Knowledge, attitude, and practice of pharmacy and medical students regarding self-medication, a study in Zabol University of Medical Sciences; Sistan and Baluchestan province in south-east of Iran

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Abstract

Background: Self-medication is defined as using medicinal products to treat disorders or symptoms diagnosed by one-self. Although informed self-medication is one of the ways to reduce health care costs, inappropriate self-treatment can pose various risks including drug side effects, recurrence of symptoms, drug resistance, etc. The purpose of this study was to investigate the knowledge, attitude, and practice of pharmacy and medical students toward self-medication.

Methods: This study was conducted in Zabol University of Medical Sciences during 2018. A sample of 170 pharmacy and medical students was selected. A three-part researcher-made questionnaire was designed to address students' knowledge, attitude, and practice. Statistical analysis was performed in SPSS 25 software.

Results: According to the results, 97 (57.1%) of the students had carried out self-medication within the past 6 months. Overall, the students used self-medication on average 4.2 ±2.9 times per year. Self-medication was more prevalent in male students (65.4%, P=0.043). Cough and cold were the most common symptoms treated with self-medication (93.2%), and antibiotics (74.4%) were the most commonly used drugs. The primary information source used by the students was their previous physician prescription (47.4%). Pharmacy students showed a higher level of drug information (P<0.001). There was a statistically significant association between the level of drug information and the rate of self-medication (P=0.005). Disease recurrence was the most common negative complication of self-medication.

Conclusion: There is a need to educate pharmacy and medical students regarding self-medication and its side effects. The high prevalence of self-medication and the overuse of antibiotics can pose a significant risk of drug resistance.

Background

Self-medication is defined as using medicinal products to self-treat disorders or their symptoms. Overusing medications prescribed by a physician for oneself or other family members (especially when it comes to children or elderly) also falls within the definition of self-treatment [1]. Self-prescription of medicines without the advice of specialists can cause many side effects including bacterial resistance, drug complications, and prolonged disease course [2].

Responsible self-medication includes using the over the counter (OTC)-approved and relatively low-risk drugs to treat self-diagnosed disorders or symptoms [3]. Responsible self-medication can prevent the development of mild illnesses, thereby reducing health care financial burden by obviating the need for referring to health centers. In order to use a prescription drug safely and effectively, the consumer must accurately identify symptoms, ascertain therapeutic goals, and use appropriate drug products, dosages,

and therapy durations. Furthermore, medical history, contraindications, concomitant co-morbidities, potential adverse effects, and finally treatment responses should also be considered.

The prevalence of self-medication widely varies in different countries. For example, in Spain [4], Chile [5], Vietnam [6], China [7], and India [8], the frequencies of self-medication have been 12.7%, 75%, 40-60%, 32%, and 71%, respectively. In comparison with other countries, the estimated per capita drug usage in Iran has been relatively high from which self-medication shares a substantial part [9]. Factors such as gender, income, personal health, and drug information can affect the tendency toward self-medication [10].

The prevalence of self-medication among different social groups in Iran has ranged from 35 to 90% [11, 12]. Pain killers, eye drops, and antibiotics bear the largest shares of self-treatment drugs used by Iranians [13, 14].The most important factors encouraging self-medication in Iran and the world have been suffering from mild self-diagnosed symptoms, having prior drug prescriptions, insurance problems, lack of awareness, ease access to drugs, and cultural and socio-economic issues [12, 15]. The most important diseases self-medicated in Iran have been respiratory diseases, colds, and headaches [16]. Studies conducted in different parts of Iran have revealed higher prevalence of self-medication among students than the general population [11, 17, 18].

Pharmacists and physicians, particularly, can play key roles in providing helpful recommendations on proper and safe use of pharmaceutical products. Therefore, the purpose of this study was to investigate the knowledge, attitude, and practice of pharmacy and medical students towards self-medication.

Methods

The present descriptive cross-sectional survey was conducted on pharmacy and medical students studying at Zabol University of Medical Sciences, Sistan and Baluchestan province in south-east of Iran in 2018.The university, which is supported by the government, was established in 2002 in order to provide health services and education to the people of the north region of Sistan and Baluchestan province. The organization currently offers health education to students in 25 study fields at different degrees (associate, bachelor, master).

Sample size

The sample size was determined as 170 considering the rate of 50% of good knowledge and attitude towards self-treatment, 95% confidence interval, and maximum error rate of 7% using the following formula.

$$n = \frac{z^2 * p(1-p)}{d^2}$$

The students of medicine and pharmacy faculties sequentially entered into the study. The sampling method was based on multi-stage random sampling so that the medical and pharmacy schools as well as each entry-year were considered as stratums, and within stratums, students were randomly selected. For interns who did not attend classes, the researcher referred to their internship hospitals (Amir-Al-Momenin and Imam Khomeini hospitals of Zabol city) where the students were also selected initially by stratified and then simple random sampling to achieve the required sample size.

