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Determinants of knowledge regarding self-medication among professional students of the apothecary

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ABSTRACT

Background: Self-medication or the use of over-the-counter drugs by the general public, including among professional students, is becoming an increasingly common practice. However, this practice can carry risks if done without adequate knowledge, especially for pharmacist students who will later play a role in providing education related to drug use.

Objective: This study aims to identify factors that affect the level of knowledge of pharmacist program students regarding self-medication.

Methods: This study was a cross-sectional survey using an online questionnaire, and the recorded data were analyzed using Logistic regression models. In total, 100 (66.7%) of 150 students practised self-medication at least once recently.

Results: We observe that female students were more likely to have a higher level of knowledge about self-medication than male students—aOR = 4.52, 95 % CI = 1.41-14.42. Meanwhile, students living alone were less likely to have a higher level of self-medication knowledge than those staying with somebody else —aOR = 0.47, 95 % CI = 0.23-0.97.

Conclusion: The effect of students who practised self-medication on a higher level of knowledge about self-medication was significant among students who live with somebody else—aOR =2.85, CI = 1.01-8.01 but not among students who live alone. There are more attempts to educate the students about self-medication and the possible risks of doing self-medication. We suggest a similar study can be observed among students during their bachelor study or in their Professional Program.

Keywords: *knowledge, self-medication, students.*

INTRODUCTION

Self-medication is an effort to choose and use modern medicine, herbs, and even traditional medicine by individuals to treat any disease or symptom (Hidayati *et al*., 2017). This includes getting all kinds of medicine without a prescription, either by repeating a prescription that has been redeemed for a while, sharing existing medicines from friends, relatives, or one of the members in the closest social environment or using leftover medicines that have been stored for a long time at home (Rickles *et al.*, 2023). Self-medication varies in different populations and is influenced by many factors (Pan, Fu and Sun, 2024). The legal basis for self-medication in Indonesia is in the Minister of Health Regulation No. 919 Menkes/Per/X/1993. The Permenkes states in Article 2 the criteria for drugs that can be provided without a prescription. The prescription is a written request from a doctor, dentist, or veterinarian to the pharmacist who manages the pharmacy to provide and deliver drugs for patients per the applicable laws and regulations (Pasal 1). That way, self-medication that is carried out correctly is the right action in rational health maintenance in accordance with government recommendations for maintaining one's health. Self-medication practices with 'over the counter' or other drug groups (analgesics/antipyretics, gastrointestinal drugs, respiratory medications, vitamins) are helpful in timely managing common ailments (Isetts, Talley and Brearley, 2023). Improved quality of life is also affected by changes in lifestyle and healthy behaviour (O'Brien *et al.*, 2024).

The pattern of drug use is an indicator or guide in a critical health aspect. The availability of information regarding drug use patterns can help to identify and determine the prevalence of diseases affecting a particular population. Also, it can provide information about how therapeutic resources are used (Choi, Ryu and Jin, 2023). However, in other cases, self-medication behaviour can be an essential problem; for example, it can delay diagnosis and facilitate the emergence of resistant microorganisms and other diseases. Even if self-medicated drugs are used correctly, self-medication can be associated with side effects that can occur and an increased likelihood of drug interactions, including drug-alcohol interactions. The abovementioned things can affect treatment adherence and quality of life (Park and Park, 2024). Various types of drugs can usually be purchased or used without consulting a doctor or medical professional. For example, analgesic drugs to relieve headaches and other minor pain conditions. As a side effect, analgesics can lead to gastritis and, even more, peptic ulcers if it is used for an extended period. Another example is resistance to living organisms because of antibiotic abuse (Lee and Choi, 2024).

Although self-medication is a common practice and is entirely accepted in the community, including among professional students such as aspiring pharmacists, there are still limitations in understanding the specific factors that affect their knowledge of this practice. Previous research has focused on aspects of self-medication behavior and practices in the general public. However, few studies have specifically explored the determinants of self-medication knowledge in pharmacist program students with an essential role in the health sector. In addition, research that discusses the influence of pharmacy education and access to health information on self-medication understanding is still limited. This gap identification highlights the need to conduct more in-depth research related to specific factors such as educational background, access to health information, and attitudes towards self-medication in pharmacist students to increase the effectiveness of pharmacy education and support safe self-medication practices. Among students/college students, drug abuse without prescription has become a severe problem. In particular, young people are exposed to a variety of media, and the increase in drug advertising could pose a more significant threat to the young population. Unexpected concerns occur, for example, wrong self-diagnosis, drug interactions, and wrong drug use because they are different from the initial indication. A survey conducted by researchers on widely advertised drugs showed that the majority of students used at least one of the advertised products without consulting with their doctor (Guo *et al.*, 2024). Self-medication should follow the limits of rational drug use (Badawoud *et al.*, 2024). Therefore, this study was conducted to determine the prevalence of self-medication by students of the Professional Program of Apothecary at University X in the first,

