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Research Article

The future physicians of United Arab Emirates: how do they self-medicate?

Syed Ilyas Shehnaz*, Nelofer Khan, Jayadevan Sreedharan, Mohamed Arifulla

Department of Pharmacology,
Gulf Medical University,
Ajman, United Arab Emirates

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*Correspondence to:
Dr. Syed Ilyas Shehnaz,
Email: shehnazilyas@yahoo.com

ABSTRACT

Background: Health professions have been a predictive factor for self-medication (SM). SM practices of medical students, the future practitioners will have a bearing on their impending professional practice. The aims were to identify prevalence and practice of SM among the medical students of Gulf Medical University (GMU), United Arab Emirates and to assess the associating factors.

Methods: The study was planned as a cross-sectional descriptive survey among 247 medical students of GMU. Students from 1st to 5th year were included in the study. Data were analyzed using SPSS version 19. Associations were tested with Chi-square test.

Results: SM with both over-the-counter medications and prescription-only medicines was practiced by 65% of students. The prevalence of SM was associated with the year of study and age. The most common sources of drugs were private pharmacies and stocks at home. The students mostly relied on themselves and parents for drug selection. The self-reliance significantly increased with year of study. Common indications for SM were headache and flu symptoms and correspondingly, analgesics and antipyretics were frequently used. A high prevalence of misuse of antibiotics was also reported. SM was 2.9 times higher (95% CI=1.502-5.620) among students belonging to families practicing SM.

Conclusion: The study revealed a fairly high rate of prevalence of SM among the medical students of GMU, which was associated with age and year of study. There is a need to emphasize responsible SM practices among the medical students by accentuating rational drug use in the curricula.

Keywords: Medical students, Self-medication, Prevalence, United Arab Emirates

INTRODUCTION

Self-medication (SM) is the exposure to a drug for self-treatment, without the advice of a physician.[1,2] Risks due to SM include delayed diagnosis of diseases, misdiagnosis, adverse effects, drug-drug interactions, polypharmacy, etc.[3] On the other hand, safe and "responsible" SM can reduce the burden on health services and be cost-effective.[2,3]

SM is being commonly practiced by university students all over the world with the prevalence rates ranging from 76% to 98%.[4,5] In the United Arab Emirates (UAE), more than half of the general population (56%) were misusing antibiotics bought from community pharmacies.[6] The UAE, a country in the Middle East, has a unique population base which is almost entirely made up of expatriates of multi-ethnic groups (83%).[7] The self-medicating practices of expatriates may be influenced by easy accessibility to medicines from their home countries. It was also earlier reported that 89% of expatriate adolescents of UAE were self-medicating with over-the-counter (OTC) medications and prescription-only medicines (POM).[8]

Health professions have often been a predictive factor for SM probably due to easy access to medicines and information.[9,10] Students in health professions have reported higher prevalence of health complaints for which they seem to be frequently self-medicating.[11-13] A physician's personal healthcare practices can substantially impact the quality of care offered to his patients. Studies have revealed that medical practitioners with inappropriate healthcare behaviors (smoking, alcohol intake, the absence of exercise or seatbelt use) are unlikely to counsel patients about such practices.[9] Hence, there is a possibility that the SM practices of medical students, the future practitioners will have a bearing on their impending professional practice.

Though there is a lot of concern about the irrational use of drugs among students, to the best of our knowledge, no studies have been done among medical students in UAE to assess the extent of this problem. Medical students, having some knowledge about diseases and drug, are likely to differ in their SM practices from non-medical students. In this context, the objectives of this study were to identify the prevalence, practice and factors associated with SM among the medical students of the Gulf Medical University (GMU), UAE.

METHODS

Study context

The study was planned as a cross-sectional descriptive survey among the students of the College of Medicine, GMU. The College of Medicine has an organ-system based integrated curriculum conducted in three phases. The 1st year (Phase I) introduces the fundamentals of medical sciences with the basics of pharmacology taught over 1 year. The next 2 years (Phase II) consist of organ systems based learning with clinical pharmacology and therapeutics integrated both horizontally and vertically. The final 2 years (Phase III) are dedicated to the clinical clerkship phase, which is followed by 1 year of compulsory rotating internship.

Students from all three phases took part in the study and prior approval from the Institutional Ethics Committee was obtained. The study questionnaire was administered to the students present in the class on the day of the survey. The objectives of the study were explained and written informed consent was obtained. Voluntary participation was encouraged.