Data collection

A researcher-made questionnaire (supplementary file 1) was used to collect the data. The questions were designed in three parts to assess knowledge, attitude, and practice. For the knowledge, the students were initially asked if they can correctly name three OTC drugs and then were given six statements and asked to determine whether these statements were true or false. Each true answer was given 1 score, and false and "don't know" responses were assigned with the scores of -1 and 0, respectively. Then the net knowledge score was categorized as good ($\geq$4), average (1-3), and poor (0 or lower) based on the Isacson and Bingeforse method [19]. For attitude, the students were asked to rate their agreement or disagreement toward multiple propositions about self-treatment. For determining practice, questions were asked about types of drugs, ailments, reasons, and negative outcomes of self-treatment.

Validity and reliability

The content validity of the questionnaire was evaluated with the help of specialists in pharmacy, medicine, and epidemiology incorporating necessary corrections suggested by them. The reliability of the questionnaire was approved after being completed over two occasions by 30 students. These students were chosen from both medical and pharmacy faculties and different educational years. They were asked to gather in a classroom at a specific time to not to interfere with their classes or other educational activities. After setting a convenient time, they were explained about the aim of the study and asked to fill the questionnaire. The same procedure was followed up for a second term after two weeks, and finally Cronbach's alpha coefficient was calculated. To reach an acceptable coefficient, some modifications were performed on four questions in the attitude domain, and one question was also omitted in this section (Cronbach's alpha coefficient= 0.44). The researcher attended the students at the time of completing the questionnaires to resolve any ambiguity.

Statistical analysis

SPSS 25 software was used to analyze the data, compare the variables, and report the results. Quantitative variables were described with mean and standard deviation, and qualitative variables were described using percent frequency. The distribution of variables was assessed by the Kolmogorov–Smirnov test. Quantitative variables were also compared by independent samples student t-test (for two group comparisons) and one-way ANOVA for comparisons among three groups or more. Comparison of qualitative variables between the groups was performed by Chi- square test. P values < 0.05 were considered statistically significant.

Results

Demographic information

In this study, 170 students were interviewed from whom 78 (45.9%) were males and 92 (54.1%) were females, and all of them completed the survey. The mean age of the students was 21.92±1.8 years. The youngest and oldest participants aged 18 and 29 years old, respectively. Of the participants, 105 (61.8%) were medical and 65 (38.2%) were pharmaceutical students. In terms of the year of enrollment, most participants (22.4%) were senior (three years or higher). Demographic information has been shown in table 1.

Table 1. Demographic features in 170 medical and pharmacy students

Variables		N	%
Gender	Male	78	45.9
	Female	92	54.1
Field of study	Medicine	105	61.8
	Pharmacy	65	38.2
Residency	Dorm	129	75.5
	With family	36	21.2
	Leased	5	2.9
Chronic disease	Yes	18	10.6
	No	152	89.4

History of self-medication

Out of 170 students, 97 (57.1%) used self-medication within the past six months. A significant association was found between self-medication and gender (p = 0.043), but not the field of study, residency, and history of chronic diseases (Table 2).

Table 2. Association of self-mediation within past six months with demographic variables in 170 medical and pharmacy students

Variables		Self-treatment		P
		Yes	No	
Gender	Male	51 (65.4)	27 (34.6)	0.043
	Female	46 (50)	46 (50)	
Field of study	Medicine	60 (57.1)	45 (42.9)	0.978
	Pharmacy	37 (56.9)	28 (43.1)	
Chronic diseases	Yes	12 (66.7)	6 (33.3)	0.456
	No	85 (55.9)	67 (44.1)	

Students' knowledge and attitude toward self-medication

When the participants were asked to name three drugs that can be obtained without a prescription (i.e. OTC drugs), 12.9% were able to provide completely correct answers (Table 3). Comparing the knowledge score, there was no difference in the level of knowledge comparing students with or without history of self-medication (P=0.480). The level of knowledge was significantly associated with the field of study (p <0.001), year of entrance (p = 0.002), and history of self-medication (p = 0.005) (Table 4). The students' attitudes regarding self-medication statements have been presented in table 5.

Table 3. The level of awareness of medical and pharmacy students from OTC drugs

Frequency of correct answers	N	%
3/3	22	12.9
2/3	45	26.5
1/3	44	25.9
0/3	8	4.7
No knowledge	51	30
Total	170	100

Table 4. The level of knowledge among medical and pharmacy students regarding self-medication

Variables		Awareness			P
		Good	Moderate	Poor	
Gender	Male	19 (24.4)	39 (50)	20 (25.6)	0.228
	Female	32 (34.8)	35 (38)	25 (27.2)	
Field	Medicine	16 (15.2)	52 (49.5)	37 (35.2)	<0.001
	Pharmacy	35 (53.8)	22 (33.8)	18 (12.3)	
Year of education	First year	2 (4.5)	25 (56.8)	17 (38.6)	0.002
	Second and more	49 (38.9)	49 (38.9)	28 (22.2)	
Self-treatment	Yes	38 (39.2)	40 (41.2)	19 (19.6)	0.005
	No	13 (17.8)	34 (46.6)	26 (35.6)	

