

Patterns and Knowledge of Analgesic Use among Undergraduate Non-Medical Students at Kirkuk University, Iraq: A Cross-Sectional Study

Mirna K. Faiq^{1*}

¹Department of Pharmacology and Toxicology, College of Pharmacy, University of Kirkuk, Kirkuk, Iraq. Ph.D. Clinical Pharmacy.

ABSTRACT

Background: Pain relievers, also known as analgesics, are very important for alleviating pain. However, despite their advantages, analgesics are frequently misused, especially by young adults, including university students. The objective of this study was to investigate the patterns and knowledge of analgesic usage among non-medical students at Kirkuk University. **Methods:** A descriptive cross-sectional study was conducted from January to March 2025 among students at various primary locations within the university. A convenience sampling method was used. The questionnaires were divided into three sections, the first of which contained sociodemographic information. Seven questions about the students' analgesic habits were included in the second. And about 13 knowledge-based questions about analgesic risks, side effects, contraindications, and analgesics found in popular brands are included in the third section. **Results:** About 312 students responded, with paracetamol being the most commonly used, 48.09%. The most common indication for use was headache. About 53% of students were taking analgesics with meals. About 31.41% reported using analgesics only as needed. Just 12.18% admitted to not reading the leaflet. About 52.20% of students consult their physician if symptoms persist. The average score of the 312 participants on the knowledge-based questions was moderate (6.6 out of 13). Hence, despite their awareness that the analgesic comes with a patient information leaflet, students' average score on the knowledge-based questions was moderate, suggesting that while they have some fundamental information, they are not aware of the maximum daily dose, risks, side effects, or contraindications.

Keywords: Analgesics, Painkillers, NSAID, Paracetamol, Kirkuk.

I. INTRODUCTION

Pain relievers, or analgesics, are essential for reducing pain and discomfort all over the world [1]. Despite their advantages, they are frequently abused, particularly by young adults like college students [2]. Self-medication is one reason why people use drugs irrationally [3]. Self-medication refers to the use of over-the-counter medications to treat minor, transient symptoms without consulting a physician or other healthcare professional [4]. For safety reasons, over-the-counter analgesics are typically used for no longer than ten

days. They are primarily recommended for headache, migraine, lower back pain, musculoskeletal disorders, dysmenorrhea, abdominal pain, toothache, and fever because they alleviate various forms of pain that the body experiences, particularly transient pain [5].

Currently, the main approaches to treating pain include non-steroidal anti-inflammatory drugs, aspirin, and paracetamol. Unfortunately, these drugs have dangerous side effects, particularly when taken improperly and disregarding safety precautions. A painkiller's prescriber

should be able to give some warning information about the drug. According to several studies, students' use of analgesics is caused by their exposure to medical information through the media, especially for non-medical students, as well as from other sources like friends, family, and neighborhood pharmacies [6]. Stress, poor nutrition, inadequate sleep, drug abuse, and mental health problems are among the most common health risks that university students often face [7].

In Iraq, analgesics are frequently used and abused [8]. Additionally, a high level of self-medication has been reported in Iraq [9]. There is a significant research gap concerning the particular knowledge levels and usage patterns among non-medical students in the Kirkuk region, despite these known concerns. The majority of Iraqi literature that is now available focuses on medical or pharmacy students who have a basic background in pharmacology. Non-medical students are more vulnerable to academic pressures like sleep deprivation and tension headaches, which result in frequent use of analgesics, because they lack clinical experience [10]. Non-steroidal anti-inflammatory drugs (NSAIDs) abuse raises the risk of gastrointestinal issues like bleeding, perforations, and ulcers, which have detrimental effects on public health. These health issues not only significantly increase morbidity but also drive up healthcare costs due to an increase in hospitalizations [11]. This study aimed to explore the patterns and knowledge of analgesic usage among non-medical students at Kirkuk University.

II. METHOD

Study design:

A descriptive cross-sectional study was conducted from January to March 2025 among Non-medical students at Kirkuk University.

Sampling technique

Convenience sampling was used because participants were chosen based on their availability at main university locations, such as the main building, the library, and nearby areas of student housing buildings. This method was used because of logistical challenges and the need to quickly collect data from a large number of students who were in common areas.

