.

2. MATERIALS AND METHODS

This was a cross-sectional descriptive study, using a pre-validated self-administered using multiple-choice questions (MCQs) questionnaire developed to collect the data from university students. The study was conducted from December 2017 until May 2018. The questionnaire was adapted and modified based on previous studies (Remesh *et al.,* 2013; Dakhale *et al.,* 2016; El Ezz *et al.,* 2011). The survey was composed of four parts include: the first part inquired about the socio-demographic characteristics of respondents, the second part included eleven questions to evaluate the knowledge of university students about RUM, the third part included twelve questions to assess the attitude and the fourth part included nine questions to explore students' practice and their reliable drug information sources. For the knowledge section, 1 point was assigned for every correct answer while 0 point for wrong and not sure answers. An arbitrary scale measurement was used to determine university students' knowledge level as poor (Score: 0-4), moderate (Score: 4-8) or good (Score: 9-11) based on their total scores in the section. The students' attitudes toward medicine usage were assessed by using a five-point Likert scale that ranges from "Strongly agree" to "Strongly disagree". To simplify the analysis, "Strongly agree" and "Agree" were categorized as having agreed and those who responded "Strongly disagree and "Disagree" as having disagreed. The fourth part contained the questions to assessed medicines usage, respondents' practices of medicines storage at home, ways of dealing with leftover medicines and their reliable drug information sources. The internal

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reliability testing was calculated using Cronbach alpha and the value for the reliability was found to be 0.766, which is acceptable to accomplish the goals of the present study. A minimum sample size of 385 was calculated by using sample size calculator (Omair, 2014) with a confidence interval at 95% and margin of error of 5%(11). A total of 418 students were selected as a simple random sample considering a 10% non-response rate.

Statistical analyses

Descriptive statistics were used to present the data on demographic characteristics, knowledge, attitudes and practice towards medicine use. The influence of demographic characteristics on knowledge and attitude was tested using Fishers Exact tests or Chi-Square, Mann-Whitney test and Kruskal-Wallis test wherever appropriate considering ap value <0.05 as statistically significant. Spearman rank correlation was used to evaluate the direction and scope of the association between knowledge and attitudes. SPSS version 24.0.0 (SPSS, Inc., Chicago, IL, USA) was used for data management and statistical analysis.

3. RESULTS

Demographic characteristics of respondents

Overall, 418 questionnaires were distributed to the students. However, 28 of the questionnaires were found to be filled partially; hence were excluded from the study. The response rate of the current study was 93.3%. The sample was largely female (n=259; 66.4%) while male consisted of (n=131; 33.6%), (Table 1). The majority of the respondents (n=320; 82.1%) were over 20 years of age while the rest (n=70; 17.9%) were less than 20 years. A high percentage of respondents (n=202: 51.8%) were from Malay followed by Chinese (n=146; 37.4%), Indians (n=14; 3.6%) and others (n=28; 7.2%). The respondents (n=174: 44.6%) fall in the family monthly income range of 1000-3000 RM.

Table 1 demographic characteristic of respondents

Characteristics	n (%)
Age	
< 20 years old	70(17.9)
> 20 years old	320(82.1)
Gender	
Male	131(33.6)
Female	259(66.4)
Race	
Malay	202(51.8)
Indian	14(3.6)
Chinese	146(37.4)
Others	28(7.2)
Family monthly income	
<1000 RM	114(29.2)
>1000-3000 RM	174(44.6)
>3000 RM	102(26.1)
Respondent's nationality	
Malaysian	364(93.3)
Others	26(6.6)
Respondent's schools	
Humanities school	21(5.3)
Industrial technology school	22(5.6)
Chemistry school	22(5.6)
Mathematics school	23 (5.8)

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Physics school	25(6.4)
Social sciences school	25(6.4)
House building and planning school	27(6.9)
Arts school	32(8.2)
Communication school	32(8.2)
Computer sciences school	35(8.9)
Biology school	40(10.2)
Education school	40(10.2)
Management school	46(11.7)

Students' Knowledge of proper use of medicines

Based on scores and arbitrary scale measurements, the study found that the respondents (n=214; 54.9%) had a moderate level of knowledge on the proper use of medicines while (n=149; 38.2%) had poor and only (n=27; 6.9%) had a good level of knowledge. The mean knowledge score was 5.3(±2.126) of all 11 knowledge items. The knowledge level of respondents was significantly associated with respondents' race *(p=0.009)* and respondents' school group *(p=0.004)* (Table 2). There was a significant difference between the Chinese and Malay race groups in terms of knowledge level *(p=0.033)* with median knowledge scores in Chinese and Malay race groups were 6 and 5 respectively. A significant difference was observed among females and males (78.4% vs. 63.4%) who correctly identified that some common cold medicines may cause drowsiness *(p=0.002)*, furthermore a positive weak correlation with gender group (*p=0.001*; r=0.16) was noted. However, (n=304; 77.9%) respondents incorrectly thought of stop taking prescribed medicine when symptoms disappear. Malay ethnic group (22.8% vs. other races > 35%) correctly identified the parenteral dosage forms (injections) as the most risky dosage form (*p<0.001*, r=0.2). A high percentage (n = 251; 64.4%) of respondents knew that all medicines have side effects with the significant difference observed among race group, Indian (71.4%, vs. others <35%; *p = 0.028*) responded incorrectly. However, the respondents (n = 259; 66.4%) thought that multivitamins are safe without any side effect with significant difference among Indian (78.6% vs. others < 75%; *p=0.002*); (n = 196; 50.3%) could not differentiate a medicine by either its genericor brand name (e.g. Panadol® and Paracetamol) (Table 3, figure 1 & 2).