Table 5. The medical and pharmacy students' attitudes regarding self-medication

Statements	Attitude				
	Completely agree	Agree	No idea	Disagree	Completely disagree
Self-treatment is part of self-care	19 (11.2)	51 (30)	41 (24.1)	47 (27.6)	12 (7.1)
Would you like to start or continue your therapy?	22 (12.9)	60 (35.3)	40 (23.5)	36 (21.2)	12 (7.1)
Do you recommend self-treatment to others?	10 (5.9)	24 (14.1)	45 (26.5)	57 (33.5)	34 (20)
Should drug release be free?	9 (5.3)	14 (8.2)	35 (20.6)	67 (39.4)	45 (26.5)
Need No Training on the Disadvantages of Self-Treatment?	11 (6.5)	13 (7.6)	31 (18.2)	53 (31.2)	62 (36.5)
There is no need to try to simplify access to health care facilities	9 (5.3)	16 (9.4)	30 (17.6)	51 (30)	64 (37.6)

Students' performance regarding self-medication

Overall, the students used self-medication on average 4.2 ±2.9 times per year. Modern medicine (allopathy) with 69.2% was the most frequently used method in comparison with traditional Islamic medicine (29.9%) and other types of therapies such as Indian medicine, homeopathy, etc. (10.3%). Cough and cold, headache, and muscle cramps were the most prevalent ailments treated by self-medications with 93.2%, 60.7% and 42.7%, respectively (Figure 1).

Drugs used for self-medication

Antibiotics were the most commonly used drugs for self-treatment with 74.4%. Painkillers (59%) and antihistamines (48.7%) were the next most commonly used drugs (Figure 2).

Reasons of self-treatment

The most common incentives encouraged the students to use self-medication were the illness being non-severe, and the students' reliance on their academic knowledge (Figure 3).

Information sources

The information sources used by students for self-treatment have been shown in Figure 4. Most students (47.4%) had used previous prescriptions as their information sources, and 39.3% used their own academic knowledge.

Negative impacts of self-treatment

Figure 5 shows that disease recurrence was the most common negative complication of self-medication. Also, 50% of the students reported no negative impacts.

Discussion

Our study showed that 57.1 % of pharmacy and medical students of Zabol University of Medical Sciences who participated in the study had at least one episode of self-medication during the past six months. The prevalence of self-medication in Iran and other countries highly varies among different demographic groups. For example, a similar study among medical and pharmacy students in Ethiopia reported a prevalence of 38.5% [20]. Also, 44.8% of Bahraini [21], 78.6% of Indian [22], and 55.2% of Egyptian [23]medical students reported episodes of self-medication. In another study, 98% of Palestinian students [24] reported self-treatment. Among studies in European countries, two studies performed on Slovenian [25] and Serbian [26] students reported frequencies of 92.3% and 79.9%, respectively. A study on a Spanish adult population also reported 45% prevalence for self-treatment for cold [27]. A study on German adolescents showed a self-medication prevalence of 8% [28]. In another study on patients with gastro-esophageal reflux disease in France, self-medication was reported by 17% of the participants [29]. Overall, the results of the present study showed a much higher prevalence of self-treatment compared with developed countries and similar to that of developing countries. It has been shown that the prevalence of self-medication is generally higher in developing than developed countries [30]. This

difference could be due to differences in the levels of welfare and income per capita and therefore the ability to pay for health cares, the quality of health care services, as well as the efficiency of monitoring programs on prescription of drugs by supply centers [31].

Among the studies conducted in other parts of Iran, self-medication was reported in 91% of Kerman students [32], 83% of Yazd University of Medical Sciences students [33], and 80% of Ardabil students [34]. A review study conducted in 2015 by Azami *et al.* reported frequencies of 53% and 67% for self-medication in Iranian general population and students, respectively [35] which were close to the prevalence reported in the present study. Self-medication seems to be typically higher among students than the general population. This could be due to a variety of reasons such as students' higher pharmaceutical and clinical knowledge, their better access to the Internet and mass media advertising pharmaceutical products, and the cost-effectiveness and time-saving nature of self-medication [36]. Nevertheless, populations under the study, and research and data analysis methods are different in various studies making difficult to compare the prevalence of self-medication among different societies.

Regarding the knowledge, only 12.9% of our students were able to correctly name three OTC drugs. The ratio of students who could recall 2 or more OTC drugs was 39.4%, and the rest of the students knew either one or none OTC drugs. Overall, 16% and 35% of our medical and pharmacy students achieved good scores regarding drug information. The ratio of pharmacy students who had good knowledge on this issue was significantly higher in comparison with medical students (P<0.001). Furthermore, senior students (two or more years of education) had significantly higher knowledge than first-year students (P=0.002). This observation probably reflects the differences in educational courses and curriculum of these fields. In a study on pharmacy students in Addis Ababa, Ethiopia, 47.3% of students did not know the OTC drugs as well. In the next part of the knowledge survey, the participants' knowledge was assessed using the Isacson's and Bingforse method [19]. Overall, 26.5% of the students had poor scores, while 43.5% and 30% attained average and good scores, respectively. In line, a similar study on Palestinian students using the same grading method reported that one-third of students had poor scores while others acquired average and good scores [24].This probably reflects the higher number of drug courses and deeper integration of pharmacy students with pharmaceutical products. Also, senior students (two-year and higher) had superior levels of drug information than juniors (one-year) indicating the impact of educational courses on their drug knowledge. In general, medical and pharmaceutical students seem to need more effective educations in this area.

