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Analgesic use patterns among medical students in Shendi city, January -March 2026

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صدق الله العظيم

Dedication

I dedicate this work to my beloved parents, whose endless support, prayers, and sacrifices have been the foundation of my success throughout my academic journey. Their encouragement and belief in me have always inspired me to move forward.

I also dedicate this work to my teachers, for their valuable guidance, knowledge, and continuous support, and to my colleagues and friends for their encouragement and shared experiences during this journey.

Finally, I dedicate this work to everyone who supported me in any way, directly or indirectly.

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List of abbreviation

Abbreviations	Full term
NSAIDs	Non-steroidal anti-inflammatory drugs
OTC	Over the counter
SDG	Sudanese pound
WHO	World health organization

Table of content:

<u>Contents</u>	<u>Page Number</u>
Title page	
Chapter One	<u>1-3</u>
1.1 Introduction and Background	<u>1-2</u>
1.2 Problem statement	<u>2</u>
1.3 Justifications	<u>2-3</u>
1.4 Research question	<u>3</u>
1.5 Objectives	<u>3</u>
Chapter Two: Literature review	<u>4-10</u>
Chapter Three: Materials and Methods	<u>11-14</u>
3.1 Study design	<u>11</u>
3.2 Study area	<u>11</u>
3.3 Study population	<u>11</u>
3.4 Study variables	<u>11-12</u>
3.5 Sampling Technique and sample size	<u>12</u>
3.7 Data collection methods and tools	<u>13</u>
3.8 Data analysis	<u>14</u>
3.9 Ethical considerations;	<u>14</u>
Chapter Four: Result	<u>15-41</u>
Chapter five: Discussion	<u>42-43</u>
Chapter Six:	<u>44-46</u>
Conclusion	<u>44</u>
Limitation	<u>45</u>
Recommendation	<u>46</u>
References	<u>47-50</u>
Appendices	<u>51-60</u>

List of tables

No	Name	Page
1	Demographic characteristics of medical students at city in 2026 (N=323)	15
2	Types of Analgesia used by medical students at Shandi city in 2026 (N=323)	17
3	Reason for using Analgesia among medical students at Shandi city in 2026 (N=323)	22
4	Types of analgesics among different age of medical students at Shandi city in 2026 (N=323)	23
5	Frequency of analgesics use among different age of medical students at Shandi city in 2026 (N=323)	24
6	Reasons of analgesics use among different age of medical students at Shandi city in 2026 (N=323)	25
7	Indications of analgesics use among different age of medical students at Shandi city in 2026 (N=323)	26
8	Types of analgesics among different genders of medical students at Shandi city in 2026 (N=323)	27
9	Frequency of analgesics use among different gender of medical students at Shandi city in 2026 (N=323)	28
10	Table No (10): Reasons of analgesics use among different gender of medical students at Shandi city in 2026 (N=323)	29
11	Indications of analgesics use among different gender of medical students at Shandi city in 2026 (N=323)	30
12	Types of analgesics among different universities of medical students at Shandi city in 2026 (N=323)	31
13	Frequency of analgesics use among different universities of medical students at Shandi city in 2026 (N=323)	32

14	Reasons of analgesics use among different universities of medical students at Shandi city in 2026 (N=323)	33
15	Indications of analgesics use among different universities of medical students at Shandi city in 2026 (N=323)	34
16	Types of analgesics among different academic years of medical students at Shandi city in 2026 (N=323)	35
17	Frequency of analgesics use among different academic years of medical students at Shandi city in 2026 (N=323)	36
18	Reasons of analgesics use among different academic years of medical students at Shandi city in 2026 (N=323)	37
19	Indications of analgesics use among different academic year of medical students at Shandi city in 2026 (N=323)	38
20	Reasons of analgesics use among different residence of medical students at Shandi city in 2026 (N=323)	
21	Types of analgesics among different monthly income of medical students at Shandi city in 2026 (N=323)	
22	Reasons of analgesics use among different monthly income of medical students at Shandi city in 2026 (N=323)	

List of figures

No	Name	Page
1	Most frequently analgesics used by medical students at Shandi city in 2026 (N=323)	18
2	Frequency of use analgesia among medical students at Shandi city in 2026 (N=323)	
3	Use of analgesics regularly for a specific condition among medical students at Shandi city in 2026 (N=323)	
4	indication of analgesic use Analgesia among medical students at Shandi city in 2026 (N=323)	

Abstract:

Background: Analgesics are widely used medications for pain relief and are commonly available over the counter. Their easy accessibility has increased the practice of self-medication, especially among medical students. Although responsible use may be beneficial, inappropriate use can lead to serious health risks such as gastrointestinal, renal, and hepatic complications. In Sudan, there is limited data on analgesic use patterns among medical students, particularly in Shendi City.

Objective: To assess the patterns of analgesic use among medical students in Shendi City during the period January–March 2026.

Methods: A descriptive cross-sectional study was conducted among 323 medical students from multiple universities in Shendi City. Data were collected using a structured self-administered questionnaire distributed online. The questionnaire covered demographic data, types of analgesics used, frequency of use, indications and reasons for self-medication. Data were analyzed using SPSS version 26, and results were presented as frequencies, percentages, and statistical associations.

Results: Paracetamol was the most commonly used analgesic (78.9%), followed by ibuprofen (39%) and diclofenac (26.6%), while opioid use was low. Most students reported using analgesics rarely (44.9%) or monthly (37.8%), with very few using them daily (2.8%). Headache was the most common indication (78.9%), followed by fever, menstrual pain, and musculoskeletal pain. The main reasons for self-medication were saving time (42.1%) and the belief that the illness was minor (39.9%). Significant associations were found between analgesic use patterns and certain demographic factors such as age, gender, and academic year.

Conclusion: Self-medication with analgesics is highly prevalent among medical students in Shendi City, mainly driven by convenience and perceived mild illness. These findings highlight the need for targeted educational interventions to promote safe and rational use of analgesics.

Keywords: Analgesics, Self-medication, Medical students, Paracetamol, Sudan

مستخلص الاطروحة

الخلفية:

تُعد المسكنات من الأدوية واسعة الاستخدام لتخفيف الألم، وهي متاحة بشكل شائع دون وصفة طبية. وقد أدى سهولة الحصول عليها إلى زيادة ممارسة التداوي الذاتي، خاصة بين طلاب الطب. ورغم أن الاستخدام المسؤول قد يكون مفيداً، إلا أن الاستخدام غير المناسب قد يؤدي إلى مخاطر صحية خطيرة مثل مضاعفات الجهاز الهضمي والكلّي والكبد. في السودان، توجد محدودية في البيانات المتعلقة بأنماط استخدام المسكنات بين طلاب الطب، خاصة في مدينة شندي.

الهدف:

تقييم أنماط استخدام المسكنات بين طلاب الطب في مدينة شندي خلال الفترة من يناير إلى مارس 2026.

المنهجية:

أُجريت دراسة وصفية مقطعية على 323 طالب طب من عدة جامعات في مدينة شندي. تم جمع البيانات باستخدام استبيان منظم يُملأ ذاتياً وتم توزيعه إلكترونياً. شمل الاستبيان البيانات الديموغرافية، وأنواع المسكنات المستخدمة، وتكرار الاستخدام، والدواعي، وأسباب التداوي الذاتي، والمضاعفات المرتبطة. تم تحليل البيانات باستخدام برنامج SPSS الإصدار 26، وعُرضت النتائج في شكل تكرارات ونسب مئوية وعلاقات إحصائية.

النتائج:

كان الباراسيتامول أكثر المسكنات استخداماً (78.9%)، يليه الإيبوبروفين (39%) والديكلوفيناك (26.6%)، بينما كان استخدام المسكنات الأفيونية منخفضاً. أفاد معظم الطلاب باستخدام المسكنات بشكل نادر (44.9%) أو شهري (37.8%)، في حين أن نسبة قليلة جداً تستخدمها يومياً (2.8%). كان الصداع هو السبب الأكثر شيوعاً لاستخدام المسكنات (78.9%)، يليه الحمى، وآلام الدورة الشهرية، وآلام العضلات. وكانت الأسباب الرئيسية للتداوي الذاتي هي توفير الوقت (42.1%) والاعتقاد بأن المرض بسيط (39.9%). كما وُجدت علاقات ذات دلالة إحصائية بين أنماط استخدام المسكنات وبعض العوامل الديموغرافية مثل العمر والجنس والسنة الدراسية.