second, and third years of 2020. Also, I want to find out their level of knowledge towards self-medication.

RESEARCH METHODOLOGY

Study design and participants

This study was a cross-sectional survey using an online questionnaire from 1st to September 10th, 2022. This study was conducted among students in The Professional Program in Apothecary. This program is a post-graduate Professional Program in Apothecary and belongs to the Faculty of Health Science from "X" University in Indonesia. A convenience sampling method was applied in this study. All active students in the program were eligible to join the study as the criteria for inclusion.

Questionnaire development

Data was collected using a questionnaire to assess the demographic characteristics of the students (1) including age, gender, housemates, residence, and distance from home to the nearest drug store, (2) knowledge of self-medication and (3) data about self-medication, including the use of self-medication, what they use for self-medication and reasons why they assess the self-medication. The guideline recommended by Guillemin et al. was utilized to evaluate the content of the instruments. The authors took steps based on the guidelines, including expert review, pilot study, and double back translation process, as the questionnaire was developed in English and translated into Bahasa Indonesia. The questionnaire was tested for a pilot study with ten students and was not included in the analysis. Knowledge of self-medication as the outcome variable was measured by asking 6 questions about knowledge of self-medication that was validated previously by other studies (Atmadani *et al.*, 2020). In this study, we checked the questionnaire based on the experts' opinions and modified the questions if there were any suggestions from the expert's review. We also did a reliability check from the pilot study with Cronbach's alpha value for the questions on knowledge about self-medication, which was 0.64, meaning appropriate internal validity.

Statistical analysis

The recorded data were analyzed using SPSS 23.0 software (SPSS, Chicago, IL, USA). Statistical analysis was carried out using descriptive statistics, including the chi-square test, to analyse the difference in demographic characteristics and the use of self-medication about knowledge on self-medication. Logistic regression models used inferential statistics to examine the significance between independent variables such as socio-demographic variables (e.g., gender, housemates) with the outcome variable knowledge about self-medication. The variables were possibly related to the foremost independent, and outcome variables were considered to be selected for a multivariate regression model with ($p \leq 0.25$). Adjusted odd ratios (ORs) were used to report all the determinants and the 95% confidence interval (95% CIs). Statistically significant was determined with p-value < 0.05. We further analyzed the interaction between self-medication practice and socio-demographic characteristics with the possibility of having higher knowledge about self-medication. We used significance <0.1 for interaction p-value to signify potential moderation effects.

Ethical considerations

The Commission of Research Ethics of the University of Muhammadiyah Malang (E.5.a/220/KEPK-UMM/VIII/2020) provided ethical approval. Informed consent was also collected from each respondent. Informed consent includes the objectives of the study, the variables, and an explanation of the data protection.

RESULT

Table 1. Analysis of socio-demographic characteristics associated with knowledge about self-medication

Variables	Total (n = 150)	%	Knowledge about self-medication		*p*-value	Multivariate model
			Lower (%)	Higher (%)		aOR[b] (95% CI)
Practice self-medication					0.197	
Yes	100	66.7	55 (62.5)	45 (72.6)		
No	50	33.3	33 (37.5)	17 (27.4)		
Gender					0.017*	
Male	22	14.7	18 (20.5)	4 (6.5)		1.00
Female	128	85.3	70 (79.5)	58 (93.5)		4.52 (1.41-14.42)*
Age					0.622	
20-23 years old	112	74.7	67 (76.1)	45 (72.6)		1.00
24 years old and more	38	25.3	21 (23.9)	17 (27.4)		1.19 (0.54-2.60)
Housemate					0.104	
With somebody else	90	60	48 (54.5)	42 (67.7)		1.00
Alone	60	40	40 (45.5)	20 (32.3)		0.47 (0.23-0.97)*
Residence					0.891	
Urban	74	49.3	43 (48.9)	31 (50)		1.00
Rural	76	50.7	45 (51.1)	31 (50)		0.83 (0.41-1.68)
Distance home to the nearest drug store					0.502	
< 2km	92	61.3	52 (59.1)	40 (64.5)		1.00
2 km and more	58	38.7	36 (40.9)	22 (35.5)		0.68 (0.33-1.40)

