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Self-medication awareness, practices, and influencing factors among Malaysian medical students studying in India: A cross-sectional study

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ABSTRACT

Self-medication is increasingly prevalent among medical students due to academic exposure and easy access to medications. While it offers convenience for minor ailments, inappropriate use poses significant health risks. Hence, a cross-sectional study was planned to assess the prevalence, awareness, practices, and determinants of self-medication among Malaysian medical students studying in India. A total of 310 students from 1st to 5th year were included, and data were collected using a pre-validated, semi-structured questionnaire covering demographics, self-medication practices, influencing factors, and awareness of adverse drug reactions and pharmacovigilance. Data were analysed using the independent *t*-test and one-way ANOVA, followed by Bonferroni's *post hoc* test and chi-square test for categorical variables. The study showed, self-medication prevalence was 86.5%, with increasing percentages observed from first (85.7%) to fifth year (95%) students during the past 6 months. Commonly used drugs included antipyretics (75%), analgesics (71%), and antihistamines (45%), used for mild illness (89.7%) and prior experience (47.4%). Despite high awareness of risks (94%) and having received formal education (84.2%), self-medication remains widely practiced. Determinants such as senior academic year, family influence, and digital health app use contribute significantly. Educational interventions and future longitudinal studies are essential to promote rational drug use and reduce inappropriate self-medication practices.

1. INTRODUCTION

Self-medication is a widespread global practice, with many individuals routinely using over-the-counter (OTC) drugs, leftover medicines, or others' prescriptions without medical guidance [1]. Common OTC medications include paracetamol, antacids, cough syrups, and vitamin supplements. The World Health Organization defines self-medication as "the selection and use of medicines by individuals to treat self-recognized illnesses or symptoms" [2]. Self-medication practices during the past 6 months were recorded, categorizing participants as frequent (≥6 times), occasional (3–6 times), or rarely (1–2 times) users. Healthcare students, particularly medical students, are prone to self-medication due to their medical knowledge and easy access to drugs [3]. Preclinical training in physiology, pathology, and pharmacology may promote self-diagnosis, leading to self-medication [4]. The widespread availability of online health information further encourages students to rely on digital sources instead of professional consultation. Although self-medication may address limited healthcare access and cost concerns, it poses serious risks such as drug misuse,

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misdiagnosis, adverse interactions, and growing antibiotic resistance [5].

Though most self-medications were allopathic, alternative systems were also common. Stricter drug regulations and greater public awareness are needed to ensure responsible use [6]. In India, self-medication has risen due to easy access to OTC drugs, contributing to antibiotic resistance, resource misuse, drug dependency, and other adverse effects [7]. In Malaysia, self-medication is also widespread, partly because some drugs are available at convenience stores without prescriptions [8]. A Malaysian study further reported a high prevalence of self-medication within the previous week [9]. Self-medication among medical students has increased noticeably over the past decade [10], largely due to easy access to digital health information, limited awareness of pharmacovigilance and adverse drug reactions (ADRs), and other influencing factors [11]. These factors collectively amplify their vulnerability to potential health risks.

The present study is distinctive in its emphasis on Malaysian medical students pursuing education in India, a group that represents a unique intersection of two healthcare and cultural systems. This cross-cultural context provides valuable insights into how differences in healthcare access, regulatory environments, and cultural attitudes toward medicine use shape self-medication behaviours. The study also offers an important perspective on foreign students studying abroad, who often face challenges such as adapting to new healthcare systems, varying drug availability, and differing cultural norms regarding medication use. Accordingly, the study aims to assess the prevalence, attitudes, and determinants of self-medication in this population, along with their awareness of pharmacovigilance and ADRs, emphasizing the need for targeted educational interventions.

1.1. Objectives

1.1.1. Primary objectives

- To determine the prevalence and frequency of self-medication among Malaysian medical students.
- To identify the types of medications used, sources of information, and various determinants responsible for self-medication.

1.1.2. Secondary objectives

- To assess awareness of ADRs, drug interactions, and pharmacovigilance.
- To propose interventional strategies, such as educational programs, to reduce self-medication practices.

2. METHODOLOGY

2.1. Study design

This is a descriptive cross-sectional study, designed to evaluate the prevalence of self-medication practices among Malaysian medical students using a pre-validated semi-structured questionnaire survey. The Strengthening the Reporting of Observational Studies in Epidemiology guidelines were followed for the conduct of this study [12]. The study was approved by the Institutional Ethics Committee (EC/KLECCH/02-2025, dated 27/03/2025) before commencement. The study was conducted over a period of 3 months, from March to May 2025.