الخاتمة:

يُعد التداوي الذاتي باستخدام المسكنات شائعاً بدرجة كبيرة بين طلاب الطب في مدينة شندي، ويُعزى ذلك بشكل رئيسي إلى سهولة الاستخدام والاعتقاد بأن الحالات المرضية بسيطة. وتُبرز هذه النتائج الحاجة إلى تدخلات تعليمية موجهة لتعزيز الاستخدام الآمن والرشيد للمسكنات.

الكلمات المفتاحية:

المسكنات، التداوي الذاتي، طلاب الطب، الباراسيتامول، السودان

Chapter One

1.1 Background

1.2 Problem statement

1.3 Justification

1.4 Research question

1.5 Objectives

1.1. Background

Analgesics, also known as painkillers, are drugs that reduce pain without impairing consciousness. They include opioid narcotics like codeine and non-opioid ones like acetaminophen and non-steroidal anti-inflammatory drugs (NSAIDs) like aspirin and ibuprofen. [1]

These medications are some of the most popular ones in the world. For instance, it is estimated that 30 million people worldwide take NSAIDs every day. [2]

A significant portion of over-the-counter drug purchases in many nations are analgesics (for example, 41.8% of OTC medications in parts of Saudi Arabia). [2]

Because these medications are so easily accessible, self-medication—the use of medications without medical supervision—is becoming more and more common. A significant percentage of youth engage in self-medication; a meta-analysis revealed that approximately 70% of college students self-medicate, and medical students in particular self-medicate at rates close to 97%. [3]

Unsupervised analgesic use carries risks, but responsible self-care has advantages. Even after just a few days of use, NSAIDs can result in kidney damage, bleeding, and stomach ulcers. Overuse of NSAIDs over time increases the risk of cardiovascular events and renal failure. Despite being thought of as safer, an overdose of paracetamol (acetaminophen) can result in fatal liver damage. In fact, an estimated 100,000 hospitalizations (15% of which result in death) are caused by NSAID-related complications in the United States each year. Lack of awareness about the right dose and underlying conditions increase these risks. This is a common practice among medical students, who may believe they are knowledgeable enough to treat themselves. According to studies, many medical students use painkillers as a form of self-medication. More than half of the students in one Middle Eastern cohort admitted to taking paracetamol and NSAIDs on their own. Future doctors who engage in inappropriate self-medication practices may be less cautious when counseling patients or in their own future practice, which makes this pattern concerning. [4]

The patterns of analgesic use among students in Sudan are poorly understood. According to a recent nationwide study of medical students in Sudan, self-medication is very common, with analgesics and vitamins being particularly popular. [5].

That study, however, did not concentrate on any one area; rather, it was carried out among populations affected by conflict. In particular, no information about the use of analgesics by medical students in Shendi City has been published. Understanding drug-use behavior in

Shendi, a city with its own university and teaching hospitals in the Nile River state of Sudan, is crucial but has not yet been investigated. This disparity warrants a targeted study of Shendi's medical students' use of analgesics and self-medication.

1.2. Problem Statement

A very high prevalence of analgesic self-medication worldwide found among medical students, about 70% of college students reported self-medicate, 97% of them are medical students. Practically speaking, students frequently take over-the-counter (OTC) pain relievers for headaches, menstrual cramps, and other minor discomforts without first seeing a physician. For example, a study conducted in Sudan revealed that 36.6% of medical students admitted to self-medicating, often using NSAIDs.[3]

This unsupervised use increased the risks of abuse associated condition include drug interactions, organ toxicity (e.g., kidney damage, gastrointestinal bleeding), and the concealment of serious illnesses. However, there is lack of information about Shendi City despite the possibility of widespread analgesic use.[2]

The absence of local data makes it difficult for educators and health planners to put a plan to improve the medical professionals use painkillers. This ignorance is the main problem: self-medication and the use of analgesics by Shendi medical students may be common and harmful, even though the reason and extent of these behaviors are unknown.

1.3 Justification

inappropriate and unsupervised use of analgesics is a significant health risks, even among medical students. Frequent or misuse of commonly available painkillers, particularly NSAIDs and paracetamol may lead to gastrointestinal irritation, renal impairment, or hepatotoxicity. [3] Identifying how often and why medical students use self-medication with analgesic will help to solve these potential health risk and highlight the need for targeted education. If a substantial proportion of students are unknowingly placing themselves at risk, this not only affects their personal health but may also influence the quality of care they provide in the future. [2-4]

there is a clear knowledge gap regarding analgesic use patterns among medical students in Shendi city, no published research has specifically documented the types, frequency, indications of analgesic consumption in this setting. The present study will contribute to fill this gab in the local data.

rational use of medicines is a key objective of the World Health Organization, to ensuring that

patients receive right medications in correct doses for adequate periods at the lowest possible cost. [6,7]

By identifying areas of irrational analgesic self-use among medical students, this identifies the area where educational or institutional interventions are needed. The findings may guide targeted strategies as workshops, campaigns, or policy measures to improve safe medication practices and improve access to professional healthcare services when needed.

In summary, investigating analgesic use patterns among medical students in Shendi city addresses a well-defined local research gap and has important implications for student health, medical education, and public health practice. The results are expected to support efforts to foster responsible analgesic use among future physicians, ultimately contributing to safer prescribing behaviors and improved patient care.

1.4 Research Question

What are the patterns of analgesic use among medical students in Shendi City during the period January–March 2026?

1.5 Objectives

1.5.1 General Objective

- To assess analgesic use patterns among medical students in Shendi City during the period January–March 2026

1.5.2 Specific Objectives

1. To identify the types of analgesics used by medical students in Shendi City in 2026
2. To determine the frequency of analgesic use among medical students among medical students in Shendi City in 2026
3. To identify the indications (causes) for analgesic use among medical students among medical students in Shendi City in 2026
4. To identify the reasons of self medications with analgesia among medical students in Shendi City 2026
5. To assess the differences in analgesic use patterns across different demographic characteristics among medical students in Shendi City in 2026

Chapter Two

Literature Review

2.1 General review

2.2 Focus review

2.3 Previous studies

1.2 General review:

One of the most prevalent symptoms for which people go to the health services globally is pain and fever. Analgesics are drugs that reduce pain and fever without knocking a person out, and they are an essential part of these symptoms management plans [8].

They can be broadly divided into opioid analgesics, adjuvants that improve pain management, and non-opioid analgesics, such as paracetamol (acetaminophen) and non-steroidal anti-inflammatory drugs (NSAIDs) [9].

The most commonly used painkillers worldwide are non-opioid analgesics specially paracetamol which used to treat mild to moderate pain and fever, the main mechanism of action of it by central inhibition of prostaglandin synthesis [10]. By blocking cyclooxygenase (COX) enzymes, NSAIDs like ibuprofen, diclofenac, and aspirin reduce prostaglandin production and have analgesic and anti-inflammatory effects [11].

Opioid analgesics as morphine, codeine and tramadol, reduce pain perception and change how people feel about pain stimuli is by acting on opioid receptors in the central nervous system [12].

Opioid analgesics are useful for treating moderate to severe pain, but they led serious risks, as physiological dependence, tolerance, and the possibility of overdosing when abused [12,13].

Opioids activate pathways in the brain, which can cause compulsive use and make it difficult to stop even after the initial pain has subsided [13].

In areas with high opioid availability or misuse, overdose is a major contributor to drug-related mortality and poses a serious risk, frequently resulting from respiratory depression [14].

NSAIDs are among the most widely used over-the-counter (OTC) medications globally because of their efficacy and the fact that they are available without a prescription in many nations [15].

The widespread availability of analgesics has significantly led to the practice of self-medication. The World Health Organization defines self-medication as people choosing and using medications to treat the illness or symptoms depending on their own knowledge without seeking medical advice [16].

The most common drugs that use in self-medication are analgesics, especially among young adults and college students [17].

Most of people thought that analgesics are safe, and most of them familiar with their use, and the availability and ease accessibility are all factors contributing to this trend [18].

Inappropriate self-medication led to major health risks, while the responsible self-medication

decreases the burden on healthcare systems and enable people to manage minor symptoms [19]. Drug abuse and unfavorable consequences may result from inadequate understanding of appropriate dosage, duration of use, and possible contraindications [20].

Regardless their widespread use, analgesics can be harmful, particularly if taken frequently, in high dose or for long periods of time.

Because they inhibit COX-1-mediated gastric mucosal protection, NSAIDs may lead to many dangerous side effects, commonly the gastrointestinal complications like gastritis, peptic ulcer disease, and gastrointestinal bleeding [21].

Even short-term use can have negative effects on the kidneys, including acute kidney injury, especially in people who are dehydrated or have underlying renal disease [22].

