

## Original Research

# Prevalence and associated risk factors of self-medication with over-the-counter medicines among university students in the United Arab Emirates

Khalid A Al-Kubaisi , Mohammed M Hassanein , Abduelmula R. Abduelkarem 

Received (first version): 04-Jun-2022

Accepted: 05-Aug-2022

Published online: 14-Sep-2022

### Abstract

**Background:** Proper self-medication with Over the Counter (OTC) medicines can benefit both the patient and the healthcare sector. Although OTC medications are considered relatively safe, their improper use can lead to serious health risks and implications. This study investigates the self-medication practices with OTC medicines among medical and non-medical students at different universities in the United Arab Emirates. **Methods:** A cross-sectional study was carried out over six months (January-June 2021). The desired confidence level was set at 95%, and the precision level was 0.03. A three-step cluster sample method was employed. A self-administered questionnaire that assessed predisposing, enabling and need factors associated with the use of OTC medicines was developed based on Andersen's behavioural model. **Results:** A total of 2355 students completed the study questionnaire. The mean age was 20.94, and 76.3% were female. More than half of the participating students (57.5%) reported using OTC medicines during the past 90 days of conducting the study. A good proportion (67.8%) reported performing a high level of self-care. Student's perceived health ( $p < 0.0001$ ), educational background ( $p = 0.003$ ), use of left-over drugs ( $p = 0.002$ ), relies on informal sources for drug information ( $p = 0.0001$ ) and reading drugs information leaflets ( $p < 0.0001$ ) were all significantly associated with whether students sought medical advice or not. **Conclusion:** Many university students were observed that they never sought pharmacist advice when taking OTC medications. The likelihood of consulting a pharmacist when using an OTC medication was lower among medical students than non-medical students and among those who do not read the drug information leaflets. The proactive role that a pharmacist can play can have paramount importance in promoting the proper and safe use of OTC drugs.

**Keywords:** non-prescription drugs; self-medication; medical students; United Arab Emirates

## INTRODUCTION

Over the Counter (OTC), also known as non-prescription medications, are medications that are available without a prescription from a healthcare professional.<sup>1</sup> Responsible self-medication with OTC medicines can help prevent diseases and treat minor ailments that do not usually require direct medical attention or consultation.<sup>1-3</sup> On the other hand, inappropriate use has been regarded as bringing potential risks.<sup>1,4-5</sup> Several governmental entities have placed multiple rules and regulations to control self-medication practices and improve medication awareness as it remains a global health problem.<sup>4,6</sup> Research suggests that seeking advice from the pharmacy

staff is vital to ensure safe and effective self-medication with drugs.<sup>1,7,8</sup>

Pharmacists, in particular, play multiple and essential roles as part of the inter-professional medical team of patients and in guidance of the appropriate use of OTC medications.<sup>1,7,8</sup>

Although confidence issues concerning deregulations were reported, pharmacy students still view deregulation of prescription-only medications to OTC has given the pharmacist the capacity to contribute to optimizing drug therapy and managing more diverse and complex clinical conditions.<sup>9</sup> Research is still suggesting an increased prevalence of self-medication among university students.<sup>10</sup> Moreover, it has been reported that most medical and pharmacy students practice self-medication.<sup>11</sup> Despite students highly practicing self-medication of OTC medicines, it is reported that they still view pharmacists as a positive source of information on drugs.<sup>12</sup>

There are multiple studied risk factors on when individuals practice self-medication. The risk factors identified behind self-medicating include suffering from economic problems, being of the male gender, visiting physicians less frequently, and the ease of using the medications.<sup>13</sup> On another hand, religion, occupational and educational status and OTC knowledge were also predictors of risky practices of OTC use.<sup>14</sup> However, the risk factors of using OTC among university students, particularly healthcare and medical students, are not similarly studied.

