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Perceived Self-medication Practices and Associated Factors among Undergraduates in a Non-State University

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Abstract

Inappropriate self-medication usage has become a significant public health problem in all countries. This study is aimed to determine the perceived self-medication practices (SMP), associated factors and awareness on contraindications related to self-medication among undergraduates in a non-state university using a random sample of 138 undergraduates of the Faculty of Humanities and Sciences (FOHS) of Sri Lanka Institute of Information Technology (SLIIT). The required data were acquired from a structured questionnaire consists of 31 questions in four parts. It was found that only 87% of the respondents had practiced self-medication in the past three months. Covid-19 restrictions (48.4%) and believing consultation for mild illnesses is unnecessary (44.0%) were the major reasons for SMP. The gender, age category, residing province, living with whom, study year, nationality, and household monthly income are not significantly associated with status of SMP, but the presence of chronic illnesses was significantly associated. The percentage of having SMP for those having chronic illness (87.9%) is significantly higher ($p<0.05$) than that for no chronic illness (78.5%). There was a significant association between the type of medicine use for SM and the levels of SM (high vs low). Also, the attitudes towards the statement "SM is effective similarly, to medicines prescribed by a doctor" is significantly associated ($p=0.07$) with the levels of SMP. Headache (80.7%) and common cold (43.0%) were the major health conditions for SMP, while painkillers (83.2%) and vitamins and minerals (47.8%) were the most used types of medicines. Conducting educational programs in pharmaceutical aspects is recommended to improve healthy medicinal compliance among the undergraduate population in Sri Lanka.

Keywords: Non-state university, Self-Medication practices, Self-Medication prevalence, Undergraduates of Sri Lanka.

Introduction

Self-medication (SM) is a traditional practice of using medications, herbs or other therapies on one's initiative or on another person's recommendation to treat a self-diagnosed physical ailment without consulting a physician (Bennadi, 2013). SM may include consuming drugs without a prescription, using leftover drugs from treatment courses prescribed earlier, sharing medication with relatives or friends, or reusing old prescriptions to purchase drugs (Ocan et al., 2015; Zafar et al., 2008). SM is the first step in treating minor illnesses for most people and it is considered non-threatening if it is continued only for a short period (Alano et al., 2009). Self-medication would be beneficial in conditions where access to healthcare facilities is limited and would relieve the workload on medical healthcare delivery systems and reduce the costs for treatment in healthcare settings only if SM is practised within the approved medicinal limits (Alano et al.,2009; Ruiz, 2010; Food and Drug Administration Jordan, 2014). Self-medication will allow the patients to self-control their well-being and gain confidence in continuing the Self-Medication practices (SMP), encouraging self-empowerment towards their health issues management (Hughes, McElnay & Fleming, 2001). However, the globally expanded higher availability of varieties of pharmaceuticals has caused easy access to medications among people resulting in increased rates of medicinal misuse (Ali, Ibrahim & Palaian, 2010).

Inappropriate medicinal usage related to SMP could lead to significant adverse effects such as antibiotic resistance, treatment failures, drug toxicity, adverse drug reactions and life long-suffering (Al Rasheed et al., 2017; Parulekar et al., 2016; Selvaraj, Kumar & Ramalingam, 2014;). Self-medication induced delays in receiving appropriate medical referrals could potentially lead to increase drug dependency and to further worsen the health status (Alhomoud et al., 2017; Hughes, Whittlesea & Luscombe, 2002). Self-medication practice is identified as a public health problem in developing countries with the raised tendency of using medications arbitrarily (Kasulkar & Gupta, 2015). The worldwide prevalence of SM has been estimated to be between 10.3% and 87.0% and a higher prevalence rate was reported in the European region while developing countries tend to report further increased prevalence of SM (Ali, Ibrahim & Palaian, 2010; Goossens et al., 2005).

Several local and international studies have been conducted on SMP among university students and have identified a rise in the prevalence of SM among undergraduates (Subashini & Udayanga, 2020; Alshawi et al., 2018; Gelayee, 2017; Gunawardhana, Sakeena & Sivayoganthan, 2015). A study done in Nepal indicated that the raised prevalence of SM among university students was related to students' misleading perceptions of SM (Mehta & Sharma, 2015).

Research is available on the prevalence of SMP among the public and state university students in Sri Lanka. In accordance with their findings prevalence of SMP among the public was lower (Urban-33.9%, rural-35.3%) than the figures reported from studies done in universities in Sri Lanka, 78.0% (Subhashini & Udayanga, 2020; Wijesinghe, Jayakody

& Rohini, 2012). However, studies on SMP among the undergraduate population of the Sri Lankan private university sector are scarce. Therefore, this study aims to identify the perceived self-medication practices among the undergraduate students of the Faculty of Humanities and Sciences (FOHS) of Sri Lanka Institute of Information Technology (SLIIT) and associated factors that impact their SMP and awareness of contraindications in SPM.

Materials and Methods

Study design and population

A descriptive cross-sectional study was conducted among undergraduates of the FOHS, SLIIT, Malabe. The population in this study is all undergraduates in the FOHS and thus the population size was 340. The sampling unit is the undergraduate following a study program namely Biotechnology, Law, Psychology, Physical Science, Biological Science, English and Nursing and students in different academic levels (1st year, 2nd year and 3rd year).

The sample size (n) was obtained using the equations (1) and (2). At first, sample size without considering the finite population correction factor (n0) was calculated using the equation (1), under the assumption of 5% margin of error (e), population proportion (p) of 0.5 (by maximizing p*(1-p)) and 95% confidence level so that z=1.96.

$$n0 = \frac{z^2 p^*(1\text{-}p)}{e^2} \qquad (1)$$

It was found that n0 = 384. As the population size, N is 340 and finite, the minimum sample size (n) was calculated by considering the correction factor for the population size using equation (2).

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$$n = \frac{N^* n_o}{n_o + (N\text{-}1)} \qquad (2)$$

The minimum sample size (n) was obtained as 181. However, due to lack of resources and time, the sample size was forced to reduce to 138. As each member of the population has an equal chance of being selected the simple random sampling method was adopted. Thus, the selected sample size was proportionally allocated among study programs as shown in Table 1.