Additionally, long-term NSAID use has been linked to increased cardiovascular risk, including myocardial infarction and stroke [23].

When taken at therapeutic dosages, paracetamol is usually considered a safe analgesic; however, overdosing is a major cause of acute liver failure globally [13].

Intentional overdose or accidental long-term excessive intake can cause hepatotoxicity, especially when combined with alcohol or other hepatotoxic medications [14].

Concerns about unintentional toxicity have been raised worldwide due to the widespread availability of paracetamol as an over-the-counter medication [25].

Opioid being used less frequently as self-medication than non-opioid analgesics, but still has a serious public health concern. A worldwide opioid crisis has been exacerbated by the abuse of opioids, which are linked to tolerance, dependence, and overdose risk [26].

Even brief exposure to opioids may raise the risk of future abuse, even though university students typically use fewer opioids than non-opioid analgesics [27].

The prevalence of self-medication varies greatly by region and population. Analgesics are the most commonly used drug class among university students, with prevalence rates ranging from 32% to over 80%, according to systematic reviews [27,28].

Previous experience with similar symptoms, the belief that the illness is mild, a lack of time to seek medical attention, financial limitations, and confidence in one's own medical knowledge are common factors that influence self-medication [29].

The World Health Organization highlights the importance of rational drug use, which means that, patients getting drugs that are suitable for their clinical condition, in the right dosages, for a sufficient time, and at the lowest possible cost [30].

Unreasonably high medical expenses, avoidable morbidity, and avoidable adverse drug reactions are all consequences of irrational analgesic use [30].

Adequate public awareness, efficient OTC drug sales regulation, and appropriate risk education are all necessary to ensure the safe use of analgesics.

Self-medication practices more common in low- and middle-income countries as Sudan, due to restricted access to healthcare services and lack of regulations [31].

Analgesics are often prescribed without a prescription by pharmacies, and there is frequently insufficient public knowledge of their side effects [31].

Regardless of these challenges there is a lack of information on the usage of analgesics in many African contexts.

In conclusion, analgesics are necessary drugs that are frequently used to relieve pain, but because they are so widely available, self-medication has become common. The literature emphasizes the need to comprehend consumption patterns, especially among populations with medical knowledge, like medical students, and highlights the serious risks associated with improper analgesic use.

2.2 Focusing review:

2.2.1 Prevalence of Analgesic Use Among Medical Students

Medical students represent a unique population with increased exposure to health-related knowledge and easier access to medications, which significantly influences their analgesic use behavior. Multiple studies have consistently reported a high prevalence of analgesic use and self-medication among medical students compared to non-medical peers. Reported prevalence rates range from 55% to more than 90%, depending on the study setting and methodology [32-34].

A systematic review by Benade (2014) demonstrated that self-medication, particularly with analgesics, is highly prevalent among medical students due to perceived competence in diagnosing minor ailments and prescribing medications [32]

In diverse settings, large proportions of student's report using painkillers without prescription. For example, 83.1% of health-sciences students in Riyadh reported taking analgesics in the past year. [35]

In Saudi medical schools, about 55% of students had self-medicated with analgesics in the prior six months. A 2015 Saudi study found 75% of senior medical students self-medicated overall, with 55.4% specifically using analgesics. [36]

In India, prevalence varies by region: one rural college found 49.7% of students used analgesics on their own, whereas a tertiary hospital survey reported 83.3% self-medication with

analgesics. [35]

In Iran, 76.6% of university students (mix of medical/non-medical) used analgesics in self-medication over three months. [37]

A recent Egypt survey reported 71% of medical students practiced self-medication of any kind, and among those 92.4% used analgesics. [38]

Even in conflict-affected Sudan, displaced medical students reported a high prevalence of self-medication – especially analgesics – with 36.6% reporting self-treatment behavior. [39]

Taken together, these studies show that over half to over three-quarters of me

2.2.2 Types of Analgesics Commonly Used by Medical Students

The literature shows that non-opioid analgesics are the most frequently used pain medications among medical students. Paracetamol (acetaminophen) consistently ranks as the most commonly used analgesic, followed by non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen, diclofenac, and aspirin [33-36,40]

Across studies, the types of analgesics used by students are remarkably consistent. Paracetamol (acetaminophen) is almost always the most common analgesic. For instance, 96.5% of Saudi students who used analgesics took paracetamol. [35]

In India and Saudi, paracetamol (often in combination with NSAIDs) was by far the leading choice. [33,40]

Other frequently used drugs are standard NSAIDs: ibuprofen, diclofenac, aspirin and ibuprofen-paracetamol combinations. In the KAU study, nearly half of analgesic users took NSAIDs and nearly half took acetaminophen. [36]

Lesser-used analgesics (such as opioids) appear in small percentages (e.g. 7–8% of Saudi students reported opioid use), usually as prescription painkillers. Overall, the pattern is that medical students self-medicate with the readily available OTC analgesics, predominantly paracetamol and NSAIDs. [35,36]

Although less common, opioid analgesics such as tramadol and codeine have been reported in some studies, particularly in regions where these drugs are easily accessible. Their use among students raises serious concerns due to the risk of dependence and misuse [13,33].

2.2.3 Frequency and indications of Analgesic Use

Frequency and indications of analgesic consumption among medical students varies from occasional use to regular or repeated use during academic semesters. Several cross-sectional studies have shown that a significant proportion of students use analgesics monthly or weekly, particularly during examination periods [29,36].

Headache is universally the most-cited reason for taking analgesics. Over 90% of the Saudi

students in one survey used painkillers for headaches, and similar figures appear elsewhere (e.g. 92% in another Saudi sample). Other common indications include menstrual cramps (dysmenorrhea), musculoskeletal and back pain, fever or cold symptoms, and dental pain. [35,46]

For example, one Saudi study found dysmenorrhea was reported by 43.8% of students using analgesics; in India, 48% cited headache and 39% musculoskeletal pain. [33,35]

The noted Egyptian study likewise found headache as the most common complaint (80.4%) leading to analgesic use. Frequency of use is high: in Riyadh, 59.9% of students used analgesics monthly and 8.8% daily. In the Nigerian student sample (broader than med school), 58.8% used painkillers 1–2 times per week. Hence, medical students not only use analgesics commonly, but often use them regularly in response to recurring pain. [39,41]

2.3 Previous studies:

2.3.1 Globally:

Several studies worldwide have documented high prevalence of self-medication with analgesics among university students, including medical students.

In India Patel et al (2025) conducted a study to identify the prevalence and reasons for self-medication, he found that Analgesics prevalence was 201 (72.8%) as a commonest one, main reasons were perception of illness as minor (63.4%), previous experience with the illness (52.1%), and lack of time to consult a doctor (41.3%). [42]

In Pakistan, Ameer et al (2024) conducted study about analgesic self-medication, and found that, the use of analgesia significantly affected by the year of study. And the most self-prescribed analgesic was paracetamol (64.58%), 35.5% of the participants used paracetamol as the only analgesic in the last 3 months. While the second one was ibuprofen (14.35%). The most common reason to self-medication with analgesia was that, the disease did not merit a consultation by the doctor (36.34%), followed by the need to save time (18.52%) or due to their busy academic schedule (15.74%). The least reported cause was that, not trust the doctors (0.46%). Most of the participants 411 (95.1%) reported no adverse effects, while the remaining 4.9% reported side effects to be among one of acidity, skin rashes, diarrhea, vomiting or dizziness. [43]

In India, Chindhalore et al (2020) conduct a study about analgesic self-medication, he found a high prevalence of self-medication with analgesics (83.33%). Most of student use it once per month, and commonly use paracetamol, then diclofenac followed by ibuprofen.

reason for opting self-medication, Quick relief 117 (54.16), Time saving 42 (19.44), Cost-effective 9 (4.16), No need to consult physician 105 (48.61), 105 (48.61), ease and convenience 83 (38.42). [40]

A systematic review and meta-analysis conducted by Behzadifar et al (202) including 89 studies with 60 938 participants reported an overall self-medication prevalence of 70.1% among university students, and found that medical students had higher rates of self-medication compared to non-medical peers, while female students use self-medication more the male students. [3]

In Iran, Sarahroodi et al (2012) conducted a study about analgesic self-medication and reported that, the prevalence in last 3 months was 76.6%, male more the female without statistically significant. The commonest analgesic use was acetaminophen (59.6%), followed by acetaminophen codeine (28.7%) and Ibuprofen (4.8%).The frequency in the last 3 months as the following, once in 19.2%, twice in 22.2%, three times in 16.3% and more than three times in 35.5%. Also, 11.4% use analgesics once a day, 8.6% once a week, 24.8% once per month and 55.2% more than once a month [37]