Table 2 Association of demographic characteristics with level of knowledge

Characteristics	Level of Knowledge Frequency (%)			P value
	Poor	Moderate	Good	
Age				
<20 years old	22 (5.6)	42 (10.7)	6 (1.5)	0.413
> 20 years old	127 (32.5)	172 (44.1)	21 (5.3)	
Gender				
Male	56 (14.3)	66 (16.9)	9 (2.3)	0.408
Female	93 (23.8)	148 (37.9)	18 (4.6)	
Race				
Malay	86 (22.0)	105 (26.9)	11 (2.8)	0.009*
Indian	4 (1.0)	10 (2.5)	0 (0)	
Chinese	49 (12.5)	82 (21.0)	15 (3.8)	
Others	10 (2.5)	17 (4.3)	1 (0.2)	
Nationality				
Malaysian	138 (35.3)	200 (51.2)	26 (6.6)	0.775
Others	11 (2.8)	14 (3.5)	1 (0.2)	

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Family monthly income				
<1000 RM	53 (13.5)	57 (14.6)	4 (1.0)	
>1000-3000 RM	59 (15.1)	100 (25.6)	15 (3.8)	0.162
>3000 RM	36 (9.2)	56 (14.3)	10 (2.5)	
Respondent's school				
Management school	23 (5.8)	18 (4.6)	5 (1.2)	
Computer sciences school	11 (2.8)	22 (5.6)	2 (0.5)	
Humanities school	10 (2.5)	10 (2.5)	1 (0.2)	
Biology school	10 (2.5)	27 (6.9)	3 (0.7)	
Education school	9 (2.3)	29 (7.4)	2 (0.5)	
Communication school	16 (4.1)	16 (4.1)	0 (0)	
Arts school	11 (2.8)	20 (5.1)	1 (0.2)	0.004*
House building and planning school	16 (4.1)	9 (2.3)	2 (0.5)	
Social sciences school	7 (1.7)	18 (4.6)	0 (0)	
Industrial technology school	8 (2.0)	12 (3.0)	2 (0.5)	
Chemistry school	6 (1.5)	11 (2.8)	5 (1.2)	
Mathematics school	6 (1.5)	14 (3.5)	3 (0.7)	
Physics school	16 (4.1)	8 (2.0)	1 (0.2)	

*p value < 0.05 was considered as statistically significant

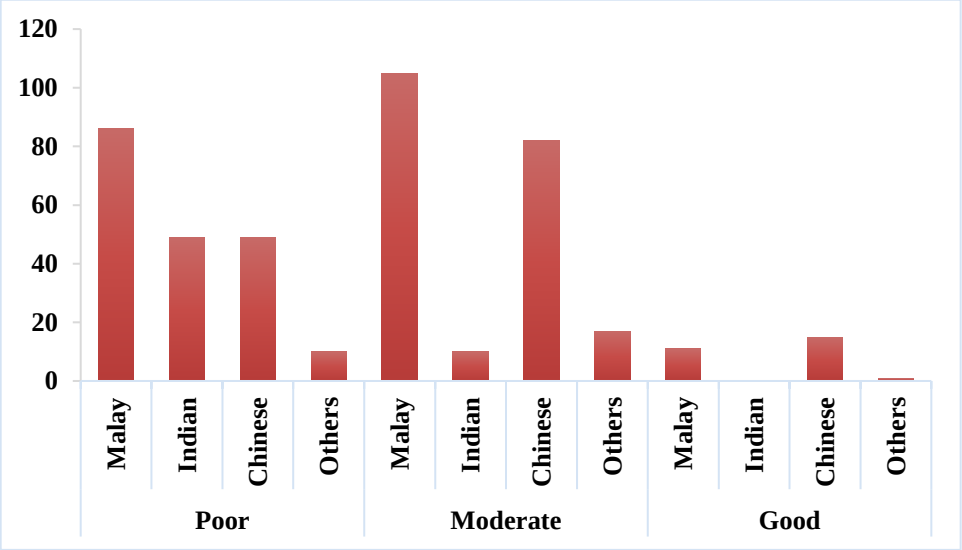

Figure 1 Association of race with level of knowledge (p < 0.05)

Students' attitude towards medication use

Based on scores and scale measurement of 12 sentences attitude (negative=1, neutral=2, positive=3). Minimum and the maximum value was in between (19-35) with mean 26.83 (+3.091), 95% CI (26.52 - 27.13), and median 27. Respondents (n=265; 67.9%) take medication only upon physicians' prescription. Around 55% of the respondents request the prescriber or pharmacist to explain the appropriate way to take the prescribed medications and inquire about the side effects. Half of the respondents comply with the drugs prescribed to them and take them timely at the recommended doses and frequency (Table 4).

