Prevalence and Patterns of Self - Medication among Medical Students in Suez Canal University

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Abstract

Background: **Self-medication (SM) is the use of over the counter or prescription drugs without professional consultation, driven by factors like limited healthcare access, high costs, and easy drug availability.** ***Aim:*** **The aim of this work was to improve and regulate the practices of medical students regarding Self-Medication by identifying its prevalence and patterns.** ***Methods:*** **This cross-sectional analytical study was carried out on 491 medical students aged from 19 to 22 years old, both sexes, who are enrolled in the academic programs lists from all the five medical classes (grades), and participants who agreed to take part in the study were enrolled during the academic semesters. Data were collected using a validated, semi-structured, self-administered online questionnaire.** ***Results:*** **Our study consisted of 491 medical students and found a high self-medication (SM) prevalence (79.3%), higher in clinical-year students (80.95%) than academic years (73.68%). Key predictors were marital status and insufficient family income ($p<0.001$). The main reasons for SM were previous experience (79.2%) and minor illness (73.6%). Common indications included respiratory (81.7%) and gastrointestinal symptoms (60.2%). NSAIDs/analgesics (80.2%), antibiotics (60.5%), and vitamins (63.1%) were the most used drugs. Sources included informal consultations (51.1%) and pharmacy clerks (41.1%). Awareness of adverse effects (70.3%) and dosing (65.8%) was moderate. Adverse effects occurred in 27.1% of students.** ***Conclusions:*** **Self-medication is highly prevalent among medical students, particularly in clinical years, driven mainly by prior experience and minor illnesses. Despite moderate awareness of risks, significant adverse effects were reported. Addressing this issue through targeted educational interventions and stricter regulation of medication access is essential to promote safer practices.**

Keywords: Self - Medication, Medical Students, Prevalence, Egypt, Antimicrobial resistance

Introduction

Self-medication (SM) is the use of over the counter or prescription drugs without professional consultation, driven by factors like limited healthcare access, high costs, and easy drug availability. While it offers autonomy and cost-saving benefits, it carries risks if misused. The World Health Organization recognizes its value in self-care when guided by accurate information but highlights public health concerns, especially in areas with restricted healthcare access.[1-3]

SM is widespread globally, with a prevalence of 67%. Europe and Southeast Asia reported the highest rates (74%), followed by the Eastern Mediterranean (72%).[4] In Egypt, prevalence ranges from 21.1% to 86.4%.[5].

SM among university students worldwide has a high prevalence of 70.1%.[6] In Egypt, rates vary across universities: 62.9% in Mansoura, 91.1% in Suez Canal, and 95.9% in Minia for analgesics [7, 8] , while antibiotic use was reported at 55% in Ain Shams, 72.4% in Mansoura, 74.6% in Tanta during the COVID-19 pandemic, and 77.7% in Cairo.[7, 9]

In developing countries, limited healthcare access and high costs drive reliance on SM, often influenced by

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socioeconomic factors like low income and lack of insurance. While SM helps address minor health issues like colds and headaches, it poses risks such as drug misuse, incorrect diagnoses, and antimicrobial resistance. Easy access to medications and pharmaceutical advertising further increases SM, particularly among youth, raising public health concerns.[10, 11]

Medical students, despite their medical knowledge, often engage in SM due to academic pressures, easy access to drugs, and confidence in treating themselves.

However, limited practical experience can lead to misuse, particularly of antibiotics, painkillers, and anti-inflammatories. The lack of early training on responsible SM further heightens risks, including drug resistance, adverse reactions, and dependence.[12, 13]

SM among medical students raises concerns for their health and future professional behavior. Habits formed during medical school, such as self-treatment, may persist, affecting their prescribing practices and potentially contributing to issues like overprescription and antimicrobial resistance. As future prescribers, they must be educated on responsible drug use to safeguard their health and that of their patients [13, 14]

Despite its widespread practice, SM among medical students in the Suez Canal region remains underexplored, particularly in the era of universal healthcare. The aim of this work was to Improve and regulate the practices of medical students regarding Self-Medication.

Patients and Methods

This cross-sectional analytical study was carried out on 491 medical students aged from 19 to 22 years old, both sexes, who are enrolled in the academic programs lists from all the five medical classes (grades), accept to participate in the study, and the data collection period were during the academic semesters.