The Questionnaires:

The researcher developed a structured questionnaire based on a comprehensive literature review [10–13]. The questionnaires were divided into three sections, the first of which contained sociodemographic information. Seven questions about the students' analgesic habits were included in the second. And about 13 knowledge-based questions about analgesic risks, side effects, contraindications, and analgesics found in popular brands are included in the third section. The researcher divided the students' knowledge into three groups based on previous research: poor knowledge (less than 50%), moderate knowledge (between 50 and 69.9%), and good knowledge (more than 70%) [3]. Most of the questions were closed, meaning responses could only be selected from a list rather than being open-ended.

Content validity and Pilot study:

A two-stage process was used to develop the questionnaire specifically for this study context to ensure that the questionnaire accurately measures the intended construct (Knowledge and Habits). The initial draft was assessed by a panel of three academic experts in clinical pharmacy and pharmacy practice. These experts evaluated the questions' applicability to Iraqi students, clinical accuracy, and clarity. Based on their feedback, the 13 knowledge-based items were slightly changed. The questionnaire was translated into Arabic to facilitate student comprehension. A pilot test was conducted with ten undergraduate students who were excluded from the final

study. The pilot phase confirmed that the language was easily understood and that the average completion time was about ten minutes.

Sample size calculation

The following formula (Cochran formula) was used:

$$n = \frac{z^2 \cdot p(1-p)}{E^2} \quad \text{Where:}$$

n= sample size, z= Z-value (e.g., 1.96 for 95% confidence), p= estimated proportion (0.5 if unknown), E= margin of error (e.g., 0.06).

A margin of error of 0.06 was selected for this study in order to achieve a balance between feasibility and precision, enabling representative results while maintaining a manageable sample size.

$$n = \frac{1.96^2 \cdot 0.5(1-0.5)}{0.06^2} = \text{round to } 267$$

calculated study sample.

A total of 312 administered questionnaires were completed and returned, exceeding the minimum requirement.

Ethical considerations:

The protocol was approved by the Ethical Committee of the University of Kirkuk - College of Pharmacy, assigned the number (RECAUKCP4062025), while maintaining the confidentiality of students' information.

Statistical analysis:

Statistical analysis was performed using the Microsoft Excel 2019 for Windows version 10 software. Descriptive statistics (N, %) were calculated for all study items.

III. RESULTS and DISCUSSION

Demographic data

A total of 312 participants were interviewed: about half of the respondents were females 54.2%, while 45.8% of the study subjects were males. Furthermore, 62% of the respondents were between 21 and 24 years of age. About 79.5% of

students reported that they sometimes use painkillers without a prescription, while 20.5% claimed that they do not use analgesics without a prescription. A similar finding was seen in another study where 70.62% of students reported that they sometimes use painkillers without a prescription [12]. Table1 describes the Socio-demographic Characteristics of the Students.

Table 1: Socio-demographic Characteristics of the Students

Ages	N.	%.
18-20	103	33
21-24	194	62
>25	15	5
Gender		
Male	143	45.8
Females	169	54.2
Do you take painkillers without a prescription?		
Yes	248	79.5
No	64	20.5

Students' analgesic habits.

In terms of reasons, headache was reported by 22.90% of participants, whereas toothache was a concern for 16.70%. Fever was experienced by 16.60%, and menstrual pain affected 14.60%. Joint pain was reported by 10.40%, while hemorrhoids and migraines was observed in 6.30%. Abdominal pain was experienced by 4.20% of the cases. The remaining health issues, categorized as "Others", were reported by 4.20% of the cases (**Figure 1**). The majority of the students in the current research cleared that they used analgesics for headache, similar results have been reported among Aston university students, UK [10], medical students in Omar Al-

Mukhtar University, Libya [12], Undergraduate Students of University of Port Harcourt, Rivers State, Nigeria [2], and medical Science Students, East Ethiopia [14]. Students may get headaches as a result of the pressure to study. Tension headaches can be brought on by stress from long study sessions, academic obligations, and sleep deprivation. Students frequently turn to analgesics for immediate relief as a result of this pressure.

