

PREVALENCE, KNOWLEDGE, AND PREDICTORS OF NON-PRESCRIPTION PAINKILLER USE AMONG UNIVERSITY NURSING STUDENTS IN PAKISTAN: A MULTICENTER CROSS-SECTIONAL STUDY

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Abstract

Background: Non-prescription use of painkillers is common among university students and may increase the risk of inappropriate dosing, adverse drug reactions, and other medication-related problems. This study assessed the prevalence, knowledge, types, reasons, and sources of non-prescription painkiller use among university students in Pakistan.

Methods: A multicenter cross-sectional study was conducted among 365 BS-level nursing students. Participants were selected using a structured sampling approach, and data were collected through a self-administered questionnaire assessing sociodemographic characteristics, painkiller use, types and sources of analgesics, reasons for use, and knowledge regarding painkiller use. Descriptive statistics were used to summarize the data, while inferential analyses were performed to examine associations and predictors of non-prescription painkiller use.

Results: Of the 365 participants, 244 (66.8%) reported using painkillers without a prescription. Paracetamol was the most commonly used analgesic (38.9%), followed by ibuprofen (25.0%) and diclofenac (15.2%). Headache (36.9%) was the leading reason for use, followed by menstrual pain (19.3%). Community pharmacies were the most common source (50.0%). Regarding knowledge, 58.6% of participants demonstrated good knowledge, 40.8% moderate knowledge, and 0.5% poor knowledge. Despite relatively good knowledge, non-prescription use remained high.

Conclusion: Non-prescription painkiller use was prevalent among university students despite generally favorable knowledge. Improving knowledge alone may be insufficient; interventions should also address medication accessibility, previous self-medication experiences, and responsible analgesic-use practices.

Introduction

Self-medication, the use of medicines by individuals for self-identified illnesses without professional consultation, poses a public-health issue. While it offers convenience for minor ailments, it can lead to issues like incorrect drug

selection, inappropriate dosing, adverse reactions, drug interactions, treatment failures, and delayed diagnoses. University students are particularly susceptible due to academic pressures, time constraints, easy access to medications, prior experiences, and the belief that common

symptoms don't require professional advice. A review of 89 studies found a self-medication prevalence of 70.1% among this demographic [1]. Analgesics are among the most commonly used medications without professional advice, especially among university students for headaches, fever, and various acute pains. A recent study found that 82.8% of students engaged in self-medication with analgesics, with headaches being the most reported symptom (81.5%) [2]. Additionally, 50.5% of medical students used over-the-counter painkillers during exams, suggesting academic stress influences analgesic use [3]. In Pakistan, access to medications through community pharmacies facilitates self-medication, particularly among educated populations. Research indicates widespread misuse of non-prescription medicines, with earlier studies showing considerable reliance on personal experience for medication choices [4]. A systematic review in 2025 revealed a 64% self-medication prevalence across 65 studies in Pakistan, with university students showing even higher rates at 71.3%, highlighting the need for better awareness and professional guidance in medication use [5]. The availability of medicines without professional assessment may lead to inappropriate use in Punjab, where concerns about non-prescription medication practices persist. A study showed final-year medical students frequently prescribed analgesics independently, revealing regulatory weaknesses in medicine access. Factors such as accessibility, health-system issues, prior exposure to medications, and knowledge potentially influence self-medication practices [6]. Despite having better pharmacological knowledge, health discipline students may not engage in rational medication practices; familiarity could boost confidence in self-treating symptoms. Recent data indicated that 76.9% of medical undergraduates practiced self-medication in the last six months, with 28.3% using analgesics, underscoring the need to explore knowledge, attitudes, and motivations behind this behavior [7].