**Khalid A AL-KUBAISI.** Department of Pharmacy Practice and Pharmacotherapeutics, College of Pharmacy-University of Sharjah, P.O. Box 27272-United Arab Emirates. [kalkubaissi@sharjah.ac.ae](mailto:kalkubaissi@sharjah.ac.ae)

**Mohammed M HASSANEIN.** Department of Pharmacy Practice and Pharmacotherapeutics, College of Pharmacy-University of Sharjah, P.O. Box 27272-United Arab Emirates. [mohammed.magdyhassanein@outlook.com](mailto:mohammed.magdyhassanein@outlook.com)

**Abduelmula R. ABDUELKAREM\*.** Department of Pharmacy Practice and Pharmacotherapeutics, College of Pharmacy-University of Sharjah, P.O. Box 27272-United Arab Emirates. [aabelkarim@sharjah.ac.ae](mailto:aabelkarim@sharjah.ac.ae)



On certain occasions, self-medication was observed more in the female gender, younger age, medical background, married students and students with home pharmacies.<sup>10</sup> The factors that remained independently related to the increased likelihood of self-medicating in students included their medical background, good health, thoughtlessness about one's health, and a home pharmacy.<sup>10</sup>

Despite empirical evidence of regional differences, no previous studies have investigated medical advice-seeking behavior in the United Arab Emirates (UAE). Investigating the medical advice-seeking behavior of undergraduate students helps to better understand information-seeking behavior and its relation to the health-seeking behavior of OTC medicines. Therefore, this study aims to identify and assess the risk factors of self-medication with OTC drugs among university students and identify the reasons for failing to refer to a pharmacist's advice upon using and purchasing OTC.

## METHODS

### Materials and methods

This cross-sectional study was conducted among the students of three major universities in the United Arab Emirates (UAE) over six months, from January to June 2021. A specified precision method was used to determine the sample size. The sample size calculation is described elsewhere.<sup>15</sup> The desired level of confidence was set at 95%, and the desired level of precision was set at 0.03, depicting that the estimated proportion of inappropriate use was within 3%. A sample size of 1068 OTC users was needed.

A multistage sampling technique was used to include universities in the UAE in this study. This previously described technique is a three-step cluster sample method.<sup>15</sup> Three universities, out of six UAE universities that offer medical and non-medical programs, were randomly selected. Three medical and non-medical colleges from each university were selected by stratifying medical and non-medical colleges. A random sampling technique was used to select one medical college and two non-medical colleges from within each university. A simple random sample of classes was selected from each randomly selected college using techniques described previously.<sup>16,17</sup> Undergraduate students enrolled in the spring academic semester of 2020–2021 who had prior experience with the self-use of OTC medications were eligible for inclusion. All participants provided informed consent.

### Data collection-questionnaire

#### Questionnaire

A self-administered questionnaire was used in this study. The questionnaire was constructed and developed based on Andersen's behavioral model that guided the present study.<sup>4</sup> The questionnaire comprised three types of questions that were divided into three categories: (1) predisposing factors, (2) enabling factors and (3) need factors. The survey consisted

of more than 25 explanatory variables. Independent variables were grouped into predisposing factors: three demographic characteristics, one social structural characteristic and fifteen health belief characteristics. Enabling factors included: colleges, year of study, medication knowledge, source(s) of OTC – information,<sup>18</sup> income and employment. Need factors encompassed self-care orientation and perceived health.

### Data analysis

The data were analysed using Statistical Package for the Social Sciences (SPSS, version 26, Chicago, IL, USA). Descriptive statistics were used to describe the study variables. Categorical variables were analysed in frequencies and percentages, while continuous variables were analysed through means and standard deviations. The bivariate analysis, conducted through Chi-Square tests, was performed for all predictors with the outcome variable (asking the pharmacists for medical advice). The Binary Logistic Regression was also conducted to identify risk factors of failing to ask the pharmacist for medical advice when purchasing OTC medications.

## RESULTS

### Study participants

A total of 2875 students were eligible to participate in the study. However, only 2519 students agreed to participate, indicating an 88% response rate. However, only 2,355 students completed the questionnaires and were considered for data analysis. Details of the inclusion and exclusion of students are described in Figure 1.

### Sample characteristics

The mean age of the student sample was 20.94 years. Most of the students were females (1797; 76.3%), single [2151(91.3%)], and not employed during the study period [2190 (93%)]. Most of the responders [2158(91.6%)] were 18-23 years old. Most students were either UAE national [1073(45.5%)] or Arabs [1068(45.4%)]. Students who participated in our study were mostly second [560(23.8%)] and third year [713(30.3%)] students. The prevalence of OTC use in this population was 57.5%, as 1348 subjects reported using OTC during the past 90 days before conducting the study. A good proportion of the students under investigation reported performing a high level of self-care [914(67.8%)]. Table 1 summarises the demographic characteristics of the participants.