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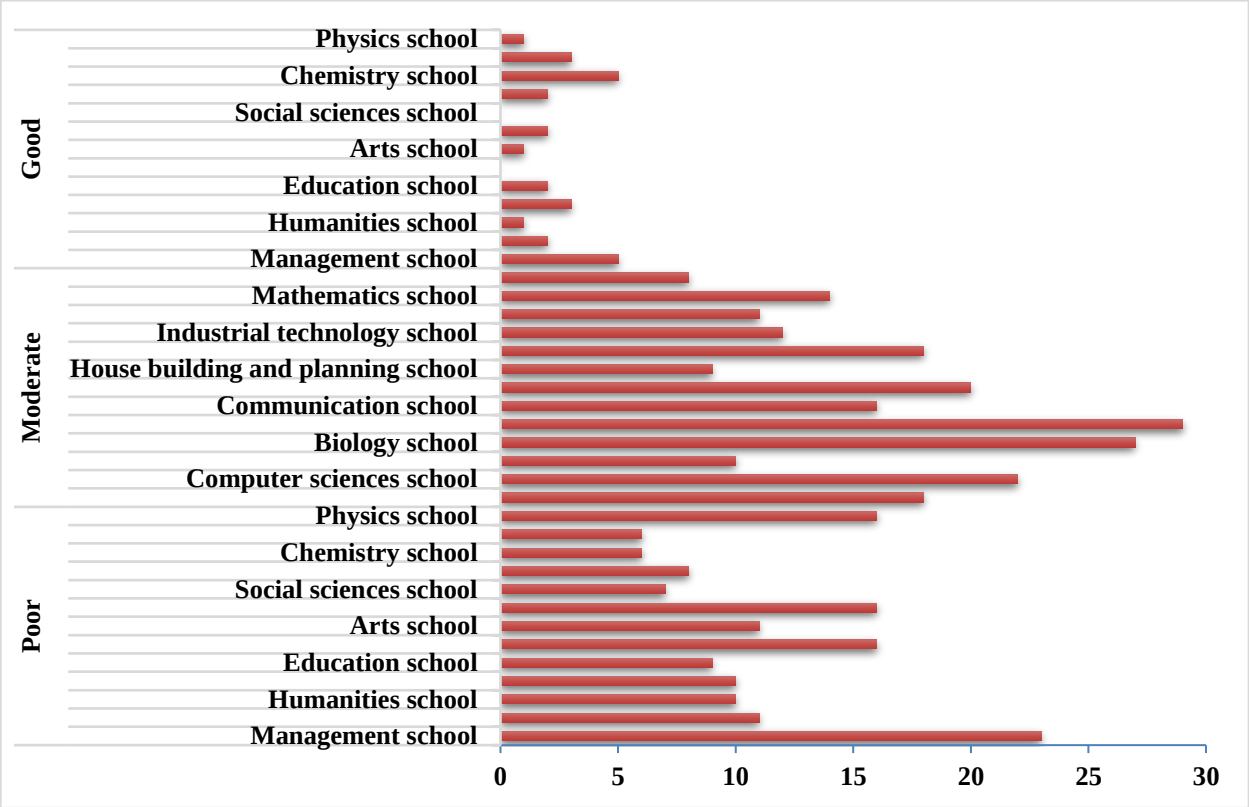

Figure 2 Association of respondents' school with level of knowledge ($p < 0.05$)

Table 3 Association of demographic characteristics with knowledge statements

Statement	Correct Answer	Incorrect Answer	Age	Gender	Race	School	Income
Knowledge towards medication use							
Do you know your medicines in terms of dose, frequency, duration?	152(38.9)	238(61)	0.41	0.827	0.35	0.004*	0.495
Can you differentiate a medicine by either its generic or brand name (e.g. Panadol and Paracetamol)	194(49.7)	196(50.3)	0.356	0.199	0.316	0.652	0.855
Do you stop taking the prescribed medicine when feel better or the symptoms disappear?	86(22.1)	304(77.9)	0.082	0.122	0.358	0.806	0.018*
Based on the current labeling for medicine, do you have trouble differentiating your medicines?	248(63.6)	142(36.4)	0.170	0.948	0.430	0.623	0.562
Knowledge about medication safety							
Do you know which the most risky dosage form is?	132(33.8)	258(66.2)	0.077	0.821	0.000*	0.250	0.530
Do you think that "Twice Daily prescribed medicines" can be taken three times a day for rapid improvement?	198(50.8)	192(49.2)	0.896	0.241	0.001*	0.256	0.002*
Knowledge about medication side effects							
Do you know that all medicines have side effects?	251(64.4)	139(35.6)	0.680	0.577	0.028*	0.136	0.105