Study instrument

The questionnaire was adapted from earlier studies[4,5,11-18] and redesigned by the investigators. The subject experts examined the survey instrument for content validity, and a small sample of the students' pilot tested it to ensure the readability of the instrument and eliminate ambiguities. The term SM was elucidated as "the use of OTC or POM for self-treatment, without prior consultation with a doctor." The questionnaire was divided into four sections:
A. Demographic details
B. Prevalence of SM in the past year determined through a yes or no response
C. Practice of SM involving the age of initiating SM, sources of drug recommendation and procurement, the therapeutic classes of drugs, the health conditions that respondents would self-treat and the reasons for not consulting a doctor
D. Factors influencing SM, which included the use of private or governmental healthcare services, the access to hospitals/pharmacies, the presence of familial habit of SM and health insurance coverage. This was ascertained through a yes or no response.

A list of options was included for establishing the sources of drug recommendation and procurement, the perceived reasons for self-treatment and the health conditions for which SM was practiced. The anatomical therapeutic chemical classification system was utilized for the drugs self-medicated, and brand names were analyzed according to active ingredient.

Statistical analysis

Data were double entered on Microsoft Excel and analyzed using SPSS 19 version (SPSS Inc., Chicago, USA). Descriptive analysis elucidated the socio-demographic characteristics and data were specified as percentages and frequencies. The Pearson's Chi-square test of significance was used to identify associations amongst dependent (SM) variable and independent variables. The significance level was set at $p \leq 0.050$. Logistic regression was used to identify the degree of association between any significant independent variable and SM. The Spearman rank correlation coefficient was utilized to calculate any correlation between the self-treated morbidities and the medications self-prescribed.

The prevalence of SM was calculated as the proportion of medical students who were using either OTC medicines or POM without prior (oral or written) consultation with a doctor. Moreover, the self-medicating category did not include any student with a physician parent.

The responses of the students who were self-prescribing were subsequently evaluated for sections C and D of the questionnaire. The total did not always add up to 100% as the students could select multiple options for the statements. Some participants did not respond to all the sections and therefore, the value of n (the total population of respondents) was different for individual statements.

RESULTS

The response rate was 85% (n=247). The majority of participating students were females (61%) and multi-ethnic expatriates (89%) with ages ranging from 17 to 29 years (mean age 21±2.4 years).

SM with both OTC medications and POMs was practiced by 65% of the students. An association with year of study and SM was observed (p=0.007) with the practice increasing as the students progressed academically from Phase I to Phase II. A significant association was also observed with the practice of SM and age of the participants (p=0.009). No association was observed with gender, ethnicity or parental educational level (Table 1).

The average age for initiating SM was 15.8± 2.9 years with most students self-prescribing when they became teenagers (86%). However, some students also reported that they had commenced SM at the age of 7-10 years (8%).

Table 1: Prevalence of SM among medical students.

Socio-demographic characteristics n=247	Number of students self-medicating (%)	Number of students not self-medicating (%)	p-value
Age (years) (not reported=3)			
17-18 (n=35)	17 (48.6)	18 (51.4)	0.009
19-20 (n=81)	58 (71.6)	23 (28.4)	
21-22 (n=68)	51 (75)	17 (25)	
23-24 (n=41)	20 (48.8)	21 (51.2)	
≥25 (n=19)	13 (68.4)	6 (31.6)	
Gender (not reported=7)			
Male (n=89)	54 (60.7)	35 (39.3)	NS
Female (n=151)	101 (66.9)	50 (33.1)	
Ethnicity (not reported=8)			
Asians (n=86)*	50 (58.1)	36 (41.9)	NS
Arabs (n=83)#	55 (66.3)	28 (33.7)	
Caucasians (n=41)▲	26 (63.4)	15 (36.6)	
Africans (n=29)	23 (79.3)	6 (20.7)	
Year of study			
Phase I (n=58)	28 (48.3)	30 (51.7)	0.007
Phase II (n=97)	70 (72.2)	27 (27.8)	
Phase III (n=92)	63 (68.5)	29 (31.5)	
Paternal educational level (not reported=1)			
Incomplete high school (n=34)	22 (64.7)	12 (35.3)	NS
High school (n=33)	23 (69.7)	10 (30.3)	
College (n=179)	115 (64.2)	64 (35.8)	
Maternal educational level (not reported=2)			
Incomplete high school (n=40)	24 (60)	16 (40)	NS
High school (n=58)	43 (74.1)	15 (25.9)	
College (n=147)	94 (63.9)	53 (36.1)	
Total	161 (65.2)	86 (34.8)	

