

Self-Medication among First and Second Year MBBS Students in Nashik

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Abstract

Background: Medical students may recognise the risks of self-medication yet continue to use medicines without consultation. We assessed self-medication during the preceding three months and compared knowledge and attitudes among first- and second-year MBBS students.

Methods: This institution-based cross-sectional survey included 121 questionnaires meeting recorded consent and completeness criteria. Prevalence was estimated with a Wilson 95% confidence interval. Knowledge was scored out of ten; attitude statements and practice items were analysed individually. Academic-year comparisons used Fisher exact and Welch tests. Practice patterns were described among students reporting recent self-medication.

Results: Sixty-two students reported self-medication (51.2%; 95% CI 42.4-60.0%). Prevalence was 53.6% in first-year and 49.2% in second-year students ($p=0.716$). Complete knowledge scores were higher in the second year (8.82 ± 1.49 versus 5.33 ± 2.84 ; mean difference 3.48, 95% CI 2.63-4.34). Most respondents agreed that antibiotics should not be taken without prescription (93/121, 76.9%). Among recent self-medicators, 33/62 (53.2%) selected analgesics and 7/62 (11.3%) selected antibiotics. Thirteen of 60 answering the adverse reaction item (21.7%) reported an adverse reaction.

Conclusion: Self-medication was reported by approximately half of respondents. Second-year students had higher knowledge scores, but recent self-medication prevalence did not differ clearly between years. Teaching should address specific misconceptions and the decisions involved in safe medicine use. These findings do not establish the appropriateness of individual self-medication episodes.

Keywords: self-medication, medical students, knowledge, medication safety, pharmacology education.

INTRODUCTION

Self-medication is the use of medicines for self-recognised symptoms without individual medical consultation. Among medical students, access to drug information and familiarity with common illnesses may encourage this practice. Such familiarity does not necessarily provide the clinical judgement needed to identify contraindications, recognise diagnostic uncertainty or decide when consultation is necessary. Previous work among first-year students has documented limited knowledge of appropriate medicine use despite an awareness of its benefits and risks [1].

Indian studies have reported substantial variation in self-medication among medical

students. A South Indian survey found that 92% of respondents practised self-medication, with analgesics among the commonly used drugs [2]. Antibiotic use raises a separate concern. Virmani et al. reported that 30% of health science students had obtained antibiotics without a valid prescription [3]. Inappropriate antimicrobial use contributes to the development and spread of resistance [4]. The relationship between academic progression and self-medication is less consistent. A study in Kerala found a higher six-month prevalence in second-year than first-year students [5], whereas a Mumbai study found no significant difference across academic years [6]. Comparing students at an

early stage of training may help identify where factual knowledge and decisions about medicine use diverge. We therefore assessed three-month self-medication prevalence, knowledge, attitudes and reported practices among first- and second-year MBBS students at a teaching institution in Nashik, Maharashtra.

MATERIALS AND METHODS

Study design and participants

This cross-sectional survey involved first- and second-year MBBS students at Dr. Vasantrao Pawar Medical College, Hospital and Research Center, Nashik. The protocol proposed universal sampling over two weeks. Recorded submission dates ranged from 16 to 29 April 2026; all but one response were submitted between 27 and 29 April. The report follows the STROBE framework [7].

Questionnaires were eligible for analysis if they contained an affirmative consent response and did not exceed the protocol threshold of 20% missing responses. Completeness was assessed across 39 substantive fields: nine demographic, ten knowledge, ten attitude and ten closed practice items. The optional open response was excluded from this assessment. The number of eligible students approached was unavailable, so a response rate could not be calculated.

Study variables and scoring

The questionnaire recorded demographic characteristics, sources of medicine information, access to a pharmacy and self-reported pharmacology training. Knowledge was assessed with ten multiple-choice items and attitudes with ten statements using a five-point Likert scale. Practice questions covered recent self-medication, conditions treated, medicines used, sources, safety behaviours and reasons for use.

The primary outcome was an affirmative response to self-medication during the previous three months. Follow-up practice analyses were restricted to these respondents. One visible response category was recorded for each condition, medicine class and source. Adverse reactions were self-reported; no clinical causality assessment was available.

