**International Journal of Medical Toxicology & Legal Medicine** **Volume 25, No. 3 and 4, 2022**

**E-ISSN: 0974-4614**

**p-ISSN: 0972-0448**

# Good Knowledge Influences the Junior and Senior Pharmacy Students to Self-Medicate

**Derar H. Abdel-Qader[1*], Abdullah Albassam[2], Esra' Taybeh[3], Nadia Al Mazrouei[4], Khalid Awad Al-Kubaisi[4], Rana Ibrahim[4], Reham Aljalamdeh[5], Salah Abdalrazak Alshehade[6], Ahmad Naoras Bitar[7], Salim Hamadi[1]**

[1]Faculty of Pharmacy & Medical Sciences, University of Petra, Amman, Jordan , Email: d.balawi@igec.com.au
[2]Department of Pharmacy Practice, Faculty of Pharmacy, Kuwait University, Kuwait, Kuwait, Email: Albassam@hsc.edu.kw
[3]Department of Applied Pharmaceutical Sciences, School of Pharmacy, Isra University, Amman, Jordan , Email: esra.taybeh@iu.edu.jo
[4]Department of Pharmacy Practice and Pharmacotherapeutics, College of Pharmacy, University of Sharjah, United Arab Emirates, Email: nalmazrouei@sharjah.ac.ae, Smeer@sharjah.ac.ae, kalkubaissi@sharjah.ac.ae, ribrahim@sharjah.ac.ae.
[5]Faculty of Pharmacy, Philadelphia University, Amman, Jordan , Email: raljalamdeh@philadelphia.edu.jo
[6]Department of Pharmacology, Faculty of Pharmacy & Bio-Medical Sciences, MAHSA University, Selangor 42610, Malaysia , Email: salah@student.usm.my
[7]Department of Clinical Pharmacy, Faculty of Pharmacy, Universiti Sultan Zainal Abidin Jalan Tembila, 22200 Besut, Terengganu, Malaysia, Email: ahmadnaorasbitar@live.com
*Corresponding Author

Received: 12.09.2022 Revised: 04.10.2022 Accepted: 26.11.2022

**ABSTRACT**

Background: Self-medication is a global health issue that requires thorough study and management due to its associated benefits and risks. This study aimed to investigate the prevalence and determinants of self-medication practices among first-year and fifth-year pharmacy students. Methods: A cross-sectional study was conducted, and data were collected from 229 students using pre-tested questionnaires. Results: The findings revealed that approximately three-quarters of pharmacy students with good knowledge practiced self-medication (75.9%). Senior students were found to be twice as likely to self-medicate compared to juniors (OR=1.92, 95%CI: 1.05:3.49), and self-medication practice was associated with academic level and gender. The most common health complaints that led to self-medication were headaches (86.3%) and the common cold (85.0%). The two primary reasons for self-medication were prior positive experiences (76.9%) and the availability of drugs at home (73.8%). Conclusion: It is crucial to acknowledge that self-medication practices can have benefits, but they should be done responsibly and with proper knowledge. Pharmacists play a critical role in promoting responsible self-medication practices as they are the primary source of drug information.

**Keywords:** Self Medication, Health Knowledge, Pharmacy Students, Pharmacy Practice, Self-Care, Cross-Sectional Study

## 1 INTRODUCTION

Self-Medication (SM) is defined as obtaining and consuming drugs without consulting a physician to diagnose or prescribe a treatment[1], [2]. Different parts of the world have shown a wide prevalence of SM practice among students, such as Kuwait 92.0%[3], Jordan 78.5%[4], Pakistan 76.0%[5], and Syria 50.7%[6]. The variation in SM practice prevalence has been attributed to the different characteristics of the study samples and is explicitly influenced by the sociocultural characteristics of the study's location[7]. Students in health-related fields have reported a higher prevalence of SM practice than the general population[8].

SM practice is a complex health behavior influenced by many factors. Demographic characteristics like age[9], gender[10], income[11], field of study[12], and year of study [13] have frequently been associated with SM practice. Older students tend to self-medicate more, potentially due to greater autonomy and responsibilities. Females generally self-medicate more than males, potentially due to higher health awareness and lower risk tolerance. Higher income provides greater access to medications. Health field students self-medicate more, likely due to greater knowledge. Senior students self-medicate more, potentially due to greater experience and confidence. Other reported reasons for SM include ready access to drugs[14], non-seriousness of the illness[15],

and long waiting times to see a physician[16].Easy access to medications without prescriptions promotes self-medication. People are more likely to self-treat minor conditions. Long wait times at clinics motivate people to self-medicate rather than lose time seeking formal care. Lifestyle factors like alcohol consumption and smoking have also been linked to higher SM rates[17], potentially due to lower health consciousness among those with poor lifestyle habits.

Knowledge about responsible SM is an essential factor for proper drug use. Studies on students have shown varying levels of SM knowledge, with mean knowledge percentages ranging from 36.7% [18] to 74.5% [19]. Low levels indicate poor understanding of proper SM principles, while high levels indicate greater mastery of responsible self-medication. This indicates an ongoing need for better education on proper SM practices among all students. Proper knowledge is key for avoiding inappropriate use and potential complications.

Headache, stomach disorders, and respiratory diseases are commonly reported minor conditions for which SM is practiced[2].People often select medications based on pharmacist advice[20] or recommendations from friends/family[21]. Seeking input from those with medical knowledge appears preferable to fully independent selection. However, there are still risks if those advising do not have full understanding of the person's medical history and conditions. Reliance on informal advice promotes misuse due to lack of expert diagnosis.

Inappropriate SM can have serious health consequences, including incorrect self-diagnosis, dangerous drug interactions, improper administration, overdosing, masking severe diseases, and risk of dependence/abuse[22].Without clinical exams and lab tests, people may incorrectly self-diagnose conditions leading to improper treatment. Taking multiple medications concurrently without guidance raises interaction risks. Improper use can reduce effectiveness or increase side effects. Excessive doses increase adverse reaction risks. Mild symptoms could indicate serious underlying disease, which self-medication could mask. Chronic self-medication also promotes dependence and addiction tendencies. This highlights a gap in understanding SM practices among pharmacy students specifically. As future pharmacists, their SM knowledge and behaviors will impact the advice and care they provide patients. Pharmacy students have high medical knowledge but limited clinical experience, creating risk for inappropriate habits. Comparing junior and senior students can indicate how the pharmacy curriculum shapes SM attitudes over time.

This study aimed to identify factors influencing SM practice among junior ($1^{st}$-year) and senior ($5^{th}$-year) pharmacy students. It assessed prevalence of SM, reasons behind behaviors, sources used for SM guidance, and knowledge of proper SM principles. This provides insight into the development of SM habits across pharmacy schools and indicates areas needing improved education on responsible self-medication. Understanding motivations and habits can help enhance curriculum to graduate pharmacists who positively impact public health through proper medication management.

## 2 METHODS

### 2.1 Study Sample

This study was conducted at the Faculty of Pharmacy & Medical Sciences at the University of Petra (UOP). All available students present during the time of collecting data were involved. The biology class students were chosen because the course contained the largest number of $1^{st}$-year students, and advanced therapeutics classes was selected for $5^{th}$-year students. Unwilling students were not included in the study.

### 2.2 Data Collection Procedure

The investigator collected the data using a structured questionnaire, which was obtained and developed based on a literature review [23]. Before the actual collection, the questionnaire was pre-tested on twenty students (but not included in the study) to ensure its accuracy, completeness, and consistency. The use of over-the-counter (OTC) or prescription-only medication without medical consultation was considered SM practice. The data were collected by visiting the class at the beginning of the lecture and distributing the questionnaire to all students. The investigator clarified any doubts and answered the students' inquiries.

