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ORIGINAL RESEARCH

Self-Prescribed Beta-Blocker Use and Health Implications Among Undergraduate Medical Students at Umm Al-Qura University

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Background: High levels of stress and anxiety are prevalent among medical students worldwide, often leading to the use of beta blockers to alleviate these symptoms. However, self-prescribing these drugs poses considerable health risks, raising concerns about the widespread, unregulated use of such medications in medical student populations.

Objective: This study aimed to assess the prevalence, patterns, and perceptions of self-prescribed beta blocker use among medical students at Umm Al-Qura University (UQU), Saudi Arabia, focusing on understanding the influences behind this behavior.

Methods: A cross-sectional online survey was conducted among UQU medical students, including males and females from their second to sixth year and those in internships. Students who did not complete the survey or used prescribed beta blockers were excluded, a Raosoft sample size calculator was used to determine the minimum sample size for this study. Data were collected on demographics, usage patterns, reasons for use, and associated perceptions. Statistical analysis was performed using IBM SPSS Version 22 to identify factors associated with beta blocker use.

Results: Out of 809 participants, 42 (5.2%) reported using beta blockers, mainly for anxiety relief and performance enhancement. The majority (69.0%) self-prescribed the medication, with 76.2% using it on an "as-needed" basis. While 81% of participants were aware of potential side effects, 31% experienced them. Peer influence played a significant role, with 61.9% of users receiving recommendations from friends or classmates.

Conclusion: This study identified a notable incidence of self-prescribed beta blocker use among medical students at UQU. The findings highlight the need for educational programs to encourage responsible medication practices. Future research should focus on the broader social dynamics influencing this behavior and the development of targeted interventions to mitigate the risks associated with self-prescription.

Keywords: beta blockers, self-prescribed, medical students, prevalence

Introduction and Rationale

Medical students worldwide are known to experience high levels of anxiety, which can significantly impact their academic performance and overall well-being. A global study conducted in English-speaking countries reported a prevalence of anxiety among medical students of 65.5%,[1] while a systematic review from Saudi Arabia revealed similar results.[2] Various factors contribute to this heightened anxiety, including the academic pressures of medical education, extended study and work hours, intense competition, the need to master complex medical knowledge, and limited time for personal or recreational activities.[3,4] In response to these stressors, some students resort to beta blockers as a means of coping with anxiety.[5]

Beta blockers, primarily used for treating cardiovascular conditions such as hypertension, coronary artery disease, and arrhythmias, have also been found to alleviate symptoms of anxiety, including tachycardia, sweating, and tension.[6] They

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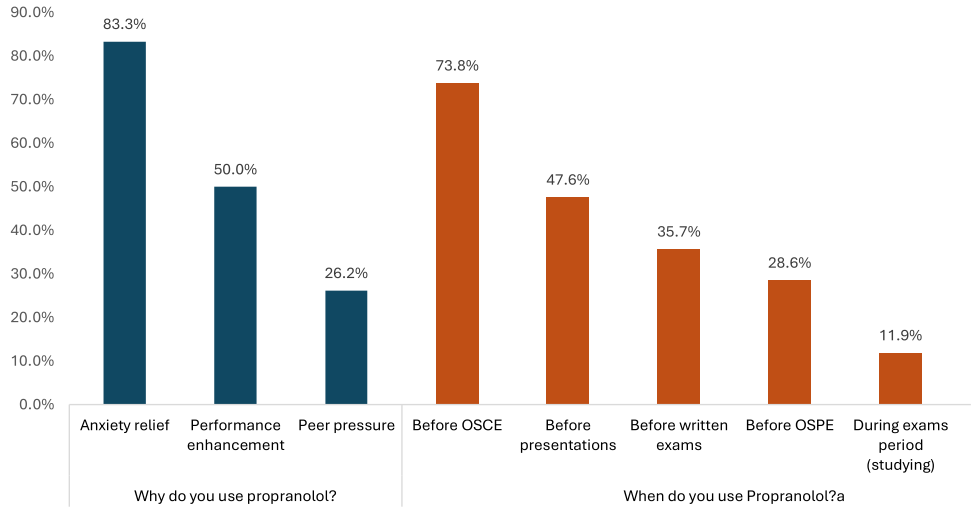