The inappropriate use of analgesics poses various risks, including gastrointestinal issues, renal injury, hepatotoxicity, cardiovascular effects,

hypersensitivity, and drug interactions. Risks increase with excessive doses, combining similar medications, prolonged use, or failing to seek professional assessment. Understanding analgesic types, usage patterns, sources, reasons, and side effects is critical for effective health education and medication safety interventions. This issue impacts rational medicine use and health policy, with the WHO stressing the importance of monitoring medicine use in healthcare systems. In the South-East Asia Region, the WHO calls for enhanced monitoring and promotion of appropriate medication practices to improve safety and combat antimicrobial resistance [8].

Globally, self-medication (SM) is highly prevalent, with rates varying widely—from 11.2% to 93.7%—depending on the country and demographic group studied [9]. Notably, its use has been rising among university students around the world. Several factors contribute to this trend, such as the easy availability of over-the-counter drugs, convenient access to pharmacies, financial limitations faced by students on tight budgets, and the growing influence of social media. Social platforms play a key role by making medication-related information more accessible, shaping behaviors through content shared online, and encouraging reliance on package inserts [10]. Additionally, the desire to save time and avoid the costs of professional healthcare further drives SM practices. Although self-medication may provide short-term relief, it carries serious risks, including incorrect drug use, adverse side effects, misdiagnosis, and growing concerns about antibiotic resistance. It may also contribute to a higher likelihood of turning to illicit substances [11].

In Pakistan, while self-medication is increasingly recognized, there's a gap in multicenter research on non-prescription painkiller use among university students from diverse academic fields. Current studies predominantly target single institutions or specific student groups, overlooking the broader context of analgesic consumption and associated knowledge and predictors. With a reported 71.3% prevalence of self-medication among students [5], the study

titled “Prevalence, Knowledge, and Predictors of Non-Prescription Painkiller Use Among University Students in Pakistan” seeks to investigate usage patterns, assess knowledge regarding safe analgesic practices, and identify factors influencing painkiller use. Findings aim to inform educational interventions for safer analgesic use among young adults.

Methodology

quantitative, multicenter cross-sectional study design was used to assess the prevalence, knowledge, and predictors of non-prescription painkiller use among university students in Pakistan. The study examines whether selected sociodemographic, academic, and behavioral characteristics are associated with the use of painkillers without a prescription. The study was conducted among undergraduate nursing students enrolled in selected universities in Punjab province of Pakistan. The participate of Including nursing to allow comparison of painkiller use and knowledge across academic programs with different levels and types of exposure to pharmacology, clinical practice, and medication-related education. The study population was comprising undergraduate university students enrolled in BS-level health-related programs.

Participants were eligible if they: Are currently enrolled as undergraduate students at the selected participating universities. Are willing to participate in the study, provide informed consent, and are able to understand and complete the study questionnaire. Students were excluded if they: are not enrolled in the selected academic programs, are on extended leave during the data-collection period, have difficulty understanding or completing the questionnaire, and decline to provide informed consent were excluded from the study.

A multistage sampling technique was used to recruit the 365 participants. In the first stage, participating universities was selected. In the second stage, eligible students were stratified, Participants was subsequently be selected from each stratum using the predetermined sampling procedure. This approach will ensure

representation of students from the different health-related academic disciplines. The primary dependent variable was: Non-prescription painkiller use, defined as the use of an analgesic medication without obtaining a prescription or consultation from a qualified healthcare professional for the particular episode of pain.

The primary dependent variable was: Non-prescription painkiller use, while the Secondary Outcomes: Knowledge regarding painkillers, Frequency of painkiller use, Type of painkiller used, Reasons for use, Source of painkillers, Source of medication information, Awareness of adverse effects, and Awareness of contraindications and drug interactions.

Potential predictors will include: Age, Gender, Academic program, Year of study, University, Residence, Previous experience of pain, History of painkiller use, Family influence, Access to medicines, Previous pharmacology education, Knowledge score, Perceived severity of symptoms, Accessibility of healthcare services, and Previous experience with painkillers.