### 2.3 Statistical Analysis

Data werecoded and entered into the SPSS program version 27 (IBM, Chicago, IL, USA) by the investigator. A set of twenty questions were used to assess the participants' knowledge about appropriate self-medication (SM) practices. Participants who answered more than 75% (15 out of 20) of the questions correctly were considered to have excellent knowledge, while those who answered 50% to 74% (10 out of 20) were considered to have good knowledge. Participants who answered less than half of the questions correctly were considered to have poor knowledge.

Descriptive statistics were computed for the study variables. The crude odds ratio (OR) was calculated, and the Pearson Chi-Square test ($\chi^2$) was used to determine if there was a significant relationship between the variables. Also, logistic regression (LR) was conducted to identify the predictors of SM practice. The 95% confidence interval was set for the test whereby the result was significant if $P \leq 0.05$.

## 3 RESULTS

The overall prevalence of self-medication (SM) among the study participants was notably high, with 69.9% (n=160) of students reporting that they engaged in SM practices (Figure 1) When comparing the two groups, a higher proportion of fifth-year students (77.7%, n=73) reported SM compared to first-year students (64.4%, n=87). However, the difference in SM prevalence between the two study years did not reach statistical significance (p=0.005).

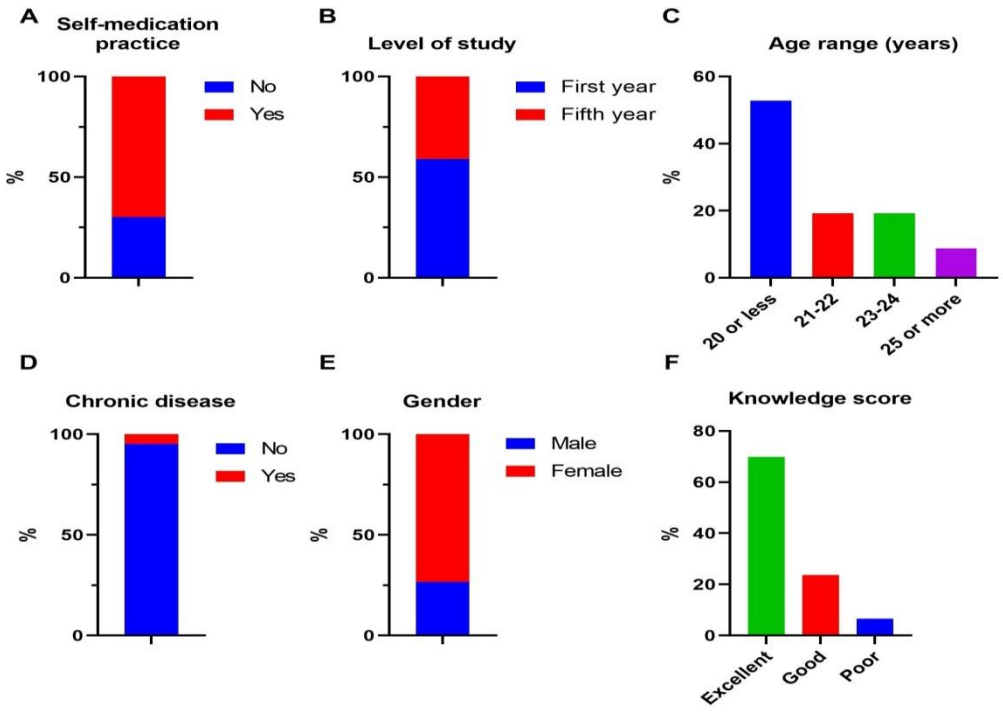


**Figure 1.** Prevalence and demographics of the study population

Also, comparing the likelihood of SM between different categories of various factors, using the respective reference categories is shown in Figure 2.Femaleshad significantly higher odds of SM (OR=2.47, 95%CI: 1.27-4.79) compared to males. Additionally, compared to the "20 or less" age group, the other age groups did not show significant differences in the odds of SM. Among the study level, fifth-year students did not have significantly different odds of SM compared to first-year students (OR=1.89, 95%CI: 0.57-6.20). And students without chronic diseases did not have significantly different odds of SM compared to those with chronic diseases (OR=1.96, 95%CI: 0.53-7.17). For the knowledge level, compared to students with poor knowledge, those with good knowledge (OR=2.01, 95%CI: 0.57-7.11) and excellent knowledge (OR=1.73, 95%CI: 0.56-5.34) did not have significantly different odds of SM.

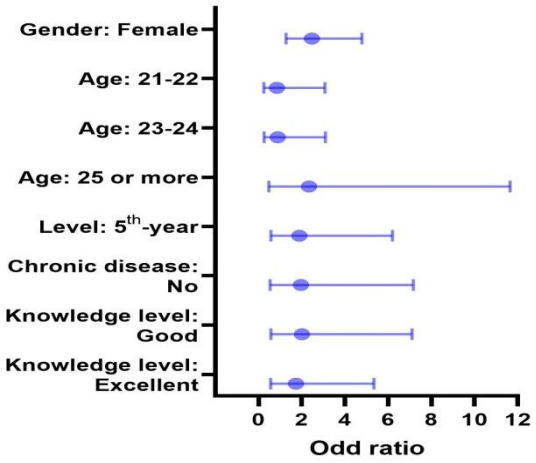


**Figure 2.** Comparison of the likelihood of SM between different categories

The analysis of SM prevalence by gender revealed interesting patterns (Figure 3). In the total study population, females had a significantly higher prevalence of SM (75.0%, n=126) compared to their male counterparts (55.7%, n=34) (p=0.005). This gender difference was particularly pronounced among first-year students, where females had a substantially higher SM prevalence (73.7%, n=73) compared to males (38.9%, n=14), and the difference was highly statistically significant (p=0.000). Interestingly, among fifth-year students, the gap in SM prevalence between females (76.8%, n=53) and males (80.0%, n=20) narrowed and was not statistically significant (p=0.743).