Figure 1 Reasons and time for using propranolol among undergraduate medical students at UQU. The most reported reasons for using the drug were anxiety relief (83.3%), performance enhancement (50%), and peer pressure (26.2%). For timing of use, 73.8% used the drug before the OSCE, 47.6% before presentations, 35.7% before written exams, 28.6% before the objective structure practical examination (OSPE), 11.9% during the exam period, and 9.5% at a social gathering. (see Figure 1).

exert their calming effects by blocking the binding of epinephrine and norepinephrine to beta-adrenergic receptors, which reduces heart rate and the strength of heart contractions.[7] However, nonselective beta blockers, such as propranolol, are associated with a range of side effects, including psychiatric issues and bronchospasms, especially in individuals with respiratory conditions.[8,9] These drugs can also exacerbate peripheral artery disease due to reduced cardiac output and vasodilation, potentially leading to complications such as claudication, cyanosis, or even gangrene.[10] Additionally, hypoglycemia is a serious concern in diabetic patients using beta blockers.[11]

Research has shown that medical students, particularly those preparing for high-stress exams like the objective structured clinical examination (OSCE), are among those who turn to beta blockers for anxiety relief. One study found that 14.5% of medical students used propranolol, with most taking 10–20 mg doses to manage exam-related stress. Despite their awareness of potential side effects, self-prescription was the predominant method of access, raising concerns about the risks of unsupervised use.[12]

The inappropriate use of beta blockers without medical oversight is a concerning trend among medical students.[13] While previous studies have explored this behavior in other medical institutions, there has been no research on beta blocker usage among medical students at Umm Al-Qura University (UQU). This gap in the literature underscores the need for a focused investigation into the prevalence and self-prescription practices within this population.

Thus, the primary objective of this study is to assess the prevalence of beta blocker use and self-prescription among UQU medical students. By addressing this knowledge gap, the findings aim to inform targeted interventions and educational programs that promote safe medication practices. Ultimately, this research seeks to enhance student well-being and improve the quality of healthcare education at UQU.

Methods

This cross-sectional descriptive study was conducted using an online questionnaire distributed to medical students at Umm Al-Qura University (UQU) in Makkah, Saudi Arabia. The study targeted male and female medical students from the second to sixth years, as well as interns. Students who did not complete the survey or were prescribed beta blockers by a physician were excluded from the analysis.

Participant Selection

A list of all eligible medical students was obtained from the academic affairs department, identifying approximately 1362 potential participants.[14] The inclusion criteria comprised medical students currently enrolled in UQU's medical program.

Exclusion criteria included incomplete responses and students already prescribed beta blockers for medical reasons. Informed consent was obtained from all participants before their inclusion in the study.

Questionnaire Development and Validation

A structured questionnaire was developed based on a review of existing research,[12] ensuring it addressed the relevant aspects of beta blocker use. The questionnaire was written in English and included sections on sociodemographic information (age, gender, GPA, academic year), followed by specific questions related to beta blocker use, dosage, frequency, reasons for use, and awareness of side effects. The content validity of the questionnaire was reviewed by experts in the field to ensure it covered all necessary topics. However, no formal validation studies were performed.

Ethical Considerations

The study received approval from the UQU Institutional Review Board (IRB). Participants were informed about the study's objectives, and their confidentiality was assured through an information sheet and consent form attached to the questionnaire. Participation was entirely voluntary, and the responses remained anonymous through the use of codes and pseudonyms. Only the research team had access to the data, which was securely stored in compliance with institutional guidelines.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this article. This study was conducted in accordance with the principles outlined in the Declarations of Helsinki.

Sampling Method

Convenience sampling was used to recruit participants. Given a total population of 1362 medical students, the sample size was calculated using the Raosoft sample size calculator. With a 95% confidence level and a response distribution of 50%, a minimum sample size of 300 was determined. To account for potential non-responses, the target sample size was increased to 340, ensuring adequate representation of both male and female students. Data collection was overseen by designated data collectors to ensure the quality of the responses.

Data Handling and Analysis

Responses were directly recorded into a statistical database and analyzed using IBM SPSS Version 22. Descriptive statistics, including frequency and percentage distributions, were calculated for all relevant variables. Pearson's chi-squared test and Fisher's exact test were employed to examine associations between beta blocker use and demographic or academic factors. The significance level was set at a p-value of less than 0.05.