Table 1.

Distribution of sample size among study programs.

Study program	Sample size
Biotechnology	74
Law	22
Psychology	21
Biological Sciences	07
Physical Sciences	06
English	05
Nursing	03
Total	138

Students who were able to read and write in the Sinhala or Tamil or English languages were included in the study while the students who were following top-up programs in the FOHS were excluded from the study. Ethical clearance for this study was obtained from the Ethics Review Committee of SLIIT.

Data collection

The researchers developed a self-administered questionnaire specific to the current research objective based on previous literature on SM (Subhashini & Udayanga, 2020; Fernando et al., 2017). The questionnaire was developed in English language and was translated to both Sinhala and Tamil languages. The face validity of the questionnaire was determined by a panel of statistical and pharmacology experts and modifications were made as necessary. A pilot survey was conducted among 10 students of FOHS. Before being finalized necessary amendments were done and the accuracy of the translated versions of the questionnaire was evaluated. Finally, the pre-tested questionnaire was distributed as an online survey among the randomly selected 138 students to obtain the necessary information.

The questionnaire consisted of four major sections (A-D) to assess types of perceived SMP among the participants within three months prior to data collection. Section A (12 questions) addressed socio-demographic characteristics of the participants such as gender, age, study area, study year, nationality, residing province, monthly income of household and presence of chronic illness. Section B contained seven SMP to assess the prevalence of SMP. Section C included thirteen questions on the source of information that influenced SMP, type of medication, the reasons for SM, things consider before purchasing medicine, types of health conditions treated through SM and experience of side-effects of SM. Section D contained five questions that mainly assessed the knowledge of respondents on SM such as awareness of risks of SM, the usefulness of having a drug label, understanding of the content of the drug label and effectiveness of SM.

Data analysis

The socio-demographic data, percentages of knowledge and practices and attitudes were analyzed using descriptive statistics and Chi

Square analyses. The Chi-square analyses were applied to test the significant association between demographic variables and presence of SMP, and intensity of the undergraduates engaged in SMP with several other factors. Data were analyzed using SPSS 22.0 version software.

Under the section B of the questionnaire, participants were questioned on whether they have at least purchased medicine with advice from pharmacists, consumed leftover medicines which were available at home, borrowed medicines from a friend, relative without visiting a doctor, shared medicines with their family members, bought medicines that they have frequently used before, purchased medicines with an old prescription given by a doctor or have consumed herbal medicines to cure mild illnesses within three months prior to data collection. Participants were considered to follow SMP if they have reported at least one of the above-mentioned practices and SM prevalence was calculated based on the reported practices. The levels of overall SMP of the study sample were further categorized into two levels as high levels of SMP and low levels of SMP based on having four or more of the above SMP and having less than four of the above SMP, respectively.

Results and Discussion

Basic statistics of the selected socio-demographic factors

Table 2.
Percentage distribution of the socio-demographic characteristics in the sample.

Socio-demographic factors and their levels		Percentage (%)
Factor	**Level**	
Gender	Female	82.6
	Male	17.4
Age category	18 – 20	15.2
	21 – 23	73.2
	≥24	11.6
Province	Western	57.2
	Other	42.8
Living with whom	With own family	93.5
	Without own family	6.5
Nationality	Sinhalese	94.9
	Tamil	4.4
	Muslim	0.7
Field of study	Biotechnology	53.6
	Law	15.9
	Psychology	15.2
	Other	15.3

Table 2. (Continued)

Socio-demographic factors and their levels		Percentage (%)
Factor	**Level**	
Study year	1st Year	22.5
	2nd Year	58.0
	3rd Year	19.5
Monthly income	>100,000	47.1
	50,000-100,000	37.0
	<50,000	15.9
Having a chronic illness	Yes	16.7
	No	83.3

Among 138 study participants, 82.6% of the sample comprised female participants. Majority of the students (73.2%) are between 21-23 years of old. Continuing education in the 2nd year of academic studies, following the biotechnology stream, residing in Western province and living with their own families were the commonest sub-characteristics of respective demographic characteristics of all the participants (Table 1). The age of the respondents was categorized into three groups ranging from 18-20 years, 21-23 years and above 24 years. Majority among the overall participants were in 21-23 years of age category. It should be noted that nearly 50% of students represented from the families having monthly income more than 100,000/=. Furthermore, 16% represented from the families whose monthly income less than 50,000/=. Among all the study participants, only 16.7% reported to have a chronic illness. It was also found that among those who have had practiced SM, the majority were females (81.7%).

Distribution of SMP users

The percentage values of the students with SMP and without SMP within each level of the nine sociodemographic factors: gender, study year, age category, nationality, province, status of extra medicine course, status of living, monthly income of student's household and the status of chronic illness are shown in Table 2.

Table 3.

Sociodemographic factor of the respondents.

Socio-demographic factors and the levels within factors		Percentages (%)	
Factor	**Level**	**With SMP**	**Without SMP**
Gender	Female	86.0	14.0
	Male	91.7	8.3
Study year	1st Year	93.5	6.5
	2nd Year	83.8	16.2
	3rd Year	88.9	11.1
Age category (years)	18-20	95.2	4.8
	21-23	87.1	12.9
	≥ 24	75.0	25.0
Nationality	Sinhalese	87.8	12.2
	Tamil	66.7	33.3
	Muslim	87.0	13.0
Province	Western	84.8	15.2
	Others	89.8	10.2
Extra medicine courses	Yes	93.8	6.2
	No	86.1	13.9
Living with whom	with own family	86.8	13.2
	others	88.9	11.1
Monthly income of student's household (Rs)	< 50,000	72.7	27.3
	50,000-100,000	88.2	11.8
	> 100,000	90.8	9.2
Having a chronic illness	Yes	87.9	12.1
	No	78.6	21.4

The percentage of students having SMP within 3 months prior to data collection is 87% irrespective of any factors. This percentage is less than national average of 98.4% (Subhashini & Udayanga, 2020). Furthermore, the present value is less than other international studies in Iran - 89.6% (Alireza et al., 2018), Nigeria - 91.4% (Osemene & Lamikanra, 2012) and Pakistan - 95.5% (Ullah et al., 2013). On the contrary, a Turkish study carried out by Buke et al. (2005) has shown a lower prevalence (45.0%) of SMP than the 87% obtained in this study.