An informed written consent was obtained from the patient or relatives of the patients. The study was done after approval from the Ethical Committee Suez Canal University Hospitals Research 5485 dated, 28/11/2023.

Exclusion criteria were students on medication for treatment of chronic conditions or illness during the study time.

All participants were subjected to an online, self-administered, validated questionnaire constructed by Family Medicine department at Al-Mansoura University and composed of two main parts to collect the data as Socio-demographic characteristics, such as age and sex, residence, level of parents' education, average family income, health insurance status and marital status and Questions about the last medical consultation, and treatment with or without medical supervision. It also included self-medication practices, covering conditions in which students believed self-medication was convenient, drugs used, reasons for self-medication, source of advice, advantages and disadvantages of self-medication, and knowledge about drugs. The questionnaire was designed to be used anonymously and to inquire about the study questions. The reliability and validity of the study tool were ensured through three expert reviewers at our faculty to establish content validity.

A pilot study was conducted on 30 students (who were not included in the sample size) to test the applicability, feasibility, time required, and their understanding of the items. Based on the

results, necessary modifications were made. Participants were subjected to informed consent before taking part in the pilot study.

Sampling Technique

First a stratified sampling technique was employed to select students studying at the Faculty of Medicine, Suez Canal University, during the 2023-2024 academic year. The population was divided into five strata based on academic years (from first to fifth year) to ensure a representative sample. The proportion of students in each stratum was calculated as the number of students in that year divided by the total number of medical students in the faculty (2,470 students).

Systematic sampling was then applied to select students within each stratum. Using an equiprobability approach, a sampling interval (k) was calculated by dividing the total number of students in the stratum by the required sample size. A random starting point was selected within the first k students, and then every k-th student on the list was chosen. The list was treated as circular, meaning that once the end of the list was reached, selection continued from the top until the desired number of students was selected, ensuring equal probability of selection across the entire group.

The Dependent Study variables were (practicing SM), and independent study variables included Sociodemographic profile.

Primary objectives were to assess the prevalence and patterns of practicing SM by the medical students in Suez Canal University in Ismailia governorate for common issues with which they may have, and to determine the causes that may initiate this practice and the factors associated with this behaviour, and identify the most prevailing drugs used for SM and for what conditions, these medications are used among medical students The secondary outcomes was to investigate the difference in academic level (academic versus clinical years) in the practice of SM.

Sample Size Calculation:

Using Epi-info TM StatCalc (version 7.2.5.0 for Windows). A sample of 491 students is calculated to detect an expected prevalence of self-medication among medical students of 72.4%.(9), at 95% level of confidence, 5% margin of error, 1.5 design effect, and corrected for a finite population of about 2500. An additional 10% of the calculated number is added to compensate for the drop out, then the final sample size will be approximately 500. The equation used is as follows:

$$\mathbf{n} = \frac{(z_{1-\alpha/2})^2 \mathbf{p}(\mathbf{1}-\mathbf{p})}{\mathbf{d}^2}$$

As n = sample size DEFF: Design effect, N: Population size (for finite population correction factor (~2500), p: Hypothesized % frequency of self-medications among medical students (72.4%) d: margin of error (5%), Z: critical value of z score corresponding to 95% level of confidence

Statistical analysis

Statistical analysis was performed using SPSS version 26 (IBM Corp., Armonk, NY, USA). Quantitative variables were presented as mean ± standard deviation (SD) and compared between two groups using the independent t-test. Qualitative variables were presented as frequencies and percentages (%) and analyzed using the Chi-square test or Fisher's exact test, as appropriate. Variables that were statistically significant in the univariate analysis were included in the multivariate regression model, with odds ratios (ORs) and 95% confidence intervals (CIs) calculated for each predictor. A two-

tailed p-value < 0.05 was considered statistically significant.

Results

Average age was higher in clinical-year students (21.79 ± 0.06 years) compared to academic-year students (19.41 ± 0.11 years), males in academic years (25.05%) and more females in clinical years (37.06%), most students were single (over 92% in both groups), parental education levels were similar across groups, with about 70% of fathers and around 20% of mothers having university degrees, majority had health insurance coverage (~67%). Regarding association with Self-Medication, age: Self-medication prevalence was 78.21% overall. A borderline statistically significant difference in age was observed between those who self-medicated and those who did not (p = 0.05). No significant differences were found regarding sex, marital status, father's education, mother's education, perceived family income, health insurance coverage, residence, or year of study. **Error! Not a valid bookmark self-reference.** .

