



ORIGINAL ARTICLE

Students' attitude toward use of over the counter medicines during exams in Saudi Arabia



Haya Almalak ^a, Ala'a Ibrahim Albluwi ^a, Dalal Ahmed Alkhelb ^a,
Hajar Mohmmmed Alsaleh ^a, Tahir Mehmood Khan ^b,
Mohamed Azmi Ahmad Hassali ^c, Hisham Aljadhey ^{a,*}

^a Medication Safety Research Chair, Department of Clinical Pharmacy, College of Pharmacy, King Saud University, Saudi Arabia

^b School of Pharmaceutical Science, Monash University, Jalan Lagoon Selatan, Bandar Sunway, 46150, Selangor Darul Ehsan, Malaysia

^c Programme Chair, Discipline of Social and Administrative Pharmacy, School of Pharmaceutical Sciences, University Sains Malaysia, 11800 Penang, Malaysia

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KEYWORDS

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Abstract *Purpose:* To explore the use of over the counter (OTC) medicines among students during exams in Riyadh City, Kingdom of Saudi Arabia.

Method: A cross-sectional study was designed; using a self-administered twenty-two item online questionnaire for the students' convenience and easy response disclosure. Data were analyzed using Statistical Package for Social Science (SPSS) version 13®.

Results: A total of $N = 1596$ students participated in this survey, of whom 829 (51.9%) were university students and 767 (48.1%) were high school students. Overall, 80.0% of the respondents disclosed the use of OTC non-steroidal anti-inflammatory drugs for headache and pain relief. In addition, other substances used during the exams were Energy Drinks (5.0%), Flu Medication (5.0%), Vitamins (5.0%) and Antibiotics (5.0%). Female students were found to be more knowledgeable about safety issues concerning the use of OTC medicines ($5.11 \pm 1.27, p = <0.001$) than male students. Ease in access to OTC medicine, availability of pharmacist consultation and advertisement in print and electronic media were the main factors disclosed by the respondents that may result in an increase in the use of OTC products. The use of OTC medicines was generally higher among female students ($p = 0.001$).

* Corresponding author. Address: College of Pharmacy, King Saud University, P.O. Box 2475, Riyadh 11451, Saudi Arabia. Tel.: +966530039008.

E-mail address: haljadhey@ksu.edu.sa (H. Aljadhey).

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Conclusion: The use of OTC medication during exams was more among high school and university students. Gender, age and educational institution were found significantly affecting the use of OTC medicines during exams.

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1. Introduction

Self-medication is one of the major reasons for the irrational use of medicines (Filho et al., 2004). Globally, self-medication practices are more frequently observed for the over the counter (OTC) medicines (World Health Organization, 1998). Social and economic factors are the main reasons that compel the individual to take a medicine without an appropriate diagnosis and surveillance of the medical therapy (WHO, 2000). It is rare to see someone purchasing an OTC product with a prescription (Collins and McAllister, 2006). In some developing countries, poor implementations of drug policies make many non-OTC products available from a pharmacy without a prescription. However, sometimes certain situations also act as compelling factors to request an OTC product or a non-prescription medicine. Tight job schedules, high job responsibilities, academic burden and exams are some of the situations that result in the use of certain medicines to improve work concentration and alertness. During exams, many students use different OTC and non-OTC substances to improve their concentration or alertness while studying. Substances like stimulants, antidepressants, OTC and non-OTC analgesics, anti-histamines and some traditional and alternative medicines like Ginkgo Biloba are all substances commonly abused by students, in general and during exams (National Institute on Drug Abuse, 2006; Syed Nabeel Zafar, 2008; Joffe, 2006).

The irrational use of medicines is a challenge in both developed and developing nations. In developed nations like the US, there are growing concerns about the use of OTC and non-OTC medicines by the students during exams. A recent report by Hugh C. McBride has argued that high school students use Methylphenidate (Ritalin) during exams to improve performance and attention (Hugh, xxxx). Similarly, among the developing nations like Taiwan and Pakistan, the misuse of a variety of painkillers, vitamin and sedatives has been reported among high school and university students (Syed Nabeel Zafar, 2008). However, no such study examining the misuse of medicine during exams has been performed in Saudi Arabia. Keeping in mind the drug safety concerns among the Saudi youth, the current study aims to explore the misuse of medication by high school and university students in Riyadh City.