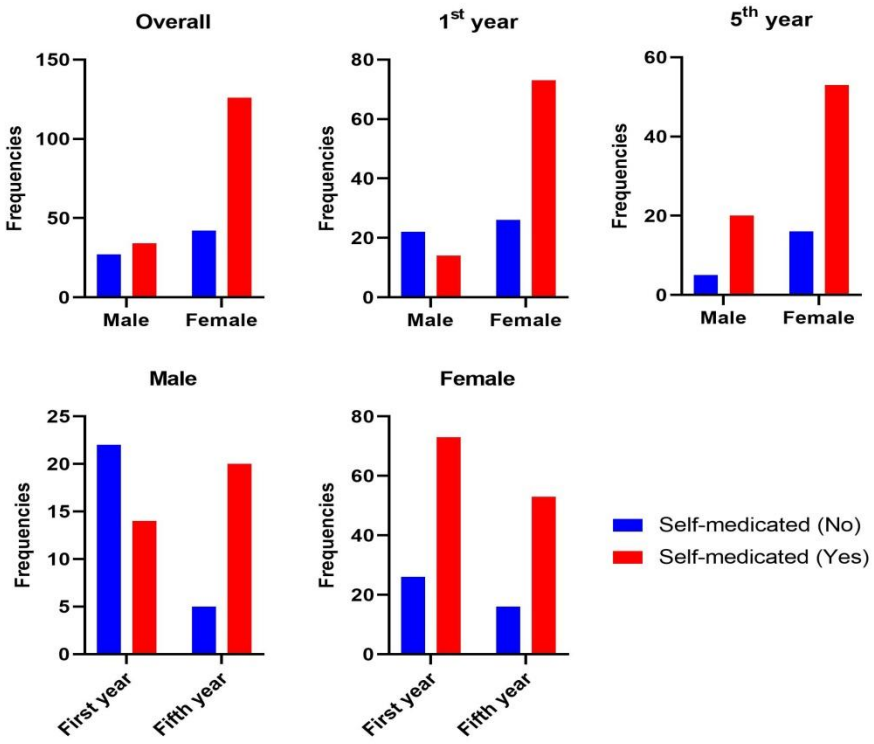


**Figure 3.** Analysis of SM prevalence by gender

When examining the prevalence of SM across different age groups (Figure 4), some variations were observed, although the differences did not reach statistical significance in the total population (p=0.206), first-year students (p=0.187), or fifth-year students (p=0.303). In the overall study population, the highest prevalence of SM was found in the "25 or more" age group, with 85.0% (n=17) of participants in this category reporting SM. This was followed by the "21-22" age group, where 75.0% (n=33) of participants engaged in SM, and the "23-24" age group, with 72.7% (n=32) of participants reporting SM practices.


**Figure 4.** Prevalence of SM across different age groups

The prevalence of SM was also analyzed in relation to the presence of chronic diseases among the study participants (Figure 5). In the total population, individuals without chronic diseases had a higher prevalence of SM (71.1%, n=155) compared to those with chronic diseases (45.5%, n=5). However, this difference did not reach statistical significance (p=0.070). A similar trend was observed when stratifying the data by study year. Among first-year students, those without chronic diseases had a higher SM prevalence (65.6%, n=84) compared to those with chronic diseases (42.9%, n=3), but the difference was not statistically significant (p=0.220). Similarly, among fifth-year students, participants without chronic diseases had a higher SM prevalence (78.9%, n=71) compared to those with chronic diseases (50.0%, n=2), although the difference was not statistically significant (p=0.175).

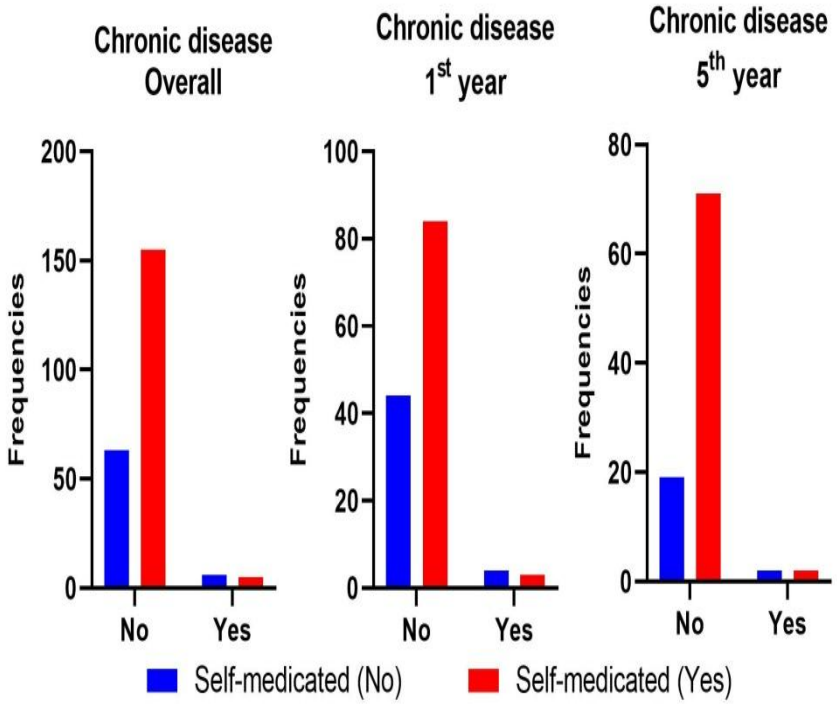


**Figure 5.** The prevalence of SM was also analyzed in relation to the presence of chronic diseases

The study also explored the outcomes experienced by participants who engaged in SM practices. Among those who practiced SM, the most commonly reported outcome was "Improved," with 58.8% (n=94) of participants indicating that their condition improved after self-medicating. The second most frequent outcome was "Cured," reported by 27.5% (n=44) of participants, suggesting that SM successfully resolved their health issue. A smaller proportion of participants (5.0%, n=8) reported using SM for "Prophylaxis," indicating that they used medications to prevent the occurrence of certain conditions. The distribution of SM outcomes was similar between first-year and fifth-year students, with no notable differences observed.

The study investigated the relationship between participants' knowledge scores and their SM practices (Figure 6). While the prevalence of SM varied across different levels of knowledge scores, the differences did not reach statistical significance in the total population (p=0.234), first-year students (p=0.345), or fifth-year students (p=0.591). In the overall study population, participants with "Good knowledge" had the highest prevalence of SM (75.9%, n=41), followed by those with "Excellent knowledge" (69.4%, n=111) and "Poor knowledge" (53.3%, n=8). This trend suggests that having a higher level of knowledge may be associated with a greater likelihood of engaging in SM, although the relationship was not statistically significant in this study (Refer to Appendix A).