### Risk factors

The bivariate analysis showed that all predictors, except for the frequency of use of OTC ( $p=0.123$ ), were significantly related to whether students asked a pharmacist for medical advice or not. The students' perceived health ( $p<0.0001$ ), educational background ( $p=0.003$ ), whether the student uses left-over drugs ( $p=0.022$ ), reads the drugs' information leaflet ( $p<0.0001$ ) and relies on informal sources for drug information ( $p=0.001$ ) were all significant predictors of whether students asked a pharmacist for medical advice. Approximately 24% ( $n=323$ )



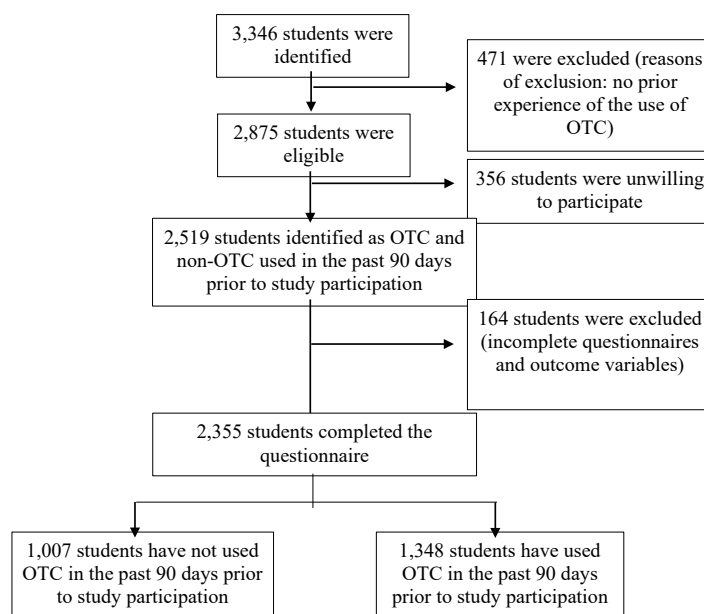


Figure 1. Inclusion and exclusion of study participants

Demographics	N (%)
Age (years)	20.94±0.050
<b>Gender</b>	
Female	1797(76)
Male	558(24)
<b>Marital Status</b>	
Single	2151(91.3)
Married	186(7.9)
Divorced	11(0.5)
Others	7(0.3)
<b>Ethnicity</b>	
UAE <sup>1</sup> National	1073(45.5)
Arab	1068(45.4)
Asian	86(3.7)
Iranian	88(3.7)
Others	40(1.7)
<b>Universities</b>	
Sharjah university	681(28.9)
UAE <sup>1</sup> university	837(35.5)
Ajman university	837(35.5)
<b>Year of study</b>	
1 <sup>st</sup>	175(7.4)
2 <sup>nd</sup>	560(23.8)
3 <sup>rd</sup>	713(30.3)
4 <sup>th</sup>	670(28.5)
5 <sup>th</sup>	190(8.2)
6 <sup>th</sup>	47(2)
<b>Employment status</b>	
Yes	165(7)
No	2190(93)
Total	2355(100)
<b>Self-care orientation</b>	
Low self-care	434(32.3)
High self-care	914(67.8)

<sup>1</sup> UAE, United Arab Emirates

of the students reported they never asked the pharmacist for medical advice when buying OTC medications. Binomial logistic regression was performed to assess the effects of 26 potential predictors on the likelihood that students fail to ask the pharmacist for medical advice when buying OTC medications. Table 2 summarises Explanatory Predictors that Demonstrated Significant Associations with Asking the Pharmacist for a Medical Advice.

Results of the logistic regression revealed that high-frequency users, students who utilise OTC medicines on a weekly ( $p=0.039$ ) and daily basis ( $p=0.034$ ), are 41.5% and 49.3% less likely to fail to ask the pharmacists for advice when purchasing OTC products respectively. Likewise, students who utilised informal drug information sources were 1.495 times more likely to not ask the pharmacist for advice ( $p=0.005$ ). Furthermore, students who use left-over OTC (OR =1.414, 95% CI: 1.029-1.944,  $p$  value < 0.05) are 1.414 times more likely to not ask the pharmacist for advice than students who do not use left-over drugs. Similarly, students who usually do not read the drug information leaflets of OTC drugs had higher odds of not asking the pharmacist for advice than those who did (OR = 2.647, 95% CI: 1.940-3.612,  $p$  value < 0.001). Students of a non-medical background were 42.5% less likely to not refer to a pharmacist for guidance on OTC than medical students. Poor to average self-reported health status (OR =1.716, 95%; CI: 1.174-2.510;  $p=0.005$ ) was also observed as a risk factor. Table 3 summarises the Logistic Regression Model for the likelihood of asking the pharmacists for advice.