2.2. Study participants & settings

The study population included all undergraduate Malaysian medical students enrolled in the MD program at USM-KLE International Medical Programme, Belagavi, from Year 1 to 5. A convenience sampling technique was employed, as all eligible students present during the study period were invited to participate, allowing efficient data collection within the available timeframe. Students who provided written informed consent were included, while those unwilling to participate or who submitted incomplete responses were excluded.

2.3. Sample size

Based on the previous study, the sample size was calculated using a 77% prevalence [11,13], 5% margin of error, and 95% CI, yielding 272 minimum participants. With 10% nonresponse, the final sample size is 302.

2.4. Data collection procedure

Participants were briefed on the study objectives and procedures, following which written informed consent was obtained. Data was collected using a self-developed, pre-validated semi-structured questionnaire comprising of mainly closed ended and few open-ended items. The questionnaire was developed based on prior studies, and the Content Validity of the questionnaire was established by a panel of three faculty experts. Each item was assessed for relevance, clarity, and appropriateness to the study objectives, and their feedback was used to refine the questions before pilot testing. A pilot study was conducted among 30 students (excluded from the final analysis) to test feasibility, and internal consistency was assessed using Cronbach's alpha ($\alpha = 0.78$), indicating that the questionnaire was reliable.

2.5. Questionnaire components

The survey questionnaire was divided into multiple sections, covering demographic and academic information, patterns and frequency of self-medication, psychological and behavioural factors influencing self-medication, awareness and attitudes toward self-medication practices, utilization of digital health platforms, knowledge related to ADRs, drug interactions, and contraindications and an interventional component focusing on awareness and education strategies to prevent practice of self-medication and promote rational drug use.

2.6. Statistical analysis

The collected data were entered into Microsoft Excel and analysed using IBM SPSS Statistics version 25.0. Descriptive statistics, including frequencies, percentages, means, and standard deviations (SD), were used to summarize demographic characteristics, prevalence of self-medication, types of drugs used, sources of information, and awareness levels. Parametric tests such as the independent *t*-test and one-way ANOVA were applied for normally distributed continuous variables, while the Mann–Whitney *U* test was used for skewed data. Bonferroni's *post hoc* test was applied to identify intergroup differences.

Categorical variables were compared using the chi-square test. Results were expressed as mean ± SD for continuous variables and as percentages for categorical variables. A p-value < 0.05 was considered statistically significant.

3. RESULTS

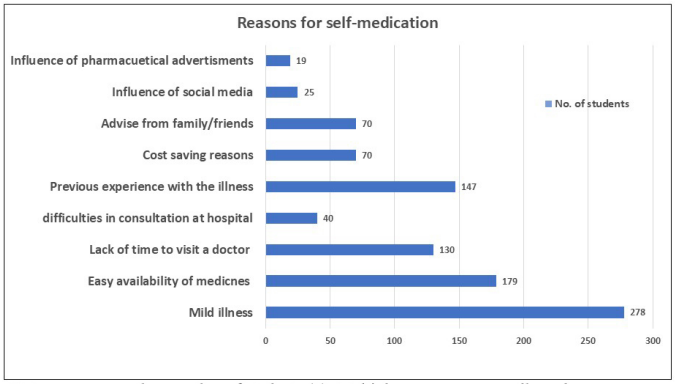
3.1. Demographic and academic characteristics

The study included 310 undergraduate medical students across five academic years. Mean age increased with year of study, from 19.6 ± 0.48 years in the first year to 23.7 ± 0.33 years in the fifth year (p = 0.001). Females comprised 60% of the sample, with no significant gender differences across years. Most students (84.2%) reported receiving formal education on rational drug use, increasing from 78.6% in the first year to 95% in the fifth year, though the difference was not statistically significant. About 45.2% had family members in healthcare, a proportion that significantly rose across years, reaching 65.9% in the final year (Table 1).

Table 1. Demographic characteristics and self-medication practices among Malaysian medical students (n = 310).