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Do you know that all multivitamins are safe without any side effect?	131(33.6)	259(66.4)	0.677	0.307	0.002*	0.189	0.440
Knowledge about OTC medication							
Do you know that analgesics should be taken before meal or after meal?	165(42.3)	225(57.7)	0.285	0.914	0.640	0.321	0.515
Do you know that some cough preparation may cause drowsiness?	220(56.4)	170(43.6)	0.146	0.449	0.286	0.407	0.227
Do you know that some common cold medicines may cause drowsiness?	286(73.3)	104(26.7)	0.883	0.002*	0.113	0.111	0.370

*p value < 0.05 was considered as statistically significant

Table 4 Association of demographic characteristics with attitude statements

				P value				
Statement	Negative	Neutral	Positive	Age	Gender	Race	School	Income
Do you take medication only by physician's prescription?	265(67.9)	13(3.3)	112(28.7)	0.969	0.563	0.197	0.329	0.786
Do you accept if no medicine is prescribed for you and only advice and assurance are provided?	158(40.5)	62(15.9)	170(43.6)	0.688	0.146	0.880	0.227	0.748
Do you show compliance with your drugs prescribed and take the medicine timely at a recommended doses and frequency?	198(50.8)	23(5.9)	169(43.3)	0.211	0.652	0.879	0.225	0.009*
Do you ever chosen not to take a prescribed medicine?	58(14.9)	145(37.2)	187(47.9)	0.226	0.274	0.387	0.775	0.694
Do you inform the prescriber/ pharmacist about the drugs you are using currently?	197(50.5)	25(6.4)	168(43.1)	0.383	0.829	0.015*	0.187	0.263
Do you ask the prescriber/ pharmacist about the side effects of the prescribed drugs?	211(54.1)	25(6.4)	154(39.5)	0.810	0.955	0.093	0.556	0.234
Do you request the prescriber/ pharmacist to explain how to take the prescribed drugs?	211(54.1)	14(3.6)	165(42.3)	0.827	0.256	0.034*	0.695	0.023*
Do you ask the prescriber/ pharmacist where to store the prescribed drug at home?	141(36.2)	66(16.9)	183(46.9)	0.064	0.718	0.072	0.677	0.015*
Do you exchange your medicines with others?	176(45.1)	82(21)	132(33.8)	0.382	0.647	0.000*	0.471	0.133
Do you recommend medicines to others?	86(22.1)	143(36.7)	161(41.3)	0.102	0.276	0.001*	0.692	0.389
Do you consult pharmacist when practicing self-medication?	89(22.8)	99(25.3)	202(51.7)	0.138	0.175	0.001*	0.108	0.025
Do you choose self-medication according to promotion?	122(31.2)	112(28.7)	155(39.7)	0.729	0.197	0.000*	0.401	0.027*

*p value < 0.05 was considered as statistically significant

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Students' attitude in different knowledge level groups

There was a significant difference in attitude scores between all knowledge groups. Poor knowledge level has significant lower mean attitude score 25.86 (+ 2.981), 95% C.I (25.37-26.34) and median 25; moderate knowledge level has mean attitude score 27.24 (+ 3.00), 95% CI (26.84 - 27.65) and median 27 and good knowledge level has mean attitude score 28.81 (+2.774), 95% CI (27.72 -29.91) and median 29. Good knowledge group versus poor knowledge group (z = -4.451; $p < 0.001$), moderate knowledge group versus poor knowledge group (z = - 4.458; $p<0.001$), moderate knowledge group versus good knowledge group (z = -2.528;$p=0.011$).

Correlation between students' attitude and knowledge

There was a significant relationship between knowledge and attitude with a positive correlation ($p <0.001$, r=0.331). Most of the respondents (77.9%) had incorrect knowledge of stop taking medicines when they feel better; a positive correlation between knowledge and attitude was observed (r=0.108; $p=0.033$). It was observed that those with poor knowledge had a negative attitude towards medicine use. A weak positive correlation (r=0.115; $p=0.023$) was noted concerning those who knew that all medicines have side effects did not necessarily inquire about the side effects. Therefore, outcomes propose that better knowledge does not necessarily imply the correct attitude in terms of medicine safety. The ones who request the prescriber or pharmacist to explain the correct way of taking the prescribed drugs (54.1 %) were more compliant in term of drug regimen than who didnot ($p <0.001$, r=0.246).

Association of students' attitude with demographic characteristics

A significant correlation between respondents' attitude and race was observed towards the exchange medicines with others ($p=0.0001$), recommending medicine to others ($p=0.001$) and not to consult pharmacist when practicing self-medicatio n ($p=0.001$) (Table 4). The attitude towards practicing self-medication was significantly associated with their family monthly income and the respondents with family monthly income <1000 RM group mostly practice self-medication (34.2 %vs. others < 23%; p 0.025) with weak positive correlation ($p<0.002$; r = 0.159).