## DISCUSSION

The primary objective of this study was to assess the multiple risk factors associated with the OTC self-medicating practices



Table 2. Explanatory predictors that demonstrated significant associations with asking the pharmacist for a medical advice (n =1348)

Predictors	Ask the Pharmacist for a Medical Advice	Do not ask the pharmacist for a Medical Advice	df	χ <sup>2</sup>	p-value
	N (%)	N (%)			
<b>Frequency of use</b>			3	5.770	0.123
Monthly	579 (56.5)	200(61.9)			
Weekly	233(22.7)	60(18.6)			
Daily	105(10.2)	24(7.4)			
<b>Perceived Health</b>			2	18.213	<0.0001*
Poor-average	177(17.3)	90 (27.9)			
Good	848(82.7)	233(72.1)			
<b>Educational Background</b>			1	4.559	0.033*
Medical Students	358(34.9)	134(41.5)			
Non-medical Study	667(65.1)	189(58.5)			
<b>The use of Left-over drug</b>			1	5.281	0.022*
Yes	228(22.2)	92(28.5)			
No	797(77.8)	231(71.5)			
<b>Reading the drug information –leaflet.</b>			1	18.948	<0.0001*
Yes	924(90.1)	262(81.1)			
No	101(9.9)	61(18.9)			
<b>Informal source of drug information</b>			1	10.424	0.001*
Yes	523(51)	198(61.3)			
No	627(49)	125(38.7)			

Table 3. Logistic regression model for the likelihood of asking the pharmacists for advice

Variables	Response	Exp (B)	OR	95% CI		p-value
Frequency of use	Monthly	-0.141	0.869	0.563	1.340	0.524
	Weekly	-0.537	0.585	0.351	.973	0.039*
	Daily	-0.680	0.507	0.270	.949	0.034*
Informal source of drug information	Yes	0.402	1.495	1.130	1.979	0.005*
Use of a left-over drug	Yes	0.347	1.414	1.029	1.944	0.033*
Reading the drug information leaflet	No	0.974	2.647	1.940	3.612	<0.001*
Educational background (medical verses non-medical backgrounds)	Non-Healthcare	-0.553	0.575	0.421	0.786	0.001*
Perceived health	Poor-average	0.540	1.716	1.174	2.510	0.005*
	Good	-0.090	0.914	0.664	1.258	0.582

among medical and non-medical students and why students are likely to fail to seek pharmacist consultation for the appropriate use of OTC medicines. Our study showed that 57.5% of the sample reported using an OTC medicine 90 days before the study. The prevalence of self-medication varies by the target population.<sup>19-22</sup> The sociodemographic characteristics of the sample, the methodology used, or how participants define self-care can be reasons behind such variance. A higher prevalence of OTC use among university students was observed among

students of medical background than those of non-medical background, and they were less likely to refer to pharmacist guidance.

In our study, frequency of OTC use, the use of informal sources of drug information and left-over drugs, failing to read the information leaflet, students of medical backgrounds, and students with a poor to average perceived health were all risk factors for failing to ask the pharmacists for their advice on



OTC use. A quarter of our sample reported they had not sought medical advice from pharmacists when buying OTC medicines. This could be either because they have had a previous similar experience, are regular users of a particular OTC medicine, or have good to moderate medication knowledge. Moreover, our findings showed that students who usually do not read the drug information leaflets had a higher odd of not asking a pharmacist for advice. The present study is the first study that investigates the relationship between reading the drug information leaflets and pharmacist-medical advice-seeking behaviour of university students. However, other studies reported that almost half of the students did not read the drug information leaflet.<sup>23</sup> As a result, pharmacists should take a more proactive role in providing advice to patients about the safe and effective use of OTC medicines.<sup>1,24</sup> In fact, pharmacists have a positive attitude toward attaining new pharmacy service roles that contributes to their roles as healthcare professionals.<sup>25</sup>

Our findings showed that students from non-medical schools had lower odds of not asking pharmacists for medical advice than students from medical schools. This finding might be attributed to a “false sense of confidence in self-diagnosis and self-management” among healthcare students.<sup>26</sup> Students who usually use left-over OTC medications had higher odds of not asking pharmacists for medical advice (OR =1.414, 95% CI: 1.029-1.944). This finding might be attributed to the experience that students acquired regarding drug use. The latter does not provide any vital need to consult a pharmacist on using the drug they have previously used for past symptoms.