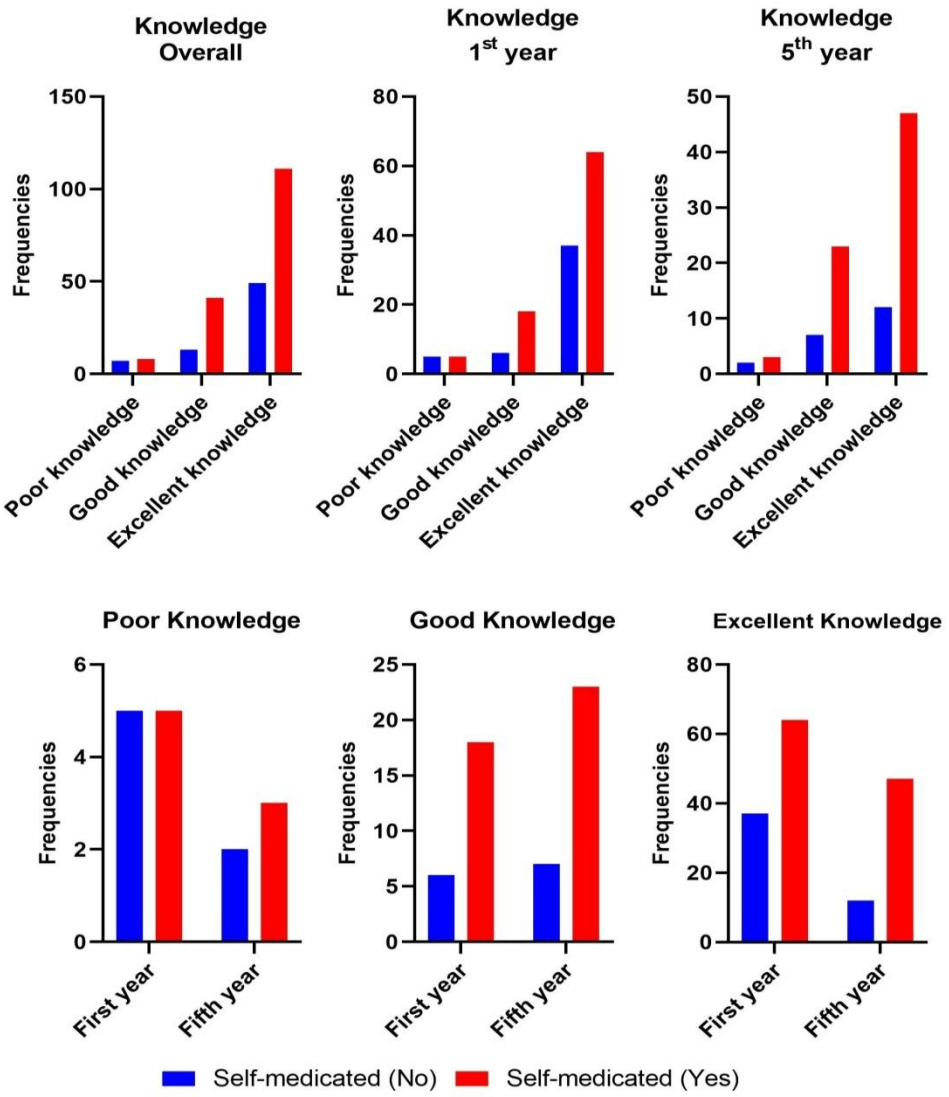


**Figure 6.** The relationship between participants' knowledge scores and their SM practices

### 3.1 Health Complaints and Self-Medication:

Among students who practiced self-medication (SM), the most common health complaints that influenced their decision to self-medicate were analyzed (Table 1). In the total study population, 86.3% (n=138) of students who practiced SM reported headache as a reason for self-medicating. First-year students had a higher prevalence of headache-related SM (92.0%, n=80) compared to fifth-year students (79.5%, n=58). However, the difference was not statistically significant.Muscle ache was reported as a reason for SM by 65.0% (n=104) of students in the total study population. Fifth-year students had a slightly higher prevalence of muscle ache-related SM (68.5%, n=50) compared to first-year students (62.1%, n=54), but the difference was not statistically significant.In the total study population, 43.1% (n=69) of students who practiced SM reported allergy as a reason for self-medicating. Fifth-year students had a significantly higher prevalence of allergy-related SM (57.5%, n=42) compared to first-year students (31.0%, n=27) ($p<0.05$).Fever was reported as a reason for SM by 51.9% (n=83) of students in the total study population. Fifth-year students had a significantly higher prevalence of fever-related SM (64.4%, n=47) compared to first-year students (41.4%, n=36) ($p<0.05$).In the total study population, 85.0% (n=136) of students who practiced SM reported common cold as a reason for self-medicating. The prevalence of common cold-related SM was similar between first-year students (85.1%, n=74) and fifth-year students (84.9%, n=62).Gastrointestinal complaints were reported as a reason for SM by 56.3% (n=90) of students in the total study population. Fifth-year students had a higher prevalence of gastrointestinal complaint-related SM (60.3%, n=44) compared to first-year students (52.9%, n=46), but the difference was not statistically significant.In the total study population, 17.5% (n=28) of students who practiced SM reported skin disorder as a reason for self-medicating. The prevalence of skin disorder-related SM was similar between first-

year students (16.1%, n=14) and fifth-year students (19.2%, n=14).Inability to sleep was reported as a reason for SM by 50.6% (n=81) of students in the total study population. First-year students had a slightly higher prevalence of inability to sleep-related SM (52.9%, n=46) compared to fifth-year students (47.9%, n=35), but the difference was not statistically significant.In the total study population, 19.4% (n=31) of students who practiced SM reported eye complaints as a reason for self-medicating. Fifth-year students had a higher prevalence of eye complaint-related SM (23.3%, n=17) compared to first-year students (16.1%, n=14), but the difference was not statistically significant.Respiratory diseases were reported as a reason for SM by 22.5% (n=36) of students in the total study population. Fifth-year students had a significantly higher prevalence of respiratory disease-related SM (35.6%, n=26) compared to first-year students (11.5%, n=10) ($p<0.05$).In the total study population, 30.6% (n=49) of students who practiced SM reported oral and dental problems as a reason for self-medicating. Fifth-year students had a significantly higher prevalence of oral and dental problem-related SM (43.8%, n=32) compared to first-year students (19.5%, n=17) ($p<0.05$).

**Table 1:** Factors Influencing SM practice pharmacy students

| The Factor | Total *n* (%) | 1st-year students *n* (%) | 5th-year students *n* (%) | P-value | OR (95%CI) |
|---|---|---|---|---|---|
| Health complains | | | | | |
| Headache | 138 (86.3) | 80 (92.0) | 58 (79.5) | 0.022* | 0.34 (0.13:0.88) |
| Common cold | 136 (85.0) | 74 (85.1) | 62 (84.9) | 0.982 | 0.99 (0.41:2.37) |
| Muscle ache | 104 (65.0) | 54 (62.1) | 50 (68.5) | 0.396 | 1.33 (0.69:2.56) |
| Gastrointestinal complaints | 90 (56.3) | 46 (52.9) | 44 (60.3) | 0.347 | 1.35 (0.72:2.54) |
| Fever | 83 (51.9) | 36 (41.4) | 47 (64.4) | 0.004* | 2.56 (1.35:4.86) |
| Inability to sleep | 81 (50.6) | 46 (52.9) | 35 (47.9) | 0.535 | 0.82 (0.44:1.53) |
| Allergy | 69 (43.1) | 27 (31.0) | 42 (57.5) | 0.001* | 3.01 (1.57:5.76) |
| Dental problems | 49 (30.6) | 17 (19.5) | 32 (43.8) | 0.001* | 3.21 (1.59:6.49) |
| Respiratory diseases | 36 (22.5) | 10 (11.5) | 26 (35.6) | 0.000* | 4.26 (1.89:9.62) |
| Eye complaints | 31 (19.4) | 14 (16.1) | 17 (23.3) | 0.251 | 1.58 (0.72:3.48) |
| Skin disorder | 28 (17.5) | 14 (16.1) | 14 (19.2) | 0.609 | 1.24 (0.55:2.80) |
| Percentages were calculated within the same group; total self-medicating students= 160; 1st-year students number= 87; 5th-year students number= 73; OR= crude odds ratio for students level (fifth/first); 95%CI= confidence interval (lower: upper). *There is a statistically significant at $P \leq 0.05$. | | | | | |

Several health complaints showed significant differences between the two groups (Figure 7). Fifth-year students had significantly higher odds of SM for fever (OR=2.56, 95%CI: 1.35-4.86), allergy (OR=3.01, 95%CI: 1.57-5.76), dental problems (OR=3.21, 95%CI: 1.59-6.49), and respiratory diseases (OR=4.26, 95%CI: 1.89-9.62) compared to first-year students. On the other hand, fifth-year students had significantly lower odds of SM for headache (OR=0.34, 95%CI: 0.13-0.88) compared to first-year students. Other health complaints, such as common cold, muscle ache, gastrointestinal complaints, inability to sleep, eye complaints, and skin disorders, did not show significant differences in SM likelihood between the two groups, as their 95% confidence intervals included the null value of 1.