Bias and Limitations

While convenience sampling facilitated data collection, it may introduce selection bias, limiting the generalizability of the findings. Furthermore, the reliance on self-reported data may result in recall or response bias. The absence of a formal validation process for the questionnaire is another limitation. However, steps were taken to minimize these biases, including the anonymous nature of the survey and the supervision of data collection.

Ethical Safeguards and Confidentiality

Our study went through the UQU Institutional Research Board (IRB) for approval; the ethical approval was obtained from the biomedical research ethics committee at Umm Al-Qura University, Makkah, Saudi Arabia approved the study (No. HAPO-02-K-012-2023-09-1711).

After we received this approval, we began the study activities. We made sure to collect survey responses anonymously without gathering any identifying or private information from the participants and all data were kept confidential and available only to the research team.

Preserving the confidentiality of all responses intact is crucial.

Results

A total of 809 eligible students completed the study survey. The students' ages ranged from 18 to more than 27 years, with a mean average of 20.1 ± 3.5 years. Of the participants, 478 (59.1%) were female, 321 (39.7%) were in their pre-clinical years (2nd and 3rd), 432 (53.4%) were in their clinical years (4th to 6th), and 56 (6.9%) were medical interns. As for grade point average (GPA), 521 (64.4%) had a score of 3.5–4 points, 235 (29%) had a score of 2.75–3.49, and 53 (6.5%) had lower scores. Only 62 (7.7%) had a chronic disease, mainly asthma (69.4%), irritable bowel syndrome (IBS) (8.1%), diabetes mellitus (DM) (4.8%), and migraines (4.8%). In addition, 116 (14.3%) complained of allergies, but only 43 (5.3%) reported having asthma. About 55 (6.8%) were diagnosed with a psychiatric disorder, mainly anxiety (25.5%), depression (20%), and panic attacks (9.1%) (Table 1).

Of the study participants, 89 (11%) were current smokers, while 33 (4.1%) were ex-smokers. In addition, 240 (29.7%) took energy drinks to improve concentration, and 333 (41.2%) exercised. As for sleep hours during exams, 237 (29.3%) reported 4 hours or less, 304 (37.6%) reported 5–6 hours, and 175 (21.6%) reported 7–8 hours. Only 24 (3%) reported using illegal or psychoactive drugs (Table 2).

A total of 42 (5.2%) of the participants used beta blockers/propranolol, while the majority (76.2%) used such drugs only rarely and only 7.1% used them daily. Of the users, 69% acquired the drug without a prescription, 7 (16.7%) had the drug prescribed by their family, and 6 (14.3%) by friends. The most reported dose per use was less than 10 mg (50%), and only 7 of the users (16.7%) reported that they increased the dose without a physician's instructions. A total of 34 (81%) were aware that the most known side effects of the unsupervised use of propranolol included hypotension (79.4%), shortness of breath (61.8%), fatigue (44.1%), and sleep disturbances (41.2%). However, only 13 (31%) of the users experienced side effects, mainly fatigue (38.5%), sleep disturbances (23.1%), shortness of breath (23.1%), and hypotension (15.4%) (Table 3).

The most reported reasons for using the drug were anxiety relief (83.3%), performance enhancement (50%), and peer pressure (26.2%). For timing of use, 73.8% used the drug before the OSCE, 47.6% before presentations, 35.7% before written exams, 28.6% before the objective structure practical examination (OSPE), 11.9% during the exam period, and 9.5% at a social gathering (Figure 1).

Table 1 Bio-Demographic Data of Undergraduate Medical Students at Umm Al-Qura University (n=809)

Bio-Demographic Data		No	%
Age in years	18–20	286	35.4%
	21–23	423	52.3%
	24–26	84	10.4%
	27+	16	2.0%
Gender	Male	331	40.9%
	Female	478	59.1%
Academic year	2nd year	147	18.2%
	3rd year	174	21.5%
	4th year	202	25.0%
	5th year	153	18.9%
	6th year	77	9.5%
	Medical intern	56	6.9%
GPA	1–1.74	5	0.6%
	1.75–2.74	48	5.9%
	2.75–3.49	235	29.0%
	3.50–4.00	521	64.4%

(*Continued*)

Table 1 (Continued).