*Asians: Inhabitants of countries of Indian subcontinent (India, Bangladesh, Pakistan, Afghanistan, Sri Lanka, Nepal), #Arabs: Inhabitants of the Arabian Peninsula or other countries of the middle East, ▲Caucasians: Individuals with ancestral origins from Europe, NS: Not significant, SM: Self-medication

The sources of procurement of drugs were private pharmacies (84%), stocks at home (59%), supermarkets (17%) and friends (7%). Males (15%) were accessing the drugs significantly more (p=0.006) from their friends than the females (3%). There were no other significant differences among any socio-demographic groups with regard to the procurement of drugs.

The students mostly relied on themselves (65%) and parents (60%) for drug recommendation. Pharmacists (28%), friends (12%), and internet (6%) were also consulted. The self-reliance significantly increased (p=0.012) with year of study as 43% of Phase I, 63% of Phase II and 78% of Phase III students were self-medicating without anyone's recommendation. Correspondingly, the dependence on parents reduced and self-reliance increased significantly as the students' age progressed (Figure 1).

Headache and flu symptoms were common self-medicated conditions (Table 2). A significant difference was observed in the prevalence of self-medicated allergies (p=0.011) and ear problems (p=0.004) among different ethnic groups. Africans (21%) reported less prevalence of allergies than Asians (51%), Arabs (59%), and Westerners (70%). A similar pattern was also reported for ear problems with Asians (9%), Arabs (15%), and Westerners (36%) reporting high prevalence of ear problems whereas Africans did not report any cases. Females (18%) also reported significantly higher (p=0.033) prevalence of ear problems than males (5%). However, there were no differences in any self-medicated health conditions based on age and year of study.

The data pertaining to the health conditions that self-medicating students treated in the past year was sub-analyzed. It was observed that an average of 6.8±3.6 self-treated morbidities were reported with significant (p=0.022) gender differences (males 5.7±3.5; females 7.2±3.6). One-fourth of

Table 2: Prevalence of self-reported health complaints in past one year among self-medicating students.

Health complaints	Number of self-medicating students reporting frequency of health complaint in past 1 year (n=161) (%)					
	At least once a year	At least 2-3 times a year	At least once a month	At least once a week	Almost every day	Total
Headache	9 (5.6)	43 (26.7)	52 (32.3)	30 (18.6)	3 (1.9)	137 (85.1)
Flu/cough/cold/sore throat	27 (16.8)	77 (47.8)	19 (11.8)	3 (1.9)	0	126 (78.3)
Fever	47 (29.2)	52 (32.3)	8 (5)	1 (0.6)	0	108 (67.1)
Stomach-ache	30 (18.6)	43 (26.7)	18 (11.2)	2 (1.2)	3 (1.9)	96 (59.6)
Pain in any other part of body	34 (21.1)	35 (21.7)	14 (8.7)	5 (3.1)	0	88 (54.7)
Allergy	30 (18.6)	26 (16.1)	11 (6.8)	5 (3.1)	4 (2.5)	76 (47.2)
Diarrhea	32 (19.9)	33 (20.5)	4 (2.5)	2 (1.2)	0	71 (44.1)
Constipation	21 (13)	25 (15.5)	6 (3.7)	5 (3.1)	0	57 (35.4)
Inability to sleep	10 (6.2)	20 (12.4)	12 (7.5)	6 (3.7)	4 (2.5)	52 (32.3)
Hair problems (dandruff)	15 (9.3)	19 (11.8)	5 (3.1)	3 (1.9)	7 (4.3)	49 (30.4)
Vomiting	25 (15.5)	22 (13.7)	2 (1.2)	0	0	49 (30.4)
Skin problems	24 (14.9)	7 (4.3)	4 (2.5)	4 (2.5)	6 (3.7)	45 (28)
Eye problems	24 (14.9)	10 (6.2)	2 (1.2)	0	0	36 (22.4)
Ear problems	15 (9.3)	4 (2.5)	0	1 (0.6)	0	20 (12.4)
Menstrual problems (n=101 girls)	8 (5)	26 (16.1)	39 (24.2)	0	0	73 (72.3)
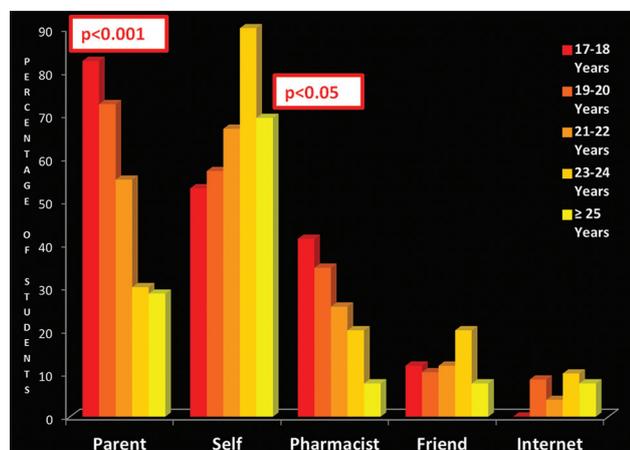
Figure 1: Sources of drug recommendation among different age groups.