Association of socio-demographic factors on the status of SMP

To find the association of socio-demographic factors and status of SMP, chi-square analyses were carried out separately.

Table 4.
Summary results of Chi-square analysis for each factor.

Socio-demographic factor	Test Statistic value	P value
Gender	χ_1^2 =0.57	0.74
Study year	χ_2^2 =2.00	0.36
Age category (in years)	χ_2^2 =3.29	0.19
Nationality	χ_2^2 =2.40	0.30
Province	χ_1^2 =0.75	0.38
Living with whom	χ_1^2 =0.03	1.00
Monthly income of student's household (Rs)	χ_2^2 =4.83	0.09
Having a chronic illness	χ_1^2 =4.14	0.04

Among the females, the percentage of students having SMP within three months prior to data collection is 86% and the corresponding percentage for the males is 91.7% (Table 2). However, the chi-square analysis (Table 4) showed that there is no significant association between gender and the status of SMP (p=0.74) confirming that there is no significance difference of having SMP between males and females. Results in Table 2 indicate that the percentage students having SMP decreases as the age increases as the corresponding percentages for the age group 18-20, 21-23 and ≥ 24 are 95.2%, 87.1% and 75.0% respectively. However, the results in Table 3 confirmed that age category is also not significantly associated with the status of SM (p=0.30). It confirms that there is no significance difference of having SMP among three age groups.

Furthermore, the results in Table 4 confirmed that the percentage of having SMP is not significantly different between western province and other provinces, between living with own family and living with others, among three nationalities, among three study years and among three categories of monthly income of student's household. In contrast, results in Table 4 confirmed that having a chronic illness is significantly associated with status of SMP ($p< 0.05$). This confirms that the percentage of having SMP among those no chronic illness is significantly lower than the percentage of having SMP among those having chronic illness.

Unlike the current study, a significant correlation was not evident between the presence of chronic diseases and SMP in the study done by Malak & AbuKamel (2019). The reported insignificant relationship between status of SMP and socio-demographic data in the current study is consistent with the studies done by Niwandinda et al. (2020), Regina, Jose & Elisardo (2020), Mustafa & Rohra (2017) and Abey & Amelo (2010) which have also proved the insignificant association between socio-demographic factors such as age, gender and having a high monthly expenditure with SMP. Even though the current study showed there was no significant association between years of study and SMP, a previous study done in Sri Lanka has emphasized that the tendency for SMP use could significantly increase with the additions of academic years of the study period (Subhashini & Udayanga, 2020). In contrast to these findings, studies done in Jordan, Nigeria and Egypt have indicated that the scientific area of study, sex, the field of study, year of study, and monthly income were significantly associated with SMP (Malak &

AbuKamel, 2019; Araia, Gebregziabher & Mesfun, 2019; Esan et al., 2018 and Helal & Abou-ElWafa, 2017).

Methods used to cure illness

The percentage distributions of various methods practiced by the SMP users to cure illness are presented in Table 5. It should be noted that the sum of total percentages is not equal to 100 due to multiple responses.

Table 5.
Frequency distribution of patterns of SMP.

Different methods used to cure illness	Percentage*
At least consuming herbal medicines	77.5
At least buy medicines that you have frequently used before	70.8
At least purchasing medicine with advice from pharmacists	57.5
At least consume leftover medicines available at home	52.5
At least share medicines with your family members	43.3
At least purchasing medicines with an old prescription given by a doctor	34.2
At least borrowing medicines from a friend, relative, etc. without visiting a doctor	12.5

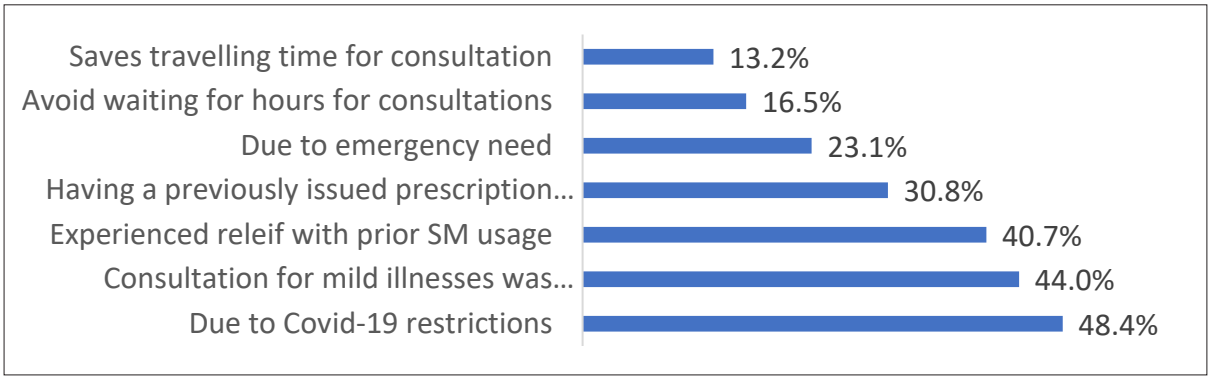
*multiple responses, total does not equal to 100%.

According to the results in Table 5, at least 77.5% have used herbal medicines to cure mild illness while at least 70.8% used the medicines that they have frequently used before. It should be noted that at least 12.5% used to borrow medicines from a friend, relative, etc. without visiting a doctor, while at least 34.2% used to purchase medicines with an old prescription given by a doctor.

Reasons for SMP

The percentage distribution of variety of reasons for SMP is shown in Figure 1. Sum of the total percentages is not equal to 100 due to multiple responses.

Figure 1.
Reported causes in percentages which have led participants to select SMP.