In the attitude section, the only variable that had a significant impact on attitude was the field of study as pharmacy students had more negative attitude than medical students which may be related to their higher pharmaceutical knowledge. In fact, students with higher drug information were also more likely to self-medicate; however, there was no statistically significant difference in the frequency of self-medication between the medicine and pharmacy students. The presence or absence of chronic diseases also had no significant impact on the rate of self-treatment among the students. In a review study, Isacson et al. showed an association between drug knowledge and a positive attitude toward self-medication [19]. A study by James *et al.* in 2005 also noted that higher levels of medical and

pharmaceutical knowledge make people more cautious about taking and recommending medications [21]. In our study, male students more frequently self-medicated than females. This observation was different from that of two other studies in which females have self-medicated more commonly than males [22, 23]. In a number of studies; however, there were no significant differences between males and females in this regard [21, 25]. Among university students, a study reported that a history of self-medication was significantly associated with age, gender, and the year and field of study [37]. Other factors associated with self-medication have been low medical information and histories of alcohol use and tobacco smoking [38]. In fact, many individuals who self-medicate may actually perceive using drugs without prescription safe [39]. Collectively, a wide spectrum of variables seems to affect the tendency for self-medication, and knowledge seems to be a predominant factor.

Antibiotics (74.4%) and painkillers (60%) were the most commonly drugs used for self-medication among our students. In other studies, NSAIDs [38, 40], antibiotics [37, 40, 41], pain killers [37, 38], and anti-flue [38] and anti-malarial drugs [37] were the most common pharmaceutics used for self-medication. In one study on 384 university students, paracetamol was the most frequently drug used for self-medication [37]. In another report, Amoxicillin was the most common drug used to self-medicate among university students [41]. In a study in Pakistan, OTC drugs comprised the most common (98.3%) used pharmaceuticals used by undergraduate students in medical fields [42]. In a study on first-year medical students in Bahrain, only 6% of participants used antibiotics for self-treatment [21]. In other studies, this rate reached 17.2% in Ethiopia [43], 38.9% in Serbia [26], 19.9% in Palestine [24], and 34% in India [44]. These rates of antibiotic usage for self-treatment are much lower than those of European and developed countries [45]. In a study by Aljinovic *et al*. in Croatia, they found that using antibiotics for self-treatment was higher among people working in healthcare systems than the general population [46] supporting our observation in this study. The rate of self-administrated antibiotic use observed here was similar to most other studies conducted in Iran and higher than rates reported in other parts of the world. According to this, the risk of antibiotic resistance may be a serious threat to our society in future.

Regarding the students' performance, cough and cold along with headache were the most common self-treated ailments. In a study including 360 Iranian women, fever, fatigue, and anxiety were the most common ailments which had been tried to be managed by self-medication[39]. Cold, fever, and cough were the main reasons of self-medication in another study on 570 university students in Rwanda [41]. Our results were also consistent with those of most similar studies [23, 43, 47]. The most important reason for self-medication was noted as the non-acute nature of the disease. This was consistent with a previous report in this field [48]. A non-severe or transient disease was also the most reason of self-medication (45-46%), according to two studies in China [49] and Brazil [40]. In the China report, 23% of the participants were reluctant to see a doctor over a relatively mild condition, and 12% noted that they did not have enough time to meet a physician. Not having a serious illness was also the main pretest of university students for self-medication in a study in Rwanda [41]. Financial shortcoming and insurance problems have been reported among other reasons for self-medication [39, 49]. In a study in Brazil, nursing students were most commonly encouraged to self-medicate because of being unaware of potential side-effects and unwanted complications [40]. In another study, bad behavior of health care providers, the

clinic being too far, and low efficiency of prescribed drugs were noted as excuses to self-medicate among university students[37]. Another reason encouraging people to self-medicate may be stored drugs at home, as mentioned in a study, 98.9% of Iranian women who perpetrated self-medication had a pile of stored drugs at home [39]. Also, in the recent report, a history of the disease was declared as another reason for self-medication [39].

An important point in our study was the students' low tendency to consult with a pharmacist as one of the most accessible sources of ensuring safe self-treatment. Only 13.7% of the students mentioned consulting with a pharmacist as one of their information sources for self-treatment. This evidence may reflect the fact that our students were aware of the dangers of self-medication; but at the same time, they believed that they were equipped with sufficient knowledge to stay safe. Unwanted interactions between drugs and drug-dependence, as well as choosing inappropriate drugs because of incorrect diagnosis are among factors placing the health of self-medicated individuals at risk [50].The importance of health side effects of self-medication becomes more pronounced knowing that individuals may not follow correct instructions of drug usage, use excessive dosages, or simultaneously consume prescription and non-prescription drugs, all of which can exaggerate the risk of health-threatening complications [38]. Medical students seem to need more education about the dangers of irresponsible self-treatment.