2.3.2 Internationally:

In Nigeria, Enuagwuna et al (2025) conducted a study about analgesic self-medication and found that, most of the participants rarely used analgesics (45.1%), with the majority using analgesics 1-2 times a week (58.8%). Paracetamol (69.6%) was the commonest analgesia, followed by Ibuprofen (16.6%) then Aspirin (7.0%). In aspect of weekly use, 34.8% participants never use analgesia 0 times, while 58.8% use it 1 – 2times, 4.3% use it 3 – 4 time (4.3%) and 2.2% use it 5 and above time 0er week. The reasons for use analgesic were headache (57.4%), muscle pain (14.2%), menstrual cramps (14.3%) toothache (3.8%), back pain (8.7%), others (Stress, Recreation, Taken alongside antimalarial) (1.6%). [40]

In Libya, Omar. Et al reported that, 70.62% of students use analgesia, the reasons for that were the previous experience with similar illness (47.22%), cost of visiting a doctor (0.84%). The analgesics most usually were Acetaminophen (41.08%) followed by Ketoprofen (19.92%) while Aspirin, Meloxicam and Indomethacin were rarely used. The most common sign for consuming analgesics without a prescription was headache (24.90%), menstrual cramps (18. 26 %) toothache was (12.45%). [24]

In Egypt, El-Sherief et al (2020) conduct a study about the pattern of analgesics use and found that, regarding the types of analgesics used, paracetamol was the most commonly reported analgesic (71.5%), followed by diclofenac (38.7%), ibuprofen (31.5%), and

ketoprofen (34.7%). The use of opioid analgesics was low, with tramadol reported by only 1.3% of students. While concerning the indications for analgesic use, headache was the most frequent cause among both male (79.6%) and female (63.6%) students. Other commonly reported indications included tooth and ear pain, musculoskeletal pain, and abdominal or chest pain. Among female students, menstrual pain was a major indication, reported by 48.7% of participants. [45]

2.3.3 Nationally:

In Sudan, although self-medication practices among university students have been studied, there is no published research specifically assessing analgesic use patterns among medical students, including those in Shendi City. Existing studies focus either on general self-medication behavior or healthcare-seeking patterns without detailing the types, frequency, causes or demographic differences of analgesic use. This gap highlights the need for the present study to provide local data on analgesic consumption among medical students, which can inform rational drug use education and student health interventions

Chapter Three

Methodology

3.1 Study Design

Descriptive cross-sectional study was used

3.2 Study Area

The study was conducted among all universities which provide medical program and located in Shendi City, River Nile State, Sudan. The medical programs in these universities provide an opportunity to study students from diverse academic and demographic backgrounds. The universities included in the study are: University of Shendi, Al-Sudan International University, Al-Neelan University, Napata college of Medicine, Imperial College of Medicine, Zamzam College of Medicine. These institutions collectively enroll medical students from different regions of Sudan, creating a heterogeneous population suitable for assessing analgesic use patterns. The study was carried out during January–March 2026, allowing access to students across all included universities.

3.3 Study Population

The study population consist of undergraduate medical students enrolled in the Faculties of Medicine across universities located in Shendi city during the study period from January to March 2026

3.3.1 Inclusion Criteria:

All medical student in Shandi city

3.3.2 Exclusion Criteria

Student how decline to participate

3.4 Variables under the Study

- **Dependent Variable:**

Analgesic use patterns which were assessed in terms of:

1. Types of analgesics used
2. Frequency of analgesic use
3. Indications (causes) for use
4. Reasons for self medication with analgesia

- **Independent Variable:**

1. Age
2. Sex

3. Academic year
 4. Marital status
- **Confounding Variable:**
 1. Academic stress
 2. History of chronic pain or illness
 3. Previous medical knowledge or training level
 4. Accessibility of healthcare services
 5. Use of other medications
 - **Background variable:**
 1. Place of residence
 2. Socioeconomic status

3.5 Sample Technique and Sample size

3.5.1 Sample Technique

Convenience sampling was used due to time constraints

3.5.2 Sample size

The sample size was calculated using the single population proportion formula, as the study is a descriptive cross-sectional study.

Where:

$$n = \frac{Z^2 P(1 - P)}{d^2}$$

n = required sample size

Z = standard normal deviation at 95% confidence level (1.96)

p = estimated prevalence of analgesic use

d = margin of error (0.05)

Previous studies among Sudanese medical students reported that 63–85% used analgesics for self-medication. Based on this, the expected prevalence in Shendi City is estimated at 70%, which was used to calculate the sample size for this study.

$$n = \frac{Z^2 P(1-P)}{d^2} = \frac{1.96^2 \times 0.7 \times (1-0.7)}{0.05^2} = \frac{3.8416 \times 0.21}{0.0025} = \frac{0.8067}{0.0025} \approx 323$$

The sample size was 323 medical students

3.6 Data Collection Techniques and Tools

3.6.1 Data Collection Techniques

Data was collected using a structured, self-administered questionnaire developed after reviewing relevant literature.

Data collection was conducted during the period from 5 February 2026 till 15 February 2026. The questionnaire was distributed as Google form in deferent platforms, the participate was voluntary, and informed consent was obtained from all participants. Confidentiality and anonymity were maintained throughout the study.

3.6.2 Data Collection Tools

3.6.2.1 Questionnaire:

The questionnaire consisted of four sections:

The questionnaire consists of the following sections:

Section 1: Demographic characteristics

Section 2: Types of analgesics used

Section 3: Frequency of use during the last three months

Section 4: Indications for analgesic use

Section 5: Factors associated with self-medication

The questionnaire was prepared in English, as it is the language of instruction in medical schools. Prior to data collection, the tool was pre-tested on a small group of medical students (not included in the final sample) to ensure clarity and consistency, and necessary modifications were made accordingly.

3.7. Data Management and Analysis

The collected data was entered into SPSS version 26 for cleaning and analysis. Categorical variables such as gender, academic year, type of analgesic used, frequency of use and indications was summarized using frequencies and percentages. The relationship between analgesic use patterns and demographic characteristics was assessed using chi square test. A p-value < 0.05 was considered statistically significant. The results were presented in tables and figures to illustrate the patterns of analgesic use, the most common indications, the prevalence, and differences across demographic groups. This approach allows both descriptive and inferential statistical evaluation to comprehensively assess analgesic use among medical students in Shendi City.

3.8 Ethical Considerations

- Written consent was obtained from each participating person, Appendices 2
- Ethical approval was obtained from the community medicine department at Faculty of medicine, Napata.

Chapter Four

Result

Table No (1): Demographic characteristics of medical students at city in 2026 (N=323)

Demographic Characteristics	N (%)
Age	
18–20	46 (14.2%)
21–23	163 (50.5%)
24-26	84 (26%)
≥ 27	30 (9.3%)
Total	323 (100%)
Gender	
Male	125 (38.7%)
Female	198 (61.3%)
Total	323 (100%)
University	
Al-Neelan University	31 (9.5%)
Napata College	205 (63.5%)
Shandi University	37 (11.5%)
Sudan international university	21 (6.5%)
Imperial college of Medicine	29 (9%)
Total	323 (100%)
Academic year	
First year	46 (14.2%)
Second year	42 (13.0%)

Third year	66 (20.4%)
Fourth year	56 (17.3%)
Fifth year	87 (26.9%)
Sixth year	26 (8%)
Total	323 (100%)

Residence during study period

University hostel	71 (22%)
With family	130 (40.2%)
With friends	122 (37.8%)
Total	323 (100%)

Monthly allowance / income

< 100,000 SDG	104 (32.2%)
100,000 - 200.000 SDG	112 (34.7%)
≥ 200.000 SDG	107 (33.1%)
Total	323 (100%)

Presence of chronic illness

Yes	274 (84.8%)
No	49 (15.2%)
Total	323 (100%)

A total of 323 medical students participated in this study. The majority were aged 21–23 years (163, 50.5%), and females represented the larger proportion of participants (198, 61.3%). Most students were from Napata College (208 students), followed by Al-Neelan University (63 students). In terms of academic level, the highest proportion were in the fifth year (87, 26.9%). Regarding residence, most students lived with their families (130, 40.2%), followed by those

living with friends (122, 37.8%). The majority of participants were single (292, 90.4%). Monthly income was relatively evenly distributed, with the largest group earning 100,000–200,000 SDG (112, 34.7%). Most participants reported no chronic illness (274, 84.8%), and similarly, 274 (84.8%) were not using regular medications other than analgesics.