Students whom all skipped reading the drug information leaflet before using OTC medicine were a risk factor for not seeking medical advice. These findings can be explained by the relationship between health seeking-behaviour and information-seeking behaviour of the participants. Information-seeking behaviour can be defined as “a conscious effort to acquire information in response to a need or gap in your knowledge”.<sup>27</sup> Correspondingly, the author identified that information-seeking behaviour entails seeking information in addition to purposive behaviours. Accordingly, those participants intentionally avoid seeking information from health care professionals.

Participants who perceived their health status as poor or average were similarly at risk for not asking the pharmacist for advice. Although more research is needed to explore the dimension of these phenomena in-depth, it can be stipulated that students with poor or average perceived health status are not aware of the importance of consulting pharmacists for the safe and effective use of OTC medicines. To avoid recall bias, students who used OTC medication over 90 days before completing the questionnaire were eliminated. A potential limitation from the selection process may refer to the 90 days selected as a criterion for exclusion. Another limitation of the selection process refers to excluding participants that did not use OTC medications. Data from these participants could have been compared with those who used OTC medications. However, while this was beyond the scope of this survey, it could have also provided a deeper analysis of OTC use behavior.

## CONCLUSION

A sizable proportion of university students do not seek pharmacists' advice when using OTC products. A higher usage frequency of OTC medications was observed among medical students than those from non-medical backgrounds, and they were less likely to seek medical advice from a pharmacist on proper use. Relying on informal sources of information or skipping reading the drug leaflet were risk factors associated with more frequent use in the absence of any professional help. Pharmacists' expertise can raise students' awareness about self-care and self-medication, and pharmacists should be encouraged to provide a point-of-sale consultation with customers regarding safe and effective drug use.

## CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

## FINANCIAL DISCLOSURE

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors

## References

1. Sanggiry S, Bhansali A, Bapat S, et al. Abuse of over-the-counter medicines: a pharmacist's perspective. *Integr Pharm Res Pract*. 2016;6:1-6. <https://doi.org/10.2147/ijprp.s103494>
2. Limaye D, Limaye V, Krause G, et al. A systematic review of the literature on survey questionnaires to assess self-medication practices. *Int J Community Med Public Health*. 2017;4(8):2620. <https://doi.org/10.18203/2394-6040.ijcmph20173192>
3. Shankar PR. Essential medicines and health products information portal. *J Pharmacol Pharmacother*. 2014;5(1):74-75. <https://doi.org/10.4103/0976-500X.124434>
4. Andersen R, Newman JF. Societal and individual determinants of medical care utilisation in the United States. *Milbank Mem Fund Q Health Soc*. 1973;51(1):95-124. <https://doi.org/10.2307/3349613>
5. Dalton K, Byrne S. Role of the pharmacist in reducing healthcare costs: current insights. *Integr Pharm Res Pract*. 2017;6:37-46. <https://doi.org/10.2147/ijprp.s108047>
6. World Health Organization. Guidelines for the regulatory assessment of medicinal products for use in self-medication. World Health Organization; 2000.
7. Mamo S, Ayele Y, Dechasa M. Self-medication practices among community of Harar City and its surroundings, Eastern Ethiopia.