Each knowledge response meeting the analysis key received one point; incorrect and "not sure" responses received zero. Blank answers remained missing, and a total was calculated only when all ten items were

answered. Both "risky" and "sometimes risky" were accepted for reusing an old prescription because both acknowledge potential harm. The truncated OTC response indicating availability without prescription was accepted. Knowledge categories followed the protocol: good, 8–10; moderate, 5–7; and poor, below 5. These were study-specific cutoffs rather than validated classifications.

Attitudes were analysed by statement, combining "agree" with "strongly agree" for presentation. The proposed practice score was not calculated because several items described conditions, medicine classes or reasons for use without a single appropriate response. The adverse reaction item measured an outcome rather than a behaviour. A combined KAP score was therefore not used. This approach differed from the scoring plan in the protocol.

Statistical analysis

Data were transcribed from the exported response table and checked against the source. Age entries were standardised, update markers removed and the label "Option 1 Books" combined with "Books". Categorical variables were summarised as counts and percentages using the number of valid responses to each item. Prevalence was reported with a Wilson 95% confidence interval. Knowledge totals were summarised as mean $\pm$ standard deviation and compared using Welch's *t* test. Mann–Whitney testing was used as a sensitivity analysis.

Fisher's exact test assessed associations with recent self-medication. Prevalence ratios and 95% confidence intervals described the size and precision of associations. A modified Poisson model with HC1 robust variance included academic year, gender and age to estimate adjusted prevalence ratios [8]. Benjamini–Hochberg adjustment was applied separately to ten knowledge-item comparisons and seven prevalence associations. All comparisons were exploratory and two-sided. Analyses were performed in Python using NumPy, pandas and SciPy.

Sensitivity analyses retained consented questionnaires with blank practice follow-ups, excluded the single early response as a possible test entry, and varied the scoring of the old-prescription knowledge item. No missing responses were imputed. Open answers were reviewed descriptively because some were truncated in the export.

Ethical considerations

The protocol specified voluntary participation and confidentiality. Analysis was restricted to questionnaires with an affirmative recorded consent response. [Insert the Institutional Ethics Committee name, approval number and approval date from the issued approval letter.]

RESULTS

Participants and recent self-medication

Of 125 exported records, two had no recorded consent response and two exceeded the missingness threshold, leaving 121 questionnaires. The latter two respondents had answered "No" to recent self-medication and left nine practice follow-ups blank. The analysis included 56 first-year and 65 second-year students. Mean age was 20.06 ± 1.45 years; 70 respondents (57.9%) were female and 82 (67.8%) reported urban residence (Table 1).

Self-medication during the previous three months was reported by 62 students (51.2%; 95% CI 42.4–60.0%). The proportion was 30/56 (53.6%) in the first year and 32/65 (49.2%) in the second year ($p=0.716$). The unadjusted prevalence ratio for second- versus first-year students was 0.92 (95% CI 0.65–1.30). Adjustment for gender and age gave a similar estimate of 0.91 (95% CI 0.63–1.32). None of the seven characteristics examined showed a clear association with recent self-medication (Table 5).

Knowledge and attitudes

Complete knowledge totals were available for 114 students. The overall score was 7.17 ± 2.83 ; 65 students (57.0%) met the protocol definition of good knowledge, 24 (21.1%) moderate knowledge and 25 (21.9%) poor knowledge. Scores were higher in second-year students than first-year students (8.82 ± 1.49 versus 5.33 ± 2.84), with a mean difference of 3.48 points (95% CI 2.63–4.34; $p<0.001$). The direction of the difference was unchanged with Mann–Whitney testing. Internal consistency of the ten knowledge items was 0.834.

Second-year students had a higher proportion of accepted responses on nine of the ten knowledge items after multiplicity adjustment; the exception was the definition of self-medication. Overall, the lowest proportions were recorded for the items on irrational antibiotic use and resistance (71/118, 60.2%) and incomplete antibiotic courses (73/121, 60.3%; Table 2).

Most respondents agreed that antibiotics should not be taken without prescription (93/121, 76.9%) and that reading medicine labels was important (93/119, 78.2%). Nevertheless, 40/121 (33.1%) agreed that medical students could self-prescribe safely. Twenty-three of 120 (19.2%) considered OTC medicines completely safe, while 58 (48.3%) were neutral on this statement (Table 3).