Bio-Demographic Data		No	%
Are you diagnosed with any chronic diseases?	Yes	62	7.7%
	No	747	92.3%
If yes, mention (n=62)	Not mentioned	26	41.9%
	Asthma	43	69.4%
	IBS	5	8.1%
	Diabetes mellitus	3	4.8%
	Migraine	3	4.8%
	Crohn's disease	2	3.2%
	Hypertension	2	3.2%
	Celiac disease	1	1.6%
	Chronic rhinitis	1	1.6%
	Congenital heart disease	1	1.6%
	COPD	1	1.6%
	Eczema	1	1.6%
	Epilepsy	1	1.6%
	Gastroesophageal reflux disease (GERD)	1	1.6%
	Glaucoma	1	1.6%
	Hypothyroidism	1	1.6%
	Iron deficiency anemia	1	1.6%
	Lactose intolerance	1	1.6%
	Obesity	1	1.6%
	Pcos	1	1.6%
	Sickle cell anemia	1	1.6%
	Ureteral stenosis	1	1.6%
Do you have any allergies or asthma?	Yes, I have allergic	116	14.3%
	Yes, I have asthma	43	5.3%
	None	650	80.3%
Are you diagnosed with any psychiatric disorder?	Yes	55	6.8%
	No	754	93.2%
If yes, mention (n=55)	Not mentioned	24	43.6%
	Anxiety	14	25.5%
	Depression	11	20.0%
	Panic attacks	5	9.1%
	Bipolar disorder	1	1.8%

Notes: As shown in, A total of 809 eligible students completed the study survey. The students' ages ranged from 18 to more than 27 years, with a mean average of 20.1 ± 3.5 years. Of the participants, 478 (59.1%) were female, 321 (39.7%) were in their pre-clinical years (2nd and 3rd), 432 (53.4%) were in their clinical years (4th to 6th), and 56 (6.9%) were medical interns. As for grade point average (GPA), 521 (64.4%) had a score of 3.5–4 points, 235 (29%) had a score of 2.75–3.49, and 53 (6.5%) had lower scores. Only 62 (7.7%) had a chronic disease, mainly asthma (69.4%), irritable bowel syndrome (IBS) (8.1%), diabetes mellitus (DM) (4.8%), and migraines (4.8%). In addition, 116 (14.3%) complained of allergies, but only 43 (5.3%) reported having asthma. About 55 (6.8%) were diagnosed with a psychiatric disorder, mainly anxiety (25.5%), depression (20%), and panic attacks (9.1%).

A total of 35 (83.3%) propranolol users thought that it improved one's performance. A total of 26 (61.9%) of the users reported that a friend or classmate had recommended propranolol to them, and 42.9% had offered propranolol to a friend or classmate. However, 21 (50%) offered beta blockers/propranolol to casual acquaintances, while 19 (45.2%) would recommend propranolol to anyone (Table 4).

A total of 10.7% of students aged 24–26 used the drug versus none of those aged 27 or more, giving a recorded statistical significance of P = 0.020). Also, 7.2% of students in their clinical years used the drug compared to 2.8% of

Table 2 Daily Habits and Behaviours of Undergraduate Medical Students at Umm Al-Qura University (n=809)

Habits	No	%
Are You a Smoker?		
Non-smoker	687	84.9%
Ex-smoker	33	4.1%
Current smoker	89	11.0%
Do you take energy drinks to improve concentration?		
Yes	240	29.7%
No	569	70.3%
Do you exercise?		
Yes	333	41.2%
No	476	58.8%
During exam week, how many hours do you usually sleep?		
4 hours or less	237	29.3%
5–6 hours	304	37.6%
7–8 hours	175	21.6%
9–10 hours	68	8.4%
More than 10 hours	25	3.1%
Do you use any illegal or psychoactive drugs?		
Yes	24	3.0%
No	785	97.0%

Notes: Illustrate that of the study participants, 89 (11%) were current smokers, while 33 (4.1%) were ex-smokers. In addition, 240 (29.7%) took energy drinks to improve concentration, and 333 (41.2%) exercised. As for sleep hours during exams, 237 (29.3%) reported 4 hours or less, 304 (37.6%) reported 5–6 hours, and 175 (21.6%) reported 7–8 hours. Only 24 (3%) reported using illegal or psychoactive drugs.