- J Pharm (Cairo). 2018;2018:1-6. <https://doi.org/10.1155/2018/2757108>
8. Bell J, Dziekan G, Pollack C, et al. Self-care in the twenty first century: A vital role for the pharmacist. *Adv Ther*. 2016;33(10):1691-1703. <https://doi.org/10.1007/s12325-016-0395-5>
  9. Hanna L-A, Murphy A, Hall M, et al. Future pharmacists' opinions on the facilitation of self-care with over-the-counter products and whether this should remain a core role. *Pharmacy (Basel)*. 2021;9(3):132. <https://doi.org/10.3390/pharmacy9030132>
  10. Helal RM, Abou-ElWafa HS. Self-medication in university students from the city of Mansoura, Egypt. *J Environ Public Health*. 2017;2017:1-7. <https://doi.org/10.1155/2017/9145193>
  11. Bekele KM, Abay AM, Mengistu KA, et al. Knowledge, attitude, and practice on over-the-counter drugs among pharmacy and medical students: A facility-based cross-sectional study. *Integr Pharm Res Pract*. 2020;9:135-146. <https://doi.org/10.2147/IPRP.S266786>
  12. Albusalih FA, Naqvi AA, Ahmad R, et al. Prevalence of self-medication among students of pharmacy and medicine colleges of a public sector university in Dammam city, Saudi Arabia. *Pharmacy (Basel)*. 2017;5(3):51. <https://doi.org/10.3390/pharmacy5030051>
  13. Roien R, Bhandari D, Hosseini SMR, et al. Prevalence and determinants of self-medication with antibiotics among general population in Afghanistan. *Expert Rev Anti Infect Ther*. 2022;20(2):315-321. <https://doi.org/10.1080/14787210.2021.1951229>
  14. Tesfamariam S, Anand IS, Kaleab G, et al. Self-medication with over the counter drugs, prevalence of risky practise and its associated factors in pharmacy outlets of Asmara, Eritrea. *BMC Public Health*. 2019;19(1):159. <https://doi.org/10.1186/s12889-019-6470-5>
  15. Al-Kubaisi, Khalid A, De Ste Croix, et al. Appropriateness assessment and identifying the risk factors of oral non-prescription drugs' use among university students in the United Arab Emirates. <https://eprints.glos.ac.uk/4968/1/Appropriateness%20assessment%20and%20identifying%20risk%20factors.pdf>
  16. Sample design for educational survey research: Module 3. Unesco.org. [cited 2022 May 28]. <https://unesdoc.unesco.org/ark:/48223/pf0000214550>
  17. Li X. *Emerging media: Uses and dynamics*. London, England: Routledge; 2015.
  18. Robert CC, Bradley H. Sociocultural, economic and regulatory influences on medicine use by consumers in a rural. *South Med Rev*. 2011;4(1). <https://doi.org/10.5655/smr.v4i1.73>
  19. Håkonsen H, Sundell KA, Martinsson J, et al. Consumer preferences for over-the-counter drug retailers in the reregulated Swedish pharmacy market. *Health Policy*. 2016;120(3):327-333. <https://doi.org/10.1016/j.healthpol.2016.01.016>
  20. Balbuena FR, Aranda AB, Figueras A. Self-medication in older urban mexicans : an observational, descriptive, cross-sectional study: An observational, descriptive, cross-sectional study. *Drugs Aging*. 2009;26(1):51-60. <https://doi.org/10.2165/0002512-200926010-00004>
  21. Gama ASM, Secoli SR. Automedicação em estudantes de enfermagem do Estado do Amazonas – Brasil. *Rev Gaucha Enferm*. 2017;38(1):e65111. <https://doi.org/10.1590/1983-1447.2017.01.65111>
  22. Arrais PSD, Fernandes MEP, Pizzol T da SD, et al. Prevalence of self-medication in Brazil and associated factors. *Rev Saude Publica*. 2016;50(2):13s. <https://doi.org/10.1590/S1518-8787.2016050006117>
  23. Scuri S, Petrelli F, Tanzi E, et al. European university students of pharmacy: survey on the use of pharmaceutical drugs. *Acta Biomed*. 2019;90(1):83-91. <https://doi.org/10.23750/abm.v90i1.7572>
  24. Hughes CM, McElnay JC, Fleming GF. Benefits and risks of self medication. *Drug Saf*. 2001;24(14):1027-1037. <https://doi.org/10.2165/00002018-200124140-00002>
  25. Luetsch K. Attitudes and attributes of pharmacists in relation to practice change - A scoping review and discussion. *Res Social Adm Pharm*. 2017;13(3):440-455.e11. <https://doi.org/10.1016/j.sapharm.2016.06.010>
  26. Xiao X, Wu Z-C, Chou K-C. A multi-label classifier for predicting the subcellular localisation of gram-negative bacterial proteins with both single and multiple sites. *PLoS One*. 2011;6(6):e20592. <https://doi.org/10.1371/journal.pone.0020592>
  27. Cole C. *Looking for information: A survey of research on information seeking, needs, and behavior* (4th edition). Donald O. Case and Lisa M. Given. Bingley, UK: Emerald Group Publishing, 2016. 528 pp. \$82.95 (hardcover). (ISBN: 9781785609688). *J Assoc Inf Sci Technol*. 2017;68(9):2284-2286. <https://doi.org/10.1002/asi.23778>