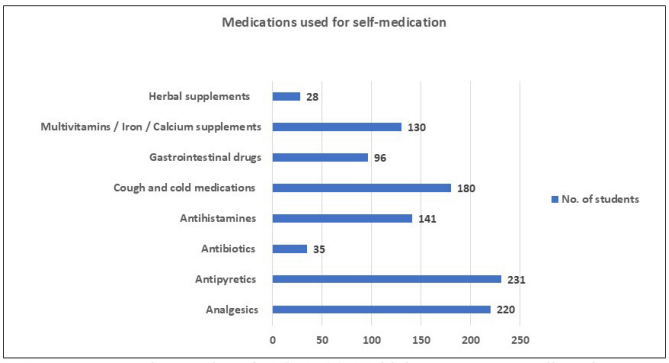
	Year 1 (n = 70)	Year 2 (n = 64)	Year 3 (n = 50)	Year 4 (n = 85)	Year 5 (n = 41)	Total (n = 310)	p value
Age (mean) years	19.62 ± 0.48	20.84 ± 0.36	21.84 ± 0.37	22.82 ± 0.44	23.73 ± 0.33	21.65 ± 1.48	0.001*
Gender							
Male	30 (43%)	21 (32.8%)	14 (28%)	43 (50.6%)	16 (39%)	124 (40%)	0.07
Female	40 (57%)	43 (67.2%)	36 (72%)	42 (49.4%)	25 (61%)	186 (60%)	
Received formal education on rational drug use							
Yes	55 (78.6%)	53 (82.8%)	41 (82%)	73 (85.9%)	39 (95%)	261 (84.2%)	0.21
No	15 (21.4%)	11 (17.2%)	09 (18%)	12 (14.1%)	02 (05%)	49 (15.8%)	
Family members working in health care							
Yes	27 (38.6%)	28 (43.7%)	26 (52%)	32 (37.6%)	27 (65.9%)	140 (45.2%)	0.02*
No	43 (61.4%)	36 (56.3%)	24 (48%)	53 (62.4%)	14 (34.1%)	170 (54.8%)	
Practiced self-medication in past 6 months							
Yes	60 (85.7%)	53 (82.8%)	43 (86%)	73 (85.9%)	39 (95%)	268 (86.5%)	0.49
No	10 (14.3%)	11 (17.2%)	07 (14%)	12 (14.1%)	02 (05%)	42 (13.5%)	
Frequency of self-medication							
Never	11 (15.7%)	12 (18.7%)	06 (12%)	13 (15.3%)	02 (4.9%)	44 (14.2%)	0.002*
Rarely (1–2 times)	38 (54.3%)	27 (42.2%)	26 (52%)	28 (33%)	18 (43.9%)	137 (44.2%)	
Occasionally (3–6 times)	20 (28.6%)	12 (18.8%)	15 (30%)	36 (42.3%)	13 (31.7%)	96 (31%)	
Frequently (>6 times)	01 (1.4%)	13 (20.3%)	03 (06%)	08 (9.4%)	08 (19.5%)	33 (10.6%)	

Data are expressed as number of students (n) (%) or mean ± SD. p values indicate statistical significance across study years (p < 0.05)*



Data are expressed as number of students (n). Multiple responses were allowed.

Figure 1. Distribution of Reasons for Practicing Self-Medication among Medical Students



Data are expressed as number of students (n). Multiple responses were allowed.

Figure 2. Types of Medications commonly used by Medical Students for Self-Medication

3.2. Prevalence, frequency, and reasons for self-medication

The study showed a high prevalence of self-medication over the past 6 months (86.5%) among Malaysian medical students, with a nonsignificant increasing trend from first- to fifth-year students. Most students reported rare use (1–2 times), whereas occasional (3–6 times) and frequent (>6 times) self-medication were more common in senior students, showing a statistically significant difference across years. Perceived mild illness was the main reason for self-medication, followed by prior experience with similar conditions and limited time to consult a doctor. Other factors included easy access to medicines and cost considerations, the latter being more frequent among early-year students ($p = 0.01$). Social influences, such as advice from family or friends and information from social media, also contributed significantly to self-medication practices (Fig. 1, Table 1).

3.3. Sources of consultation and medications used for self-medication

Analgesics (71%) and antipyretics (75%) were the most commonly used medications, followed by cough/cold

Table 2. Sources of consultation and medications used for self-medication among medical students.