Table 3 Beta-Blocker Usage Among Undergraduate Medical Students at Umm Al-Qura University

Propranolol Use	No	%
Do you use beta-blockers/propranolol? (such as Inderal)		
Yes	42	5.2%
No	767	94.8%
Who prescribed propranolol to you? (n=42)		
Family member	7	16.7%
Friend	6	14.3%
Myself	29	69.0%
How frequently do you use propranolol? (n=42)		
Daily	3	7.1%
2–3 times per week	2	4.8%
Once a week	4	9.5%
Once every two weeks	1	2.4%
Rarely (only as needed)	32	76.2%
Dose of taken propranolol per time (n=42)		
< 10 mg	21	50.0%
10–29 mg	11	26.2%
30–40 mg	5	11.9%
> 40 mg	5	11.9%

(*Continued*)

Table 3 (Continued).

Propranolol Use	No	%
Do you increase the dose without physician instructions? (n=42)		
Yes	7	16.7%
No	35	83.3%
Are you aware of the side effects of the unsupervised use of Propranolol? (n=42)		
Yes	34	81.0%
No	8	19.0%
If yes, what are the side effects you know? (n=34)		
Hypotension	27	79.4%
Shortness of breath	21	61.8%
Fatigue	15	44.1%
Sleep disturbances	14	41.2%
Sexual dysfunction	12	35.3%
Cold extremities	11	32.4%
Did you experience any side effects? (n=42)		
Yes	13	31.0%
No	29	69.0%
If yes, what are the side effects you experienced? (n=13)		
Fatigue	5	38.5%
Sleep disturbances	3	23.1%
Shortness of breath	3	23.1%
Hypotension	2	15.4%
Sexual dysfunction	2	15.4%
Cold extremities	1	7.7%

Notes: According to, A total of 42 (5.2%) of the participants used beta blockers/propranolol, while the majority (76.2%) used such drugs only rarely and only 7.1% used them daily. Of the users, 69% acquired the drug without a prescription, 7 (16.7%) had the drug prescribed by their family, and 6 (14.3%) by friends. The most reported dose per use was less than 10 mg (50%), and only 7 of the users (16.7%) reported that they increased the dose without a physician's instructions. A total of 34 (81%) were aware that the most known side effects of the unsupervised use of propranolol included hypotension (79.4%), shortness of breath (61.8%), fatigue (44.1%), and sleep disturbances (41.2%). However, only 13 (31%) of the users experienced side effects, mainly fatigue (38.5%), sleep disturbances (23.1%), shortness of breath (23.1%), and hypotension (15.4%).

those in the pre-clinical years (P =0.024). Propranolol use was reported among 12.9% of students diagnosed with a chronic disease (P = 0.004), of whom 11.6% had asthma and 10.3% had allergies (P = 0.002). In addition, 6.5% of the students who did not exercise used the drug, versus 3.3% of those who did (P = 0.043) (Table 5).

Table 4 Perception and Availability of Using Propranolol Among Undergraduate Medical Students at Umm Al-Qura University (n=42)

Perception and Availability	Yes		No	
	No	%	No	%
Do you think it improves your performance?	35	83.3%	7	16.7%
Did a friend or a classmate ever recommend propranolol to you?	26	61.9%	16	38.1%
Did you ever offer propranolol to a friend or classmate?	18	42.9%	24	57.1%
Would you recommend propranolol to anyone?	19	45.2%	23	54.8%
Were you ever recommended beta-blockers/propranolol?	20	47.6%	22	52.4%
Were you ever offered beta-blockers/propranolol?	21	50.0%	21	50.0%

Notes: Reveals that A total of 35 (83.3%) propranolol users thought that it improved one's performance. A total of 26 (61.9%) of the users reported that a friend or classmate had recommended propranolol to them, and 42.9% had offered propranolol to a friend or classmate. However, 21 (50%) offered beta blockers/propranolol to casual acquaintances, while 19 (45.2%) would recommend propranolol to anyone.