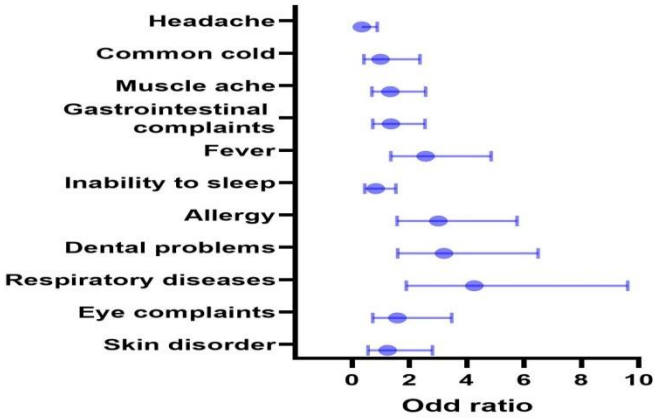


**Figure 7.** Odds ratios of SM for different health complaints

### 3.2 Reasons for Self-Medication:

Among students who practiced self-medication (SM), the reasons that influenced their decision to self-medicate were analyzed (Table 2).

**Table 2:** Factors Influencing SM practice pharmacy students

| The Factor | Total *n* (%) | 1st-year students *n* (%) | 5th-year students *n* (%) | P-value | OR (95%CI) |
|---|---|---|---|---|---|
| Reasons | | | | | |
| Experiencing a good previous SM result | 123 (76.9) | 72 (82.8) | 51 (69.9) | 0.054 | 0.48 (0.23:1.02) |
| Having drugs at home | 118 (73.8) | 66 (75.9) | 52 (71.2) | 0.507 | 0.79 (0.39:1.60) |
| Low perceived seriousness of the disease | 110 (68.8) | 69 (79.3) | 41 (56.2) | 0.002* | 0.33 (0.17:0.67) |
| Easily purchasable medications from pharmacies | 105 (65.6) | 56 (64.4) | 49 (67.1) | 0.715 | 1.13 (0.59:2.18) |
| To save time | 103 (64.4) | 53 (60.9) | 50 (68.5) | 0.319 | 1.40 (0.72:2.69) |
| Long waiting time to visit doctors | 82 (51.3) | 42 (48.3) | 40 (54.8) | 0.411 | 1.30 (0.70:2.42) |
| High costs of visits to doctors | 65 (40.6) | 28 (32.2) | 37 (50.7) | 0.018* | 2.17 (1.14:4.12) |
| Low trust in medical services | 56 (35.0) | 23 (26.4) | 33 (45.2) | 0.013* | 2.30 (1.18:4.46) |
| Lack of access or distance to healthcare centers | 48 (30.0) | 17 (19.5) | 31 (42.5) | 0.002* | 3.04 (1.50:6.15) |
| Information sources | | | | | |
| Pharmacists | 134 (83.8) | 74 (85.1) | 60 (82.2) | 0.625 | 0.81 (0.35:1.88) |
| Parents/relatives | 116 (72.5) | 73 (83.9) | 43 (58.9) | 0.000* | 0.28 (0.13:0.58) |
| Media | 64 (40.0) | 32 (36.8) | 32 (43.8) | 0.364 | 1.34 (0.71:2.53) |
| School/teacher/coach | 59 (36.9) | 30 (34.5) | 29 (39.7) | 0.494 | 1.25 (0.66:2.39) |
| Friends/neighbors | 49 (30.6) | 24 (27.6) | 25 (34.2) | 0.363 | 1.37 (0.70:2.69) |

Percentages were calculated within the same group; total self-medicating students= 160; 1st-year students number= 87; 5th-year students number= 73; OR= crude odds ratio for students level (fifth/first); 95%CI= confidence interval (lower: upper). *There is a statistically significant at $P \leq 0.05$.

#### 3.2.1 To Save Time

In the total study population, 64.4% (n=103) of students who practiced SM reported saving time as a reason for self-medicating. Fifth-year students had a higher prevalence of citing time-saving as a reason for SM (68.5%, n=50) compared to first-year students (60.9%, n=53), although the difference was not statistically significant.

When stratified by gender, males in both the first and fifth years had a higher prevalence of reporting time-saving as a reason for SM compared to females. In the first year, 78.6% (n=11) of males cited time-saving, while only 57.5% (n=42) of females did so. Similarly, in the fifth year, 70.0% (n=14) of males reported time-saving, compared to 67.9% (n=36) of females.Across different age groups, the prevalence of citing time-saving as a reason for SM varied. In the first year, the "21-22" age group had the highest prevalence (100%, n=3), followed by the "20 or less" age group (61.5%, n=48). In the fifth year, the prevalence was similar across age groups, ranging from 66.7% to 70.0%.

#### 3.2.2 High Costs of Visits to Doctors

High costs of visiting doctors were reported as a reason for SM by 40.6% (n=65) of students in the total study population. Fifth-year students had a significantly higher prevalence of citing high costs as a reason (50.7%, n=37) compared to first-year students (32.2%, n=28) ($p<0.05$).Gender-wise, in the first year, females had a slightly higher prevalence of reporting high costs as a reason for SM (32.9%, n=24) compared to males (28.6%, n=4). However, in the fifth year, males had a lower prevalence (40.0%, n=8) compared to females (54.7%, n=29).Age-wise, in the first year, the "21-22" age group had the highest prevalence of citing high costs (66.7%, n=2), while in the fifth year, the "23-24" age group had the highest prevalence (53.3%, n=16).

### 3.2.3 Experience of Good Results from SM

Having experienced good results from SM was reported as a reason by 76.9% (n=123) of students in the total study population. The prevalence was higher among first-year students (82.8%, n=72) compared to fifth-year students (69.9%, n=51), although the difference was not statistically significant.Gender-wise, the prevalence of citing good results as a reason for SM was similar between males and females in both study years.Age-wise, in the first year, the "21-22" age group had the highest prevalence (100%, n=3), while in the fifth year, the "21-22" age group had the highest prevalence (76.7%, n=23).

### 3.2.4 Easily Purchasable Medications from Pharmacies

The ease of purchasing medications from pharmacies was reported as a reason for SM by 65.6% (n=105) of students in the total study population. The prevalence was similar between first-year students (64.4%, n=56) and fifth-year students (67.1%, n=49).Gender-wise, in the first year, females had a higher prevalence of citing easily purchasable medications as a reason (65.8%, n=48) compared to males (57.1%, n=8). However, in the fifth year, males had a higher prevalence (85.0%, n=17) compared to females (60.4%, n=32).Age-wise, the prevalence varied across age groups in both study years, with no clear trend observed.

### 3.2.5 Long Waiting Time to Visit Doctors

Long waiting times to visit doctors were reported as a reason for SM by 51.3% (n=82) of students in the total study population. Fifth-year students had a slightly higher prevalence (54.8%, n=40) compared to first-year students (48.3%, n=42), but the difference was not statistically significant.Gender-wise, in the first year, females had a higher prevalence of citing long waiting times as a reason (50.7%, n=37) compared to males (35.7%, n=5). In the fifth year, the prevalence was similar between males (60.0%, n=12) and females (52.8%, n=28).Age-wise, in the first year, the "21-22" age group had the lowest prevalence (0%, n=0), while in the fifth year, the "21-22" age group had the highest prevalence (60.0%, n=18).

### 3.2.6 Low Trust in Medical Services

Low trust in medical services was reported as a reason for SM by 35.0% (n=56) of students in the total study population. Fifth-year students had a significantly higher prevalence (45.2%, n=33) compared to first-year students (26.4%, n=23) ($p<0.05$).Gender-wise, in the first year, the prevalence was similar between males (28.6%, n=4) and females (26.0%, n=19). However, in the fifth year, females had a higher prevalence (50.9%, n=27) compared to males (30.0%, n=6).Age-wise, in the first year, the "23-24" age group had the highest prevalence (50.0%, n=1), while in the fifth year, the "23-24" age group also had the highest prevalence (50.0%, n=15).