2. Methods

2.1. Setting and participants

A cross-sectional study was conducted to achieve the study objective. Students from the King Saud University and a high school in central Riyadh City were invited to participate. An online questionnaire format was uploaded on the university and high school websites from May 2011-until December 2011. Email notifications were sent to all students through collaboration with the university and high school administrations. To further increase survey awareness, posters were also placed on

bulletin boards throughout the university and high schools. The minimum effective sample size calculated for this study was 377, with a confidence interval of 95% and margin of error of 5%. However, to reduce the chances of bias all the students registered at study setting were approached for their participation in this study.

2.2. Validity and reliability of the questionnaire

A self-administered questionnaire was subjected to the process of content validation. During the content selection, the questions were limited to the use of aspirin, paracetamol, ibuprofen and anti-histamines. The content validation of the study tool was performed by the research team at the Medication Safety Research Chair, King Saud University. While, the face validity was tested on a pilot sample of thirty students. During the pilot phase respondents were found to understand all the questions without any confusion. Furthermore, factor analysis was carried out using Bartlett's test of sphericity and the Kaiser-Meyer-Olkin measure. Bartlett's test of sphericity was significant at 0.0001, while the Kaiser-Meyer-Olkin measure was 0.710. According to Scheridan and Lyndall (2001), the contents of a tool are considered adequate if the Kaiser-Meyer-Olkin measure value is more than 0.6 (Scheridan and Lyndall, 2001). In addition, a reliability scale evaluation was applied to estimate the internal consistency of the items; it was estimated based on Cronbach's Alpha ($\alpha = 0.73$).

2.3. Study tool

A twenty-two item questionnaire was used to attain the study objectives. The questionnaire was mainly composed of four sections.

Section one: This section was composed of four items with the main focus on respondent demographic information.

Section two: The main aim of this section was to evaluate student general knowledge toward safety and toxicity of the OTC products. A nominal scale (Yes/No) was used for the purpose of evaluation using eight items as shown in Table 2. To make a clear demarcation of respondent knowledge level, the responses were scored. Every correct answer added one mark to the respondents' total score, and zero was given for a wrong answer. The minimum possible score was one, while the maximum was eight. For the first items in Table 2, reverse scoring was performed. Respondents received one mark for selecting a No option. For the other seven items, Yes was the right answer. To discern the knowledge differences among the groups, knowledge score was further divided into three categories: 0–3 (Poor Knowledge Level), 4–6 (Moderate Knowledge Level) & 7–8 (Good Knowledge Level). Details about the items and the categorical distribution of scores are shown in Table 2 and Fig. 1.

Section three: This section evaluated respondent views on the sale and use of OTC products in Saudi Arabia. Six items

Table 1 Socio-demographic characteristics of participants ($N = 1596$).

Demographic information of respondents	Frequency (%)
<i>Institution of students</i>	
University level	829 (51.9)
High school	767 (48.1)
<i>Gender</i>	
Male	451 (28.3)
Female	1145 (71.7)
<i>Age</i>	
16–18	690 (43.2)
19–21	570 (37.5)
22–25	336 (21.1)
<i>Family Income per month</i>	
< 5000	139 (8.7)
5000–10000	406 (25.4)
> 10000	865 (54.2)
Not mentioned	186 (11.7)

were provided for the respondents to disclose their views using a two item nominal scale (Yes/No). (Table 3)

Section four: The core section of this study tool evaluates the use of OTC products by the respondents during the exam time. This section was comprised of six items that reflect respondent justification for the use of OTC products during exam time (Table 4). The first five items had two response options (Yes/No). Question six was an open-ended question soliciting the type of OTC medicine that students use during exams. A scoring of responses to the first five items analyzed the OTC medication use among the different groups. Those disclosing the use of OTC products with a Yes were given

one mark; those selecting No were not given a mark. The maximum possible score for this section was five.