Table No (2): Types of Analgesia used by medical students at Shandi city in 2026 (N=323)

Analgesics	N (%)
Paracetamol	255 (78.9%)
Ibuprofen	126 (39%)
Diclofenac	86 (26.6%)
Aspirin	71 (22%)
Mefenamic acid	44 (13.6%)
Tramadol	26 (8%)
Codeine	21 (6.5%)
Morphine	28 (8.7%)

The most commonly used analgesic among medical students was paracetamol (255, 78.9%), followed by ibuprofen (126, 39%) and diclofenac (86, 26.6%). Moderate use was observed for aspirin (71, 22%) and mefenamic acid (44, 13.6%). In contrast, the use of opioid analgesics was relatively low, including morphine (28, 8.7%), tramadol (26, 8%), and codeine (21, 6.5%).

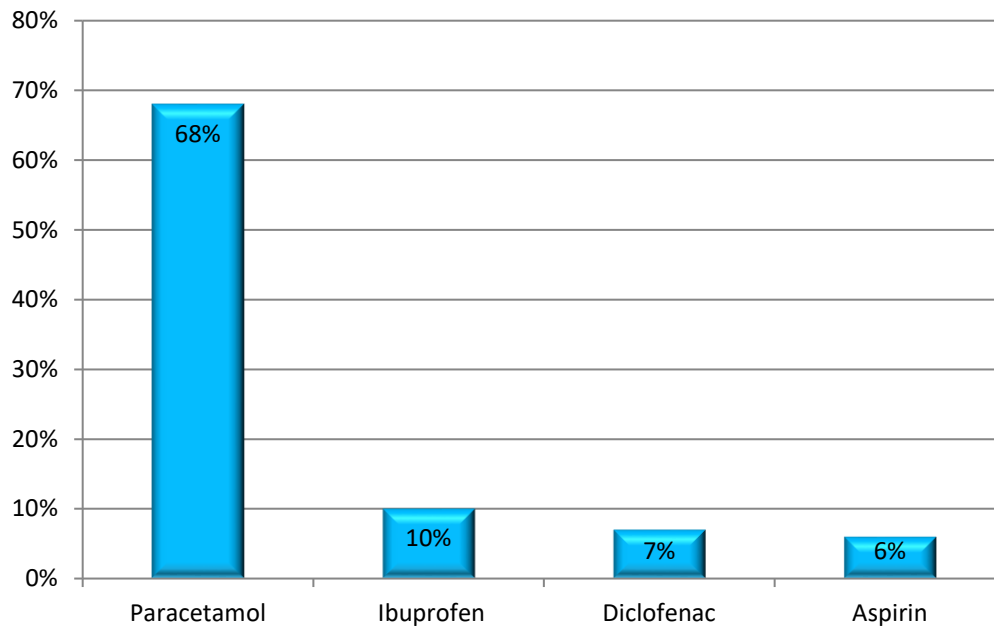


Figure No (1): Most frequently analgesics used by medical students at Shandi city in 2026 (N=323)

Paracetamol was the most frequently used analgesic among the participants, reported by 220 students (68.1%). This was followed by ibuprofen (33, 10.2%), diclofenac (23, 7.1%), and aspirin (20, 6.2%). A small proportion of students reported not using any analgesics (27, 8.4%).

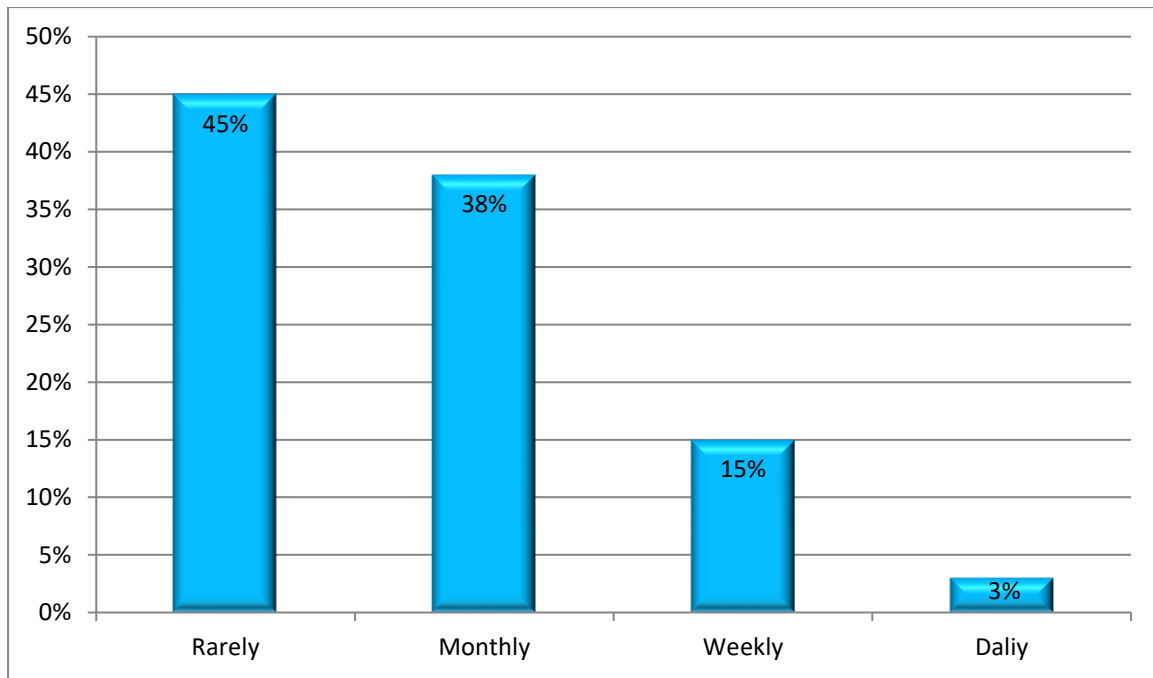


Figure No (2): Frequency of use analgesia among medical students at Shandi city in 2026 (N=323)

Most students reported using analgesics rarely or occasionally (145, 44.9%), followed by those who used them on a monthly basis (122, 37.8%). Less frequent use was observed among students using analgesics weekly (47, 14.6%), while only a small proportion reported daily use (9, 2.8%).