Strengths and Limitations

This is a cross-sectional study. It is advisable to also study the trend of students' changing tendency toward self-medication in prospective studies and evaluate the factors that actually may be causative to alternations in attitude and practice towards self-medication. As the study relied on the ability of students to recall using drugs, a bias is inevitable due to this issue. To manage this sort of bias, we restricted the history to prior six months. Furthermore, first year students may have also created some sort of heterogeneity in the field of knowledge. On the other hand, a high response rate (100%) was one of the strengths of this study.

Conclusions

As responsible self-medication is one of the main strategies to reduce health care costs, it seems that the role of pharmacists is particularly important in this regard. Introducing pharmacists as major contributors to public health system is critical. Medical and pharmacy students, as future health professionals, should be more educated about good pharmacy practice.

Abbreviations

OTC: Over the counter

Declarations

Ethics approval and consent to participate

The study was approved by the Ethics Committee of Zabol University of Medical Sciences (IR.ZBMU.REC.1396.160). The students also gave verbal consent to participate in the survey.

Consent for publication

Not applicable.

Availability of data and materials

All data generated or analysed during this study are included in this published article.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

MH supervised and developed the concept and design of the study, MA performed statistical analysis, ZK gathered the data, AB drafted the manuscript, RR helped in data interpretation and analysis, KT supervised the study and critically revised the manuscript. All authors have read and approved the manuscript.