Data was collected a demographic data, and using structured, self-administered questionnaire regarding prevalence, knowledge regarding pain killer, and factors associated [4, 12]. The questionnaire may consist of four sections:

Section A: Sociodemographic and Academic Characteristics: This section will collect information regarding: Age, gender, academic program, year of study, university and residence and other relevant characteristics.

Section B: Painkiller Use: Questions will assess:

- Whether the student has used painkillers without prescription
- Frequency of use, Type of analgesic used, Indication/reason for use
- Duration of use, Dose/frequency, Source of the medicine
- Person or source recommending the medicine
- Whether the student read the medication label/package insert

Section C: Knowledge Regarding Painkillers:
Knowledge questions will assess students' understanding of:

- Appropriate indications, Dosage
- Contraindications, Adverse effects, Drug interactions, Maximum recommended use
- Risks of prolonged use, Risks associated with combining analgesics, and
- Importance of professional consultation

A total knowledge score was calculated by assigning 1 point for each correct response and 0 points for an incorrect or "don't know" response. The total score will then be categorized into predefined levels, such as poor, moderate, and good knowledge, according to the validated scoring method selected for the study.

Section D: Factors Associated with Non-Prescription Use

This section will assess potential reasons and predictors, including:

- Previous successful experience, Convenience, Time constraints
- Cost of consultation, Easy availability of medicines, Perceived minor nature of the illness
- Recommendation by friends/family, Previous prescription
- Academic stress, and Lack of time to visit a healthcare professional

Validity and Reliability

The questionnaire was evaluated for content and face validity by experts in pharmacology, pharmacy, nursing, medicine, and research methodology, focusing on relevance, clarity, comprehensiveness, and appropriateness. A pilot study with eligible university students will follow. Reliability was measured using a coefficient like Cronbach's alpha or KR-20 for dichotomous items. Revisions were made based on validity and reliability assessment findings.

Data Collection Procedure

After obtaining ethical approval and permission from the participating universities, the researcher will approach eligible students through the respective departments. The purpose of the study was explained to the participants, and written informed consent was obtained before data collection. Participants will complete the questionnaire independently. No names or personally identifying information was collected. Completed questionnaires were checked for completeness and assigned identification codes before data entry.

Data was entered into IBM SPSS Statistics and analyzed using descriptive and inferential statistics. Categorical variables were presented as: Frequency (n), Percentage (%). Continuous variables were summarized using: Mean, Standard deviation, Median, Interquartile range, where appropriate. The association between non-prescription painkiller use and categorical variables such as gender, academic program, and year of study was assessed using the chi-square test or Fisher's exact test when appropriate. For comparisons of knowledge scores between two groups, an independent-samples *t* test was used when assumptions are satisfied; otherwise, the Mann-Whitney U test was applied. For comparisons among more than two academic programs, one-way ANOVA or the Kruskal-Wallis test was used according to data distribution. To identify independent predictors of non-prescription painkiller use, binary logistic regression was performed if the outcome is coded as: 0= No non-prescription painkiller uses and 1 = Non-prescription painkiller use. The results were reported as adjusted odds ratios (AORs) with 95% confidence intervals and *p* values. Statistical significance was considered at $p < .05$.

Ethical approval was obtained from the relevant institutional research/ethics committee before commencement of data collection. Permission was also obtained from the participating universities. Participants received information about the purpose and procedures of the study and will provide informed consent. Participation was voluntary, and participants would have the

right to withdraw at any stage without penalty. Confidentiality and anonymity were maintained by using coded questionnaires rather than names or other identifying information. Data was stored securely and used exclusively for research purposes.

Result

Table 4.1 presents the sociodemographic and academic characteristics of the 365 participants. More than half of the participants were female (55.9%), while 44.1% were male. Most participants were from urban areas (63.8%), while 36.2% were from rural areas. A previous history of pain was reported by 69.3% of participants, suggesting that exposure to pain-related symptoms was common in the study population.