the students (24%) had reported experiencing ten or more health complaints annually. In a month, around three-fourths of the students (71%) had experienced at least one health complaint, with females (79%) reporting significantly higher (p=0.002) prevalence than males (56%). Few self-medicating students (14%) also reported suffering from at least one health complaint every day. There were no differences based on any other socio-demographic variables for the self-treated morbidities.

Analgesics and antipyretics were most common self-medicated drugs (Table 3). Females (49%) were self-medicating significantly more (p=0.012) with non-steroidal anti-inflammatory drugs (NSAIDs) than males (28%). No other differences in self-medicated drug use were observed with regard to any other socio-demographic characteristics.

The students were self-medicating with an average of 2.7±1.9 drugs in the last year. Between 1 and 11 drugs were being used with 45% of the students self-treating with three or more drugs. A positive correlation was observed between the self-treated morbidities and the medications self-prescribed for the whole sample (r=0.334; p≤0.001), the males (r=0.402; p=0.003), and the females (r=0.311; p=0.002).

Mild illness (76%); previous experiences with the medicines (40%); convenience (31%); lack of time (28%); cost factor (11%); urgent nature of problem (11%); advice from friend (2%); and unavailability of physician (2%) were quoted as most common reasons for SM. There was a significant trend seen among students of different ethnicity (Table 4). Moreover, a significantly larger (p=0.003) proportion of senior students (Phase II; 86% and Phase III; 75%) reported mild illness as a common reason for self-medicating as compared to the junior students (Phase I; 54%).

With regard to the factors influencing SM, a statistically significant association between SM and familial practice of SM (p≤0.001) was observed. The drug usage was significantly more in students with family members who had been self-medicating (71%) than those students whose family members did not self-medicate (46%). Logistic regression showed that SM was three times more in students with family members who practiced SM (OR=2.9; 95% CI=1.502-5.620; p=0.002). Though most of the respondents had access to hospitals or pharmacies (94%) and half of them had health insurance policies, the majority were not frequenting any private clinics or government hospitals for common illnesses (79%). None of the above-mentioned factors were significantly associated with SM.

Table 3: Drug groups self-medicated in past 1 year.

Category of drugs (ATC code)	Number of students (%) reporting SM in past 1 year (n=161)
Antipyretics (paracetamol) (N02BE01)	128 (79.5)
Analgesics (NSAIDs) (M01A; N02B)	67 (41.6)
Systemic antibiotics (J01)	40 (24.8)
Anti-histamines (R06)	28 (17.4)
Drugs for gastro-intestinal conditions (A03A, A04, A06, A07)	28 (17.4)
Nasal decongestants (R01A/R01B)	24 (14.9)
Cough and cold combinations (R05)	10 (6.2)
Proton pump inhibitors/H2 blockers (A02B)	13 (8.1)
Vitamins/nutritional supplements (A11/B03)	6 (3.7)
Skin preparations (D02, D03, D06, D07, D08, D10)	6 (3.7)
Sedatives/hypnotics (N05C)	2 (1.2)
Drugs for migraine (N02C)	2 (1.2)
Drugs for asthma (R03)	2 (1.2)
Others	3 (1.9)

ATC: Anatomical therapeutic chemical, NSAIDs: Non-steroidal anti-inflammatory drugs, SM: Self-medication

Table 4: Reasons for SM among medical students of different ethnicity.