2.4. Ethical considerations

The Medication Safety Research Chair Committee, College of Pharmacy, King Saud University, approved the study protocol. Furthermore, respondents were requested to submit an electronic consent for their study participation. The researchers did not record any information that may disclose the identity of the respondents.

2.5. Data analysis

Data were analyzed using Statistical Package for Social Science (SPSS) version 13®. An alpha value less than 0.05 was considered statistically significant. Student's *t*-test and a One Way ANOVA were applied to see the knowledge differences between the groups.

3. Results

A total of $N = 1596$ students participated in this survey, of whom 829 (51.9%) were high school students and 767 (48.1%) were university students. Overall, higher participation was observed from the female respondents. In the majority, or 854 (61.3%) of the cases, the family income of the respondents were over 10000.00 Saudi Riyals. Details of the demographic profile of the respondents are shown in Table 1.

3.1. Knowledge level of the safety of OTC medicines

Most of the students were aware of OTC medication safety concerns. A majority (85.2%) were aware of the fact that long

Table 2 Respondents' knowledge about the safety of OTC medicines.

Question	Response	N (%)	Variable/mean score SD	p Value
Over using panadol extra is very safe during exam period	Yes	769 (48.2)	Gender	$F = 42.366$
	No	827 (51.8)		
Use of herbal/natural products for memory and attention will not cause negative effects to human body	Yes	586 (36.7)	Male 4.53 ± 1.56 Female 5.11 ± 1.27	Df = 1594 $p = < 0.001^{*,a}$
	No	1010 (63.3)		
	Yes	1359 (85.2)		
Long term use of OTC medications will cause serious side effects	No	237 (14.8)	Age group 16–18 = 4.45 ± 1.43 19–21 = 5.27 ± 1.23 22–25 = 5.42 ± 1.19	$F = 87.105$ Df = 1591 $p = < 0.001^{*,b}$
	Yes	905 (56.7)		
	No	691 (43.3)		
	Yes	1305 (81.8)		
NSAID (ibuprofen) may cause harm to your kidneys if they are misused	No	291 (18.2)	Institution High School 4.45 ± 1.43	$F = 21.45$ Df = 1594
NSAID (ibuprofen) cause stomach ulcer	Yes	805 (50.4)		
I read medication leaflet before using any medication	No	791 (49.6)	University 5.41 ± 1.16	$p = < 0.001^{*,a}$
	Yes	1275 (79.9)		
To decrease the risk of serious side effects from antihistamines (flu medications), users should carefully follow all dosage directions	No	321 (20.1)		
	Yes	998 (62.5)		
	No	598 (37.5)		

* Significant.

^a Independent *t*-test.

^b One way ANOVA.