Students' practice of medicines

The respondents took medicines according to instruction on the label (33.4%), physician prescription (31.9%), and pharmacist counseling (22.3%) whereas 8.3% of respondents took medicines according to the advice of relatives and friends (Table 5). The respondents (n=166; 42.6%) store all medicines in the fridge and (n=72; 18.5%) in medicine's box and the others on a shelf, wardrobe, in a bag and adrawer. For dealing with leftover medicines (n=148; 38.1%) of respondents keep them for future use; however, 49.7% throw out leftover medicines, and only 12.1% return it to the pharmacy. The majority of respondents (n=325; 83.3%) were satisfied with the information that the physicians share with them whereas (n=287; 73.8%) need additional counseling from the pharmacist.

Table 5 Respondents' practice statements and drug information sources

Practice statements and drug information sources	n (%)
Currently taking the following preparations	
Multivitamins	172(44.1)
Herbal beverages	41(10.5)
Minerals	4(1)
Non-processed herbs	13(3.3)
Processed herbs (e.g. Ginseng's capsule)	13(3.3)
Not taking any of these	147(37.6)
Taking dose, frequency and duration of medicine according to?	
Instructions on the label	129(33.4)
Physician prescription	123(31.9)
Pharmacist counseling	86(22.3)
Advices of relatives and friends	32(8.3)

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Past experience	20(5.1)
Which medicines did you take for the last 6 months?	
Pain relief medicine	104(26.7)
Common cold medicine	95(24.4)
Antibiotic	48(12.3)
Anti-cough	34(8.7)
Antihistamine	6(1.5)
Chronic disease medicine	2(0.5)
No medicines taken	101(25.8)
How do you deal with left-over medicine?	
Keep it for future use by myself or others	148(38.1)
Return it to the pharmacy	47(12.1)
Throw out left-over medicines	193(49.7)
Practice statements and drug information sources	
Store all the medicines	
In the fridge	166(42.6)
In the medicine's box	72(18.5)
On a shell	66(16.9)
In a wardrobe	22(5.6)
In a drawer	45(11.5)
In a bag	19(4.8)
In case of having any concerns about medicines, who will be the first person that you would consult?	
Doctor	155(39.8)
Pharmacist	50(12.9)
Family member	79(20.3)
Nurse	26(6.7)
Medical Assistant	15(3.8)
Friend or neighbor	10(2.6)
Doctor and Pharmacist	54(13.9)
Are you satisfied with the information doctor share with you?	
Yes	325(83.3)
No	65(16.6)
Do you require additional counseling from your pharmacist?	
Yes	287(73.8)
No	102(26.1)
Have you ever obtained medicines information from?	
Internet	171(43.8)
Health magazines	93(23.8)
TV programs	65(16.6)
Newspaper	35(8.9)
Other	26(6.6)

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The most preferred sources of information for RUM as perceived by the respondents include; physicians (n= 155; 39.8%), pharmacist (n=50; 12.9%) and both physician and pharmacist (n=54; 13.9%) however, (n = 89; 22.9%) preferred family members and friends or neighbors to consult regarding the use of medications.

4. DISCUSSION

The outcomes of the current study showed a deprived level of knowledge about RUM by the studied students of a public university as well as highlight some improper medicine use practices. Approaches and views have been identified which might increase associated health risks and possibly unnecessary healthcare expenses, this indicates the need to encourage the educational strategies for RUM in the society. The findings revealed that only (6.9%) of the respondents had a good level of knowledge on the proper use of medicines whereas (54.9%) had a moderate and (38.2%) had a poor level of knowledge. Another study depicted that nearly one-third of respondents (30.4%) had a good knowledge score of medicines use (Gunawardhana *et al.,* 2015). Poor knowledge was mostly found among respondents with lower family income groups (46.5%), Malay race group (42.6%), and male respondents (42.7%). Another study reported that the knowledge about drug use was significantly related to an increase in age, higher level of education, race, females, higher earnings and respondents suffering from chronic ailments (Dawood *et al.,* 2017).

In the current study, the respondents with low family monthly income mostly practice self-medication. Another study reported a statistically significant association among respondents practicing self-medication based on knowledge and income (Shafie *et al.,* 2018). In the present study, only 28.7% took medication by physicians' prescription, and 42.3% request the prescriber or pharmacist to explain the appropriate methods of using the prescribed drugs. The majority of respondents (73.8%) opined that they need additional counseling from pharmacists. Another study reported that almost half of the respondents stated that the drug label, reason for taking the drug, mechanism of action, dosing instructions, usage period, and cautions were not appropriately described to them by the healthcare professionals and they require further counseling (Basaran *et al.,* 2012). In the current study, the medicines purchased/used by the respondents in the last six months were pain relief medicines (26.7%) and common cold medicines (24.4%). Another study reported that the most common drugs that the respondents had used without prescription were analgesics (39.5%), followed by antibiotics (36.9%) and cold remedies (24.0%) (Okyay *et al.,* 2017).