Key predictors were identified as self-medication among students, regardless of educational background, significant factors include marital status (p <0.001, OR 3.45), and perceived family income (P<0.001, OR, 3.87), all showing strong associations with self-medication (p<0.001). Other variables, such as age, gender, parental education, health insurance, residence, and study phase, are not significantly associated. Table 2

A statistically significant relationship (p = 0.01 for all items) was found regarding Reasons of self medicated2. Reasons for Avoiding Self-Medication there was Significant reasons with p < 0.05, but Not statistically significant: concerns about safety, side effects, and lack of knowledge. Indications for Self-Medication was found to have Significant associations (p < 0.05) for but not significant. All medication categories and all sources showed significant association (p < 0.05). All awareness parameters showed strong significant associations (p = 0.01). Table 3.

Reasons for Using Self-Medication, Reasons for Avoiding Self-Medication, Indications for Self-Medication there was Significant difference (p=0.01). Indications for Self-Medication as Pain & musculoskeletal symptoms and Drug Categories Used showed Significant difference (p=0.01). Clinical-year students demonstrated greater awareness of completing the full course of treatment (p=0.01) and understanding the correct dose and frequency (p=0.01). No significant differences were found between the groups regarding awareness of expiry dates (p=0.32) and potential adverse effects. clinical-year students were more likely to change medications and stop medications compared to academic-year students. However, gender was not a significant factor in predicting any of the self-medication outcomes, as the differences between males and females were not statistically significant (all p > 0.05)..

Table 1: Sociodemographic Characteristics and Their Association with Self-Medication Practices Among University Students (n = 491)			
		Academic years (n=223)	Clinical years (n=268)
Age (years)		19.41± 0.11 years	21.79±0.06 years
Sex	Male	123 (25.05%)	86 (17.51%)
	Female	100 (20.36%)	182 (37.06%)
Material status	Single	206 (92.38%)	253 (94.40%)
	Married	2 (0.90%)	3 (1.05%)
Father education	Primary school	50 (22.42%)	65 (24.25%)
	Secondary school	17 (7.62%)	15 (5.60%)
	University degree or above	156 (69.96%)	188 (70.15%)
Mother education	Primary school	128 (57.40%)	135 (50.37%)
	Secondary school	52 (23.32%)	79 (29.48%)
	University degree or above	43 (19.28%)	54 (20.15%)
Perceived family income	Sufficient	69 (30.94%)	96 (35.82%)
Covered by health insurance		150 (67.26%)	179 (66.79%)
Residence	Rural	115 (51.57%)	113 (42.16%)
	Urban	108 (48.43%)	155 (57.84%)
	Comparison of sociodemographic characteristics with self-medication		P value
Age		78.21%	0.05
Sex	Male	78.99%	0.72
	Female	77.21%	
Material status	Single	78.00%	0.217
	Married	100.00%	
Father education	Primary school	78.26%	0.901
	Secondary school	78.49%	
	University degree or above	75.00%	
Mother education	Primary school	78.63%	0.988
	Secondary school	77.95%	
	University degree or above	78.35%	
Perceived family income	Sufficient	78.53%	0.90
Covered by health insurance		78.12%	1.00
Residence	Rural	78.51%	0.96
	Urban	77.95%	
Year of study	Academic	73.68%	0.22
	Clinical	80.95%	
*Data are presented as mean ± SD or frequency (%). *****: significance p value (< 0.05.)*			

Table 2: Multivariate Logistic Regression Analysis of Sociodemographic Predictors of Self-Medication (N=491)				
	S.E.	P-value	OR	95% C.I.
			Lower	Upper
Age (Years)	0.09	0.47	1.07	-0.12
Gender (Reference category: male)	0.23	0.86	0.96	0.62
Marital status (Reference category: single)	0.11	<0.001	3.54	1.05
Father' education (Reference category: primary school)	0.16	0.74	0.99	-0.36
Mather education (Reference category: primary school)	0.161	0.947	0.99	-0.327
Perceived family income (Reference category: insufficient income)	0.328	<0.001*	3.87	2.03
Covered by health insurance (Reference category: presence of insurance coverage)	0.233	0.944	0.98	0.62
Residence (Reference category: rural)	0.219	0.880	0.97	0.63
Phases (Reference category: Academic)	0.219	0.180	1.34	0.87
*: significance p value (< 0.05.)				