### 3.2.7 Lack of Access or Distance to Health Care Centers

Lack of access or distance to health care centers was reported as a reason for SM by 30.0% (n=48) of students in the total study population. Fifth-year students had a significantly higher prevalence (42.5%, n=31) compared to first-year students (19.5%, n=17) ($p<0.05$).Gender-wise, the prevalence was similar between males and females in both study years.Age-wise, in the first year, the "21-22" age group had the highest prevalence (33.3%, n=1), while in the fifth year, the "21-22" age group also had the highest prevalence (50.0%, n=15).

### 3.2.8 Low Perceived Seriousness of the Disease

Low perceived seriousness of the disease was reported as a reason for SM by 68.8% (n=110) of students in the total study population. First-year students had a significantly higher prevalence (79.3%, n=69) compared to fifth-year students (56.2%, n=41) ($p<0.05$).Gender-wise, in the first year, females had a higher prevalence (82.2%, n=60) compared to males (64.3%, n=9). In the fifth year, the prevalence was similar between males (60.0%, n=12) and females (54.7%, n=29).Age-wise, in the first year, the "20 or less" age group had the highest prevalence (83.3%, n=65), while in the fifth year, the "25 or more" age group had the highest prevalence (76.9%, n=10).

### 3.2.9 Previous Prescription from Doctor

Having a previous prescription from a doctor was reported as a reason for SM by 53.8% (n=86) of students in the total study population. The prevalence was similar between first-year students (55.2%, n=48) and fifth-year students (52.1%, n=38).Gender-wise, in the first year, females had a higher prevalence (57.5%, n=42) compared to males (42.9%, n=6). In the fifth year, the prevalence was similar between males (45.0%, n=9) and females (54.7%, n=29).Age-wise, no clear trend was observed across age groups in either study year.

## 4 DISCUSSION

Self-medication is a widespread issue, particularly among healthcare students. Therefore, it is crucial to assess the prevalence and responsible self-medication knowledge of pharmacy students to improve future healthcare

quality. This study aimed to compare self-medication practices between junior and senior pharmacy students and investigate whether specialized pharmacy courses, such as pharmacotherapy and advanced pharmacology, taken by senior students would increase awareness of proper self-medication practices. However, the generalizability of the study findings is limited by its small sample size and single-university setting. Additionally, recall and social desirability biases may have influenced the analysis. Future research should replicate this study on larger and more diverse samples to enhance the generalizability of the findings.

This study showed a high prevalence of SM among pharmacy students; more than two-thirds (69.9%) of them were self-medicating, which is lower than other studies conducted on medical students in different parts of the world, such as Palestine 98.0%,[24] Kuwait 92.0% , [4]Jordan 86.7%, [25]and Pakistan 76.0%.[6]The prevalence of SM in studies may vary due to differences in the socio-demographic characteristics of the study participants from one country to another. These characteristics can include differences in lifestyle, academic level, age, gender, economic status, and knowledge. Other factors that may contribute to variations in prevalence include differences in sampling methodology, sample size, the definition of SM used in the study, and the types of drugs that the study aimed to identify.

A previous study conducted in Jordan recorded an SM prevalence of 86.7% among 4$^{th}$ and 5$^{th}$-year pharmacy students.[25] Also, a previous study reported a dissimilarity to the conclusion of this study; the SM practice was not significantly different between senior and junior students [79.1%) junior vs (77.8%) senior].[5]

A previous study reported different results; the SM practice was a statistically insignificant difference with the level of study and gender.[25] The female students in this study self-medicated (75.0%) more frequently than males (52.0%), which was less than in a previous study; 94.1% of females and 90.9% of males.[26]

However, the most common symptoms and diseases for SM practice in a previous study were body pains, headache, cold and cough, fever, and gastrointestinal complaints.[27] This study's result was related to a study conducted on medical students, which found that headaches, fever, cough, and sore throat were the predominant health problems in SM.[7]which is different from the study of Suaifan*et al.,* which concluded that the main reasons behind SM's high rate were the students' desire to have quick relief from illness and save the clinicians' fees.[28]

The majority of patients who received pharmaceutical counseling reported an improvement in their symptoms.[29] A previous study mentioned that the previous prescription for a similar illness was the most common source of information about the drugs used for SM,[30] whereas another one reported that textbooks were the most common source of information.[9]

These results underscore the importance of educating pharmacy students about the risks of improper SM practice and encouraging them to seek professional medical advice before self-medicating.[31] Also it was reported that common OTC medications led to adverse health reactions and even fatalities due to inadequate drug knowledge.[32], [33]

Self-medication (SM) is a prevalent practice among pharmacy students, as evidenced by the high overall prevalence of 69.9% in this study. The prevalence of SM was higher among fifth-year students (77.7%) compared to first-year students (64.4%), although the difference was not statistically significant. This trend suggests that as students progress through their pharmacy education, they may become more confident in their ability to self-medicate, possibly due to increased knowledge of medications and their effects.

When examining the factors that influence SM practices among pharmacy students, gender emerged as a significant determinant. In the total study population, females had a significantly higher prevalence of SM (75.0%) compared to males (55.7%). This gender difference was particularly pronounced among first-year students, with females having a significantly higher prevalence of SM (73.7%) compared to males (38.9%). However, the gender difference narrowed and became non-significant among fifth-year students. This finding suggests that gender-specific factors may play a more significant role in shaping SM practices during the early years of pharmacy education, but their influence may diminish as students gain more knowledge and experience.

Age, chronic disease status, and knowledge scores did not show consistent or statistically significant associations with SM prevalence in this study. However, it is important to note that the sample size for some age groups and chronic disease categories was small, which may have limited the power to detect significant differences. Future studies with larger sample sizes could provide more conclusive evidence regarding the influence of these factors on SM practices.

The reasons for SM varied between first-year and fifth-year pharmacy students, highlighting the evolving nature of SM practices throughout pharmacy education. Fifth-year students had a significantly higher prevalence of citing high costs of visiting doctors, low trust in medical services, and lack of access or distance to health care centers as reasons for SM compared to first-year students. These findings suggest that as students progress through their education, they may become more aware of the financial and accessibility barriers to seeking professional medical care, leading them to rely more on SM as a cost-effective and convenient alternative.

On the other hand, first-year students had a significantly higher prevalence of citing low perceived seriousness of the disease as a reason for SM compared to fifth-year students. This finding indicates that early in their pharmacy education, students may have a lower threshold for considering a condition as serious enough to

warrant professional medical attention, leading them to self-medicate for minor ailments. As students gain more knowledge and experience, they may develop a better understanding of the potential risks and limitations of SM, leading to a more cautious approach to self-treating serious conditions.

Other reasons for SM, such as saving time, experiencing good results from SM, easily purchasable medications from pharmacies, long waiting times to visit doctors, having a previous prescription from a doctor, and having drugs at home, did not show significant differences between first-year and fifth-year students. These reasons appear to be consistently important drivers of SM practices across different stages of pharmacy education.