Many respondents (77.9%) incorrectly stop using the medications when symptoms disappear with comparable proportion when compared with another study (Senadheera *et al.,* 2017). The respondents generally lacked knowledge that they must continue medications as directed by the healthcare provider even if they get better or indications resolve. Many respondents knew that all medicines have side effects (64.4%); however, higher proportion (74%) having adequate knowledge about associated side effects was reported in another study (Abdo-Rabbo *et al.,* 2009). The current study reported that only half of the respondents showed compliance with their prescribed medicines. Similar attitude of lower level of adherence to therapeutic régimes was observed in other studies (Miller *et al.,* 2016; Al-daken *et al.,* 2017). Exploration in the Gulf region proposes a higher inclination of respondents towards non-adherent with the dosing régimes of their prescribed drugs (Ibrahim *et al.,* 2020). A study in Gezira State, Sudan, stated that the level of adherence was inadequate and only 15% showed adherence to medications (Badi *et al.,* 2020). In another study conducted in Turkey, a similar trend of not compliant was observed (Tat *et al.,* 2018). In the current study, the ones who request the prescriber or pharmacist to explain the appropriate methods of using the prescribed drugs (54.1 %) were more compliant in term of drug regimen than who didn't inquire ($p < 0.001$; r=0.246). Similar findings were reported in other studies in which the respondents who knew the appropriate methods of using the drugs were found to be more compliant (Rhalimi *et al.,* 2018; Aston *et al.,* 2018).

In the present study, 25.4% of the respondents did not consult prescribers or pharmacists when practicing self-medication and 21% exchange medicines with others which is comparable with a survey conducted in Oman demonstrating that 33% of participants exchange medicines with others (Abdo-Rabbo *et al.,* 2009). Another study found that majority of the respondents had one pharmaceutical product at least kept at their home,a large ratio reported self-medication, re-use of kept drugs and exchange of medications between family members (Awad *et al.,* 2007), likewise a study in Indonesia described that 95% of the respondents had unused medicines stored in their homes (Insani *et al.,* 2020). Around 80% of all drugs were bought by the users without a prescription in another study (Alhomoud *et al.,* 2017). A practice of self-diagnosis and self-medication should be avoided to ensure effective and safe treatment, and it is necessary to consult the prescriber or pharmacist to get the most appropriate medications for the timely cure (Lee *et al.,* 2017). In this study, half of the respondents (50.5%) informed the prescriber or pharmacist about the medicine they are using, and above half of the respondents enquired the provider regarding the side effects and ways to take the medicines. Patients must inform the prescriber about any traditional and conventional drugs they are using and inquire about the potential side effects and directions to take the prescribed medicines. Besides, healthcare professionals must probe applicable queries and provide patients the information in a language they comprehend and encourage the patients to communicate appropriately (Jakaria *et al.,* 2017). The intake of daily multivitamins among individuals is increasing throughout the world in the last

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few decades. The majority of the individuals trust that vitamins are safe even if they are not effective (Hamishehkar *et al.,* 2016). In the current study, 66.4% of respondents thought that multivitamins are safe without any side effect. Half of the respondents could not differentiate a medicine by either its generic or brand name. Another Malaysian study reported that more than 70% of the respondents did not know that generic medications can be sold under different brand names (Al-Gedadi *et al.,* 2008).

In this study, around half of the respondents 49.7% throw out left-over medicines; 38.1% keep them for future usage, and only 12.1% return them to the pharmacy. Similar results were reported in other studies in which the most commonly used technique of disposal of unused drugs was to discard them in the waste bin (Bashaar *et al.,* 2017; Tong *et al.,* 2011). One more study reported that a considerable proportion (79.15 %) of respondents disposed of the unused drug in household trash, whereas only 1.7% of respondents returned unused drugs to a pharmacy (Al-Shareef *et al.,* 2016). It is generally observed that the majority of buyers do not know what to do with any drug that remains unutilized at homes. The accessibility of unused drugs in the household might become a source for irrational drug use and unintended or accidental poisoning. A study reported that the most common reason for having unused medications were "in case they are needed later" (Vellinga *et al.,* 2014). It is significant to consult a prescriber or pharmacist for dealing with the unused drugs as there is no guideline at present in Malaysia regarding the disposal of medications by the public. In another study (95.7%) of respondents stated that they had drugs in the home which they wanted to dispose-off (Abahussain *et al.,* 2006). Only 12% of the current study respondents returned unused drugs to a pharmacy which is similar to the result found in one more study (Akici *et al.,* 2018). The influence of incorrect drug disposal practices by the public is a hazardous environmental issue (Akici *et al.,* 2018). Hence, the strategies on safely discarding the unused drugs are obligatory and a structured process of collecting unused medicine is needed to be introduced.