COVID-19 pandemic related restrictions (48.4%) were the main reason presented by current study participants to engage in SMP (Fig. 1). Though COVID-19 pandemic related issues are new and related literature is not available, other SMP directed reasons have been similarly reported in previous literature. Accordingly, a study done by Helal & Abou-ElWafa (2017) has reported that believing consultation for mild illnesses is unnecessary (73.9%) and knowledge with prior use of SM (71.4%) were the most common reasons that led the participants to use SMP. Another study done in Ethiopia (Mekonnen, Zelalem & Tezera, 2018) also has presented with similar results by having most participants who have engaged in SMP due to the mildness of the illness (34.1%), and due to having prior good experience of SM (24.8%). The overall SMP of the study sample were further categorized into two levels as, 'high levels of SMP' and 'low levels of SMP' based on having four or more of the above SMP and having less than four of the above SMP, respectively. The percentage of persons having low level SMP and high level SMP are 52.5% and 42.5% respectively. Irrespective of the level of SMP**,** most of the participants (62.5%) have utilized only western medicines while 10.5% users have consumed only herbal medicine (Table 6).

Table 6.
Pattern of use western vs herbal medicines.

Method	Percentage
Only Western Medicines	62.5
Only Herbal Medicines	10.5
Both	27.0

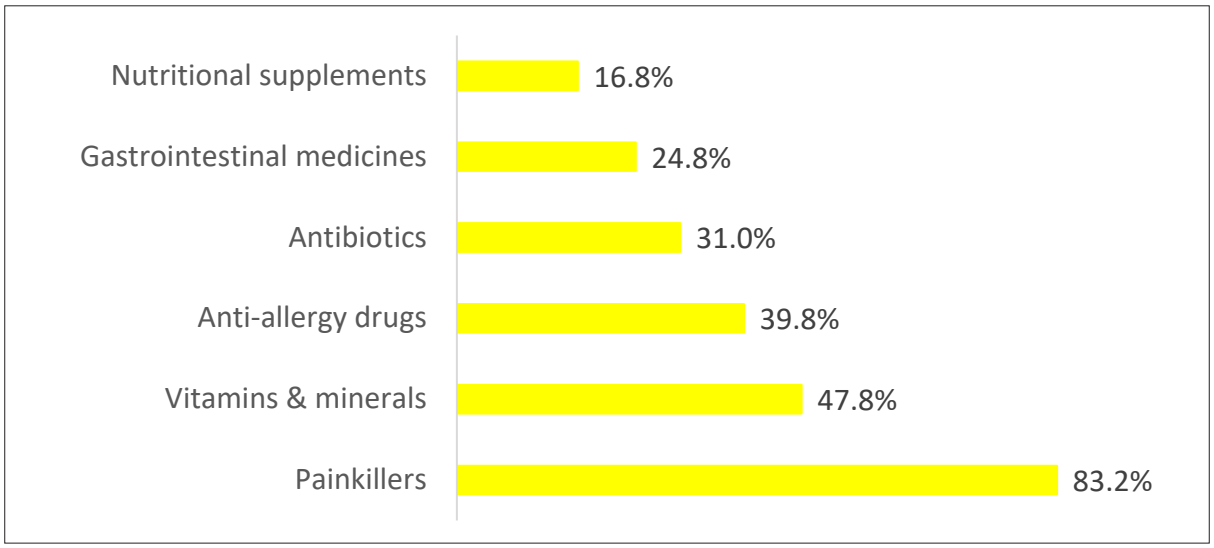
The percentage use of only western medicine is significantly higher than that of use only herbal medicine ($p<0.05$). Furthermore, it was found that both western and herbal medicines are used by 27% of SMP users. Other studies showed that in Sri Lanka, allopathic medicines were the most used variety of medicine for SM (Wijesinghe, Jayakody & Rohini, 2012). A study carried out in Pakistan has also reported higher usage of western medicines (75.8%) for SM rather than other varieties of medicines (Ullah et al., 2013). The analysis also found that there was a significant association ($p=0.033$) between the 'variety of medicines' (Western/Herbal/Both) used for SM and the levels of SMP.

Type of western medicine used for SMPs.

The most common types of medicine used in SMP are shown in Figure 2.

Figure 2.

Frequency of consuming different types of medicines under SMP.



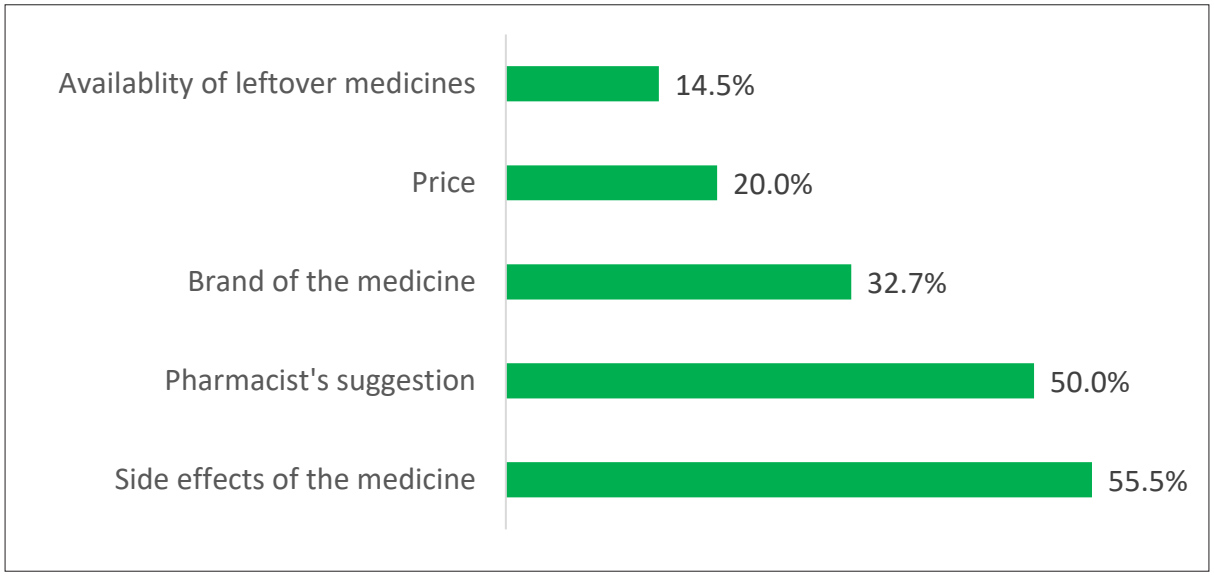
*multiple responses, total does not equal to 100%.