Table 1. Sociodemographic and Academic Characteristics of Participants		
Category	Frequency	Percentage
Gender		
Female	204	55.9
Male	161	44.1
Residence		
Urban	233	63.8
Rural	132	36.2
Previous pain history		
Yes	253	69.3
No	112	30.7
Prevalence of Non-prescription painkiller use		
Yes	Yes	Yes
No	No	No

Prevalence, knowledge, type and reason of pain killer used among student

The 244 participants (66.8%) reported using painkillers without a prescription, whereas 121 (33.2%) reported no non-prescription painkiller use. Thus, approximately two-thirds of the participants in this dataset practiced non-prescription painkiller use. This finding indicates that self-directed analgesic use was relatively common among the participating university students. The paracetamol was the most commonly used painkiller, reported by 95 participants (38.9%). This was followed by ibuprofen (25.0%) and diclofenac (15.2%). Aspirin and naproxen were each reported by 7.8% of users, while 5.3% reported using other painkillers. The predominance of paracetamol indicates that participants primarily relied on commonly available analgesics for managing pain without obtaining a prescription. Headache was

the most frequently reported reason for non-prescription painkiller use, accounting for 36.9% of users. Menstrual pain was the second most common reason (19.3%), followed by fever and musculoskeletal pain (13.5% each). Dental pain accounted for 10.2%, while 6.6% reported other reasons. The findings suggest that students primarily used painkillers for common acute symptoms rather than for complex or chronic conditions. The majority of participants (58.6%) had good knowledge regarding painkiller use. A further 40.8% demonstrated moderate knowledge, while only 0.5% had poor knowledge. Overall, the participants demonstrated a relatively favorable level of knowledge concerning painkillers. However, the presence of non-prescription use despite generally good knowledge suggests that knowledge alone may not necessarily prevent self-medication behavior.

Table 2: Prevalence and Patterns of Non-Prescription Painkiller Use and Knowledge Among University Students		
Category	Frequency	Percentage
Prevalence of Non-prescription painkiller use		
Yes	244	66.8
No	121	33.2
Types of Painkillers Used Without Prescription Among Users		
Paracetamol	95	38.9
Ibuprofen	61	25.0
Diclofenac	37	15.2
Aspirin	19	7.8
Naproxen	19	7.8
Other	13	5.3
Reasons for Non-Prescription Painkiller		
Headache	90	36.9
Menstrual pain	47	19.3
Fever	33	13.5
Musculoskeletal pain	33	13.5
Dental pain	25	10.2
Other	16	6.6
Sources of Painkillers Among Users (n = 244)		
Community pharmacy	122	50.0
Previous prescription	37	15.2
Family/friends	36	14.8
Home medicine cabinet	36	14.8
Online source	13	5.3
Knowledge Categories Regarding Painkiller		
Poor	2	0.5
Moderate	149	40.8
Good	214	58.6

Associations Between Selected Characteristics and Non-Prescription Painkiller Use

A statistically significant association was found between year of study and non-prescription painkiller use ($\chi^2 = 13.602$, $p = 0.009$), indicating that the prevalence of non-prescription painkiller use differed across academic years. A strong statistically significant association was also observed between easy access to painkillers and non-prescription use ($\chi^2 = 28.995$, $p < 0.001$). Similarly, previous successful experience with painkillers was significantly associated with non-prescription use ($\chi^2 = 54.579$, $p < 0.001$).

In contrast, gender ($p = 0.634$), academic program ($p = 0.552$), residence ($p = 0.601$), knowledge level ($p = 0.867$), pharmacist advice ($p = 0.803$), and previous pain history ($p = 0.741$) were not statistically significantly associated with non-prescription painkiller use. These findings suggest that accessibility and previous positive experience with painkillers may be more important determinants of self-medication behavior than demographic characteristics or overall knowledge level.