	Year 1 ($n = 70$)	Year 2 ($n = 64$)	Year 3 ($n = 50$)	Year 4 ($n = 85$)	Year 5 ($n = 41$)	Total ($n = 310$)	p value
Consult medication source	53 (76%)	48 (75%)	40 (80%)	58 (68%)	28 (68%)	227 (73%)	0.54
Sources of consultation							
None	21 (30%)	24 (38%)	13 (26%)	28 (33%)	14 (34%)	100 (32%)	0.007*
Google	46 (66%)	36 (56%)	31 (62%)	44 (52%)	17 (41%)	174 (56%)	
Medical textbooks	0 (0%)	2 (3%)	5 (10%)	12 (14%)	5 (12%)	24 (8%)	
Pharmacist	3 (4%)	2 (3%)	1 (2%)	1 (1%)	5 (12%)	12 (4%)	
Sources of medication							
Pharmacy without prescription	55 (79%)	49 (77%)	40 (80%)	75 (88%)	35 (85%)	254 (82%)	0.34
Leftover medicines at home	25 (36%)	31 (48%)	16 (32%)	26 (31%)	7 (17%)	105 (34%)	0.01*
Online pharmacies	7 (10%)	12 (19%)	7 (14%)	16 (19%)	6 (15%)	48 (15%)	0.56
Friends/family	27 (39%)	31 (48%)	11 (22%)	21 (25%)	9 (22%)	99 (32%)	0.004*

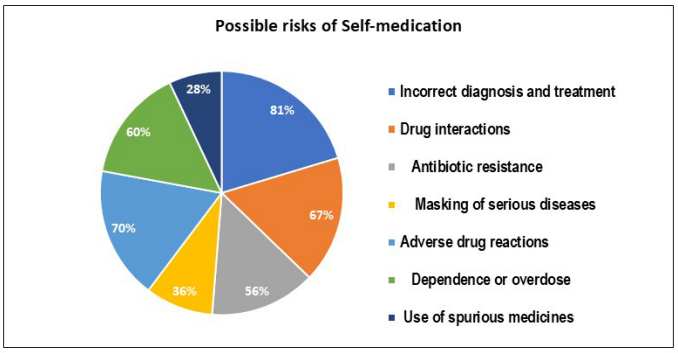
Data are expressed as number of students (n) (%). p values indicate statistical significance across study years ($p < 0.05$)*

Table 3. Psychological and behavioural factors influencing self-medication among medical students.

	Year 1 ($n = 70$)	Year 2 ($n = 64$)	Year 3 ($n = 50$)	Year 4 ($n = 85$)	Year 5 ($n = 41$)	Total ($n = 310$)	p value
Presence of Stress or academic pressure							
Yes	10 (14%)	11 (17%)	9 (18%)	16 (19%)	10 (24%)	56 (18%)	0.76
No	60 (86%)	53 (83%)	49 (98%)	69 (81%)	31 (76%)	254(82%)	
Use of Self-medication to manage stress, anxiety, or sleep disturbances							
Yes	8 (11%)	8 (12%)	5 (10%)	9 (11%)	9 (22%)	39 (13%)	0.41
No	62 (89%)	56 (88%)	45 (90%)	76 (89%)	32 (78%)	271(87%)	
Frequency of self-medication							
Never	61 (87%)	58 (91%)	46 (92%)	79 (93%)	34 (83%)	278(90%)	0.51
Rarely	7 (10%)	5 (8%)	4 (8%)	2 (2%)	6 (15%)	24 (8%)	
Occasionally	2 (3%)	1 (2%)	0 (0%)	3 (4%)	1 (2%)	7 (2%)	
Frequently	0 (0%)	0 (0%)	0 (0%)	1 (1%)	0 (0%)	1 (0%)	
Rely on social media/online reviews							
Yes	10 (14%)	12 (19%)	10 (20%)	9 (11%)	3 (7%)	44 (14%)	0.29
No	60 (86%)	52 (81%)	40 (80%)	76 (89%)	38 (93%)	266 (86%)	

Data are expressed as *n (%)*. p values indicate statistical significance across study years ($p < 0.05$).

preparations (58%), antihistamines (45%), multivitamins/ supplements (42%), and gastrointestinal drugs (31%).



Data are expressed as percentage of students (%). Multiple responses were allowed.

Figure 3. Percentage of Medical Students aware of various possible risks of Self-Medication.