Table 3: Patterns, Reasons, and Awareness Related to Self-Medication Practices Among University Students		
		P- value
The need to visit a doctor for minor illness.	276 (73.6%)	0.01*
Knowledge from previous experience.	309 (79.2%)	0.01*
The doctor will prescribe the same drugs	141 (37.3%)	0.01*
Financial Restrictions	35 (8.7%)	0.01*
Fast relief to enhance work performance.	107 (29.1%)	0.01*
Absence of trust in health services	12 (3.2%)	0.01*
Unavailability of health services	5 (1.3%)	0.01*
Reasons for avoiding self-medication (N=114)		
It's unsafe	54 (47.37%)	0.73
Bad prior experience of self- medication	14 (11.86%)	0.01*
Lack of confidence	38 (22.75%)	0.01*
May be waste of money	5 (4.31%)	0.01*
Fear of adverse side effects	48 (39.34%)	0.07
Lack of knowledge & experience	69 (46.00%)	0.48
Trust in health services	24 (19.05%)	0.01*
Availability of health services	31 (26.05%)	0.01*

Data are presented as mean ± SD or frequency (%). *: significance p value (< 0.05.)

Table 4 (cont): Patterns, Reasons, and Awareness Related to Self-Medication Practices Among University Students		
		P- value
The indications for self-medication (N=491).		
Respiratory symptoms	407 (81.73%)	0.01*
Gastrointestinal symptoms	295 (60.20%)	0.01*
Pain & musculoskeletal symptoms	266 (54.18%)	0.69
Neurological symptoms	227 (46.23%)	0.01*
Skin conditions	111 (22.60%)	0.01*
Tooth-ache	104 (21.18%)	0.01*
Others	17 (3.46%)	0.01*
Categories		
NSAIDs/Analgesics	394 (80.24%)	0.01*
Antacids/ PPIs	157 (31.98%)	0.01*
Antibiotics	297 (60.49%)	0.01*
Antihistaminic	115 (23.42%)	0.01*
Ear/eye drops	143 (29.12%)	0.01*
Topical Steroids	86 (17.52%)	0.01*
Beta-Blockers	31 (6.31%)	0.01*
Psychoactive	8 (1.63%)	0.01*
Anti-emetics	121 (24.64%)	0.01*
Anti-tussive	79 (16.09%)	0.01*
Vitamins/ Supplements	310 (63.14%)	0.01*
Anti-fungal	90 (18.33%)	0.01*
Anti-diarrheal	198 (40.33%)	0.01*
Others	22 (4.48%)	0.01*
Pharmacy clerks	202 (41.14%)	0.01*
Informal consultations from physicians you personally know	251 (51.12%)	0.824
Neighbors & family	191 (38.90%)	0.01*
Friends / classroom colleagues	77 (15.68%)	0.01*
Old prescription	206 (41.96%)	0.01*
My decision	150 (30.55%)	0.01*
Internet / Media	139 (28.31%)	0.01*
Textbooks	86 (17.52%)	0.01*
The Awareness aspects answers		
Complete course	320 (65.17%)	0.01*
Expiry date	293 (59.67%)	0.01*
Adverse effect	345 (70.26%)	0.01*
Dose and frequency	323 (65.78%)	0.01*
The Outcomes of self- medication answers		
Experienced adverse effects	133 (27.14%)	0.01*
Inexperienced adverse effects	169 (34.49%)	
Changed medications and started another	71 (14.49%)	
Stopped medications	118 (24.08%)	