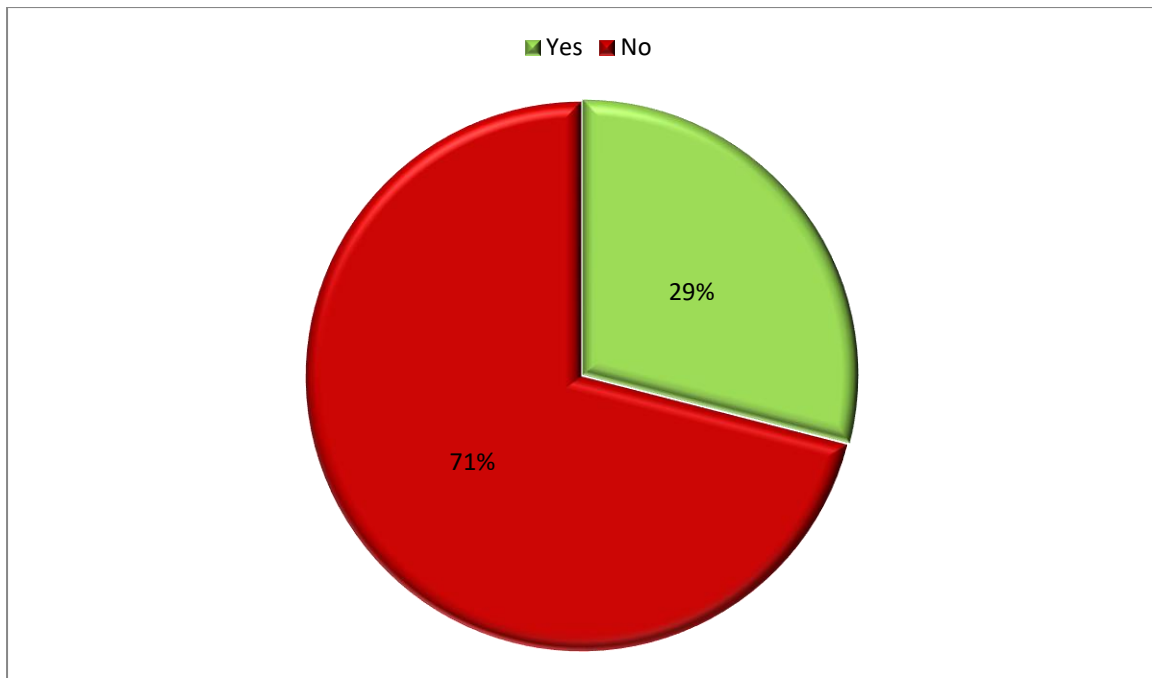
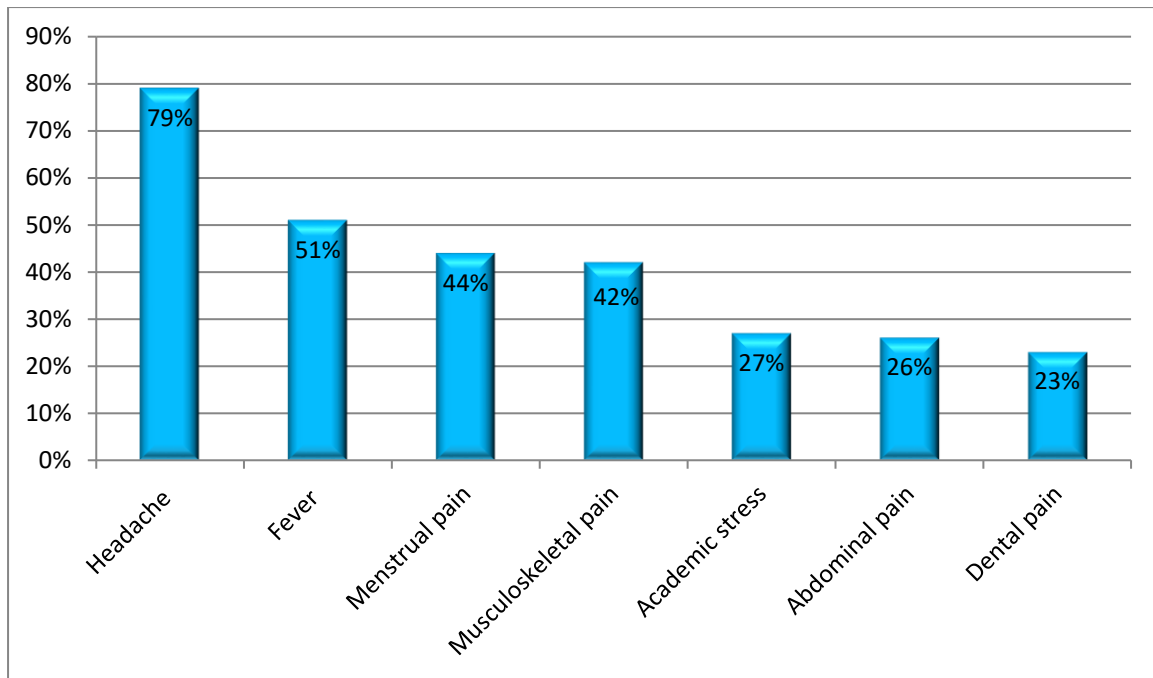


Figure No (3): Use of analgesics regularly for a specific condition among medical students at Shandi city in 2026 (N=323)

The majority of students reported not using analgesics regularly for a specific condition (229, 70.9%), while 94 students (29.1%) indicated that they use analgesics on a regular basis for a specific condition.



Figuer No (4): indication of analgesic use Analgesia among medical students at Shandi city in 2026 (N=323)

Headache or migraine was the most common reason for analgesic use, reported by 255 students (78.9%). This was followed by fever or flu symptoms (164, 50.8%), menstrual pain (143, 44.3%), and musculoskeletal pain (136, 42.1%). Less common indications included academic stress (88, 27.2%), abdominal pain (85, 26.3%), and dental pain (74, 22.9%).

Table No (3): Reason for using Analgesia among medical students at Shandi city in 2026 (N=323)

Reasons	N (%)
Doctor/Clinic is far from home	106 (32.8%)
High consultation fee of the doctor	65 (20.1%)
I have an old prescription for the same medicine	93 (28.8%)
Doctor is busy with many patients	40 (12.4%)
To save time	136 (42.1%)
I have medicines from family members	88 (27.2%)
I don't trust the doctor or pharmacist's advice	30 (9.3%)
Busy academic schedule	105 (32.5%)
Disease did not merit consulting a doctor	129 (39.9%)

The most common reason for using analgesics was to save time (136, 42.1%), followed by the perception that the disease did not require medical consultation (129, 39.9%). Other common reasons included doctor/clinic being far from home (106, 32.8%) and a busy academic schedule (105, 32.5%). Additionally, 93 students (28.8%) reported using an old prescription, and 88 (27.2%) used medications available from family members. Less frequently reported reasons were high consultation fees (65, 20.1%), not self-prescribing in the last 3 months (64, 19.8%), doctor being busy (40, 12.4%), and lack of trust in doctor or pharmacist advice (30, 9.3%).

Table No (4): Types of analgesics among different age of medical students at Shandi city in 2026 (N=323)

Age	Paracetamol use			Ibuprofen use		
	Yes,	No	Total	Yes	No	Total
18–20	24 (9.4%)	22 (32.4%)	46 (14.2%)	9 (7.1%)	37 (18.8%)	46 (14.2%)
21–23	30 (44.1%)	133(52.2%)	163 (50.5%)	71 (56.3%)	92 (46.7%)	163 (50.5%)
24-26	10 (14.7%)	74 (29%)	84 (26%)	34 (27%)	50 (25.4%)	84 (26%)
≥ 27	6 (8.8%)	24 (9.4%)	30 (9.3%)	12 (9.5%)	18 (9.1%)	30 (9.3%)
Total	68 (100%)	255 (100%)	323 (100%)	126 (100%)	197 (100%)	323 (100%)
			0.001			
P value				0.032		

Paracetamol and ibuprofen use were highest among students aged 21–23 years (52.2% and 56.3%, respectively), while the lowest use was observed in those aged ≥ 27 years. Chi-square test showed a statistically significant association between age and the use of paracetamol ($p = 0.001$) and ibuprofen ($p = 0.032$).

Table No (5): Frequency of analgesics use among different age of medical students at Shandi city in 2026 (N=323)

Age	Frequency				
	Rarely	Monthly	weekly	Daily	Total
18–20	29 (20%)	12 (9.8%)	3 (6.4%)	2 (22.2%)	46(14.2%)
21–23	70 (48.3%)	63 (51.6%)	27 (57.4%)	3 (33.3%)	163 (50.5%)
24-26	35 (24.1%)	35 (28.6%)	12 (25.5%)	2 (22.2%)	84 (26%)
≥ 27	11 (7.6%)	12 (9.8%)	5 (10.6%)	2 (22.2%)	30 (9.3%)
Total	145 (00%)	122 (100%)	47 (100%)	9 (100%)	323 (100%)

0.248

P value

Most medical students used analgesics monthly (50.5%), followed by rarely (14.2%), weekly (26%), and daily (9.3%). Usage patterns did not differ significantly across age groups (Chi-square test, $p = 0.248$).

Table No (6): Reasons of analgesics use among different age of medical students at Shandi city in 2026 (N=323)

Age	Mild illness			To save time		
	Yes	No	Total	Yes	No	Total
18–20	27 (20.9%)	19 (9.8%)	46 (14.2%)	17 (12.5%)	29 (15.5%)	46 (14.2%)
21–23	59 (45.7%)	104 (53.6%)	163 (50.5%)	67 (49.3%)	96 (51.3%)	163 (50.5%)
24–26	33 (25.6%)	51 (26.3%)	84 (26%)	39 (15.3%)	45 (24.1%)	84 (26%)
≥ 27	10 (7.8%)	20 (10.3%)	30 (9.3%)	13 (9.6%)	17 (9.1%)	30 (9.3%)
Total	129 (100%)	194 (100%)	323 (100%)	136 (100%)	187 (100%)	232 (100%)
			0.041			
						0.746

P value

The main reasons for analgesic use were perceived mild illness (129/323, 39.9%) and saving time (136/323, 42.1%). There was a significant association between age and use due to mild illness (Chi-square test, $p = 0.041$), but no significant association for using analgesics to save time ($p = 0.746$).