Reasons	Ethnicity (%)				Total (n=152) (%)	p-value
	Arabs (n=54)[#]	Asians (n=49)[*]	Caucasians (n=26)[▲]	Africans (n=23)		
Mild illness	32 (59.3)	39 (79.6)	24 (92.3)	19 (82.6)	114 (75)	0.012
Previous experiences with medicines	23 (42.6)	15 (30.6)	11 (42.3)	14 (60.9)	63 (41.4)	NS
Convenience	8 (14.8)	21 (42.9)	8 (30.8)	8 (34.8)	45 (29.6)	0.033
Lack of time	22 (40.7)	12 (24.5)	6 (23.1)	2 (8.7)	42 (27.6)	0.050
Cost factor	4 (7.4)	8 (16.3)	3 (11.5)	3 (13)	18 (11.8)	NS
Urgent nature of problem	8 (14.8)	3 (6.1)	2 (7.7)	3 (13)	16 (10.5)	NS
Advice from friend	0	1 (2)	1 (3.8)	1 (4.3)	3 (2)	NS
Unavailability of physician	2 (3.7)	0	1 (3.8)	0	3 (2)	NS

*Asians: Inhabitants of countries of Indian subcontinent (India, Bangladesh, Pakistan, Afghanistan, Sri Lanka, Nepal), #Arabs: Inhabitants of the Arabian Peninsula or other countries of the middle East, ▲Caucasians: Individuals with ancestral origins from Europe, NS: Not significant, SM: Self-medication

DISCUSSION

SM is commonly practiced globally and urban, literate people are reported to be especially inclined to this practice.[19] Among the health professions fraternity, doctors often tend to self-medicate.[9,20] Owing to the medical knowledge (about drugs and diseases) imparted at various stages of the training, medical students are also more likely to indulge in this practice. Several studies have reported that medical students initiate SM right from their formative years of training due to their boosted confidence with increasing medical knowledge.[12-18] However, inadequate medical knowledge may increase the likelihood of inappropriate SM with its resultant serious adverse effects.

The prevalence of SM among the medical students of GMU was fairly high. As these students are future medical practitioners, their own healthcare practices may influence their patient's health.[9] Hence, it is imperative that responsible SM practices be emphasized to the students through appropriate concepts and principles of rational drug use in the core curricula.

Though the heterogeneity of the recall periods in other studies has rendered direct comparison inappropriate, it was heartening to observe that the overall prevalence of SM in this study was found to be lower (65%) than that reported in literature, notably: Badiger et al. (92%);[15] Pandya et al. (82%);[16] Kumar et al. (78.6%),[17] and Zafar et al. (76%).[4] However, the prevalence was comparable with the students of Egypt (55%),[18] Bahrain (45%)[12] and Ethiopia (38.5%).[14]

The prevalence of SM increased with progressive years of study among the study sample as also observed among the medical students of Bahrain.[13] Nevertheless, the practice declined slightly among the senior-most students (Phase III), probably as a result of knowledge about the risks of empirical

use of drugs. This is also corroborated by the decrease in the practice of SM among the elder students (23 years and beyond; Table 1).

The primary source of procuring drugs was retail pharmacies in accordance with studies reported worldwide.[4,12,13] A large number of the students were also accessing the medicines from stocks at home (59%) as also reported among expatriate adolescents in the UAE,[7] the congruence highlighting the uniqueness of the UAE population made up almost entirely of expatriates (89%).[21] The expatriate population may be accessing the medicines (OTC or POM) from their native countries and stocking up at home. Though few students procured medicines from their friends (6.8%), the practice of medication-sharing was observed to be higher among male students, which was contrary to previous reports showing female predominance.[22,23]

It was observed that students often consulted their parents at the beginning of their course, but their self-reliance increased as they progressed in their program. Other medical students have also indicated that the confidence developed subsequent to medical training was a motive for practicing SM and also for recommending drugs to family or friends.[15] However, this misplaced overconfidence in their prescribing ability enhances the health risk to self and others. Besides these sources of recommendation, pharmacists and friends were also consulted by the students in this study. Another study has also reported family (53%) and pharmacists (52%) advising the students about SM.[11] Though the media and internet was not consulted often by the study sample, 20% of Brazilian students did so.[11]

SM was commonly practiced for minor illnesses such as headache, flu/fever, and stomach-ache, as also reported by other medical students.[11-13,15,16] An ethnic variation in allergies and ear problems had also been observed in this study which has not been reported in other studies,[11-18] probably due to the insular ethnicity of their student population. Similar to the gender-based differences in health reported elsewhere,[12] the females in this study had experienced more health complaints on an average and also on a monthly basis. The latter may be attributable to menstrual problems, which is corroborated by the higher use of NSAIDs among the females. Moreover, the prevalence of menstrual problems in the study sample is much higher than that reported in another study (48%).[11] The positive correlation between the health complaints reported and the drug use in this sample also substantiates that the self-rated health of the students is a predictor for SM.