*p value <0.05
OR adjusted odds ratio, CI confident interval
results from the chi-square test
results were adjusted for socio-demographic characteristics

In total, 100 (66.7%) students recently practised self-medication at least once. The students were mostly self-medicated with analgesics (49 students), and 89 students admitted that the reason for them to self-medicate was because it was only a minor illness. Socio-demographic characteristics from these respondents most of them were female (85.3 %), 20-23 years old (74.7%), living with somebody else (60%), rural residents (50.7%), and the distance between home and the nearest drug store are less than 2 kilometres (61.3%). Table 1 reports the results from the logistic regression analysis displaying the adjusted odds ratio. The data shows the effects of socio-demographics, including gender, age, housemate, residence, and distance home to the nearest drug store. Specifically, housemates and gender are significantly associated with knowledge about self-medication. We observe that female students were more likely to have a higher level of expertise about self-medication than male students—aOR = 4.52, 95 % CI = 1.41-14.42. Meanwhile, students living alone were less likely to have a higher level of self-medication knowledge than those staying with somebody else —aOR = 0.47, 95 % CI = 0.23-0.97.

Table 2. Knowledge about self-medication

Statements	Percentage (%)
When you are self-medicating, there is a possible risk of drug interaction.	
Correct	86.7
Incorrect	13.3
Antibiotics are drugs that should be bought without a prescription for self-medication.	
Correct	92.0
Incorrect	8.0
When you are self-medicating, there is a possibility of misdiagnosis that causes false drug indications (for example, you are actually having thymus but only taking the fever-reducing drugs).	
Correct	93.3
Incorrect	6.7
You should consult a doctor first, then get a drug prescription.	
Correct	72.0
Incorrect	28.0
When you are self-medicating, there is a dangerous side effect that can occur.	
Correct	88.0
Incorrect	12.0
When you are self-medicating, there is a risk that you might take the medication mistakenly (for example, it is supposedly for the rectum. Instead, you use it for oral)	
Correct	63.3
Incorrect	36.7
Overall knowledge score into binary outcomes	
Lower	58.7
Higher	41.3

From 6 statements investigating knowledge about self-medication among students, only 2 statements were answered correctly below 80% of the participants. This means that over 80% of all students in this study answered the knowledge statements correctly. Of the 150 students being measured by knowledge about self-medication, 58.7 % had lower knowledge, and 41.3% had higher knowledge (Table 2). The female students in this study were more likely to have a higher understanding regarding self-medication (93.5%) (Table 1).

Table 3. Subgroup analysis for the effect of practice self-medication on knowledge about self-medication by socio-demographic factors

Variable	Housemates	
	With somebody else aOR[b] (95% CI)	**Alone aOR[b] (95%)**
Practice self-medication	2.85 (1.01-8.01)*	0.66 (0.18-2.48)

Subgroup analyses were performed when the interaction terms of practice self-medication with variable housemates significantly affected higher levels of knowledge about self-medication ($p < 0.1$). Specifically, the effect of students who practised self-medication on a higher level of knowledge about self-medication was significant among students who live with somebody else—aOR =2.85, CI = 1.01-8.01 but not among students who live alone (Table 3).