Table No (7): Indications of analgesics use among different age of medical students at Shandi city in 2026 (N=323)

Age	Headache			Fever		
	Yes	No	Total	Yes	No	Total
18–20	34 (13.3%)	12 (17.5%)	46 (14.2%)	16 (9.8%)	30 (18.9%)	46 (14.2%)
21–23	132 (51.8%)	31 (45.6%)	163 (50.5%)	89 (54.3%)	74 (46.5%)	163 (50.5%)
24-26	67 (26.3%)	17 (25%)	84 (26%)	46 (28%)	38 (23.9%)	84 (26%)
≥ 27	22 (8.6%)	8 (11.8%)	30 (9.3%)	13 (7.9%)	17 (10.7%)	30 (9.3%)
Total	255 (100%)	68 (100%)	323 (100%)	164 (100%)	159 (100%)	232 (100%)
			0.653			
P value				0.076		

Table No (8): Types of analgesics among different genders of medical students at Shandi city in 2026 (N=323)

Gender	Paracetamol use			Ibuprofen use		
	Yes	No	Total	Yes	No	Total
Male	96 (42.6%)	29 (37.6%)	125 (38.7%)	44 (34.9%)	81 (41.1%)	125 (38.7%)
Female	159 (62.4%)	39 (57.4%)	198 (61.3%)	116 (58.9%)	82 (65.3%)	198 (61.3%)
Total	255 (100%)	68 (100%)	323 (100%)	167 (100%)	126 (100%)	323 (100%)
			0.452			
P value				0.265		

The most common indications for analgesic use were headache (255/323, 78.9%) and fever (164/323, 50.8%). Using chi square test here were no significant associations between age and use for headache ($p = 0.653$) or fever ($p = 0.076$).

Table No (9): Frequency of analgesics use among different gender of medical students at Shandi city in 2026 (N=323)

Age	Frequency				Total
	Rarely	Monthly	weekly	Daily	
Male	69 (47.6%)	40 (32.8%)	14 (29.8%)	2 (11.8%)	125 (38.7%)
Female	76 (52.4%)	82 (67.2%)	33 (70.2%)	7 (29.1%)	198 (61.3%)
Total	145 (100%)	122 (100%)	47 (100%)	9 (100%)	323 (100%)
					0.026

P value

Regarding frequency of analgesic use, most students reported rare (145/323, 44.9%) or monthly use (122/323, 37.8%), with few using them weekly (47/323, 14.6%) or daily (9/323, 2.8%). Females were more likely than males to use analgesics monthly, weekly, or daily, and this difference was statistically significant (Chi-square test, $p = 0.026$).

Table No (10): Reasons of analgesics use among different gender of medical students at Shandi city in 2026 (N=323)

Gender	Mild illness			To save time			
	Yes	No	Total	Yes	No	Total	
Male	41 (31.8%)	84 (43.3%)	125 (38.7%)	53 (39%)	72 (38.5%)	125 (38.7%)	
Female	88 (68.2%)	100 (56.7%)	198 (61.3%)	83 (61%)	115 (61.5%)	198 (61.3%)	
Total	127 (100%)	194 (100%)	323 (100%)	136 (100%)	187 (100%)	(323%)	
			0.037				0.932

P value

Use of analgesics for mild illness was higher among females (68.2%) compared to males (31.8%), while use for saving time was nearly similar between both genders. Chi-square test showed a statistically significant association between gender and mild illness ($p = 0.037$), but not with saving time ($p = 0.932$).

Table No (11): Indications of analgesics use among different gender of medical students at Shandi city in 2026 (N=323)

Gender	Headache			Fever		
	Yes	No	Total	Yes	No	Total
Male	106 (41.6%)	19 (27.9%)	125 (38.7%)	62 (37.8%)	63 (39.6%)	125 (38.7%)
Female	149 (58.4%)	49 (72.1%)	198 (61.3%)	102 (62.2%)	96 (60.4%)	198 (61.3%)
Total	68 (100%)	255 (100%)	323 (100%)	164 (100%)	159 (100%)	323 (100%)
			0.040	0.737		
P value						

Headache was more commonly reported among females (58.4%) than males (41.6%), while fever showed similar distribution between genders. Chi-square test showed a statistically significant association between gender and headache ($p = 0.040$), but not with fever ($p = 0.737$).

Table No (12): Types of analgesics among different universities of medical students at Shandi city in 2026 (N=323)

University	Paracetamol use			Ibuprofen use		
	Yes	No	Total	Yes	No	Total
Al-Neelan	25 (9.8%)	6(8.8%)	31 (9.6%)	15 (11.9%)	16 (8.1%)	31 (9.6%)
Imperial collage	20 (7.8%)	9 (13.2%)	29 (9.0%)	11 (8.7%)	18 (9.1%)	29 (9.0%)
Napata college	161 (63.1%)	55 (64.7%)	205 (63.5%)	79 (62.7%)	126 (64%)	205 (63.5%)
Shandi	31 (12.2%)	6 (8.8%)	37 (11.5%)	13 (10.4%)	24 (12.2%)	37 (11.5%)
Sudan international	18 (7.1%)	3 (4.4%)	21 (6.5%)	8 (6.3%)	13 (6.6%)	21 (6.5%)
Total	255 (100%)	68 (100%)	323 (100.0%)	126 (100%)	197 (100%)	323 (100.0%)
P value	0.573			0.814		

Paracetamol and ibuprofen use were highest among students from Napata College (63.5% for both), while lower proportions were observed in other universities. Chi-square test showed no statistically significant association between university and the use of paracetamol ($p = 0.573$) or ibuprofen ($p = 0.814$).

Table No (13): Frequency of analgesics use among different universities of medical students at Shandi city in 2026 (N=323)

University	Frequency				
	Rarely	Monthly	weekly	Daily	Total
Al Neelin	21 (14.5%)	9 (7.4%)	1 (2.1%)	0 (0%)	31 (9.6%)
Imperial collage	14 (9.7%)	9 (7.4%)	4 (7.5%)	2 (22.2%)	29 (9.0%)
Napata college	96 (66.2%)	73 (59.8%)	30 (63.8%)	6 (66.7%)	205 (63.5%)
Shandi	10 (6.9%)	18 (14.8%)	8 (17%)	1 (11.1%)	37 (11.5%)
Sudan international	4 (2.8%)	13 (10.7%)	4 (8.5%)	0 (0%)	21 (6.5%)
Total	145 (100%)	122 (100%)	47 (100%)	9 (100%)	323 (100.0%)
P value	0.030				

Most students from all universities reported rare or monthly use, with Napata College contributing the highest proportions. Chi-square test showed a statistically significant association between university and frequency of analgesic use ($p = 0.030$).

Table No (14): Reasons of analgesics use among different universities of medical students at Shandi city in 2026 (N=323)

University	Mild illness			To save time		
	Yes	No	Total	Yes	No	Total
Napata College	12 (9.3%)	19 (9.8%)	31 (9.6%)	11 (8.1%)	20 (10.7%)	31 (9.6%)
Al-Neelan	17 (13.2%)	12 (6.2%)	29 (9.0%)	15 (11%)	14 (7.5%)	29 (9.0%)
Imperial college	79 (61.2%)	126 (64.9%)	205 (63.5%)	86 (63.2%)	119 (63.6%)	205 (63.5%)
Shandi	16 (12.4%)	21 (10.8%)	37 (11.5%)	17 (12.5%)	20 (10.7%)	37 (11.5%)
Sudan international	5 (3.9%)	16 (8.2%)	21 (6.5%)	7 (5.1%)	14 (7.5%)	21 (6.5%)
Total	128 (100%)	194 (100%)	323 (100.0%)	136 (100%)	187 (100%)	323 (100.0%)
P value	0.144			0.636		

Use of analgesics for mild illness and saving time was highest among Napata College students, with similar patterns across other universities. Chi-square test showed no statistically significant association between university and reasons for use (mild illness $p = 0.144$, saving time $p = 0.636$).

Table No (15): Indications of analgesics use among different universities of medical students at Shandi city in 2026 (N=323)

University	Headache			Fever		
	Yes	No	Total	Yes	No	Total
Napata College	28 (11%)	3 (4.4%)	31 (9.6%)	13 (7.9%)	18 (11.3%)	31 (9.6%)
Al-Neelan	22 (8.6%)	7 (10.3%)	29 (9.0%)	15 (9.1%)	14 (8.8%)	29 (9.0%)
Imperial college	158 (62%)	47 (69.1%)	205 (63.5%)	110 (67.1%)	95 (59.7%)	205 (63.5%)
Shandi	32 (12.5%)	5 (7.4%)	37 (11.5%)	17 (10.4%)	20 (12.6%)	37 (11.5%)
Sudan international	15 (5.9%)	6 (8.8%)	21 (6.5%)	9 (5.5%)	12 (7.5%)	21 (6.5%)
Total	255 (100%)	68 (100%)	323 (100.0%)	164 (100%)	159 (100%)	323 (100.0%)
P value	0.288			0.639		

Headache and fever were most commonly reported among Napata College students, with comparable distributions across universities. Chi-square test showed no statistically significant association between university and indications (headache $p = 0.288$, fever $p = 0.639$).