Table 5: Gender-Based Comparison of Self-Medication Practices Among Academic and Clinical Medical Students (N=491)					
	Academic years		Clinical years		
	Male	Female	Male	Female	P value
The need to visit a doctor for minor illness.	60 (68.97%)	60 (77.92%)	53 (75.71%)	103 (72.03%)	0.57
Knowledge from previous experience.	77 (88.51%)	63 (81.82%)	53 (75.71%)	116 (81.12%)	0.01*
The doctor will prescribe the same drugs	26 (29.89%)	14 (18.18%)	19 (27.14%)	68 (47.55%)	0.31
Financial Restrictions	9 (10.34%)	6 (7.79%)	8 (11.43%)	12 (8.39%)	0.28
Fast relief to enhance work performance.	24 (27.59%)	16 (20.78%)	24 (34.29%)	43 (30.07%)	0.22
Absence of trust in health services	2 (2.30%)	2 (2.60%)	------	8 (5.59%)	0.84
Unavailability of health services	2 (2.30%)	1 (1.30%)	2 (2.86%)	------	0.15
avoiding self-medication					
It's unsafe	15 (41.67%)	10 (43.48%)	7 (43.75%)	22 (56.41%)	0.58
Bad prior experience of self-medication	3 (8.33%)	1 (4.35%)	3 (18.75%)	3 (7.69%)	0.45[a]
Lack of confidence	10 (27.78%)	10 (43.48%)	7 (43.75%)	5 (12.82%)	0.03*
May be waste of money	2 (5.56%)	1 (4.35%)	16 (100.00%)	2 (5.13%)	0.82[a]
Fear of adverse side effects	2 (5.56%)	12 (52.17%)	16 (44.44%)	18 (46.15%)	0.64[a]
Lack of knowledge & experience	22 (61.11%)	10 (62.50%)	8 (50.00%)	3 (13.04%)	0.01*
Trust in health services	3 (8.33%)	4 (17.39%)	2 (12.50%)	5 (12.82%)	0.78[a]
Availability of health services	8 (22.22%)	4 (17.39%)	3 (18.75%)	11 (28.21%)	0.76[a]
Indications					
Respiratory symptoms	99 (80.49%)	87 (87.0%)	67 (78.82%)	154 (85.08%)	0.48
Gastrointestinal symptoms	63 (51.22%)	63 (63.0%)	56 (65.12%)	113 (62.43%)	0.28
Pain & musculoskeletal symptoms	55 (44.72%)	49 (49.0%)	44 (51.16%)	118 (65.19%)	0.01*
Neurological symptoms	65 (52.85%)	42 (42.0%)	28 (32.56%)	92 (50.83%)	0.50
Skin conditions	34 (27.64%)	24 (24.0%)	15 (17.44%)	38 (20.88%)	0.32
Tooth-ache	22 (17.89%)	26 (26.0%)	20 (23.26%)	36 (19.78%)	0.45
Others	4 (3.25%)	7 (7.0%)	1 (1.16%)	5 (2.75%)	0.15[a]