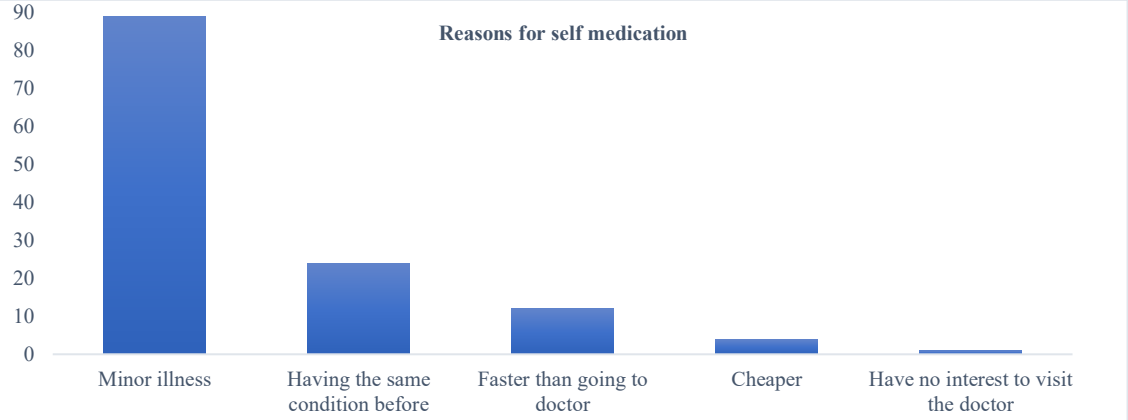

Figure 1. Reasons for self-medication

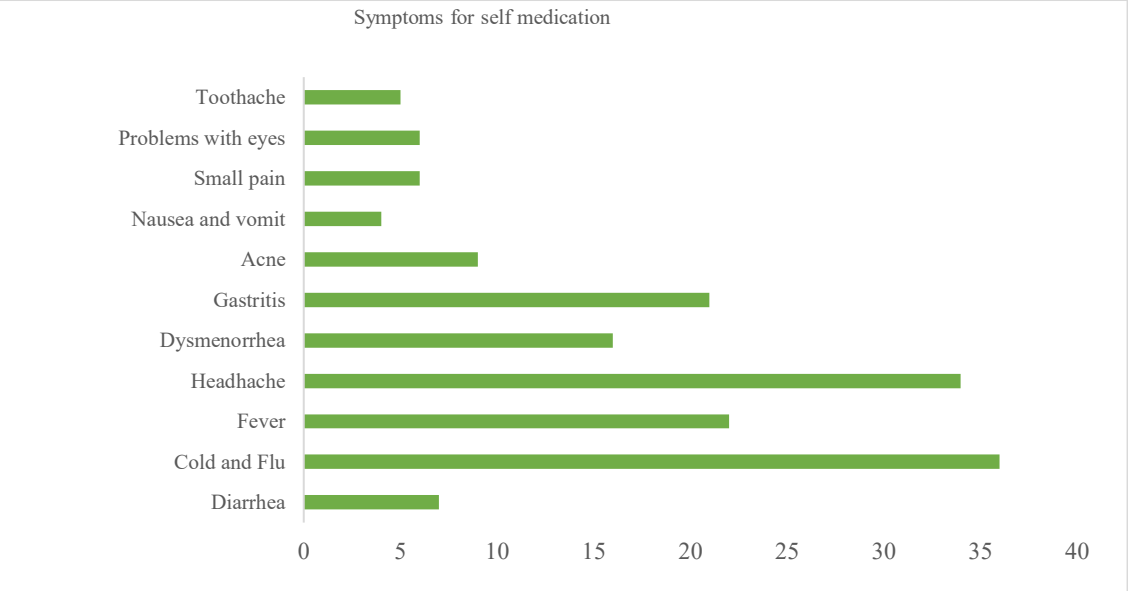

Figure 2. Symptoms for self-medication

DISCUSSION

A higher level of knowledge was associated with a higher likelihood of living with somebody else. Furthermore, if students also practice self-medication, it increases the likelihood of having higher knowledge about self-medication. The effects of the practice of self-medication on higher knowledge of self-medication were significant among students who live with somebody else or have housemates. The proportion of participants who did self-medication in our sample was higher (33.3%) than in a similar study conducted in Malang, with 11.7% (Atmadani *et al.*, 2020). Our findings were also higher than those of studies conducted in the Netherlands (12.5%). However, the percentage of self-medication practice in this study is lower than in a survey conducted in the United States of America and lower than in a similar research investigated in Brazil and a survey from Zabol University. Students in this program likely have more knowledge about self-medication and, thus, understand the risks of self-medication. These facts also can be

shown by the score of knowledge about self-medication in each section. The differences in population, research, and data analysis methods can cause a negative percentage of self-medication practice. Therefore, it is difficult to compare the prevalence (Michael *et al.*, 2024).