Patterns and safety behaviours

Among the 62 recent self-medicators, fever was the most frequently recorded condition (17, 27.4%), followed by cold (16, 25.8%). Analgesics were selected by 33 students (53.2%) and antibiotics by seven (11.3%). A pharmacy was the recorded source for 33 (53.2%), while 19 (30.6%) selected an old prescription. Mild illness was the most common reason among respondents answering that item (19/60, 31.7%; Table 4). Forty-four of 62 students (71.0%) reported always checking expiry dates and 38 (61.3%) always reading labels. Thirteen of 60 answering the adverse reaction item (21.7%) reported a reaction. For persistent symptoms, 40/59 (67.8%) selected consulting a doctor, 13 (22.0%) changing the medicine and six (10.2%) continuing it. Fifteen students who denied recent self-medication nevertheless selected antibiotics in the follow-up question, and nine reported an adverse reaction. These responses were retained in the data audit but were not used to redefine the primary outcome.

Sensitivity analyses

Retaining the two consented questionnaires with blank follow-ups gave a prevalence of 62/123 (50.4%; 95% CI 41.7–59.1%). Excluding the early possible test entry from the main sample gave 61/120 (50.8%; 95% CI 42.0–59.6%). The knowledge difference persisted when only "risky" was accepted for the old-prescription item (mean difference 3.51, 95% CI 2.65–4.38) and when that item was omitted (3.19 of nine points, 95% CI 2.40–3.97). Knowledge totals did not clearly differ between recent self-medicators and other respondents (7.33 ± 2.89 versus 7.00 ± 2.77 ; Mann–Whitney $p=0.281$).

DISCUSSION

In this study, approximately half of the respondents reported self-medication during the preceding three months. Second-year students had considerably higher knowledge

scores, but the proportion reporting recent self-medication was similar in the two academic years. This finding suggests that a comparison based only on prevalence would miss an important difference in what students knew about medicines. It also cautions against treating a higher knowledge score as evidence of safer behaviour without examining the circumstances of use.

The observed prevalence was lower than the 92% reported by Badiger et al. [2] and the 83.9% reported in the Mumbai study [6]. Differences in recall period, academic years included and questionnaire design limit direct comparison. The Kerala study reported six-month self-medication in 46.8% of first-year and 67.6% of second-year students [5]. Our estimates did not follow that pattern. However, the confidence interval around the year comparison was wide enough to include differences in either direction. The result should therefore be read as an inconclusive year association, rather than evidence that the two groups were equivalent.

The knowledge results identify areas that could be addressed during early pharmacology teaching. Recognition of the expected responses on antibiotic courses and antimicrobial resistance was less frequent than recognition of several basic medicine-safety concepts. At the same time, most students agreed that antibiotics should not be taken without prescription. This combination points to a need to connect general safety statements with practical decisions: whether a medicine is indicated, whether a previous prescription applies to a new illness and when symptoms require clinical assessment.

Seven recent self-medicators selected antibiotics as their medicine class. This finding is relevant to stewardship, although it does not measure total antibiotic exposure. The export contained one recorded class per respondent, so additional use could have been missed. The percentage also cannot be compared directly with the 30% antibiotic procurement figure reported by Virmani et al., whose study specifically examined obtaining antibiotics without a valid prescription [3]. The present questionnaire did not establish antibiotic names, doses or prescription status. Its generic course-completion question cannot be used to estimate antibiotic nonadherence.

The reported safety behaviours deserve attention independently of prevalence. Some students did not consistently read labels or check expiry dates, and approximately one-

third of those answering the persistent-symptom question selected changing or continuing the medicine rather than consulting a doctor. These responses provide useful situations for case-based teaching. The reported adverse reactions also merit further study, but they were not verified or linked to a particular medicine. They represent perceived adverse effects and should not be interpreted as a causally established incidence of harm.

Self-medication itself covers a broad range of decisions. Appropriate use of a suitable non-prescription medicine for a familiar minor symptom differs from unsupervised antibiotic use or repeatedly treating an unresolved illness. Our data could not distinguish these situations reliably. A useful educational response would therefore address the boundaries of self-care, rather than assume that every episode reflects poor practice. Any benefit from such teaching would need to be tested prospectively.