Painkillers (83.2%), vitamins and minerals (47.8%) and anti-allergic drugs (39.8%) were the most consumed medication types by the participants who engaged in SMP (Fig. 2). The comparatively higher utility of painkillers reported in current study is similar to a study conducted by Al-Flaiti et al. (2014) in Oman (96.6%). However, a previous Sri Lankan study has reported a contrasting finding in which antipyretics (73.6%) and cough and cold medicines (76.3%) have been commonly utilized under SMP (Subhashini & Udayanga, 2020).

Factors considered prior to purchase medicine

Figure 3.

The factors of participants' considerations prior to purchase medicine.

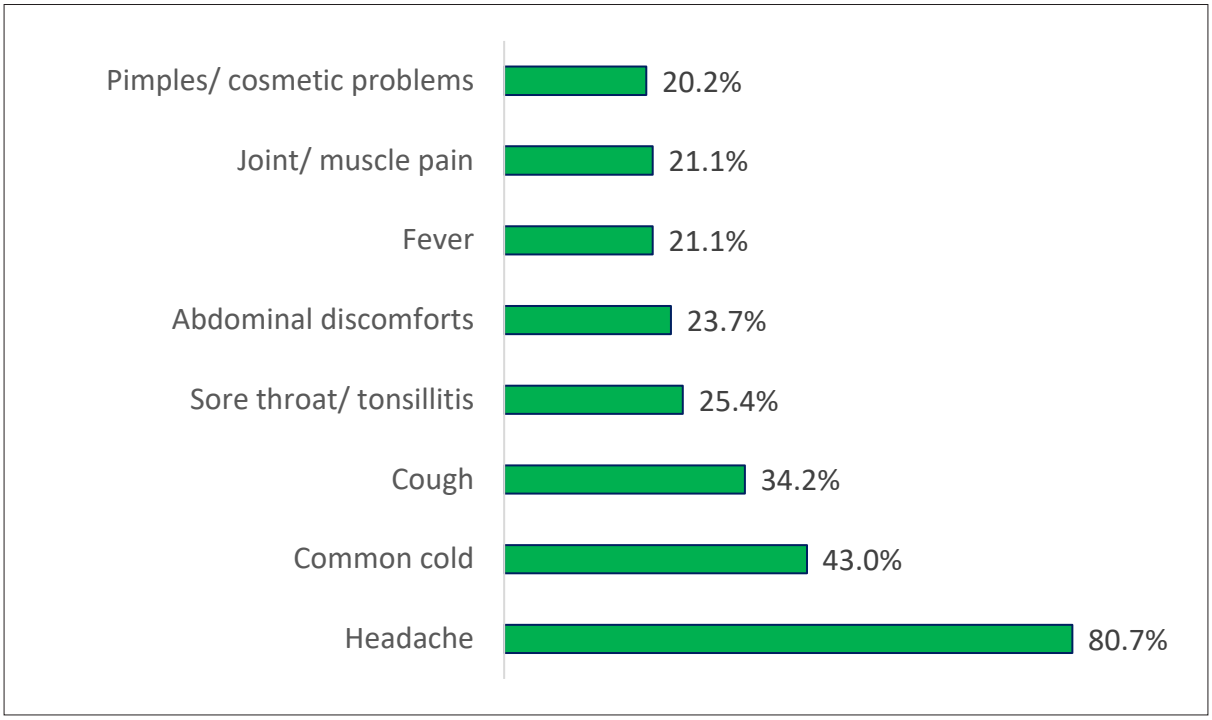


Out of the participants who had SMP, majority considered the side effects of the medicines (55.5%) and the pharmacist's suggestions (50.0%) prior to purchasing medicine for SM (Fig. 3). A study done by Gelayee (2017) claimed that 25.1%, of respondents consider about leftover medications while purchasing drugs for SM, which is higher than the reported result in current study (14.5%). Consistent with this study findings a notable fraction was considering the potential side effects (32.1%) and the brand name of SM (31.7%) prior to purchase in study done in Si Lanka (Subhashini & Udayanga, 2020). For instance, a study conducted in Saudi Arabia has reported that majority (84.1%) pay attention to the effectiveness of medications, followed by the brand (Al-Ghadeer et al., 2018).

Perceived health conditions for SMP

Figure 4.

Perceived health conditions for SMP (%). *



*multiple responses, total does not equal to 100%.