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Table 5 Factors Associated With Undergraduate Medical Students Use of Beta-Blockers/Propranolol

Factors		Do You Use Beta-Blockers/Propranolol				p-value
		Yes		No		
		No	%	No	%	
Age in years	18–20	8	2.8%	278	97.2%	0.020*$
	21–23	25	5.9%	398	94.1%	
	24–26	9	10.7%	75	89.3%	
	27+	0	0.0%	16	100.0%	
Gender	Male	15	4.5%	316	95.5%	0.481
	Female	27	5.6%	451	94.4%	
Academic phase	Pre-clinical	9	2.8%	312	97.2%	0.024*
	Clinical	31	7.2%	401	92.8%	
	Internship	2	3.6%	54	96.4%	
Do you use any illegal or psychoactive drugs?	Yes	1	4.2%	23	95.8%	0.818
	No	41	5.2%	744	94.8%	
Do you take energy drinks to improve concentration?	Yes	17	7.1%	223	92.9%	0.115
	No	25	4.4%	544	95.6%	
Are you diagnosed with any chronic diseases?	Yes	8	12.9%	54	87.1%	0.004*$
	No	34	4.6%	713	95.4%	
Do you have any allergies or asthma?	Yes, I have allergic	12	10.3%	104	89.7%	0.002*
	Yes, I have asthma	5	11.6%	38	88.4%	
	None	25	3.8%	625	96.2%	
Do you exercise?	Yes	11	3.3%	322	96.7%	0.043*
	No	31	6.5%	445	93.5%	
Are you smoker?	Non-smoker	34	4.9%	653	95.1%	0.106$
	Ex-smoker	0	0.0%	33	100.0%	
	Current smoker	8	9.0%	81	91.0%	
GPA	1–1.74	0	0.0%	5	100.0%	0.165$
	1.75–2.74	3	6.3%	45	93.8%	
	2.75–3.49	6	2.6%	229	97.4%	
	3.50–4.00	33	6.3%	488	93.7%	

Notes: As detailed, A total of 10.7% of students aged 24–26 used the drug versus none of those aged 27 or more, giving a recorded statistical significance of P = 0.020). Also, 7.2% of students in their clinical years used the drug compared to 2.8% of those in the pre-clinical years (P =0.024). Propranolol use was reported among 12.9% of students diagnosed with a chronic disease (P = 0.004), of whom 11.6% had asthma and 10.3% had allergies (P = 0.002). In addition, 6.5% of the students who did not exercise used the drug, versus 3.3% of those who did (P = 0.043). P: Pearson X^2 test. $: Exact probability test.* P < 0.05 (significant).

Discussion

Medical education is widely regarded as one of the most demanding academic paths, with significant dedication, time, and emotional resilience required to meet its challenges. The intense environment can adversely impact the psychological well-being of students, often leading to anxiety and stress-related conditions.[15,16] This study aimed to explore the prevalence and patterns of self-prescribed beta blocker use among medical students at Umm Al-Qura University (UQU).

The results revealed that 5.2% of students used beta blockers, which is lower than the rates reported at King Saud University in Riyadh[8] and King Saud bin Abdulaziz University for Health Sciences (KSAU-HS).[12] Interestingly, 69.0% of beta blocker users in our study were self-prescribed, which is higher than the rates found in studies from Riyadh and KSAU-HS.[8,12] The majority of students in our study (76.2%) used beta blockers on an "as-needed" basis, primarily before high-stakes exams like the Objective Structured Clinical Examination (OSCE). This pattern aligns with the KSAU-HS study, where 70.6% of students reported using beta blockers for exam-related stress.[12]

In terms of dosage, about 50% of our participants used doses below 10 mg, which is lower than what was reported in a study of health professions students in Jeddah.[17] At King Saud University, some students reported using up to 20 mg, but only 9.5% reached that level. Lower dosages may have contributed to the lower incidence of side effects observed in our study. Most participants (83.3%) did not increase their dosage without physician approval, a behavior consistent with the findings from the Jeddah study.[17]

Despite self-prescribing, 81.0% of participants were aware of potential side effects, with hypotension being the most recognized (79.4%). This awareness likely discouraged participants from increasing their dosage, as uncontrolled use could lead to serious side effects. In our study, 31.0% of participants reported experiencing side effects, with fatigue being the most common (38.5%). In contrast, studies at King Saud University[8] and among health professions students in Jeddah[17] reported hypotension as the most frequent side effect. Fatigue in our study may be partially attributable to the students' exam-related stress and sleep deprivation, which could exacerbate the effects of beta blockers.