The most common drugs self-medicated were analgesics, notably NSAIDs and paracetamol (acetaminophen). Analgesics have also been identified as the commonly used group of drugs among all other medical students.[11-13,15-18] However, none of the students in this study reported the use of complementary and alternative medicines (herbal, Ayurvedic) unlike that reported among medical students of India[16,17] Egypt[18] and Ethiopia.[14] With regard to the average

number of drugs self-medicated, though the students of GMU reported a lesser number (2.7) as compared to students from Brazil (3.4),[11] almost half of the sample were self-medicating with three or more drugs.

Though UAE regulations restrict the use of antibiotics drugs without a physician's prescription,[24] a quarter of the students have been able to procure them. It is reported that previous experiences of immigrants in home countries without restrictions to antibiotics have influenced their SM with antibiotics.[25] As most of the expatriate population of UAE are citizens of developing countries which have a reputation of easy availability of antibiotics without prescriptions,[26,27] we presume these POMs may have been accessed from stocks at home or unused drugs from previous prescriptions.[6,28]

Similar observations of increased use of antibiotics for SM have been reported in other studies.[10,16-18] Higher rates of antibiotic usage were reported by junior doctors (81%)[20] and medical students (34%, 39%, 45%).[15,16] However, lower rates were reported by medical students from palestine (19.9%)[5] and Bahrain (8.5%; 6%).[13,12] Inappropriate antibiotic consumption carries the increased risk of development of antibiotic resistance, enteropathy, alteration of biosphere, and microbial ecosystems. Failure to respond to antibiotics may also increase the periods of infectivity and spread the resistant strain of bacteria in the community or even result in death. SM with antibiotics may also result in increased incidences of adverse effects as a consequence of improper dosing or drug-drug interactions.[29,30] Hence, it is recommended that both the academic and the health authorities should attempt to raise awareness about the rational use of antibiotics. Strict precautions should be undertaken to avoid the sale of antibiotics without prescriptions.

Analogous to other studies, the students in this study reported the presence of mild illness and previous experiences with the medicines as common reasons for SM.[4,11-13,15,17] The similarity of symptoms of different diseases may lead a person with previous experience to misdiagnose the mild illness, self-medicate irrationally and also indulge in high risks practices such as reusing of old prescriptions and sharing of prescription medicines. Other studies have also observed the easy availability of OTC or POM; familiarity with medicines;[16] and shortage of time[12,13,15] as reasons for SM among medical students.

The students in this study have reported the influence of familial practice on SM. The existence of a home pharmacy, which corroborates with a familial practice of SM may have influenced their SM practices; as also observed in other studies.[10,11] Moreover, previous experiences with the drugs as the reasons cited for SM, the advice from family members/parents regarding SM and the reuse of previous prescriptions all imply a culturally acceptable familial practice of SM. We also postulate that the multi-ethnic expatriate nature of the study sample may have influenced this familial practice as immigrants are reported to be more likely to self-medicate.[31]

The high response rate is the strength of the study while the self-reported nature of data collection can be considered a limitation. Moreover, generalizing the results may not be possible in view of the involvement of only one medical school and the non-probability sampling design. However, in view of the absence of research among medical students in UAE, we consider this study contributes to knowledge about this issue.

CONCLUSION

The self-treatment of illnesses by healthcare professionals is a deep-rooted behavior which transcends different cultures and is initiated as early as the undergraduate years. This study revealed a fairly high rate of prevalence of SM among the medical students of GMU which was associated with age and year of study. A positive correlation was observed between the self-treated morbidities and the medications self-prescribed. SM was significantly higher among student belonging to families that frequently practiced SM. A high prevalence of misuse of antibiotics was also reported. There is a need to emphasize responsible SM practices among the medical students by accentuating rational drug use in the curricula.

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