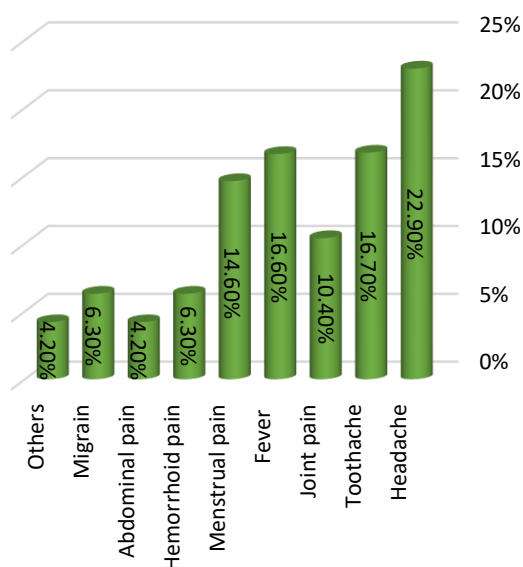


Figure 1: What students use analgesics for.

Of all participants questioned, 53% of students were taking analgesics with meals (**Figure 2**). In another study, 43% of participants used NSAIDs after meals [11]. To lower the incidence of gastrointestinal adverse effects, healthcare providers should emphasize proper NSAID use, specifically taking the medication with a meal. Besides that, 96% of students drank water with analgesics, demonstrating a basic knowledge of analgesic use. About 31.41% reported using analgesics only as needed (**Figure 3**). Customizing pain management to each patient's unique experience is the main objective of "on-need" dosage, which avoids needless medication when pain is minimal or absent. The majority of respondents, 69.6% in a different survey of Thai people, reported

using NSAIDs frequently or constantly [15].

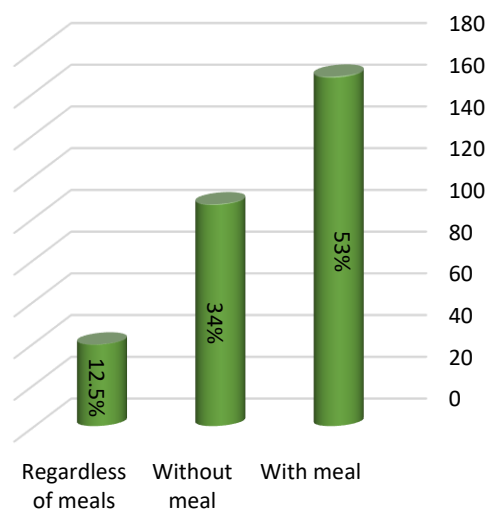


Figure 2: Usage of analgesics based on meals

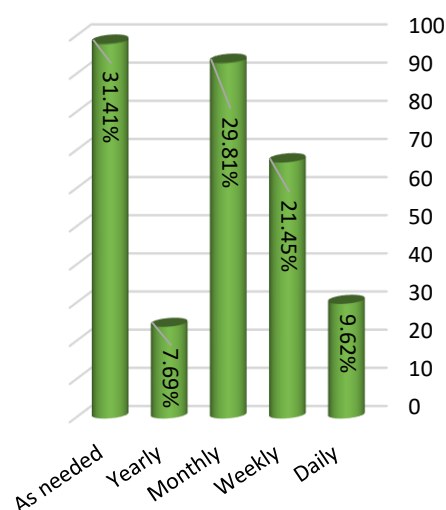


Figure 3: Medication-taking schedule of participants

In order to avoid feeling embarrassed or to satisfy the interviewer, students might have been unwilling to admit they hadn't read the leaflet. However, about 12.18% of respondents acknowledged not reading the leaflet. (**Figure 4**).

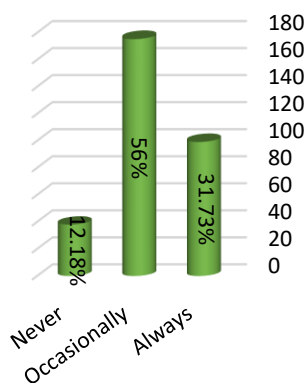


Figure 4: Pattern of reading patient information leaflets before analgesic use among students.

About 52.2% of students consult their physician if symptoms persist, while 30.8% continue to use without consultation, and about 17% raise the dose (**Figure 5**). Similar results have been reported among Northern border university students, Saudi Arabia, where 38.7% said they would see a physician if there was no improvement, and one-third proposed raising the dose [7]. This indicates that while a considerable percentage of students prioritize seeking medical advice, a sizable portion either self-manage their symptoms or escalate their treatment on their own.