Antibiotics and herbal supplements were used by 11% and 9% of students, respectively, with no significant variation across years. Most students (73%) consulted a source before self-medication, predominantly using online search engines and medical textbooks, while a third did not consult any source. Medications were mainly obtained from pharmacies without prescriptions, followed by friends/family, leftover medicines, and online pharmacies (Fig. 2, Table 2).

3.4. Psychological, behavioural, and awareness factors in self-medication

Stress or academic pressure influenced self-medication in 18% of students, while only 13% reported using medications for anxiety, stress, or sleep disturbances. Most students (90%) rarely or never self-medicated for psychological reasons, and social media or online reviews influenced 14%, with no significant variation across years (Table 3). Although 60% considered self-medication

Table 4. Awareness and attitudes towards self-medication among medical students.

	Year 1 (*n* = 70)	Year 2 (*n* = 64)	Year 3 (*n* = 50)	Year 4 (*n* = 85)	Year 5 (*n* = 41)	Total (*n* = 310)	*p* value
Awareness towards self-medication							
Self-medication is a safe practice	40 (57%)	36 (56%)	29 (58%)	58 (68%)	22 (54%)	185 (60%)	0.43
Experienced relief from self-medication	68 (97%)	60 (94%)	48 (96%)	77 (91%)	37 (90%)	290 (94%)	0.40
Aware of potential risks associated with self-medication	66 (94%)	59 (92%)	48 (96%)	78 (92%)	39 (95%)	290 (94%)	0.84
Experienced adverse effects due to self-medication	7 (10%)	8 (12%)	5 (10%)	7 (8%)	2 (5%)	29 (9%)	0.75
Consult for same adverse effects	3 (4%)	2 (3%)	2 (4%)	1 (1%)	0 (0%)	8 (3%)	0.55

Data are expressed as *n (%)*. *p* values indicate statistical significance across study years ($p < 0.05$).

Table 5. Knowledge of digital health care, ADRs, drug interactions, and contraindications among medical students.

	Year 1 (*n* = 70)	Year 2 (*n* = 64)	Year 3 (*n* = 50)	Year 4 (*n* = 85)	Year 5 (*n* = 41)	Total (*n* = 310)	*p* value
Digital health care							
Use of mobile apps or online platforms for drug information	42 (60%)	51 (80%)	36 (72%)	70(82%)	32 (78%)	231 (75%)	0.01*
Sources do you trust the most							
Medical journals	31 (44%)	23 (36%)	26 (52%)	49(58%)	29 (71%)	158 (51%)	0.005
AI-driven health app	24 (34%)	34 (53%)	23 (46%)	40(47%)	15 (37%)	136 (44%)	0.18
Social media groups	5 (7%)	2 (3%)	8 (16%)	8 (9%)	2 (5%)	25 (8%)	0.12
YouTube videos	4 (6%)	7 (11%)	6 (12%)	10(12%)	1 (2%)	28 (9%)	0.32
Purchased medication from an online pharmacy	11 (16%)	14 (22%)	17 (34%)	29(34%)	14 (34%)	85 (27%)	0.04
Aware of common ADR, drug-drug interactions	40 (57%)	58 (91%)	48 (96%)	76(89%)	38 (93%)	260 (84%)	0.001*
Aware of common contraindications	67 (96%)	63 (98%)	48 (96%)	80(94%)	40 (98%)	298 (96%)	0.71
Aware of pharmacovigilance and ADR reporting programs	34 (49%)	25 (39%)	35 (70%)	52(61%)	26 (63%)	172 (55%)	0.005

Data are expressed as number of students (n) (%). *p* values indicate statistical significance across study years ($p < 0.05$)*

Table 6. Intervention measures for promoting rational drug use among medical students.

	Year 1 (n = 70)	Year 2 (n = 64)	Year 3 (n = 50)	Year 4 (n = 85)	Year 5 (n = 41)	Total (n = 310)	p value
Interested in attending a lecture on rational drug use	57 (81%)	49 (77%)	12 (24%)	45 (53%)	27 (66%)	190 (61%)	0.001*
Educational interventions would help reduce self-medication							
Case-based learning	45 (64%)	52 (81%)	26 (52%)	40 (47%)	19 (46%)	182 (59%)	0.001*
Lecture	18 (26%)	19 (30%)	7 (14%)	21 (25%)	15 (37%)	80 (26%)	0.15
Webinars on rational drug use	27 (39%)	20 (31%)	18 (36%)	38 (45%)	13 (32%)	116 (37%)	0.46
Faced any difficulties during consultation leading to self-medication	9 (13%)	15 (23%)	5 (10%)	20 (24%)	7 (17%)	56 (18%)	0.13

Data are expressed as number of students (n) (%). p values indicate statistical significance across study years ($p < 0.05$)*

safe, 94% reported symptomatic relief and were aware of associated risks. Only 9% experienced adverse effects, and 3% of them consulted a physician. Recognized risks included incorrect diagnosis/treatment (81%), drug interactions (67%), antibiotic resistance (56%), masking serious diseases (36%), ADRs (70%), dependence/overdose (60%), and counterfeit medicines (28%) (Fig. 3, Table 4).