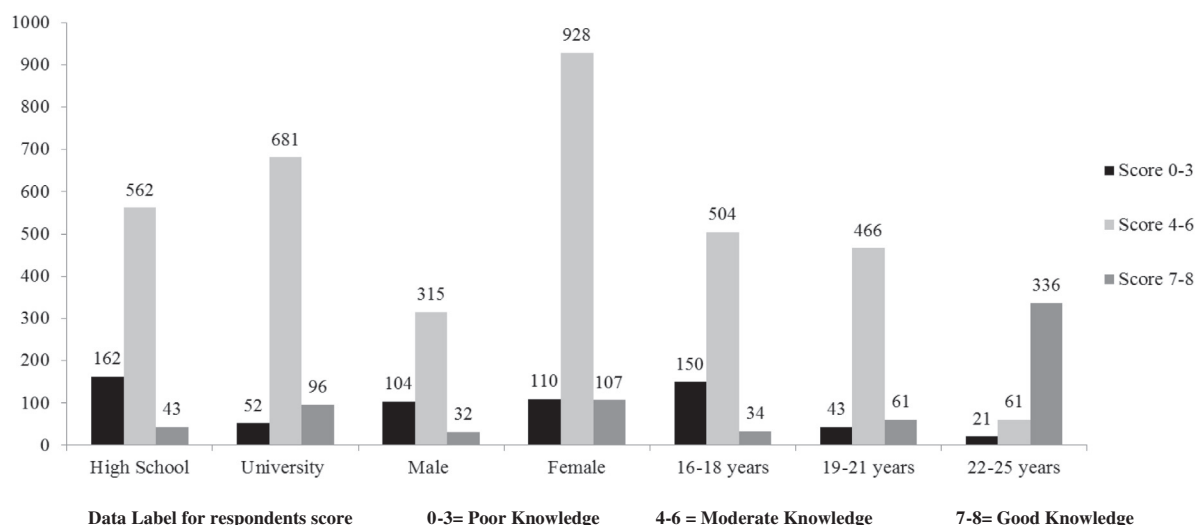


Figure 1 Categorical distribution of respondents' knowledge.

Table 3 Respondents' view toward use and purchase of OTC products during exams

Question	Response	N (%)
OTC medications are cheap and easily available in Saudi Arabia that is why all people use them	Yes	998 (60.7)
	No	628 (39.3)
Advertising is the main cause that people use OTC medicine	Yes	1103 (69.1)
	No	493 (30.9)
I feel convenient with the use of OTC medicines because of the consultation provided by the pharmacist	Yes	1275 (79.9)
	No	321 (20.1)
The sedative effect of antihistamines (flu medications) makes people misuse them typically during exam period	Yes	1277 (80.0)
	No	319 (20.0)
During exam period many try medicines according to friend's suggestion	Yes	173 (10.8)
	No	1423 (89.2)
The availability of OTC medicines and the belief on its safety leading me to use them a lot during the exam period	Yes	316 (19.8)
	No	1279 (80.2)

term use of OTC medicine like aspirin, ibuprofen and paracetamol will result in serious side effects. In addition, 81.2% of the respondents were also familiar with the side effects of ibuprofen in the kidneys. However, approximately 36.7% of the respondents agreed that herbal and natural products for memory and attention would not result in any adverse effects on the human body. Final score evaluation revealed a moderate knowledge level about the safety of OTC medicines (Fig. 1). Mean score comparison revealed that female students were more knowledgeable (5.11 ± 1.27) about safety issues concerning the use of OTC medicines ($F = 42.366$, $Df = 1594$, $p = <0.001$) than their male counterparts. In terms of the institutional or educational profile, the university students were found to be more knowledgeable than the high school students (Table 2) were.

3.2. Views of the use and purchase of OTC medicines

Responses in this section of questionnaire were to reveal that most of the respondents (60.7%) confirm that easy access to OTC medicines is a potential reason for the use of OTC medications. In addition, 1103 (69.1%) associated the use of OTC medicines with electronic and print media advertisements. The most highlighted options include the sedative effects of

antihistamines (80%) and pharmacist consultation over the counter (79.9%). Detailed findings are shown in Table 3.

3.3. Respondents' personal use of OTC products during exams

This main aim of this section was to identify the group with a higher use of OTC medicines. In addition, this section also explored student justifications for the use of OTC medications. Generally, it was found that the use of Non-Steroidal Anti-Inflammatory Drug (NSAIDs) drugs was highest during exams. Nearly 80.0% of the respondents disclosed the use of NSAIDs [*Panadol* (49.0%), *Panadol extra* (12.0%), *Ibuprofen* (10.0%), *Panadol Night* (8.0%) and *Aspirin* (4.0%)] to obtain relief from headaches [790 (49.5%)] and moderate pain [714 (44.73%)] that may interfere with their sleep schedule during exams. Other commonly used OTC products during exams were Energy Drinks (5.0%), Flu Medication (5.0%), Vitamins (5.0%) and Antibiotics (5.0%). Comparison among the groups based on gender, age and educational institution revealed that there was a high use of OTC medications by female students during exams (2.19 ± 1.20 , $F = 13.14$, $p = 0.001$). Overall, a moderate to high use of OTC medicines was noticed among the majority (Fig. 1). Details about the differences in the mean score for OTC medication use are shown in Table 4.