This present study investigated whether there were significant results between socio-demographic characteristics and knowledge about self-medication. Previously, a study observed socio-demographic characteristics significantly associated with knowledge (Lau, 2024). For instance, socio-demographics such as education, occupation, and source of information are significantly associated with knowledge related to Punjab's labour process (Spinoni *et al.*, 2024). However, in this survey, we investigated the difference between male and female students regarding the level of knowledge. Similar results were observed in previous studies. In this study, female students had a higher level of knowledge than male students. A contrary result was found in a previous study conducted at Zabol University of Medical Sciences, which stated no significant difference between genders in drug information knowledge (YAP *et al.*, 2024). This reason can be caused by a higher frequency of female students who did self-medication in this study.

Furthermore, female students had higher knowledge regarding self-medication. This fact about female students who had a higher proportion of self-medication is also supported by previous literature (Caballero *et al.*, 2024). However, there were no significant results between genders towards self-medication practice in this current study. Another socio-demographic factor that was significantly associated with knowledge about self-medication was housemates (Dong, Zhang and Wang, 2024). This study showed that living with somebody else gave students higher knowledge regarding self-medication than students who lived alone. However, there are no studies that support this result yet. Moreover, from subgroup analysis, the moderating effects of practising self-medication on the association between housemates and knowledge about self-medication were observed (Mujiati, Hidayati and Atmadani, 2022).

The impact of practising self-medication on a higher level of expertise about self-medication was significant among students who lived with somebody else (Zhang *et al.*, 2024). The most typical reason for self-medication in this study was ‘minor illnesses’ that have been widely reported in studies on self-medication (AbdElsalam and ElKholy, 2024). The second reason they were doing self-medication was because they have the same condition as before that make they did self-medication. Regarding the students' symptoms, cough, cold, and headache are the most common self-treated medications. These results were similar to previous studies (Heo *et al.*, 2024). The practice of self-medication among students, especially those who live with others, significantly improves knowledge and skills regarding self-medication. A key factor driving the practice is the perception that the disease is mild, a finding consistent with previous studies of self-medication. In addition, another common reason is experiences with similar conditions in the past, which encourages college students to self-medicate in the same way. The most common symptoms treated by self-medication include cough, runny nose, and headache, which show a pattern of similarity with previous research results in the context of common conditions that are self-treated by students (Thompson, Bowers and Evans, 2024a).

Self-medication practice among college students, especially those with a higher understanding of self-medication, shows a significant impact, especially among students living with others. The primary motivation driving this practice is "mild illness," which has been frequently reported in various studies related to self-medication (Thompson, Bowers and Evans, 2024b). The second common reason is the repetition of previously experienced health conditions so that students can self-medicate based on previous experience. Symptoms that are often the reason for self-medication include cough, runny nose, and headache, according to findings in previous studies (Jia, Yue and Sheng, 2024). The level of knowledge about self-medication in this study is contrary to that of an earlier study.

Regarding the expertise regarding self-medication, 58.7% of respondents had lower knowledge, whereas 41.3% had higher knowledge. These proportions are similar to a study from Zabol University, where 35% of pharmacy students achieved good scores in drug knowledge and a study from Palestine. These results indicate more attempts to increase education in this subject for pharmacy students, especially professional program students, representing all apothecary students in Indonesia. Second, the study used a cross-sectional method that inhibited causal inference (Selvi Sarıgül, Ürek and Uğurluoğlu, 2024). The strength of the study was that this study investigated self-medication topics among Apothecary students in the Professional Program; this study may be the first study investigating the topic among Professional Program students in Indonesia. A similar study can be observed among students during their bachelor's study or in their professional program with a larger sample size and in other universities in Indonesia that can be more generalized (Wu *et al.*, 2024).

CONCLUSION

The study observed that 66.7% of students self-medicated mostly for minor ailments such as headaches, flu, and colds. Gender was found to be associated with the level of knowledge about self-medication. Our results suggest that being female and living with others in their home dramatically increases the likelihood of having a higher level of expertise in self-medication. There are more efforts to educate students about self-medication and the possible risks of self-medicating. Similar studies can be observed in students in the undergraduate or professional program with a larger sample size and in other universities in Indonesia that can be more generalized in Indonesia. Self-medication or self-medication is common among college pharmacists, especially those with higher knowledge of medicines and health. The main reason for self-medication among college students is to address minor illnesses or conditions they have experienced before, which gives them confidence in choosing medications without medical consultation. Cough, runny nose, and headache are the most common symptoms that college students self-manage, which aligns with previous research results.

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Conflict of Interest

The authors declare no conflict of interest.

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