3.5. Knowledge of digital health, ADRs, and educational interventions

Most students (75%) used mobile apps or online sources for drug information, with usage increasing significantly across years ($p = 0.01$). Trusted sources included medical journals (51%), AI-driven health apps (44%), social media (8%), and YouTube (9%). About 27% purchased medicines from online pharmacies, mainly in years 3 and 4 ($p = 0.04$). Awareness of common ADRs, drug interactions, and common contraindications was high, and about 55% of them were aware of pharmacovigilance programs ($p = 0.005$), with knowledge increasing in senior students (Table 5). Regarding educational interventions, 61% expressed interest in lectures on rational drug use, highest among first- (81%) and second-year (77%) students ($p = 0.001$). Preferred formats included case-based learning (59%), lectures (26%), and webinars (37%). About 18% reported difficulties during formal consultations (Table 6).

4. DISCUSSION

This study aimed to assess the prevalence, perceptions, and determinants of self-medication among Malaysian medical students studying in India. This study revealed a high prevalence of self-medication (86.5%) among undergraduate medical students, consistent with similar findings reported in India and other developing countries, where prevalence ranges from 60% to 90% among health science students [3,9,11–14]. The increasing trend from first to final year suggests growing confidence in drug use, possibly attributable to academic exposure and clinical experience. In addition, it implies that their confidence in self-diagnosing and treating ailments may be influenced by their exposure to medical knowledge. But there are also worries about overconfidence and possible underestimate of related risks. In our present study, no significant gender difference was observed, noticeably the high percentage of students receiving formal education on rational drug use (84.2%) did not correlate with a decrease in self-medication. This disconnect highlights a potential gap between theoretical knowledge and practical behaviour, as also noted in an earlier study [15]. Moreover, students with family members in healthcare were significantly more likely to self-medicate, perhaps due to greater access to medical information and medications.

The primary reasons for self-medication were minor ailments, previous experience, and convenience, which correlates with the results from earlier studies [11,13,16]. While cost-saving was a less frequent reason overall, it was more commonly reported by early-year students, suggesting economic concerns may influence self-treatment decisions in the pre-clinical phase. Social influences such as peer advice and social media also played a significant role, aligning with the digital habits of a similar study [17]. The most frequently used drugs were antipyretics (75%), analgesics (71%), and cough and cold medicines, similar to previous studies [16,18]. Analgesics and antipyretics were the most commonly used medications because these agents are easily available OTC, widely perceived as safe for self-limiting conditions such as headache, body ache, fever, and fatigue, symptoms frequently experienced during academic stress.

Although the use of antibiotics was lower (11%) than in some reports [19], it remains a concern given its implications for antimicrobial resistance. In concordance with this, a study showed that antibiotics were not commonly used in self-medication [20], but in contrast, another study reported a high rate of antibiotics (84%) in self-medication practices [21]. Use of antihistamines, multivitamins, and gastrointestinal drugs reflects the common symptom profile students aim to self-manage. The reliance on OTC pharmacies (82%) and leftover medicines (34%) points to a systemic lack of regulation and the need for stricter enforcement. The study shows that, despite high awareness about the risks of self-medication (94%), adverse drug effects were reported by 9% of students, with only a minority seeking medical consultation. Notably, awareness of serious risks such as incorrect diagnosis, drug interactions, and antibiotic resistance was significantly associated with year of study. Yet, nearly one-third of students were unaware

of pharmacovigilance programs, indicating a need for targeted educational reinforcement. However, the questionnaire did not capture information on spectrum, indication, or duration of antibiotic use, which is a limitation acknowledged in the context of antimicrobial resistance and should be explored in future studies.