The odds ratios (ORs) from this study provide valuable insights into the self-medication (SM) practices of pharmacy students. Fifth-year students had significantly higher odds of SM for certain health complaints, such as fever (OR=2.56, 95%CI: 1.35-4.86), allergy (OR=3.01, 95%CI: 1.57-5.76), and reasons like high costs of doctor visits (OR=2.17, 95%CI: 1.14-4.12) and low trust in medical services (OR=2.30, 95%CI: 1.18-4.46), compared to first-year students. Conversely, fifth-year students had lower odds of SM for headache (OR=0.34, 95%CI: 0.13-0.88) and low perceived seriousness of the disease (OR=0.33, 95%CI: 0.17-0.67). Females had significantly higher odds of SM (OR=2.47, 95%CI: 1.27-4.79) compared to males. These findings suggest that SM practices evolve throughout pharmacy education, influenced by factors such as increased knowledge, awareness of healthcare barriers, and gender differences. The results highlight the need for targeted interventions and education to promote responsible SM practices among pharmacy students, considering their unique needs and challenges.

To address the high prevalence of SM among pharmacy students and promote responsible self-care practices, a multi-faceted approach is needed. Pharmacy curricula should incorporate comprehensive education on the appropriate use of medications, the risks and benefits of SM, and the importance of seeking professional medical advice for serious or persistent conditions. Emphasis should be placed on developing critical thinking skills and decision-making abilities to enable students to make informed choices about when SM is appropriate and when professional medical attention is necessary.

Furthermore, universities and healthcare institutions should work towards improving access to affordable healthcare services for students, such as on-campus clinics or partnerships with local healthcare providers. By reducing financial and accessibility barriers to seeking professional medical care, students may be less likely to rely on SM as a primary means of managing their health.

Gender-specific interventions may be particularly valuable in addressing SM practices among first-year pharmacy students, where the gender difference in SM prevalence was most pronounced. These interventions could focus on exploring the underlying reasons for the higher prevalence of SM among females and developing targeted strategies to promote responsible self-care practices.

Finally, ongoing research is crucial to understanding the evolving landscape of SM practices among pharmacy students and the factors that influence these practices. Future studies should employ larger sample sizes, longitudinal designs, and qualitative methods to gain deeper insights into the motivations, perceptions, and experiences of pharmacy students regarding SM. By building a strong evidence base, educators and policymakers can develop evidence-informed interventions to promote safe and appropriate SM practices among this important population of future healthcare professionals.

## 5 CONCLUSION

Thisstudy highlights the high prevalence of SM among pharmacy students and the various factors and reasons that influence these practices. While SM can be a convenient and cost-effective approach to managing minor health concerns, it is essential to ensure that pharmacy students have the knowledge, skills, and resources to make informed decisions about when SM is appropriate and when professional medical attention is necessary. By addressing the identified factors and reasons for SM through targeted interventions and education, we can work towards promoting responsible self-care practices among pharmacy students and preparing them to be effective advocates for safe and appropriate medication use in their future roles as healthcare professionals.

**Conflict of interest**

The authors have no conflict of interest to declare.

**Fund**

Not available

## REFERENCES

1. Baracaldo-Santamaría D, Trujillo-Moreno MJ, Pérez-Acosta AM, Feliciano-Alfonso JE, Calderon-Ospina CA, Soler F. Definition of self-medication: a scoping review. Therapeutic advances in drug safety. 2022 Oct;13:20420986221127501.

2. Abu-Zaid AM, Barakat M, Al-Qudah R, Abdalhafez A. The Role of Pharmacists in Patient Counselling for Self-Medication Practice among Amman's Householders: Prevalence and Factors. OTC Medication in Jordan: A Cross-Section Study. Jordan J Pharm Sci. 2021;14(4):445–55.
3. Shehade SA Al, Zarzour RH Al, Alshehadeh AR, Bal'awi D, Hamade S. J Pharm Res Int . 2020 Jul 20;32(11):102–13. Available from: https://www.journaljpri.com/index.php/JPRI/article/view/30562
4. Abahussain E, Matowe LK, Nicholls PJ. Self-reported medication use among adolescents in Kuwait. Med Princ Pract . 2005;14(3):161–4. Available from: http://www.ncbi.nlm.nih.gov/pubmed/15863989
5. Alkhatatbeh MJ, Alefan Q, Alqudah MAY. High prevalence of self-medication practices among medical and pharmacy students: A study from Jordan. Int J Clin Pharmacol Ther . 2016 May 1;54(5):390–8. Available from: http://www.ncbi.nlm.nih.gov/pubmed/26932303
6. Almalak H, Albluwi AI, Alkhelb DA, Alsaleh HM, Khan TM, Hassali MAA, et al. Students' attitude toward use of over the counter medicines during exams in Saudi Arabia. Saudi Pharm J . 2014 Apr;22(2):107–12. Available from: https://www.sciencedirect.com/science/article/pii/S1319016413000182?via%3Dihub
7. F. Haroun, R. S. Al-kayali. Self-medication among undergraduate medical students in two universities in Syria. Int J Pharm Sci Res . 2017 [cited 2019 May 22];8(4):1881–6. Available from: http://ijpsr.com/bft-article/self-medication-among-undergraduate-medical-students-in-two-universities-in-syria/?view=fulltext
8. Shehnaz SI, Khan N, Sreedharan J, Issa KJ, Arifulla M. Self-medication and related health complaints among expatriate high school students in the United Arab Emirates. Pharm Pract (Granada) . 2013 Oct;11(4):211–8. Available from: http://www.ncbi.nlm.nih.gov/pubmed/24367461
9. Ayalew MB. Self-medication practice in Ethiopia: a systematic review. Patient Prefer Adherence . 2017 Mar;(11):401–13. Available from: https://www.dovepress.com/self-medication-practice-in-ethiopia-a-systematic-review-peer-reviewed-article-PPA
10. Abahussain NA, Taha AZ. Knowledge and attitudes of female school students on medications in eastern Saudi Arabia. Saudi Med J . 2007 Nov;28(11):1723–7. Available from: http://www.ncbi.nlm.nih.gov/pubmed/17965798
11. Jasim A, Fadhil T, Taher S. Self Medication Practice among Iraqi Patients in Baghdad City. Am J Pharmacol Sci . 2014 Feb 4;2(1):18–23. Available from: http://pubs.sciepub.com/ajps/2/1/4/index.html
12. Osemene K., Lamikanra A. A Study of the Prevalence of Self-Medication Practice among University Students in Southwestern Nigeria. Trop J Pharm Res . 2012 Aug;11(4):683–9. Available from: http://www.tjpr.org
13. Bekele SA, Argaw MD, Yalew AW, Bekele SA, Argaw MD, Yalew AW. Magnitude and factors associated with self-medication practices among university students: the case of Arsi University, College of Health Science, Asella, Ethiopia: cross-sectional survey based study. Open Access Libr J . 2016 Jun;3(06):1. Available from: http://www.oalib.com/paper/pdf/5267975
14. Dawood OT, Hassali MA, Saleem F, Ibrahim IR, Abdulameer AH, Jasim HH. Assessment of health seeking behaviour and self-medication among general public in the state of Penang, Malaysia. Pharm Pract (Granada) . 2017 Jul 1;15(3):991. Available from: http://www.ncbi.nlm.nih.gov/pubmed/28943981
15. Al-Hussaini M, Mustafa S, Ali S. Self-medication among undergraduate medical students in Kuwait with reference to the role of the pharmacist. J Res Pharm Pract . 2014 Jan [cited 2020 Jan 26];3(1):23. Available from: http://www.ncbi.nlm.nih.gov/pubmed/24991632
16. Shoaib MH, Yousuf RI, Anjum F, Saeed L, Ghayas S, Ali T, et al. Survey based study on the use of non-prescription drugs among pharmacists and non-pharmacists. African J Pharm Pharmacol . 2013 Oct;7(38):2652–6. Available from: http://academicjournals.org/journal/AJPP/article-abstract/39E1FA041279
17. Niclós G, Olivar T, Rodilla V. Factors associated with self-medication in Spain: a cross-sectional study in different age groups. Int J Pharm Pract . 2018 Jun 1 [cited 2020 May 23];26(3):258–66. Available from: http://doi.wiley.com/10.1111/ijpp.12387
18. James H, Handu SS, Al Khaja KAJ, Otoom S, Sequeira RP. Evaluation of the Knowledge, Attitude and Practice of Self-Medication among First-Year Medical Students. Med Princ Pract . 2006;15(4):270–5. Available from: http://www.ncbi.nlm.nih.gov/pubmed/16763393
19. Shankar PR, Dubey AK, Dwivedi NR, Nandy A, Barton B. Knowledge, perception and practice of self-medication among premedical and basic science undergraduate medical students. Asian J Med Sci . 2016 Oct;7(6):63–8. Available from: https://www.nepjol.info/index.php/AJMS/article/view/15246
20. Gyawali S, Ravi Shankar P, Poudel PP, Saha A. Knowledge, attitude and practice of self-medication among basic science undergraduate medical students in a medical school in Western Nepal. J Clin Diagnostic Res . 2015 Dec [cited 2018 Dec 13];9(12):FC17–22. Available from: http://jcdr.net/article_fulltext.asp?issn=0973-709x&year=2015&volume=9&issue=12&page=FC17&issn=0973-709x&id=6988