In the present study, 39.8% of respondents preferred physician to be the first person to consult; 12.9% preferred pharmacist and 13.9% chose either physician or pharmacist together which is comparable to another public consumers study in Malaysia where respondents preferred both the physician and pharmacist (Eades *et al.,* 2011). However, in the present study 22.9% respondents inappropriately preferred family member and friends or neighbors to consult about the medicine use; another Malaysian study reported that 16.9% of participants preferred relative and friend to be the first person to consult (Jamshed *et al.,* 2016). The current study has some limitations; the sampling method which was utilized had potentials for selection bias. The outcomes of the study were based on self-reported information that depends on the reliability and recalls aptitude of the students.

5. CONCLUSION

The findings of the study recognized areas of misapprehensions and highlight the need for educational interventions regarding RUM among public university students in Malaysia. Thus, a well-planned, structured, and the organized educational program must be carried out to promote the correct use of drugs in the community.

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Conflicts of interest

The authors declare that there are no conflicts of interest.

Ethical approval

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REFERENCES AND NOTES

1. Abahussain EA, Ball DE, Matowe WC. Practice and opinion towards disposal of unused medication in Kuwait. Medical Principles and Practice. 2006;15(5):352-7.
2. Abdo-Rabbo A, Al-Ansari M, Gunn BC, Suleiman BJ. The use of medicines in Oman: public knowledge, attitudes and practices. Sultan Qaboos University Medical Journal. 2009;9(2):124.
3. Akici A, Aydin V, Kiroglu A. Assessment of the association between drug disposal practices and drug use and storage behaviors. Saudi Pharmaceutical Journal. 2018;26(1):7-13.

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4. Al-daken LI, Eshah NF. Self-reported adherence to therapeutic regimens among patients with hypertension. Clinical and Experimental Hypertension. 2017;39(3):264-70.
5. Al-Gedadi NA, Hassali MA, Shafie AA. A pilot survey on perceptions and knowledge of generic medicines among consumers in Penang, Malaysia. Pharmacy Practice. 2008;6(2):93.
6. Alhomoud F, Aljamea Z, Almahasnah R, Alkhalifah K, Basalelah L, Alhomoud FK. Self-medication and self-prescription with antibiotics in the Middle East—do they really happen? A systematic review of the prevalence, possible reasons, and outcomes. International Journal of Infectious Diseases. 2017;57:3-12.
7. Al-Shareef F, El-Asrar SA, Al-Bakr L, Al-Amro M, Alqahtani F, Aleanizy F, et al. Investigating the disposal of expired and unused medication in Riyadh, Saudi Arabia: a cross-sectional study. International journal of clinical pharmacy. 2016;38(4):822-8.
8. Aston J, Wilson KA, Terry DR. Children/young people taking long-term medication: a survey of community pharmacists' experiences in England. International Journal of Pharmacy Practice. 2018;26(2):104-10.
9. Awad A, Ball D, Eltayeb I. Improving rational drug use in Africa: the example of Sudan. EMHJ-Eastern Mediterranean Health Journal, 2007; 13 (5), 1202-1211.
10. Badi S, Abdalla A, Altayeb L, Noma M, Ahmed MH. Adherence to antidiabetic medications among sudanese individuals with type 2 diabetes mellitus: a cross-sectional survey. Journal of Patient Experience. 2020;7(2):163-8.
11. Bajait C, Motghare V, Kalikar M, Dakhale G, Jire A. Impact of educational intervention on knowledge and attitude about rational use of medicine among doctors doing internship. population. 2017;9(10):11.
12. Bajait CS, Pimpalkhute SA, Sontakke SD, Dakhale GN, Jaiswal KM, Urade CS. Evaluation of knowledge, attitude and practice of rational use of medicines among clinicians in a tertiary care teaching hospital. International Journal of Nutrition, Pharmacology, Neurological Diseases. 2014;4(3):153.
13. Basaran NF, Akici A. Patients' experience and perspectives on the rational use of drugs in Turkey: a survey study. Patient preference and adherence. 2012;6:719.
14. Bashaar M, Thawani V, Hassali MA, Saleem F. Disposal practices of unused and expired pharmaceuticals among general public in Kabul. BMC public health. 2017;17(1):1-8.
15. Dakhale G, Pimpalkhute S, Bajait C, Raghute L. Evaluation of knowledge, attitude and practice of rational use of medicine among interns and resident doctors in a tertiary care teaching hospital. Journal of Young Pharmacists. 2016;8(2):114.
16. Dawood OT, Hassali MA, Saleem F. Factors affecting knowledge and practice of medicine use among the general public in the State of Penang, Malaysia. Journal of Pharmaceutical Health Services Research. 2017;8(1):51-7.
17. Eades CE, Ferguson JS, O'Carroll RE. Public health in community pharmacy: a systematic review of pharmacist and consumer views. BMC public health. 2011;11(1):582.
18. El Ezz N, Ez-Elarab H. Knowledge, attitude and practice of medical students towards self medication at Ain Shams University, Egypt. J prev med hyg. 2011;52(4):196-200.
19. Gunawardhana CB, Sakeena M, Sivayoganthan C. Awareness of rational medication use and antibiotic self-medication practices among undergraduate students in a university in Sri Lanka. Tropical Journal of Pharmaceutical Research. 2015;14(4):723-9.
20. Hamishehkar H, Ranjdoost F, Asgharian P, Mahmoodpoor A, Sanaie S. Vitamins, are they safe? Advanced pharmaceutical bulletin. 2016;6(4):467.
21. Ibrahim NA, Edis Z, Al-Owais KS. Adherence of geriatric patients and their beliefs toward their medicines in the United Arab Emirates. Journal of Pharmacy and Bioallied Sciences. 2020;12(1):22.
22. Insani WN, Qonita NA, Jannah SS, Nuraliyah NM, Supadmi W, Gatera VA, et al. Improper disposal practice of unused and expired pharmaceutical products in Indonesian households. Heliyon. 2020;6(7):e04551.
23. Jain S, Upadhyaya P, Goyal J, Kumar A, Jain P, Seth V, et al. A systematic review of prescription pattern monitoring studies and their effectiveness in promoting rational use of medicines. Perspectives in clinical research. 2015;6(2):86.
24. Jakaria M, Hasant A, Tarek M, Islam M, Zaman R, Parvez M, et al. Evaluation of Self Medication among Students from Different Universities in Chittagong, Bangladesh. Journal of Medicine. 2017;18(1):15-20.
25. Jamshed SQ, Wong PS, Yi HC, Yun GS, Khan MU, Ahmad A. Self-medication practices among female students of higher educational institutions in Selangor, Malaysia: A quantitative insight. Journal of pharmacy &bioallied sciences. 2016;8(3):217.
26. Kar SS, Pradhan HS, Mohanta GP. Concept of essential medicines and rational use in public health. Indian journal of community medicine: official publication of Indian Association of Preventive & Social Medicine. 2010;35(1):10.
27. Lee C-H, Chang F-C, Hsu S-D, Chi H-Y, Huang L-J, Yeh M-K. Inappropriate self-medication among adolescents and its association with lower medication literacy and substance use. PloS one. 2017;12(12):e0189199.
28. Mahmood A, Elnour AA, Ali AAA, Hassan NA, Shehab A, Bhagavathula AS. Evaluation of rational use of medicines (RUM) in four government hospitals in UAE. Saudi Pharmaceutical Journal. 2016;24(2):189-96.