Table 6 (cont): Gender-Based Comparison of Self-Medication Practices Among Academic and Clinical Medical Students (N=491)					
	Academic years		Clinical years		
	Male	Female	Male	Female	P value
Drug categories					
NSAIDs/Analgesics	84 (68.29%)	71 (71.0%)	77 (89.53%)	162 (89.01%)	0.01*
Antacids/ PPIs	31 (25.2%)	34 (34.0%)	27 (31.4%)	65 (35.71%)	0.27
Antibiotics	77 (62.6%)	64 (64.0%)	41 (47.67%)	115 (63.19%)	0.07
Antihistaminic	25 (20.33%)	17 (17.0%)	18 (20.93%)	55 (30.22%)	0.05
Ear/eye drops	44 (35.77%)	41 (41.0%)	15 (17.44%)	43 (23.63%)	0.01*
Topical Steroids	20 (16.26%)	17 (17.0%)	10 (11.63%)	39 (21.43%)	0.25
Beta-Blockers	18 (14.63%)	3 (3.0%)	4 (4.65%)	6 (3.3%)	0.01*[a]
Psychoactive	6 (4.88%)	-------	1 (1.16%)	1 (0.55%)	0.01*[a]
Anti-emetics	26 (21.14%)	12 (12.0%)	27 (31.4%)	56 (30.77%)	0.02*
Anti-tussive	28 (22.76%)	12 (12.0%)	18 (20.93%)	21 (11.54%)	0.02*
Vitamins/ Supplements	67 (54.47%)	74 (74.0%)	54 (62.79%)	115 (63.19%)	0.03*
Anti-fungal	32 (26.02%)	13 (13.0%)	12 (13.95%)	33 (18.13%)	0.05
Anti-diarrheal	52 (42.28%)	35 (35.0%)	32 (37.21%)	79 (43.41%)	0.49
Others	12 (9.76%)	-------	3 (3.49%)	7 (3.85%)	0.01*[a]
source self-medication					
Pharmacy clerks	42 (34.15%)	56 (56.00%)	37 (43.02%)	67 (36.81%)	0.21
Informal consultations from physicians you personally know	56 (45.53%)	47 (47.00%)	42 (48.84%)	106 (58.24%)	0.45
Neighbors & family	57 (46.34%)	47 (47.00%)	30 (34.88%)	57 (31.32%)	0.37
Friends / classroom colleagues	25 (20.33%)	17 (17.00%)	17 (19.77%)	18 (9.89%)	0.48
Old prescription	74 (60.16%)	38 (38.00%)	18 (20.93%)	76 (41.76%)	0.23
My decision	25 (20.33%)	22 (22.00%)	39 (45.35%)	64 (35.16%)	0.27
Internet / Media	44 (35.77%)	36 (36.00%)	18 (20.93%)	41 (22.53%)	0.17
Textbooks	24 (19.51%)	14 (14.00%)	15 (17.44%)	33 (18.13%)	0.29
students' responses					
Complete course	67 (54.47%)	51 (51.0%)	63 (73.26%)	139(76.37%)	0.01*
Expiry date revision	72 (58.54%)	53 (53.0%)	51 (59.3%)	117(64.29%)	0.32
Adverse effect	86 (69.92%)	71 (71.0%)	58 (67.44%)	130(71.43%)	0.92
Dose and frequency	62 (50.41%)	60 (60.0%)	60 (69.77%)	141(77.47%)	0.01*
outcomes of self-medication					
Experienced adverse effects	46 (37.4%)	28 (28.0%)	14 (16.3%)	45 (24.7%)	0.01*
Inexperienced adverse effects	42 (34.1%)	34 (34.0%)	28 (32.6%)	65 (35.7%)	
Changed medications and started another	18 (14.6%)	12 (12.0%)	19 (22.1%)	22 (12.1%)	
Stopped medications	17 (13.8%)	26 (26.0%)	25 (29.1%)	50 (27.5%)	

Data are presented as mean ± SD or frequency (%). *: significance p value (< 0.05.)

Discussion

Self-medication is a prevalent practice among university students and is a significant public health concern, especially those studying medical and health- related fields.

The findings from the study on SM among medical students at Suez Canal University reveal a complex and multifaceted issue that extends beyond individual behavior to encompass broader cultural, educational, and economic factors.

The prevalence of self-medication observed in this study was notably high, with more than 79% of students across both academic and clinical years reporting that they frequently engaged in self-medication practices. These results are consistent with trends observed globally[10] and align with those from various parts of the world, such South America, Saudi Arabia [18] , and others. SM rates among medical students frequently exceed 50%, often reaching as high as 90% [19]

This pattern can be explained by the increased exposure to clinical environments and practical knowledge that comes with advanced training. Students in their clinical years often gain hands-on experience with medications, learning about their indications, dosages, and side effects [20]. Our study revealed that clinical-year students were more likely to believe they could accurately diagnose and treat minor health issues without the need for professional guidance and that was agreed by Malli et al [21]

The issue of antibiotic misuse is one of the most critical concerns raised by this study. Despite their medical training, a significant number of students admitted to using antibiotics without prescriptions, often based on past experiences or recommendations from peers. This action was also showed at study by Haque et al [22]

The motivations behind self-medication practices, as identified in the study, such as the belief that visiting a doctor for minor illnesses is unnecessary (73.6%) and reliance on prior knowledge (79.2%). Similar findings have been reported in studies by Aba [23], which highlighted convenience, prior experience, and perceived minor illness severity as common reasons for self-medication.

For many students, self-medication is seen as a practical solution to managing minor health issues without disrupting their busy academic schedules.

Self-medication allows them to address their symptoms immediately, without the need to wait for a doctor's appointment or take time off from their studies. This behavior was consistent across both academic and clinical-year students, indicating a common desire for autonomy and control over their health [24]

Cost-saving is another critical factor driving self-medication among students cited by 8.7% of participants, align with studies by Lukovic et al [25], indicating that cost barriers can prompt individuals to self-medicate. This economic consideration is not unique to Egypt; similar trends have been observed in other developing countries, including Saudi Arabia, India, and Nigeria, where the high cost of healthcare services has led to an increase in self-medication practices [10]

One of the more nuanced findings of the study was the role of prior successful experiences in reinforcing the habit of self-medication. Students who had previously self-medicated effectively were more likely to continue doing so, even without proper guidance. This pattern of behavior was also observed in studies from Saudi Arabia, where

students who experienced relief from self-prescribed medications were more likely to rely on them again in the future [21].