Table 3. Associations Between Selected Characteristics and Non-Prescription Painkiller Use

Variable	χ^2	<i>P</i>	Interpretation
Gender	0.227	0.634	Not significant
Academic program	2.099	0.552	Not significant
Year of study	13.602	0.009	Significant
Residence	0.273	0.601	Not significant
Knowledge level	0.286	0.867	Not significant
Easy access to medicines	28.995	<0.001	Significant
Previous successful experience	54.579	<0.001	Significant
Pharmacist advice	0.062	0.803	Not significant
Previous pain history	0.109	0.741	Not significant

Binary Logistic Regression Analysis of Predictors of Non-Prescription Painkiller

Table 4 presents the multivariable logistic regression analysis conducted to identify independent predictors of non-prescription painkiller use. Easy access to medicines was a significant independent predictor. Students reporting easy access had approximately 3.16 times higher odds of using painkillers without a prescription compared with those without easy

access (AOR = 3.155, 95% CI: 1.905–5.226, $p < 0.001$). Previous successful experience with painkillers was the strongest predictor in the model. Students who had previously experienced successful use had approximately 5.89 times higher odds of non-prescription painkiller use (AOR = 5.894, 95% CI: 3.513–9.890, $p < 0.001$). Age, gender, previous pain history, and knowledge score were not significant independent predictors in the adjusted model ($p > 0.05$).

Table 4: Binary Logistic Regression Analysis of Predictors of Non-Prescription Painkiller

Predictor	AOR	95% CI	<i>P</i>
Age	1.103	0.957–1.271	.178
Female	1.009	0.610–1.666	.973
Easy access to medicines	3.155	1.905–5.226	<.001
Previous successful experience	5.894	3.513–9.890	<.001
Previous pain history	1.108	0.650–1.892	.706
Knowledge score	1.330	0.620–2.853	.464

Discussions

The sociodemographic characteristics of the 365 university students in the study, noting a slightly higher percentage of females (55.9%) compared to males (44.1%). A significant majority (63.8%) hailed from urban areas, with 36.2% from rural regions. In terms of pain history, 69.3% of participants indicated previous experiences with pain, which is crucial as it may affect their familiarity with analgesic medications and their decisions about non-prescription use. The female representation aligns with recent studies among university and health-science students in Pakistan,

though variations exist depending on the institution and sampling methods [13]. Previous studies show high prevalence of analgesic self-medication, but direct comparisons are complex due to differing sample focuses. The urban dominance in the present findings likely reflects better access to healthcare and pharmacies, which influences self-medication behaviors [14]. Recent research underscores the significance of accessibility regarding medication use among students, including those engaged in self-diagnosis and self-medication through online resources [15].

A significant 69.3% of participants reported previous pain experience, which is crucial as it relates to familiarity with analgesics and increased likelihood of self-medication, consistent with earlier studies indicating this trend among Pakistani university students. A study in Karachi noted 50.1% cited past experience as their main reason for self-medication, primarily for headaches (72.4%) [16]. Recent studies reveal similar patterns; for instance, a 2024 study in Punjab found a 73.9% analgesic self-medication prevalence among medical students, closely matching the current study's 66.8% [17]. Ameer et al. reported 68.5% in Lahore. However, the current study's multidisciplinary sample strengthens the findings [13]. Conversely, a 2023 Lahore study reported a startling 98.6% prevalence due to a broader self-medication definition. International research also reflects high self-medication rates, underscoring its commonality among university populations [18]. In the present study, 244 out of 365 participants (66.8%) reported using painkillers without a prescription, aligning with evidence from Pakistan that self-medication is particularly prevalent among university students [5]. A systematic review estimated a self-medication prevalence of 64% in Pakistan, with university students at 71.3%. The current prevalence of 66.8% is consistent with this literature and is similar to findings from a Lahore study showing 68.5% self-medication among 432 medical students [13]. A subsequent 2024 study in Punjab reported a higher prevalence of 73.9%. These results suggest that non-prescription painkiller use is common among health-science students in Pakistan [17]. A broader 2025 study of 699 students indicated that 64.9% had self-medicated in the past six months, with analgesics being the most common, sourced primarily from pharmacies (81.3%) [19]. Although the present study focuses specifically on non-prescription painkiller use, the overall prevalence supports that self-medication extends beyond medical students to the wider university population, warranting cautious interpretation of direct numerical comparisons.