21. Cheaito L, Azizi S, Saleh N, Salameh P. Assessment of self-medication in population buying antibiotics in pharmacies: A pilot study from Beirut and its suburbs. Int J Public Health . 2014 Apr 13 [cited 2018 Dec 11];59(2):319–27. Available from: http://www.ncbi.nlm.nih.gov/pubmed/23942698
22. Johnson D, Sekhar HS, Alex T, Kumaraswamy M, Chopra RS. Self medication practice among medical, pharmacy and nursing students. Int J Pharm Pharm Sci . 2016;8(7):1–5. Available from: https://innovareacademics.in/journals/index.php/ijpps/article/view/10455
23. Shafie M, Eyasu M, Muzeyin K, Worku Y, Martín-Aragón S. Prevalence and determinants of self-medication practice among selected households in Addis Ababa community. Kumar N, editor. PLoS One . 2018 Mar;13(3). Available from: http://www.ncbi.nlm.nih.gov/pubmed/29579074
24. Mumtaz Y, Jahangeer A, Mujtaba T, Zafar S, Adnan S. Self Medication among University Students of Karachi. JLUMHS . 2011;10(3). Available from: https://www.lumhs.edu.pk/jlumhs/Vol10No03/pdfs/v10n3oa13.pdf
25. Alsous M, Elayeh E, Jalil MA, Alhawmdeh E. Evaluation of Self-Medication Practice among Pharmacy Students in Jordan. Jordan J Pharm Sci . 2018 Feb;11(1). Available from: https://journals.ju.edu.jo/JJPS/article/view/101106
26. Klemenc-Ketiš Z, Hladnik Ž, Kersnik J. A cross sectional study of sex differences in self-medication practices among university students in Slovenia. Coll Antropol . 2011 Jun;35(2):329–34. Available from: http://www.ncbi.nlm.nih.gov/pubmed/21755698
27. Kumar R, Goyal A, Padhy BM, Gupta YK. Self-medication practice and factors influencing it among medical and paramedical students in India: A two-period comparative cross-sectional study. J Nat Sci Biol Med . 2016;7(2):143–8. Available from: http://www.ncbi.nlm.nih.gov/pubmed/27433064
28. Suaifan G, Shehadeh M, Darwish DA, Al-Ijel H, Yousef A-MM, Darwish RM. A cross-sectional study on knowledge, attitude and behavior related to antibiotic use and resistance among medical and non-medical university students in Jordan. African J Pharm Pharmacol . 2012 Mar;6(10):763–70. Available from: http://www.academicjournals.org/AJPP
29. Coelho RB, da Costa FA. Impacto del consejofarmacéuticoenproblemas de saludmenoresen Portugal rural. Pharm Pract (Granada). 2014 Dec;12(4):0–0.
30. Al-Ameri RJK, Al-Badri HJA, Lafta RK, Abd Al-Badri HJ, Lafta RK. Prevalence of self-medication among university students in Baghdad: a cross-sectional study from Iraq. East Mediterr Heal J . 2017 Mar;23(2):87–93. Available from: https://apps.who.int/iris/handle/10665/260374
31. Kumari R, Kiran K, Kumar D, Bahl R, Gupta R. Study of Knowledge and Practices of Self-Medication among Medical Students at Jammu. JMS Ski . 2012 Dec;15(2):141–4. Available from: http://www.jmsskims.org/index.php/jms/article/view/252
32. Sawalha AF. Assessment of self-medication practice among university students in Palestine: therapeutic and toxicity implications. IUG J Nat Stud. 2015;15(2):67–82. Available from: http://www.iugaza.edu.ps/ara/research/
33. Jarab, A.S., Al-Qerem, W., Alzoubi, K.H., Obeidat, H., Heshmeh, S.A., Mukattash, T.L., Naser, Y.A. and Al-Azayzih, A.. Artificial intelligence in pharmacy practice: Attitude and willingness of the community pharmacists and the barriers for its implementation. Saudi Pharmaceutical Journal, 2023;31(8).


**Appendix A**

Knowledge of appropriate SM practice among pharmacy students (n=229)

| The questions | Correct answer | Total *n* (%) |
|---|---|---|
| Can a particular medicine exist in more than one form (e.g., in tablet and syrup)? | Yes | 202 (88.2) |
| Does a pregnant woman need to ask a physician's advice before taking any medicine? | Yes | 202 (88.2) |
| Does a nursing mother need to ask a physician's advice before taking any medicine? | Yes | 192 (83.8) |
| Some of the drugs should not be taken with certain types of food items. | Yes | 192 (83.8) |
| Can a form containing a particular medicine have more than one name? | Yes | 191 (83.4) |
| Are sick children given the same medicine as adults? | No | 188 (82.1) |
| Can drinking alcohol affect how a medicine works in the body? | Yes | 187 (81.7) |
| Do heat and direct sunlight damage medicines? | Yes | 187 (81.7) |
| Should some drugs not be simultaneously taken with other drugs? | Yes | 187 (81.7) |
| Are sick children given the same dosage of medicine as adults? | No | 186 (81.2) |
| Does the intake of vitamins cause any harm if too much of it is taken? | Yes | 183 (79.9) |
| Does the intake of cough medicines cause any harm if too much of it is taken? | Yes | 181 (79.0) |
| NSAID (ibuprofen) may cause harm to your kidneys if they are misused | Yes | 180 (78.6) |
| Do all medicines have to be kept in the refrigerator? | No | 180 (78.6) |
| Do you have the habit of checking the expiry date of drugs during the purchase or | Yes | 178 (77.7) |

| | | |
|---|---|---|
| before use? | | |
| NSAID (ibuprofen) cause stomach ulcer | Yes | 178 (77.7) |
| Is the bathroom a good place for the storage of medicines? | No | 178 (77.7) |
| Overusing Panadol (Paracetamol) will cause liver toxicity | Yes | 172 (75.1) |
| Does the color of a tablet affect the action of medicine in the body? | No | 164 (71.6) |
| Does the shape of a tablet affect the action of medicine in the body? | No | 124 (54.1) |