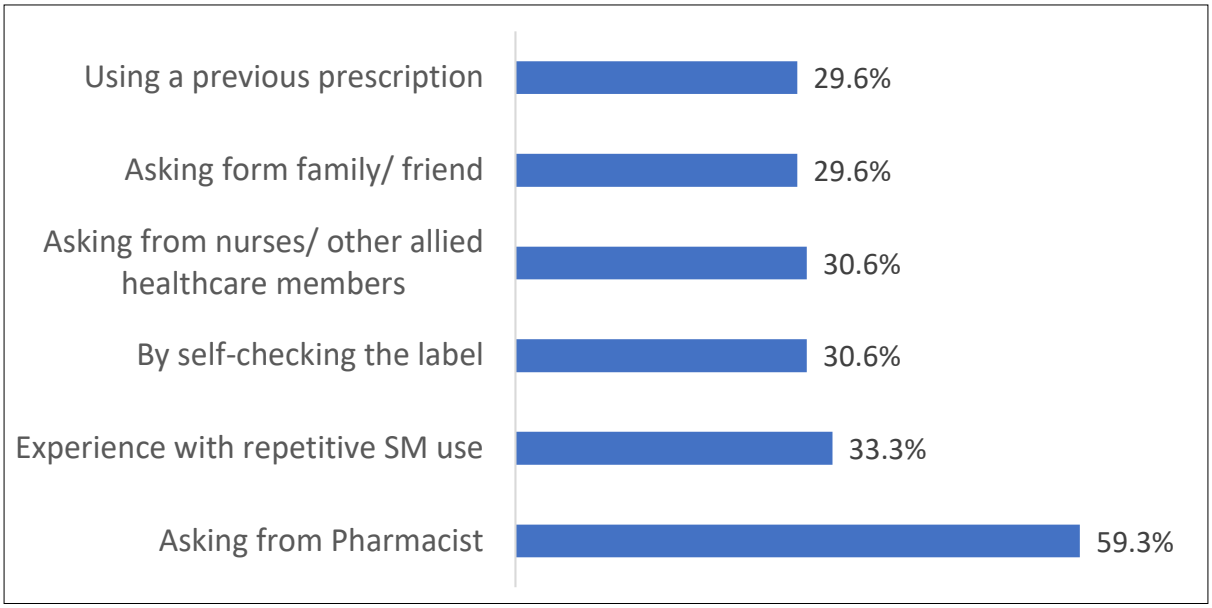
Figure 4 indicates that the causative health conditions among current participants which have led to SMP were, headache (80.7%) followed by common cold (43%) and cough (34.2%). In contrast to current study findings, fever (61.3%) has been reported as the major illness for SMP in a previous Sri Lankan study (Subhashini & Udayanga, 2020). An Indonesian study also has indicated cough and common cold (23.8%), fever (18.9%) and headache (17.9%) as the commonest health conditions (Annisa & Kristina, 2020) although the reported frequency was comparatively low in the latter studies and the current study.

Frequency distribution of followed source of information for SM

As a physician's consultation on required medicine is overridden in SMP, the participants had relied on alternative sources to gain information on medicines to be consumed for the disease conditions being presented (Figure 5).

Figure 5.

Participants' source of information to engage in SMP (%*).



*multiple responses, total does not equal to 100%.

Most of the participants had gained further information on drug type, frequency, and dosage for SMP from the pharmacists (59.3%) and their own knowledge from repetitive usage of the drug (33.3%). Many studies have also reported similar findings with regard to asking from pharmacist about medications. (Shimul & Haider, 2021; Annisa & Kristina, 2020; Shah; Alireza et al. 2018). Furthermore, it was found that most of the SM users (91.3%) had not experienced side effects. This result was like the study done by Malak & AbuKamel (2019) which had the majority (97.4%) of SM users who had not experienced side effects related to SMP. Of the participants who experienced side effects, about 45% had consulted a doctor and about 35% had stopped taking the drug after experiencing side effects with SMP. A similar result was found in Kuwait (Mitra et al., 2018).

Knowledge on SMP

Table 7.

The percentages among levels in the factors related to knowledge of SMP.

Factors related to knowledge on SMP		Percentage
Awareness of SM risks	Yes	89.2
	No	10.8
Usefulness of having a drug label	Very useful	90.0
	Fairly useful	8.0
	Of some use	2.0
Understanding the content in drug labels	Fully understood	43.0
	Partially understood	55.0
	Not at all	2.0
Attitude towards the statement "SM is effective similarly to medicines prescribed by a doctor"	Agree	13.0
	Neutral	56.0
	Disagree	24.0
	Strongly disagree	7.0

Results in Table 7 indicate that among the students who have engaged in SMP, about 90% were aware that SM has some risks and having a drug label was very useful. However, only 43.0% have fully understood the content in drug labels, while the balance 57% have partially understood or not at all. Similar results were found among university students in Thailand (Burapadaja, Jamroendararasame & Sanguansermsri, 2002) and in Turkey (Okyay & Erdogan, 2017). Only 13% has agreed on the statement, "SMP are effective similarly to medicines prescribed by a doctor" while 31% disagree. The attitudes towards the statement "SM is effective similarly to medicines prescribed by a doctor" is significantly associated (p=0.07) with the levels of SMP. The studies done in China by Zhu et al. (2016) and in Africa by Araia, Gebregziabher & Mesfun (2019) claimed that 94% and 55% respectively have believed that SM is a good, acceptable and effective practice.

Known risk factors

Table 8.

Frequency distribution of the known risks related to SMP.

Already known SM related risks	Percentage*
Side effects/ allergies	85.0
Consuming wrong drug	49.0
Consuming wrong dose	65.0
Interactions among drugs/ consumed foods	41.0
Worsening the symptoms	26.0
Addictions	34.0
Antimicrobial resistance	26.0

*multiple responses, total does not equal to 100%.

Based on the results in Table8, the reported mostly known risks related to the SMP were 'side effects/ allergies' (85.0%), 'consuming wrong dose' (65.0%), 'consuming wrong drug'

(49%), and 'interactions among drugs/ foods consumed' (41.0%). A similar study done in Sri Lanka recognized that risk of misdiagnosing the illness (53.7%) and misuse of medications (49.6%) were commonly reported which were not assessed in the current study (Subhashini & Udayanga, 2020).

Conclusions and Recommendations

Conclusions

The reported SMP among the undergraduates of FOHS, SLIIT was 87% irrespective of their variations of socio-demographic characteristics and significantly related with the presence of chronic illnesses. The intensity of these undergraduates engaged in SMP was significantly different according to the variety of medicines used in SM while it was not significantly related with their previous experience of side effects related to SM. Painkillers and vitamins and minerals were the most common medicine types used in SMP. Headache and common cold were the main health conditions that have led the participants to engage in SMP. Covid-19 restrictions, belief that it is unnecessary to consult a doctor for mild illnesses, and prior relief experienced with SM were the major contributing factors for SMP. Majority of the participants have considered the side effects of the medicine and pharmacist's suggestions prior to purchasing them under SMP.

The major sources of drug information in SMP use were pharmacists' suggestions and their own knowledge of repetitive use of the drug. Most SM users believed that drug labels are useful. However, only 43.0% have fully understood the content of the drug labels. The awareness among the undergraduates regarding the risks related to SMP was 89.2% which was a satisfactory finding. Side effects / allergies and consuming wrong dose was the most commonly known risks related to SM. Most of the students had neutral attitude towards the statement "SM is effective as the medicines prescribed by a doctor". Moreover, the current study finding confirms that the COVID-19 restrictions have become a contributing factor for SMP among the studied population. Therefore, Sri Lankan health authorities should pay more attention to the medicinal compliance-related health impacts of the COVID-19 crisis.