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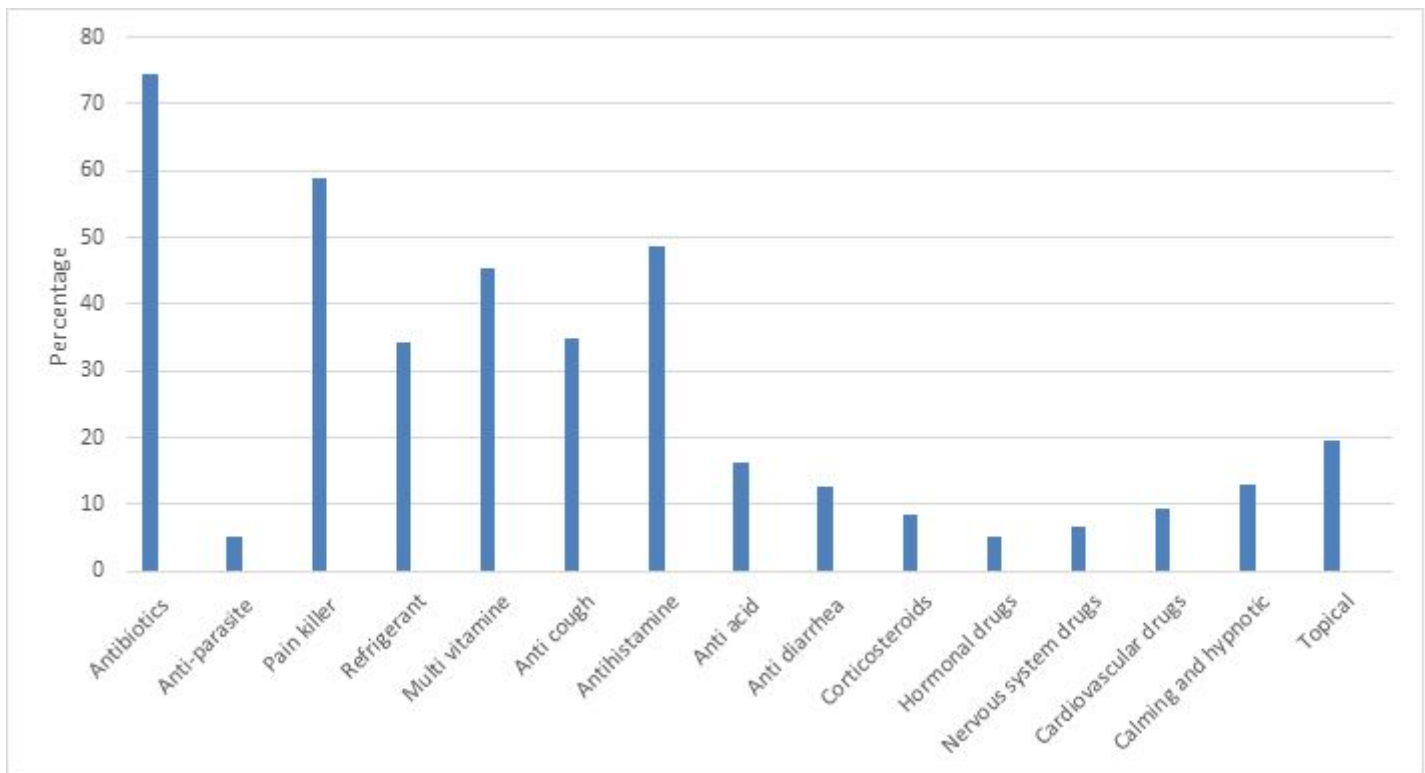[50]   Ruiz ME. Risks of self-medication practices. Current drug safety 2010;5:315-23.
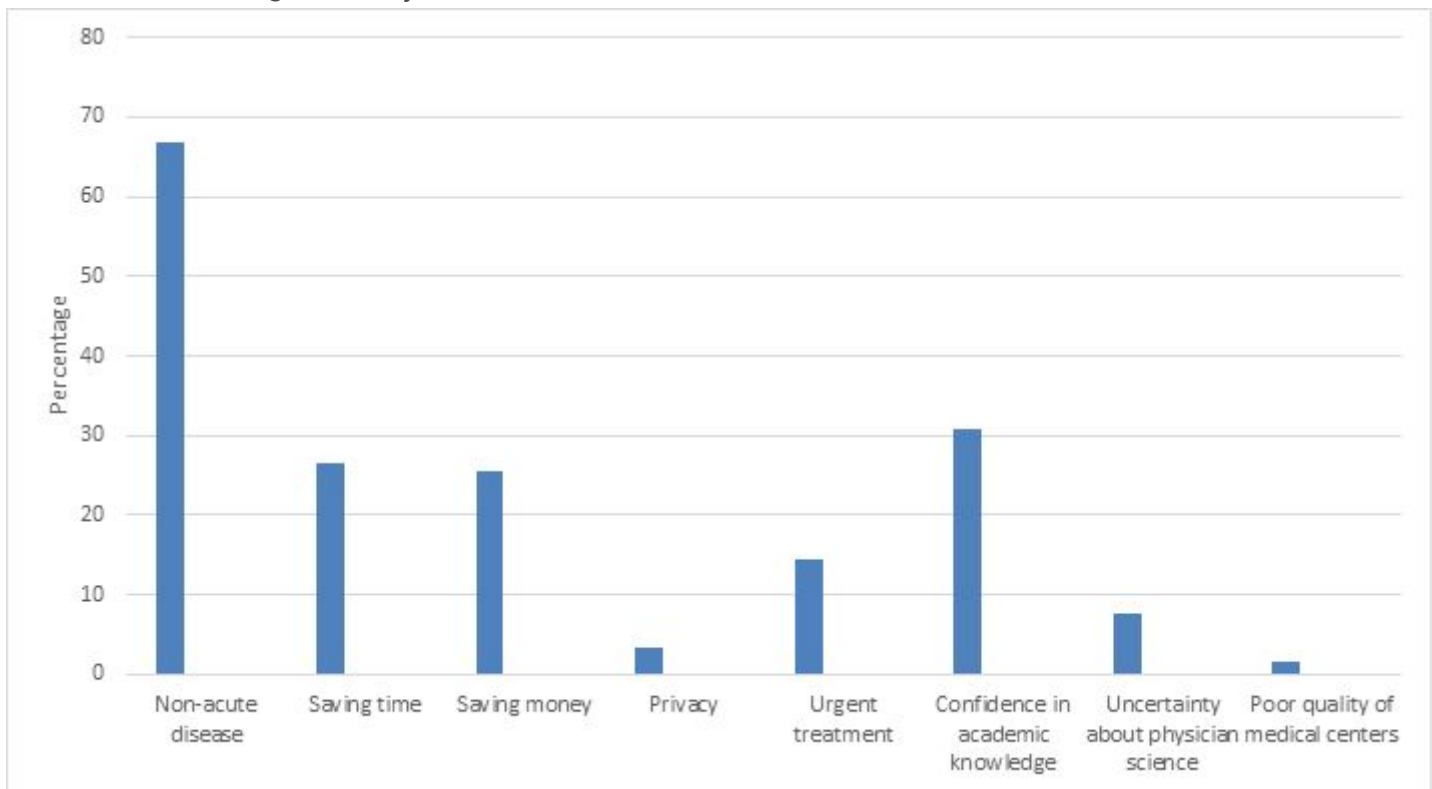
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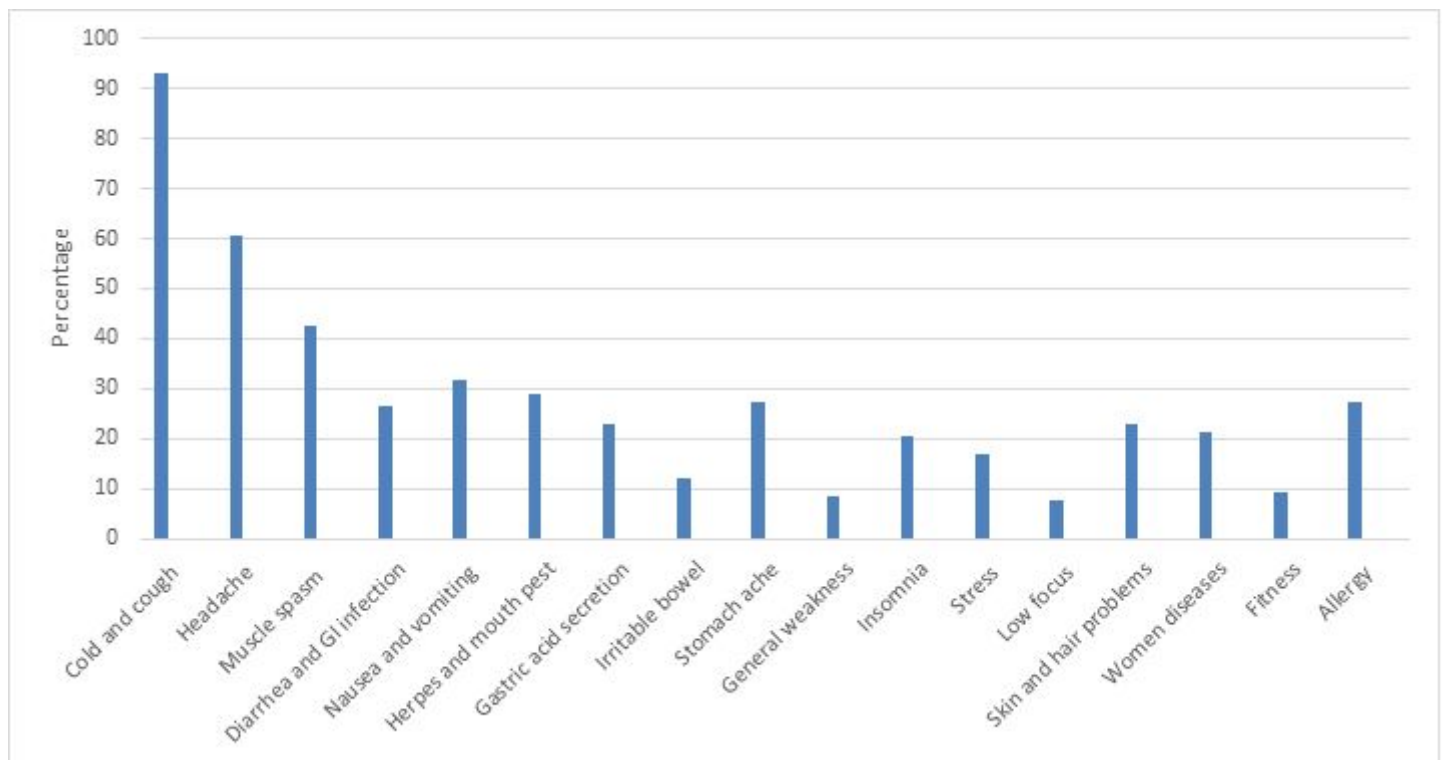
Figure 1