Limitations

The study was confined to one institution, and the number of students approached was unavailable. Selection and nonresponse bias could therefore affect the prevalence estimate. Responses were self-reported and susceptible to recall and social desirability bias. Some students denied recent self-medication but answered subsequent drug-use questions, suggesting uncertainty about the recall period or the intended scope of the follow-ups. Two questionnaires excluded for missing responses may instead have reflected legitimate skips; retaining them changed prevalence only slightly.

Some response labels and longer open answers were truncated in the PDF export. The knowledge key required an explicit analysis decision for the old-prescription item, and the questionnaire's validity was not established by the available material. Internal consistency alone does not resolve this limitation. Self-reported formal pharmacology training was also difficult to interpret and could not be assumed to represent routine curricular exposure. Finally, the cross-sectional design cannot establish whether teaching, prior experience or other differences between cohorts explain the observed knowledge scores.

CONCLUSION

Approximately half of first- and second-year MBBS respondents reported recent self-

medication. Knowledge was higher in the second year, while the prevalence of self-medication did not differ clearly between years. The findings support closer attention to specific misconceptions and medicine-safety decisions during early training. Future evaluations should distinguish appropriate self-care from potentially harmful use and measure behaviour alongside knowledge.

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Table 1 Participant characteristics

Characteristic	Category	Number and percentage
Academic year	First MBBS	56 (46.3%)
Academic year	Second MBBS	65 (53.7%)
Gender	Female	70 (57.9%)
Gender	Male	51 (42.1%)
Residence	Urban	82 (67.8%)
Residence	Rural	39 (32.2%)
Medical family member	Yes / No / Maybe	31 / 87 / 3
Easy pharmacy access	Yes	97 (80.2%)
Chronic illness	Yes / No / Maybe	5 / 108 / 8
Formal pharmacology training	Yes	15 (12.4%)
Age years	Mean ± SD	20.06 ± 1.45

N=121. Age range 18–30 years. “Maybe” was retained as a separate response for medical

family background and chronic illness. Values are n (%) unless otherwise indicated.

Table 2 Knowledge responses by academic year

Item	First MBBS	Second MBBS	Fisher p	BH q
K1 Definition of self medication	40/56 (71.4%)	51/65 (78.5%)	0.404	0.404
K2 Definition of OTC medicines	34/55 (61.8%)	55/64 (85.9%)	0.003	0.003
K3 Antibiotics effective against bacteria	30/56 (53.6%)	54/65 (83.1%)	<0.001	<0.001
K4 Incomplete antibiotic course and resistance	23/56 (41.1%)	50/65 (76.9%)	<0.001	<0.001
K5 Paracetamol overdose and liver	24/55 (43.6%)	54/65 (83.1%)	<0.001	<0.001

damage				
K6 Meaning of drug interaction	32/56 (57.1%)	60/64 (93.8%)	<0.001	<0.001
K7 Meaning of adverse drug reaction	21/55 (38.2%)	62/65 (95.4%)	<0.001	<0.001
K8 Meaning of expiry date	33/56 (58.9%)	63/65 (96.9%)	<0.001	<0.001
K9 Risk from reusing old prescriptions	39/56 (69.6%)	63/65 (96.9%)	<0.001	<0.001
K10 Irrational antibiotic use and resistance	21/56 (37.5%)	50/62 (80.6%)	<0.001	<0.001

Values are responses meeting the analysis key / valid responses (%). BH q values adjust for ten item comparisons. Both "risky" and "sometimes risky" were accepted for K9.

Complete knowledge totals were available for 54 first-year and 60 second-year students. The operational key and alternative scoring analyses are described in the text.

Table 3 Attitudes toward self-medication

Statement	Agree or strongly agree	Neutral	Disagree or strongly disagree
A1 Acceptable for minor illnesses	64/121 (52.9%)	40/121 (33.1%)	17/121 (14.0%)
A2 Medical students can self prescribe safely	40/121 (33.1%)	41/121 (33.9%)	40/121 (33.1%)
A3 Antibiotics should not be taken without prescription	93/121 (76.9%)	12/121 (9.9%)	16/121 (13.2%)
A4 Full antibiotic course is necessary	92/121 (76.0%)	14/121 (11.6%)	15/121 (12.4%)
A5 Self medication reduces healthcare burden	26/119 (21.8%)	39/119 (32.8%)	54/119 (45.4%)
A6 Consulting a doctor is better	86/120 (71.7%)	16/120 (13.3%)	18/120 (15.0%)
A7 OTC medicines are completely safe	23/120 (19.2%)	58/120 (48.3%)	39/120 (32.5%)
A8 Reading drug labels is important	93/119 (78.2%)	16/119 (13.4%)	10/119 (8.4%)
A9 Self medication can delay diagnosis	74/120 (61.7%)	28/120 (23.3%)	18/120 (15.0%)
A10 ADR awareness is important	85/120 (70.8%)	18/120 (15.0%)	17/120 (14.2%)