Recommendations

Increasing awareness on SM by conducting educational programs in pharmaceutical aspects is recommended to promote healthy medicinal compliance among the undergraduate population. Future research is needed to determine the impact of the Covid-19 situation on SMP among the general population in Sri Lanka. We also recommend a future study to determine the SMP students in all non-state universities. It is necessary to extent this study for different faculties in both state and non-state universities.

Acknowledgment

All respondents in this survey are acknowledged.

References

Abey, S. M., & Amelo, W. (2010). Assessment of self-medication practices among medical, pharmacy, and health science students in gondar university, ethiopia. *Journal of Young Pharmacists, 2*(3), 306–310. https://doi.org/10.4103/0975-1483.66798.

Alano, G. M., Galafassi, L .M., Galato, D., & Trauthman, S. C. (2009). Responsible self-medication: review of the process of pharmaceutical attendance. *Brazilian Journal for Pharmaceutical Sciences*, 4(94): 626-633.

Al-Ghadeer, S., Aljuaydi, K., Babelghaith, S., Alhammad, A., & Alarifi, M. N. (2018). Self-medication with antibiotics in Saudi Arabia. *Saudi pharmaceutical journal: the official publication of the Saudi Pharmaceutical Society*, *26*(5), 719–724.https://doi.org/10.1016/j.jsps.2018.02.018.

Alhomoud, F., Aljamea, Z., Almahasnah, R., Alkhalifah, K., Basalelah, L., & Alhomoud, F. K. (2017). 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 : the official publication of the International Society for Infectious Diseases*, *57*, 3–12.https://doi.org/10.1016/j.ijid.2017.01.014.

Al-Flaiti, M., Al Badi, K., Hakami, W. O., & Khan, S. A. (2014). Evaluation of self-medication practices in acute diseases among university students in Oman. *Journal of Acute Disease*. 3(3) 249-252. https://doi.org/10.1016/S2221-6189(14)60056-1.

Al Rasheed, F., Naqvi, A. A., Ahmad, R., & Ahmad, N. (2017). Academic stress and prevalence of stress-related self-medication among undergraduate female students of health and non-health cluster colleges of a public sector university in Dammam, Saudi Arabia. *Journal of Pharmacy and Bio-allied Sciences,* 9(4):251.

Ali, S. E., Ibrahim, M. I., & Palaian, S. (2010). Medication storage and self-medication behaviour amongst female students in Malaysia. *Journal of Pharmacy Practic, .*8(4):226–32.

Alireza, A., Azam, F., Fateme, D., & Alireza, K. (2018). Prevalence of self-medication practice among health sciences students in Kermanshah, Iran. *BMC Pharmacology and Toxocology,* doi:10.1186/s40360-018-0231-4.

Alshawi, A .F., Ali, A. F., Enad, M. M., & Salih, J. A. (2018). Self-medication among medical students in Anbar and Fallujah Universities in Iraq. *Journal of the Faculty of Medicine Baghdad,* 60(3), 156–159. doi:https://doi.org/10.32007/jfacmedbagdad.603606.

Annisa, M., & Kristina, S. A. (2020). Self medication practice, literacy and associated factors among students in Yogyakarta. *International Journal of Pharmaceutical Research.*12, https://doi.org/10.31838/ijpr/2020.12.03.098.

Araia, Z. Z., Gebregziabher, N. K., & Mesfun, A. B. (2019). Self medication practice and associated factors among students of Asmara College of Health Sciences, Eritrea: a cross sectional study. *Journal of Pharmaceutical Policy and Practice, 12*. https://doi.org/10.1186/s40545-019-0165-2.

Bennadi D. (2013). Self-medication: A current challenge. *Journal of Basic and Clinical Pharmacy*, *5*(1), 19–23.https://doi.org/10.4103/0976-0105.128253.

Buke, C., Hosgor-Limoncu, M., Ermertcan, S., Ciceklioglu, M., Tuncel, M., Köse, T., & Eren, S. (2005). Irrational use of antibiotics among university students. *Journal of Infection*, 51(2):135–9.

Burapadaja, S., Jamroendararasame, B., & Sanguansermsri, J. (2002). Improvement of consumer's understanding of drug leaflet content. *Chiang Mai University Journal of Natural Sciences*, 1(3):273– 28.

Esan, D. T., Fasoro, A. A., Odesanya, O. E., Esan, T. O., Ojo, E. F., & Faeji, C. O. (2018). Assessment of Self-Medication Practices and Its Associated Factors among Undergraduates of a Private University in Nigeria. *Journal of Environmental and Public Health*, https://doi.org/10.1155/2018/5439079.

Fernando, A. D. A., Bandara, L. M. H., Bandara, H. M. S. T, Pilapitiya, S., & de Silva, A. (2017). A descriptive study of self-medication practices among Sri Lankan national level athletes. *BMC Research Notes* 10, 257. https://doi.org/10.1186/s13104-017-2579-8.

Food and Drug Administration Jordan (2014). National Medicine Policy. http://www.jfda.jo/EchoBusV3.0/SystemAssets/PDF/AR/Allaince/E1.pdf.

Gelayee, D. A. (2017). Self-medication pattern among Social Science University students in Northwest Ethiopia. *Journal of Pharmaceutical Sciences,* https://doi.org/10.1155/2017/8680714.

Goossens, H., Ferech, M., Vander Stichele, R., & Elseviers, M. (2005). Outpatient antibiotic use in Europe and association with resistance: a cross-national database study. *Lancet Global Health*, 365(9459):579–87.

Gunawardhana, C. B., Sakeena, M. H., & Sivayoganthan, C. (2015). Awareness of rational medication use and antibiotic self-medication practices among undergraduate students in a university in Sri Lanka. *Tropical Journal of Pharmaceutical Research*, 14(4):723–9.