Most common diseases treated with self-medication among medical and pharmacy students
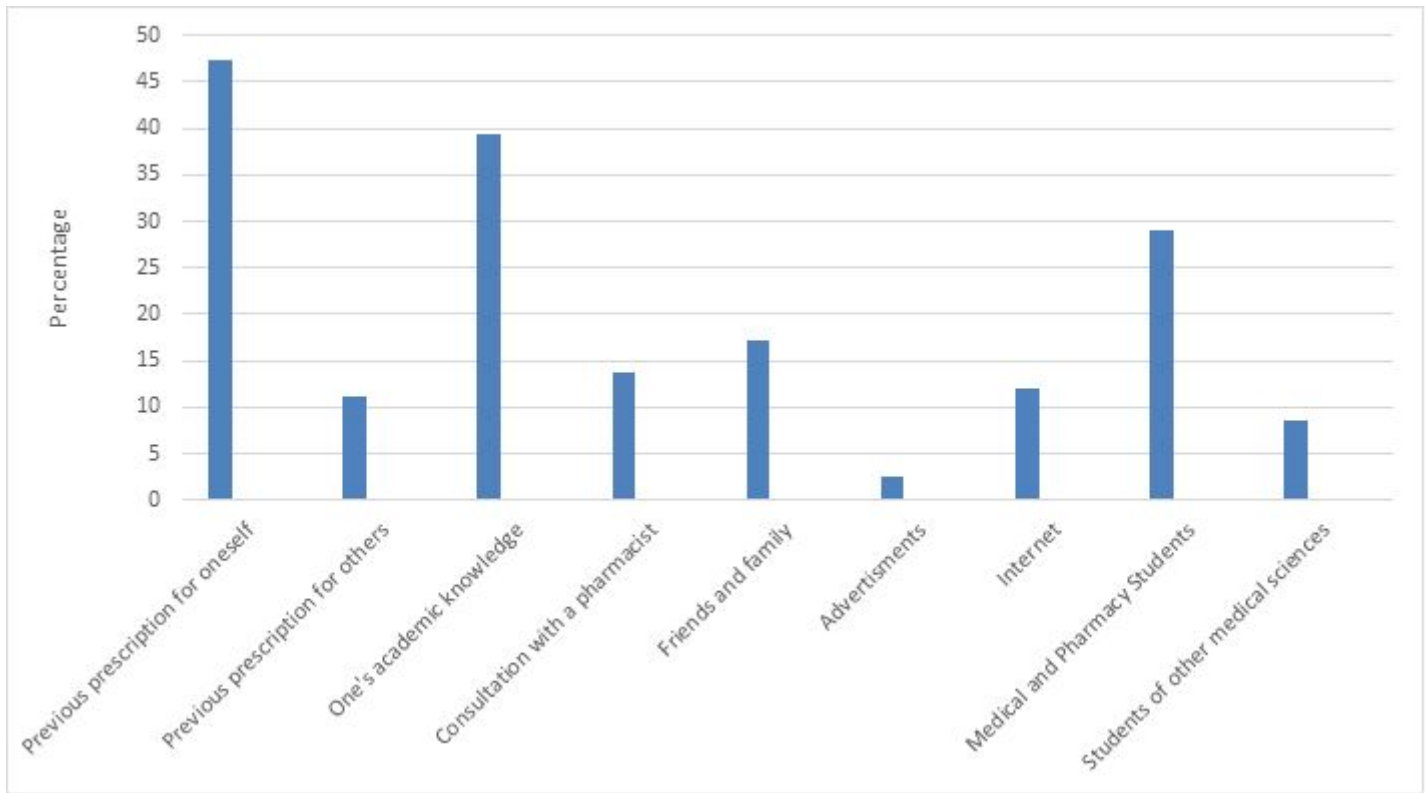
Figure 2