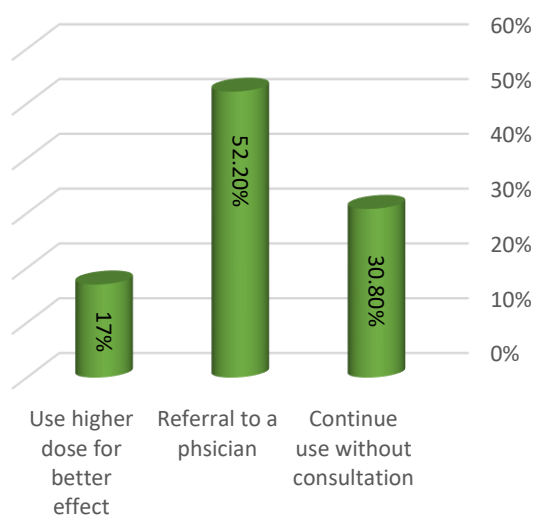


Figure 5: Action taken if there is no response to the medication

The analgesics most usually used for self-medication were Paracetamol 48.09%, followed by Diclofenac sodium 11.86%,

mefenamic acid 10.17%, and Ibuprofen 7.63%, while Aspirin and Orphenadrine citrate were rarely self-used among the students (**Figure 6**). The analgesic consumption pattern of this study is similar to a study conducted in Nigeria [2,7], in which 69.6% of the respondents used Paracetamol and in UK [10], in which 66.7% of the respondents used Paracetamol, and different from a study conducted in East Ethiopia, in which 28.7% of the respondents used Ibuprofen, followed by Diclofenac 25.7% and Paracetamol 21.7% [14]. Paracetamol, a common and easily accessible drug in many countries, is included in approximately 150 preparations [16]. Students prefer paracetamol for pain relief due to its effectiveness against mild to moderate pain, minimal gastrointestinal side effects, and safety when used correctly. It is a well-liked option for pain management because of its non-sedative properties, which enable individuals to maintain concentration while studying.

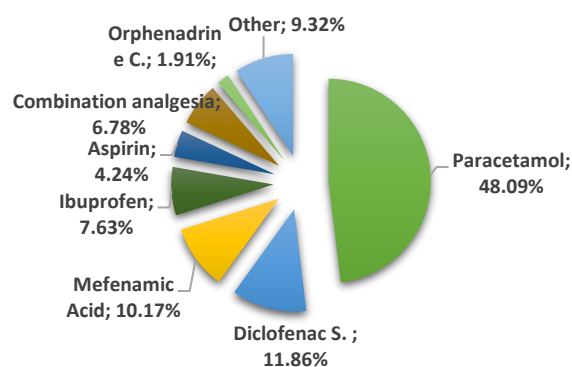


Figure 6: The most commonly used analgesics by the participants.

Although students may have been reluctant to acknowledge that they regularly consumed large doses of analgesics, 36.30% of students acknowledged that they did not have a chronic illness and consumed two tablets, and 17.2% consumed three tablets in one dose (**Figure 7**). Paracetamol was the most commonly used drug in two

or three tablets in a single dose. This was the incidence of overdosing recorded. Acetaminophen can be found in a large range of over-the-counter and prescription drugs in single-entity, combination, and multiple forms [17]. Because consumers may not be aware that these medications include acetaminophen, it is simple to combine products and accidentally take more than the prescribed amount. Between 2007 and 2017, there was a 108% increase in acute liver toxicity connected to paracetamol, which is the drug most commonly used in overdoses [18]. There is a minimal chance of side effects when using paracetamol at therapeutic dosages. Every year, less than 0.1% of the estimated 30 million paracetamol users in the UK visit a hospital after overdosing. Compared to paracetamol, NSAIDs have more side effects when used therapeutically, but they also have less severe side effects or overdose deaths [19].

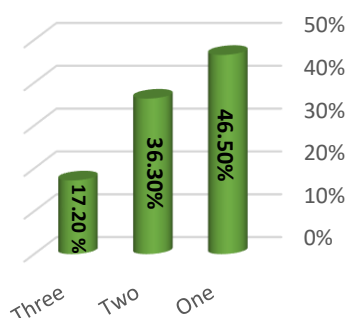


Figure 7: Percentage distribution of students by the number of analgesic tablets consumed per dose.

Knowledge-based questions regarding analgesics.