The growing role of digital platforms in drug information seeking was evident, with 75% of students using mobile apps or online sources. Trust in evidence-based sources such as medical journals was moderate (51%), while use of unverified sources such as social media and YouTube, though less common, poses potential risks. In addition, 27% of students—mainly in years 4 and 5—purchased medicines online. These findings align with concerns in recent studies on digital health information among youth [17,22,23], which show that while online resources offer convenience, they also increase the risk of misinformation and inappropriate self-medication [23,24]. Effective use of digital health apps requires proper education and guidance. Self-medication to manage academic stress or sleep disturbances was reported by 13% of students. Although relatively low, this behaviour warrants attention due to its potential to escalate into misuse or dependence, especially during examinations [25]. Psychological and behavioural factors such as stress, academic pressure, and perceived minor severity of symptoms have been shown to influence self-medication practices among medical students, consistent with our findings [26].

The present study showed that most students were aware of ADRs (86%) and common drug contraindications (94%), but only 55% knew about pharmacovigilance and ADR reporting programs. Similar gaps have been reported among healthcare students, underscoring the need to strengthen pharmacovigilance training in medical curricula [27]. Enhancing students' knowledge and reporting practices, along with regulating pharmacy dispensing and increasing awareness of pharmacovigilance programs, is essential to reduce unsupervised medication use.

In this study, 61% of students expressed interest in lectures on rational drug use, while many preferred case-based learning (59%) over webinars (37%) and traditional lectures (26%) to reduce self-medication. This shift—from lectures in early years to case-based learning in later years—highlights the need for curriculum-integrated, year-specific strategies that foster critical thinking. Some students also reported barriers during hospital consultations, such as long queues, prolonged waiting times, overcrowding, and limited consultation time, which discouraged them from seeking care and promoted self-medication. Accordingly, many suggested dedicated registration counters and consultation rooms for medical students to streamline access and reduce reliance on self-medication.

Self-medication among medical students varies across countries, influenced by cultural, educational, and regulatory contexts. In India and Malaysia, higher prevalence may reflect easier access to medications and informal or personal networks with peers or family for healthcare advice. Future targeted interventions (e.g., awareness programs, strengthening medication instruction, facilitating student access to medical care, and strict regulations for OTC drugs) are needed to address the potential harms of self-medication, ensuring safe and informed practices among the medical students [28,29].

4.1. Strength and limitations

This study assessed the prevalence of self-medication among Malaysian medical students studying in India, exploring how cross-cultural settings, variations in healthcare systems, and digital health tools influence their practices. Although it provides valuable insights, the study is limited by self-reported data, which may be affected by recall errors and social desirability bias. The Content Validity Index and domain-wise reliability of the questionnaire were not calculated. Nevertheless, the large sample covering all academic years strengthens internal generalizability. Interestingly, formal education on rational drug use did not significantly predict self-medication, highlighting a gap between theoretical knowledge and practical application.

4.2. Future research perspectives

Future studies could employ longitudinal designs and advanced statistical modeling, such as logistic regression, to identify predictors of self-medication and quantify their effect sizes. Incorporating larger, multicentre samples and evaluating interventions to improve safe self-medication practices among medical students would provide stronger evidence to guide educational strategies.

5. CONCLUSION

This study reveals a high prevalence of self-medication among Malaysian medical students, with analgesics and antipyretics most commonly used. The main determinants of self-medication were perceived minor ailments, convenience, prior experience, and easy access to medications. Formal education on rational drug use did not significantly predict self-medication, highlighting a gap between knowledge and practice. These findings underscore the need for targeted educational interventions and stricter guidance on safe medication use.

6. AUTHOR CONTRIBUTIONS

All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; agreed to submit to the current journal; gave final approval of the version to be published; and agreed to be accountable for all aspects of the work. All the authors are eligible to be an author as per the International Committee of Medical Journal Editors (ICMJE) requirements/guidelines.

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8. CONFLICTS OF INTEREST

The authors report no financial or any other conflicts of interest in this work.

9. ETHICAL APPROVALS

Ethical approval details are given in the 'Methodology' section.

10. DATA AVAILABILITY

All data generated and analyzed are included in this research article.

11. PUBLISHER'S NOTE

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12. USE OF ARTIFICIAL INTELLIGENCE (AI)-ASSISTED TECHNOLOGY

The authors declare that they have not used artificial intelligence (AI)-tools for writing and editing of the manuscript, and no images were manipulated using AI.

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