Gender differences in self-medication practices were not as pronounced in this study as they have been in others. In many global contexts, studies have reported that female students are more likely to engage in self-medication than their male counterparts, often for conditions such as menstrual pain, headaches, or anxiety[10]

However, at Suez Canal University, both male and female students exhibited similar tendencies to self-medicate, suggesting that factors like training, access to medications, and cultural attitudes toward self-care might be more evenly distributed across genders in this setting.

However, the study did note some differences in how medications were used, with female students showing a greater tendency to adhere to recommended dosages and treatment protocols, while male students were more likely to adjust doses or switch medications based on their perceptions of efficacy. That was similar to Jimmy and Jose [26]

Single participants (71.68%) were more inclined to self-medicate compared to married participants, none of whom reported self-medication, echoing patterns observed in studies by Filho[27] linking single status with higher self-care behaviours.

Urban residents (77.58%) slightly outpaced rural residents (78.53%), reflecting differences in accessibility, as similarly observed by Bennadi [28].

Parental education, particularly medical or higher education, appeared to positively influence self-medication practices.

Despite their medical training, Mahmud [29] who showed that students often demonstrated a concerning gap between their theoretical knowledge of medication safety and their practical behavior. The study found that although students were generally well-informed about the potential risks associated with incorrect dosing, drug interactions, and adverse effects, this knowledge did not always translate into responsible self-care practices.

The implications of these findings are significant, particularly concerning antibiotic misuse. The study's results suggest that despite their medical training, students are still prone to engaging in behaviors that contribute to the development of antimicrobial resistance. This highlights a critical area where educational interventions are urgently needed. To mitigate the risks associated with self- medication, it is essential to incorporate comprehensive training on the principles of antibiotic stewardship within the medical curriculum [30]

This training should emphasize not only the scientific understanding of antibiotics and their mechanisms but also the practical aspects of responsible use, such as when antibiotics are appropriate and the importance of completing prescribed courses [31].

In many countries, including Egypt and Saudi Arabia [18, 32], antibiotics can be obtained without a prescription, a practice that facilitates self-medication and contributes to the global challenge of AMR. Addressing this issue requires coordinated efforts between regulatory authorities, healthcare providers, and educational institutions to enforce prescription regulations and promote the responsible use of antibiotics.

The study's results also highlighted the importance of addressing economic

barriers to healthcare access. Many students turn to self-medication as a cost-saving measure because consulting a healthcare provider can be prohibitively expensive. By improving access to affordable healthcare services, particularly for students, institutions can encourage individuals to seek professional medical advice rather than relying on self-treatment [6]

University health services, for example, could play a vital role by offering affordable, on-campus consultations that are accessible to students, reducing their reliance on OTC medications and self-diagnosis. This approach would not only promote safer health practices but also help to reduce the economic burden of healthcare on students, making it easier for them to seek appropriate care when needed [7]

We recommend enhancing education in medical curricula, regulating access to medications, promoting professional healthcare consultations, implementing antibiotic stewardship programs, continuous monitoring and awareness campaigns, developing peer education programs, establishing clear guidelines for self-medication, fostering a culture of responsible self-care, and conducting longitudinal studies and research

Limitations were self-reporting Bias as the data collected through questionnaires rely on self-reporting, which may introduce bias in reporting the prevalence and patterns of SM. The study was conducted in a single university, limiting the generalizability, and lack of Longitudinal Data.

Conclusions:

This study highlights the widespread practice of SM among medical students at the Faculty of Medicine, Suez Canal University, driven by factors like easy access to medications, cost saving, and confidence in self-diagnosis. However, significant health risks, including antibiotic misuse and adverse effects like overdosing, were identified. These findings emphasize the need for targeted educational interventions to raise awareness about SM risks, especially regarding antibiotics, and for stricter regulation of medication sales to promote safer practices.

Financial support and sponsorship: Nil
Conflict of Interest: Nil

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