Table 4 Respondents' use of OTC products during exam.

Question	Response N (1596)		Age in years					Institution		
	Male N (%)	Female N (%)	16-18 N (%)	19-21 N (%)	22-25 N (%)	High school N (%)	University N (%)			
I Usually use OTC medicines during exam period	Yes	98 (6.14)	160 (10.03)	156 (9.77)	107 (6.70)	167 (10.46)	256 (16.04)			
	No	353 (22.11)	820 (51.37)	528 (33.08)	414 (25.94)	229 (14.34)	600 (37.59)	573 (35.90)		
I use OTC medicines during exam period to relieve my headache	Yes	178 (11.15)	622 (38.97)	321 (20.11)	292 (18.29)	187 (11.71)	361 (22.61)	439 (27.50)		
	No	273 (17.11)	523 (32.76)	367 (22.99)	278 (17.41)	149 (9.33)	406 (25.43)	390 (24.43)		
I note the use of OTCs by my colleagues	Yes	162 (10.15)	512 (32.08)	276 (17.29)	244 (15.28)	154 (9.64)	292 (18.29)	382 (23.93)		
	No	289 (18.10)	633 (39.66)	412 (25.81)	326 (20.42)	182 (11.40)	475 (29.76)	447 (28.0)		
I use Panadol Night to relieve mild to moderate pain such as headaches, that cause sleeping disturbance during my exam period	Yes	226 (14.16)	488 (30.57)	486 (30.45)	150 (9.39)	76 (4.76)	549 (34.39)	165 (10.33)		
	No	225 (14.09)	607 (41.16)	202 (12.65)	420 (26.32)	260 (16.29)	218 (13.65)	664 (41.60)		
I use energy drinks during exam period	Yes	232 (14.53)	571 (35.77)	522 (32.70)	200 (12.53)	79 (4.95)	621 (38.90)	182 (11.40)		
	No	219 (13.72)	574 (35.96)	166 (10.40)	370 (23.18)	257 (16.10)	146 (9.14)	793 (49.68)		
Mean score ± SD		1.98 ± 1.14	2.19 ± 1.20	2.57 ± 1.05	1.82 ± 1.19	1.79 ± 1.17	2.59 ± 1.03	1.71 ± 1.17		
<i>p</i>		<i>p</i> = 0.003 ^a	<i>p</i> = <0.002 ^b				<i>p</i> = <0.001 ^a			

* Significant.

^a Mann-Whitney.

^b Kruskal-Wallis.

4. Discussion

To our knowledge, this is the first study in the Arabian Gulf region that compares student use of OTC medications during high school and university exams. Our study findings showed a higher incidence of OTC medication use during exams. In general, approximately 80.0% of the students disclosed the use of NSAIDs during exams. Panadol was the most frequently used OTC product. The use of NSAIDs among university students is also under debate in European and Asian studies (Syed Nabeel Zafar, 2008; Joffe, 2006; Hugh, xxxx; Scheridan and Lyndall, 2001; Rosvold, 2008). However, no previous study reported a higher percentage of NSAIDs use. Two potential reasons may explain this higher incidence rate. First, most of the respondents were female, and data report a higher incidence of NSAIDs use among females (2.19 ± 1.20, *F* = 13.14, *p* = 0.001) than males. Second, the majority stated that they use NSAIDs for headaches and general body pains, and the NSAID Panadol® is a well know OTC product for these symptoms (Rosvold, 2008). Overall, the use of OTC medicines showed significant gender and age related differences. Female high school (2.59 ± 1.03, *F* = 17.11, *p* = <0.001) students aged 16–18 years (2.57 ± 1.05, *F* = 85.43, *p* = <0.001) were more likely to use OTC medicines than male students and other age groups. These findings confirm the results from regional and international studies that report the same gender and age associated use of OTC medication (Abahussain and Matowe, 2005; Chambers et al., 1997; Hansen et al., 2003). Eman et al. (2005) associated the high use of NSAIDs among female students with monthly menstrual pains (Abahussain and Matowe, 2005), and other studies found that the use of OTC pain killers increase with age (Nicholls et al., 2002; Tse et al., 1989; Antonov and Isacson, 1998; Nielsen et al., 2003). In contrast, our findings contradict the increase in OTC pain killers use with age (Nicholls et al., 2002; Tse et al., 1989). We noticed a gradual decline in the use of OTC medication with an increase in age. However, a sharp decrease in the OTC medication use regardless of gender is noticed with an increase in education level. These findings confirm the results of Neilsen et al. (2005), who reported the higher use of OTC medication among the students with a poor educational background (Nielsen et al., 2005). Moreover, female respondents (mean score = 5.11 ± 1.27) were found to be more knowledgeable about the safety of OTC medicines than male respondents (mean score = 4.53 ± 1.56). Overall, the university students were found to be more knowledgeable about OTC drug safety than the high school students were.