In the study, paracetamol was the most frequently used painkiller (38.9%), followed by ibuprofen (25.0%) and diclofenac (15.2%). Aspirin and naproxen each represented 7.8%, while 5.3% reported other analgesics. This prevalence of paracetamol aligns with recent Pakistani studies, which found that 64.58% of medical students in Lahore favored it for self-medication, and 62.3% of students in Khyber Pakhtunkhwa used paracetamol [13]. The current study's proportion of paracetamol users (38.9%) is lower, possibly due to a broader sample composition and inclusion of various analgesics [20]. The higher ibuprofen usage in this study (25.0%) contrasts with the 9.8% reported for Khyber Pakhtunkhwa, reflecting differing analgesic preferences among student populations across health disciplines. Thus, while patterns are similar, specific analgesic distributions vary.

Headache (36.9%) was the primary reason for non-prescription painkiller use, followed by menstrual pain (19.3%), fever (13.5%), musculoskeletal pain (13.5%), and dental pain (10.2%). This aligns with previous studies, such as one in Lahore (50.69% for headaches) [13], and another involving medical students in Khyber Pakhtunkhwa (30.3%) [20]. Variations may stem from differences in study design, participant demographics, and the ability to select multiple reasons. The tendency of students to self-medicate for typical acute symptoms is further supported by a study indicating similar results, emphasizing the inclination to avoid professional consultation for familiar issues. Community pharmacies emerged as the most common source of painkillers (50.0%), followed by previous prescriptions (15.2%), family/friends (14.8%), and home medicine cabinets (14.8%) [21]. This reinforces findings from other recent Pakistani studies citing pharmacies as the primary source for medications. Although 15.2% of participants reported using previous prescriptions as guidance, a 25.8% figure was noted in the Khyber Pakhtunkhwa study, indicating potential differences in the operationalization of sources. Regarding knowledge, 58.6% of participants exhibited good knowledge of painkiller use, yet two-thirds still

engaged in non-prescription painkiller use, highlighting a disconnect between knowledge and behavior [20]. This discrepancy echoes findings from the Superior University study, where medical students recognized medication risks but had similar self-medication rates compared to others. Factors like accessibility, perception of safety, and personal experience likely contribute to ongoing self-medication despite knowledge of risks [19]. As a recommendation Interventions should address safe dosage, adverse effects, interactions, contraindications, and professional consultation, not just knowledge, to reduce inappropriate analgesic use in students.

The study has several limitations: its cross-sectional design prevents establishing causal relationships between knowledge, sociodemographic characteristics, and painkiller use. Data reliant on self-reports may suffer from recall and social-desirability bias. The sample, drawn from specific health programs, may not represent all university students in Pakistan, limiting generalizability. The single geographical context may overlook regional variations in healthcare. Recall bias could affect accuracy in reporting past analgesic use. Knowledge assessment might not reflect actual behavior, and there was no clinical verification of medication practices. Potential selection bias exists, and differences in academic programs may influence knowledge. No longitudinal assessment limits understanding of changes over time.

Conclusion

The study revealed that majority of university students used non-prescription painkillers, with paracetamol being the most common, followed by ibuprofen and diclofenac. The primary reason for usage was headaches, followed by menstrual pain, fever, and musculoskeletal pain, with community pharmacies being the main source. Although more than half of participants demonstrated good knowledge about medications, this knowledge did not significantly correlate with non-prescription usage. Factors like year of study, easy access to medications, and past successful experiences were linked to usage. This suggests that mere knowledge

enhancement is inadequate; universities should implement comprehensive interventions. Collaboration with community pharmacists is also essential to ensure responsible dispensing and encourage consultation, addressing medication safety concerns. Future studies should explore broader factors influencing non-prescription analgesic use among diverse student populations.

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