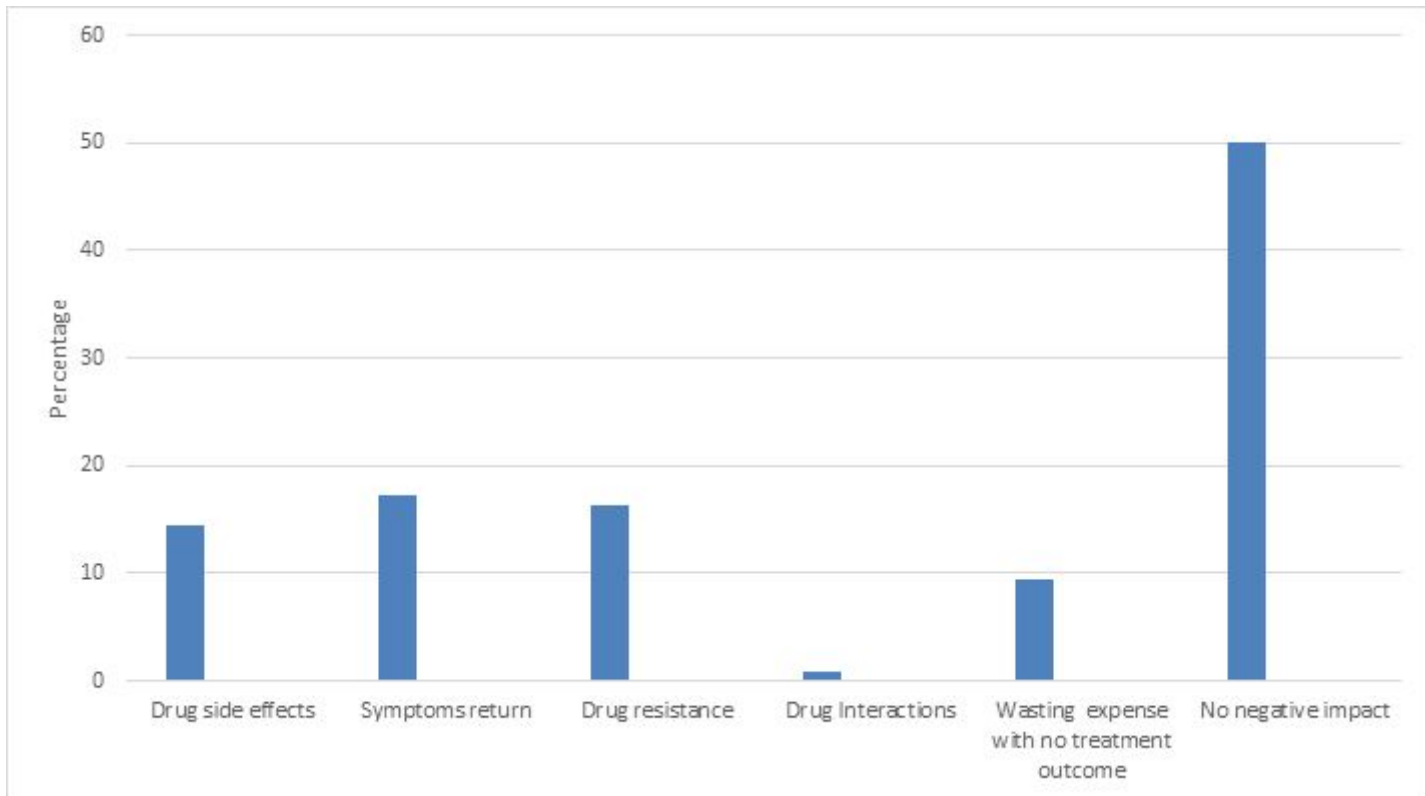Most common drugs used by the students for self-medication

Figure 3

Common reasons for self-medication among Iranian pharmacy and medical students

Figure 4

Information sources used by pharmacy and medical students to self-medicate

Figure 5

Supplementary Files

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