Self-medication continues to be a concern among medical students, many of whom perceive it as acceptable due to their medical knowledge. However, this practice carries significant risks, and the need for medical supervision is often underestimated. Our findings indicate that 83.3% of propranolol users believed the drug improved their performance, echoing similar results from the Riyadh study.[8] This perception of propranolol's benefits highlights the potential for misuse, driven by peer recommendations and the pressure to excel academically.[18]

Peer influence emerged as a key factor in our study, with 61.9% of participants stating they were encouraged by friends or classmates to use propranolol. This peer-driven behavior is concerning, especially since 50.0% of respondents admitted they would offer propranolol to casual acquaintances. This high level of informal drug sharing reflects a broader issue of accessibility, with previous studies showing that propranolol is readily available without a prescription in many pharmacies across Saudi Arabia.[19]

Interestingly, our study found that female students used propranolol more frequently than their male counterparts, a pattern also observed in studies from Iran[20] and Saudi Arabia.[12] The higher prevalence of use among females may be linked to social anxiety, which is reported to be more common in women, possibly due to societal pressures and expectations.[21] Moreover, clinical-year students had the highest rates of beta blocker use, likely driven by anxiety around the OSCE. This high-stakes exam, which tests clinical skills under strict time limits, has been noted as a significant source of stress for medical students.[22]

Limitations and Future Directions

This study has several limitations that should be noted. First, it utilized a convenience sample of medical students at Umm Al-Qura University (UQU), which may not be representative of the entire medical student population. This limitation affects the generalizability of the findings to other regions or institutions, as cultural and institutional differences can influence beta blocker use among students. Second, the reliance on self-reported data introduces the possibility of recall and social desirability biases, where participants may underreport or exaggerate their use of beta blockers due to memory errors or a desire to appear in a favorable light. Additionally, the study did not explore students' medical or psychological histories, which could be key factors influencing their decision to use beta blockers.

Another limitation is the data collection method, which was conducted through an online questionnaire. This may have led to self-selection bias, where students more concerned with or experienced in beta blocker use were more likely to participate. The questionnaire was not formally validated, and while it was developed from existing research, its accuracy in measuring the targeted behaviors could be improved. Moreover, although the study identified peer influence as a factor in beta blocker use, it did not delve into the broader cultural or social norms that may contribute to this behavior. These underlying social dynamics are crucial for developing effective interventions.

Future Directions and Recommendations

Based on the study's findings, several recommendations can be made to address the issue of beta blocker use among medical students. Educational initiatives should be implemented to raise awareness about the potential risks and side effects of beta blocker use, particularly when self-prescribed. These programs should emphasize the importance of consulting healthcare professionals before considering any medication for anxiety or performance enhancement.

Additionally, fostering responsible behavior through open discussions about the ethical implications of non-prescribed beta blocker use is essential. Support systems should be developed to help students manage academic pressures more effectively, reducing the perceived need for medications like propranolol. Stricter regulations and monitoring of beta blocker availability should also be enforced to prevent unauthorized use.

Future research should focus on understanding the gender differences in propranolol use, as our study indicated that female students were more likely to use the drug than their male counterparts. Exploring the underlying factors for this disparity could help tailor interventions and support systems to specific student groups. It is also important to investigate the broader cultural and social influences on beta blocker use, as peer recommendations played a significant role in students' decisions to use the drug.

Finally, creating a culture of ethical behavior within medical schools is crucial. Students should be educated about the risks of sharing or endorsing medications without proper medical supervision, helping promote informed and responsible decision-making regarding propranolol use.

Conclusion

This study highlights a 5.2% prevalence of self-prescribed beta blocker use among UQU medical students, primarily driven by the desire for anxiety relief and performance enhancement. Despite being aware of the potential side effects, many students still engaged in self-medication, largely influenced by peer recommendations. These findings underscore the need for targeted interventions to reduce inappropriate beta blocker use, focusing on educating students about the associated risks and promoting healthier stress management techniques. Future research should delve deeper into the broader social and cultural factors that contribute to this behavior and develop comprehensive strategies to address it effectively across diverse student populations.

Abbreviations

UQU, Umm Al-Qura University; OSCE, objective structured clinical examination; IRB, Institutional Research Board; GPA, grade point average; IBS, irritable bowel syndrome; DM, diabetes mellitus; KSAU-HS, King Saud bin Abdulaziz University for Health Sciences.

Disclosure

The authors report no conflicts of interest in this work.

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