The second main study aim was to identify the factors that may result in an increase in student OTC medication use. We identified three types of issues: situational, community pharmacy and media/advertisement. In the situational context, findings demonstrate that the use of certain medicines is due to the non-therapeutic effects of that particular drug. Namely, a majority (80.0%) agreed that students use anti-histamines for the sedative affect. These facts highlight that sleep pattern disturbances are a compelling factor for the non-prescribed use of OTC medicines. Future studies should explore whether students stick to the use of anti-histamine or jump to tranquilizers to cope with disturbed sleep patterns.

Another important issue affecting OTC medicine purchase was community pharmacy service. Two main issues that affect

purchase were: consultation provided by the community pharmacist discussing the use of OTC products and easy access to the OTC products. In most of the cases, students purchased the NSAIDs without any prescription after consultation with the pharmacist. In the Kingdom of Saudi Arabia, all pharmacies have a full time pharmacist available, but pharmacists should ensure that non-OTC medicines are not sold without prescription (Tomson and Sterky, 1986). The drug regulatory authorities and Ministry of Health should implement a stick check and balance to the dispensing of non-prescription drugs. Otherwise, this ease of access to OTC medicines will further augment the self-medication practice among students. The third most important factor affecting the purchase of the OTC products was media and advertisement. Most of the 1103 respondents (69.1%) attributed the high OTC demand to pharmaceutical company advertisements in print and electronic media. Research has found that advertisements directly affect a youths' decision to self-medicate Burak and Damico, 2000. In recent years, there has been a massive increase of direct to customer advertisements (DTCA). The pharmaceutical sector currently targets the customer through print and electronic media, which directly affect the consumer demand for the specific brand Burak and Damico, 2000. Any regulatory effort should consider finalizing criteria that prohibit the publication of any information that promotes reader self-medication and bypassing of professional advice to ensure an advertising culture that promotes safety messaging through DTCA.

5. Limitations

Current study only addresses the students' knowledge and attitude toward the use of OTC NSAIDs from an urban sample. Future studies should address the same issue with a more diverse sample. Furthermore, the current study has not addressed the association of medical complication with the OTC use of medication. It might be possible that some students have some medical complication and they use OTC NSAIDs to relieve somatic symptoms. This limitation can be a potential motivation for future studies to segregate the disease based use of OTC medication from the exam-based use.

6. Conclusion

The current study findings confirm the high use of OTC medicines during exams. The use of OTC NSAIDs was higher among female high school students aged 16–18 years. Overall, university students were found to have a better knowledge about the safety of OTC medicine. Gender, age and educational institution were the three main factors significantly affecting the use of OTC medicines during exams.

Recommendation: Keeping in view the findings of this study, institution should educate the students about the safe use of OTC medications. Moreover, availability of the around the clock health center on campus can be another way that may influence the students' perception to take medication based on appropriate assessment.

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