Helal, R. M., & Abou-ElWafa, H. S. (2017). Self-Medication in University Students from the City of Mansoura, Egypt. *Journal of Environmental and Public Health*, 9145193. doi:10.1155/2017/9145193.

Hughes, C. M., McElnay, J. C., & Fleming, G. F. (2001). Benefits and risks of self medication. *Drug Safety.* 24(14), 1027–1037. doi: 10.2165/00002018-200124140-00002.

Hughes, L., Whittlesea, C., & Luscombe, D. (2002). Patients' knowledge and perceptions of the side-effects of OTC medication. Journal of Clinical

Pharmacy and Therapeutics, 27(4):243.

Kasulkar, A. A., & Gupta, M. (2015). Self Medication Practices among Medical Students of a Private Institute. *Indian Journal of Pharmaceutical Sciences*, 77(2), 178–182. doi:10.4103/0250-474x.156569.

Malak, M. Z., & AbuKamel, A. M. (2019). Self-Medication among university students: A phenomenological study. *EuroMediterranean Biomedical Journal*, 13 (37) 164-170. http://www.embj.org/wp-content/uploads/2018/12/Malak_37.pdf.

Mehta, R. K., & Sharma, S. (2015). Knowledge, attitude and practice of self-medication among medical students. *Journal of Nursing and Health Science*, 4(1), 89–96. doi:10.9790/1959-04118996.

Mekonnen, M., Zelalem, D., & Tezera, N. (2018). Self-medication practice and associated factors among non-health professional students of university of Gondar, North West Ethiopia, 2017. *Hospice & Palliative Medicine International Journal*, 2 (6): 347- 353. doi:10.15406/hpmij.2018.02.00122.

Mitra, A. K., Imtiaz, A., Al Ibrahim, Y. A., Bulbanat, M. B., Al Mutairi, M. F., & Al Musaileem, S. F. (2018). Factors influencing knowledge and practice of self-medication among college students of health and non-health professions. *IMC Journal of Medical Science*, 12(2): 57-68.

Mustafa, O., & Rohra, D. (2017). Patterns and determinants of self-medication among university students in Saudi Arabia. *Journal of Pharmaceutical Health Services Research,* https://doi.org/10.1111/jphs.12178.

Niwandinda, F., Lukyamuzi, E. J., Ainebyona, C., Ssebunya, V. N., Murungi, G., & Atukunda, E. C. (2021). Patterns and Practices of Self-Medication Among Students Enrolled at Mbarara University of Science and Technology in Uganda. *Integrated Pharmacy Research and Practice.*

Ocan, M., Obuku, E. A., Bwanga, F., Akena, D., Richard, S., Ogwal-Okeng, J., & Obua, C. (2015). Household antimicrobial self-medication: A systematic review and meta-analysis of the burden, risk factors and outcomes in developing countries. *BMC Public Health*, 15(1). https://doi.org/10.1186/s12889-015-2109-3.

Okyay, R. A., & Erdoğan, A. (2017). Self-medication practices and rational drug use habits among university students: a cross-sectional study from Kahramanmaraş, Turkey. *Peer Reviewed Journal,* 1(5): e3990. doi: 10.7717/peerj.3990.

Osemene, K. P., & Lamikanra, A. (2012). A Study of the Prevalence of Self-Medication Practice among University Students in Southern Nigeria. *Tropical Journal of Pharmaceutical Research*, 11(4):684-689.

Parulekr, M., Mekoth, N. K., Ramesh, C. M., & Parulekar, A. (2016). Self- medication in Developing Countries a Systematic

Review. *Journal of Pharmaceutical Technology, Research and Managemen,* Vol 4,103–127. https://doi.org/10.15415/jptrm.2016.42007.

Regina, F. A., José, P., & Elisardo, B. (2020). Knowledge, attitudes and practice of self-medication among university students in Portugal: A cross-sectional study. *SAGE Journals,* https://doi.org/10.1177/1455072520965017.

Ruiz, M. E. (2010). Risks of self-medication practices. *Current Drug Safety*, 5 (4): 315-23. https://doi.org/10.2174/157488610792245966.

Selvaraj, K., Kumar, S. G., & Ramalingam, A. (2014). Prevalence of self-medication practices and its associated factors in urban Puducherry, India. *Perspectives in Clinical Research,* 5(1):32. https://doi.org/10.4103/2229-3485.124569 .

Shah, K., Shimul, H., & Haider, S. S. (2021). Assessment of knowledge, perception, and awareness about self-medication practices among university students in Nepal. *Heliyon*. https://doi.org/10.1016/j.heliyon.2021.e05976.

Subhashini, N., & Udayanga, L. (2020). Demographic, socio-economic and other associated risk factors for self-medication behaviour among university students of Sri Lanka: a cross sectional study. *BMC Public Health*, 20:613. https://doi.org/10.1186/s12889-020-08622-8.

Ullah, H., Khan, S. A., Ali, S., Karim, S., Baseer, A., Chohan, O., Hassan, S. M., Khan, K. M., & Murtaza, G. (2013). Evaluation of self-medication amongst university students in Abbottabad, Pakistan; Prevalence, Attitude and Causes. Acta Poloniae Pharmaceutica, 70(5):919-22.

Wijesinhe, P. R., Jayakody, L. R., & Rohini, A. S. (2012). Prevalence and predictors of self-medication in a selected urban and rural district of Sri Lanka. *WHO South-East Asia Journal of Public Health,* 1(1):28-41. https://doi.org/10.4103/2224-3151.206911.

Zafar, S. N., Syed, R., Waqar, S., Zubairi, A. J., Vaqar, T. & Shaikh, M. (2008). Self-medication amongst university students of Karachi: prevalence, knowledge and attitudes. Journal of the Pakistan Medical Association, 58 (4): 214–217.

Zhu, X., Pan, H., Yang, Z., Cui, B., Zhang, D. & Ba-Thein, W. (2016). Self-medication practices with antibiotics among Chinese university students. *Public Health.* 130:78-83. doi: 10.1016/j.puhe.2015.04.005.