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29. Miller TA. Health literacy and adherence to medical treatment in chronic and acute illness: A meta-analysis. Patient education and counseling. 2016;99(7):1079-86.
30. Okyay RA, Erdoğan A. Self-medication practices and rational drug use habits among university students: a cross-sectional study from Kahramanmaraş, Turkey. PeerJ. 2017;5:e3990.
31. Omair A. Sample size estimation and sampling techniques for selecting a representative sample. Journal of health specialties. 2014;2(4):142.
32. Ranganathan SS, Gazarian M. Rational use of medicines (RUM) for children in the developing world: Current status, key challenges and potential solutions. Optimizing Treatment for Children in the Developing World: Springer; 2015. p. 225-38.
33. Remesh A, Gayathri A, Singh R, Retnavally K. The knowledge, attitude and the perception of prescribers on the rational use of antibiotics and the need for an antibiotic policy–a cross sectional survey in a tertiary care hospital. Journal of clinical and diagnostic research, 2013;7(4):675.
34. Rhalimi M, Rauss A, Housieaux E. Drug-related problems identified during geriatric medication review in the community pharmacy. International journal of clinical pharmacy. 2018;40(1):109-18.
35. Senadheera G, Ranganathan S, Gunawardane N, Fernando G, Fernandopulle B. Practice of self-medication with antibiotics in the Colombo district, Sri Lanka. 2017.
36. Shafie M, Eyasu M, Muzeyin K, Worku Y, Martin-Aragon S. Prevalence and determinants of self-medication practice among selected households in Addis Ababa community. PlosOne. 2018;13(3):e0194122.
37. Sumaila A-N, Tabong PT-N. Rational prescribing of antibiotics in children under 5 years with upper respiratory tract infections in Kintampo Municipal Hospital in Brong Ahafo Region of Ghana. BMC research notes. 2018;11(1):443.
38. Tat TS. Adherence to subcutaneous allergen immunotherapy in Southeast Turkey: a real-life study. Medical Science Monitor: International Medical Journal of Experimental and Clinical Research. 2018;24:8977.
39. Tong AY, Peake BM, Braund R. Disposal practices for unused medications around the world. Environment international. 2011;37(1):292-8.
40. Vellinga A, Cormican S, Driscoll J, Furey M, O'Sullivan M, Cormican M. Public practice regarding disposal of unused medicines in Ireland. Science of the Total Environment. 2014;478:98-102.

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