For the question, "When aspirin is needed, at what age is it appropriate to take it?", the correct response was >16 years, with only 32.69% of respondents (n=102) selecting this option. Regarding the conditions that make ibuprofen inappropriate? The correct answer was pregnancy, which was chosen by 33.33% of participants (n=104). In response to the question, "Which one of the following is usually associated with a small risk of heart disease or stroke?", the correct

answer was Ibuprofen, selected by 33.3% of participants (n=104). A majority of respondents, approximately 60.58% (n=189), correctly identified medications containing paracetamol. Ibuprofen was correctly identified by 36.86% of respondents (n = 115) when asked, "Which medication, in your opinion, also reduces swelling?" about 35.30% of participants (n=110) acknowledged that codeine carries a risk of addiction.

Regarding Ibuprofen, mefenamic acid, and Diclofenac's potential to irritate the gastrointestinal tract, 70.5% (n=220) of respondents agreed. Concerning the recommendation of paracetamol for managing fever, 74.04% of participants (n=231) acknowledged its appropriateness. Additionally, 72.12% (n=225) correctly stated that paracetamol can be administered 2-3 times daily as needed. However, only 44.55% of participants (n=139) accurately identified the maximum daily dosage as 8 tablets. When queried about whether paracetamol does not irritate the gastrointestinal tract when taken before meals, 50% (n=156) recognized this statement as true.

Lastly, with respect to the potential for high-dose paracetamol to cause liver toxicity, 66.99% of participants (n=209) provided the correct answer. The average score of the 312 participants on the knowledge-based questions (Table 2) was (6.6 out of 13), the total level of knowledge for the whole sample was (51.9%) indicating a moderate level of Knowledge according to the classification scores developed by the researcher based on previous literature [3] as poor knowledge (<50%), moderate knowledge (50-69.9%) and good knowledge (>70%). Though they are not aware of the maximum daily dose, risks, side effects, or contraindications. In another research study, the 50 students' average score on the knowledge-based questions was 3.32. [10].

Table 2. Knowledge-based questions

When aspirin is needed, at what age is it appropriate to take it?	Age	N.	%.
	≤ 6 years	108	34.61%
	10 years	59	18.91%
	12 years	43	13.79%
	>16 years *	102	32.69%
Which of the following conditions would make ibuprofen inappropriate?	Diseases	N.	%.
	Diabetes Mellitus	73	23.4%
	Obesity	77	24.68%
	Pregnancy *	104	33.33%
	Menopause	33	10.58%
	Aging	25	8.01%
Which one of the following is usually associated with a small risk of heart disease or stroke?	Analgesics	N.	%.
	Codeine	108	34.6%
	Ibuprofen *	104	33.3%
	Aspirin	73	23.4%
	Paracetamol	27	8.7%
	Which analgesics contain paracetamol?	Analgesics	N.
Panadol Extra ®*		189	60.58%
Voltfast sachet ®		89	28.52%
Profen ®		34	10.26%
Which medication, in your opinion, also reduces swelling?		Analgesics	N.
	Paracetamol	128	41.03%
	Ibuprofen *	115	36.86%
	Codeine	69	22.12%
	Painkillers that cause addiction?	Analgesics	N.
Ibuprofen		70	22.30%
Paracetamol		104	33.70%
Codeine *		110	35.30%
Aspirin		27	8.70%
Does Ibuprofen/mefenamic acid/Diclofenac irritate the GIT?		Yes N, (%)	NO N, (%)
	220(70.5%)*	92(29.5%)	
Paracetamol is good for a fever		231 (74.04%)*	81 (25.96%)
Paracetamol contains 500 mg of the active ingredient		204 (65.38%)*	108(34.62%)
You can take paracetamol 2-3 times a day if needed		225 (72.12%)*	87(27.88%)
The maximum dose of paracetamol is 8 tablets a day		139 (44.55%)*	173(55.45%)
Paracetamol doesn't irritate the GIT if taken before meals		156 (50%)*	156 (50%)
High-dose paracetamol can cause liver toxicity		209 (66.99%)*	103(33.01%)

*The right responses to the questions based on knowledge.

IV. CONCLUSIONS

Despite their awareness that the analgesic comes with a patient information leaflet, students' average score on the knowledge-based questions was moderate, suggesting that while they have some fundamental information, they are not aware of the maximum daily dose, risks, side effects, or contraindications.

V. LIMITATIONS

This study was limited to a single university. Increasing the sample size and number of universities can improve the generalizability of future studies. Despite being pilot-tested and based on similar previous research, the questionnaire was designed specifically for this study, is not validated, and only covers a few aspects of analgesic consumption and risks. Additionally, logistical limitations prevented the calculation of formal internal consistency (such as Cronbach's alpha).

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