Percentages use the valid denominator for each statement. Agreement with acceptability for minor illness or reduced healthcare burden

was not automatically classified as unsafe. ADR, adverse drug reaction; OTC, over the counter.

Table 4 Practices among students reporting recent self-medication

Item	Response	N / valid N (%)
Condition	Fever	17/62 (27.4%)
Condition	Cold	16/62 (25.8%)
Condition	Pain	13/62 (21.0%)
Condition	Headache	12/62 (19.4%)
Condition	Others	4/62 (6.5%)
Medicine class	Analgesics	33/62 (53.2%)
Medicine class	Others	8/62 (12.9%)
Medicine class	Antihistamines	8/62 (12.9%)
Medicine class	Antibiotics	7/62 (11.3%)
Medicine class	Antacids	6/62 (9.7%)
Recorded source	Pharmacy	33/62 (53.2%)
Recorded source	Old prescription	19/62 (30.6%)
Recorded source	Friends	6/62 (9.7%)

Recorded source	Internet	4/62 (6.5%)
Reason	Mild illness	19/60 (31.7%)
Reason	Cost saving	14/60 (23.3%)
Reason	Previous experience	13/60 (21.7%)
Reason	Time saving	8/60 (13.3%)
Reason	Others	6/60 (10.0%)
Complete course	Always	22/62 (35.5%)
Check expiry	Always	44/62 (71.0%)
Read labels	Always	38/62 (61.3%)
Reported adverse reaction	Yes	13/60 (21.7%)
Persistent symptoms	Consult doctor	40/59 (67.8%)
Persistent symptoms	Change drug	13/59 (22.0%)
Persistent symptoms	Continue	6/59 (10.2%)

The subgroup contained 62 students. Missing responses: adverse reaction, 2; persistent symptoms, 3; reason, 2. other listed items were complete. Safety-behaviour rows show

the specified response rather than all response categories. "Complete course" was not antibiotic-specific. Adverse reactions were self-reported and were not clinically adjudicated.

Table 5 Associations with recent self-medication

Comparison	Prevalence in group	Prevalence in reference	Unadjusted PR and 95% CI	Fisher p
Academic year Second MBBS versus First MBBS	32/65 (49.2%)	30/56 (53.6%)	0.92 (0.65 to 1.30)	0.716
Gender Female versus Male	35/70 (50.0%)	27/51 (52.9%)	0.94 (0.67 to 1.34)	0.854
Residence Urban versus Rural	43/82 (52.4%)	19/39 (48.7%)	1.08 (0.73 to 1.58)	0.846
Medical family member Yes versus No	18/31 (58.1%)	43/87 (49.4%)	1.17 (0.81 to 1.70)	0.531
Easy pharmacy access Yes versus No	47/97 (48.5%)	15/24 (62.5%)	0.78 (0.53 to 1.12)	0.258
Formal pharmacology training Yes versus No	8/15 (53.3%)	54/106 (50.9%)	1.05 (0.63 to 1.74)	1.000
Chronic illness Yes versus No	3/5 (60.0%)	56/108 (51.9%)	1.16 (0.55 to 2.42)	1.000

Adjusted model term	Adjusted PR	95% CI	p value
Second versus first MBBS	0.91	0.63 to 1.32	0.630
Female versus male	0.94	0.66 to 1.34	0.740
Age per year	1.01	0.89 to 1.14	0.925

PR, prevalence ratio; CI, confidence interval. "Maybe" responses were omitted only from the relevant binary comparison (medical family background, n=118; chronic illness, n=113). All seven Fisher tests had BH q=1.000. The adjusted model included academic year, gender and age in 121 participants and used HC1 robust variance. These analyses were exploratory.