Table No (16): Types of analgesics among different academic years of medical students at Shandi city in 2026 (N=323)

University	Paracetamol use			Ibuprofen use		
	Yes	No	Total	Yes	No	Total
1st	25 (9.8%)	21 (30.9%)	46 (14.2%)	6 (4.8%)	40 (20.3%)	46 (14.2%)
2nd	31 (12.2%)	11 (16.2%)	42 (13%)	11 (8.7%)	31 (15.7%)	42 (13%)
3rd	51 (20%)	15 (22.1%)	66 (20.4%)	32 (25.4%)	34 (17.3%)	66 (20.4%)
4th	47 (18.4%)	9 (13.2%)	56 (17.3%)	25 (19.8%)	31 (15.7%)	56 (17.3%)
5th	80 (31.4%)	7 (10.3%)	87 (26.9%)	38 (30.2%)	49 (24.9%)	87 (26.9%)
6th	21 (8.2%)	5 (7.4%)	26 (8%)	14 (11.1%)	12 (6.1%)	26 (8%)
Total	255 (100%)	68 (10%)	323 (100%)	126 (100%)	197 (100%)	323 (100%)
			0.001			
P value						

Paracetamol and ibuprofen use were highest among 5th-year students (31.4% and 30.2%, respectively), while lower use was observed in earlier years. Chi-square test showed a statistically significant association between academic year and both paracetamol and ibuprofen use ($p = 0.001$ for both).

Table No (17): Frequency of analgesics use among different academic years of medical students at Shandi city in 2026 (N=323)

University	Frequency				
	Rarely	Monthly	weekly	Daily	Total
1st	28 (19.3%)	12 (9.8%)	3 (6.4%)	3 (33.3%)	46 (14.2%)
2nd	18 (12.4%)	15 (12.3%)	8 (17%)	1 (11.1%)	32 (13%)
3rd	38 (26.2%)	17 (13.9%)	9 (19.1%)	2 (22.2%)	66 (20.4%)
4th	23 (15.9%)	23 (18.9%)	10 (21.3%)	0 (0%)	56 (17.3%)
5th	26 (17.9%)	44 (36.1%)	14 (29.8%)	3 (33.3%)	87 (26.9%)
6th	12 (8.3%)	11 (9%)	3 (6.4%)	0 (0%)	26 (8%)
Total	145 (100%)	122 (100%)	47 (100%)	9 (100%)	323 (100%)

0.038

P value

Monthly and weekly use were more common among senior students, especially 5th-year students. Chi-square test showed a statistically significant association between academic year and frequency of use ($p = 0.038$).

Table No (18): Reasons of analgesics use among different academic years of medical students at Shandi city in 2026 (N=323)

University	Mild illness			To save time		
	Yes	No	Total	Yes	No	Total
1st	20 (15.5%)	26 (13.4%)	46 (14.2%)	12 (8.8%)	34 (18.2%)	46 (14.2%)
2nd	19 (11.9%)	23 (14.7%)	32 (13%)	13 (9.6%)	29 (15.5%)	32 (13%)
3rd	27 (20.9%)	39 (20.1%)	66 (20.4%)	30 (22.1%)	36 (19.3%)	66 (20.4%)
4th	22 (17.1%)	34 (17.5%)	56 (17.3%)	26 (19.1%)	30 (16%)	56 (17.3%)
5th	31 (24%)	56 (28.9%)	87 (26.9%)	44 (32.4%)	43 (23%)	87 (26.9%)
6th	10 (7.8%)	16 (8.2%)	26 (8%)	11 (8.1%)	15 (8%)	26 (8%)
Total	129 (100%)	194 (100%)	323 (100%)	136 (100%)	187 (100%)	323 (100%)
P value			0.917	0.068		

Use of analgesics for mild illness and saving time was relatively similar across academic years. Chi-square test showed no statistically significant association (mild illness $p = 0.917$, saving time $p = 0.068$).

Table No (19): Indications of analgesics use among different academic year of medical students at Shandi city in 2026 (N=323)

University	Headache			Fever		
	Yes	No	Total	Yes	No	Total
1st	33 (19.1%)	13 (12.9%)	46 (14.2%)	18 (11%)	28 (17.6%)	46 (14.2%)
2nd	35 (13.7%)	7 (10.3%)	32 (13%)	19 (11.6%)	23 (14.5%)	32 (13%)
3rd	51 (20%)	15 (22.1%)	66 (20.4%)	33 (21.1%)	33 (20.8%)	66 (20.4%)
4th	45 (17.6%)	11 (16.2%)	56 (17.3%)	35 (21.3%)	21 (13.2%)	56 (17.3%)
5th	68 (26.7%)	19 (27.9%)	87 (26.9%)	46 (28%)	41 (25.8%)	87 (26.9%)
6th	23 (9%)	3 (4.4%)	26 (8%)	13 (7.9%)	13 (8.2%)	26 (8%)
Total	68 (100%)	255 (100%)	323 (100%)	164 (100%)	159 (100%)	323 (100%)
			0.616			0.281

P value

Headache and fever were commonly reported across all academic years, especially among 5th-year students. Chi-square test showed no statistically significant association (headache $p = 0.616$, fever $p = 0.281$).

Table No (20): Reasons of analgesics use among different residence of medical students at Shandi city in 2026 (N=323)

Place of residence	Mild illness			To save time		
	Yes	No	Total	Yes	No	Total
University hostel	28 (21.7%)	43 (22.2%)	71 (22%)	25 (18.4%)	46 (24.6%)	71 (22%)
With family	66 (51.2%)	64 (33%)	130 (40.2%)	59 (43.4%)	71 (38%)	130 (40.2%)
With friends	35 (27.1%)	87 (44.8%)	122 (37.8%)	52 (38.2%)	70 (37.4%)	122 (37.8%)
Total	129 (100%)	194 (100%)	323 (100%)	136 (100%)	187 (100%)	323 (100%)
P value	0.002			0.373		

Use of analgesics for mild illness was higher among students living with family (51.2%), while saving time was similarly distributed across residence types. Chi-square test showed a statistically significant association with mild illness ($p = 0.002$), but not with saving time ($p = 0.373$).

Table No (21): Types of analgesics among different monthly income of medical students at Shandi city in 2026 (N=323)

Place of residence	Paracetamol use			Ibuprofen use		
	Yes	No	Total	Yes	No	Total
< 100,000 SDG	80 (31.4%)	24 (35.3%)	104 (32.2%)	55 (43.7%)	49 (24.9%)	104 (32.2%)
100,000 - 200.000 SDG	86 (33.7%)	26 (38.2%)	112 (34.7%)	30 (23.8%)	82 (41.6%)	112 (34.7%)
≥ 200.000 SDG	89 (34.9%)	18 (26.5%)	107 (33.1%)	41 (32.5%)	66 (33.5%)	107 (33.1%)
Total	255 (100%)	68 (100%)	323 (100%)	126 (100%)	197 (100%)	323 (100%)
			0.422			
P value						

Ibuprofen use was higher among students with income <100,000 SDG (43.7%), while paracetamol use was similar across income groups. Chi-square test showed a statistically significant association with ibuprofen use ($p = 0.001$), but not with paracetamol ($p = 0.422$).

Table No (22): Reasons of analgesics use among different monthly income of medical students at Shandi city in 2026 (N=323)

University	Mild illness			To save time		
	Yes	No	Total	Yes	No	Total
< 100,000 SDG	31 (24%)	73 (37.6%)	104 (32.2%)	48 (35.3%)	56 (29.9%)	104 (32.2%)
100,000 - 200.000 SDG	48 (37.2%)	64 (33%)	112 (34.7%)	37 (27.2%)	75 (40.1%)	112 (34.7%)
≥ 200.000 SDG	50 (38.8%)	57 (29.4%)	107 (33.1%)	51 (37.5%)	56 (29.9%)	107 (33.1%)
Total	129 (100%)	194 (100%)	323 (100%)	136 (100%)	187 (100%)	323 (100%)
			0.032			
P value						

Use of analgesics for mild illness was higher among students with $\geq 200,000$ SDG (38.8%), while saving time showed similar distribution. Chi-square test showed a statistically significant association with mild illness ($p = 0.032$), but not with saving time ($p = 0.054$).

Chapter Five

Discussion

Types of Analgesics

The present study showed that paracetamol was the most commonly used analgesic (78.9%), followed by ibuprofen (39%) and diclofenac (26.6%), while opioid use was low. This finding is consistent with several previous studies. In Pakistan, Ameer et al (2024) reported that paracetamol was the most self-prescribed analgesic (64.58%), followed by ibuprofen (14.35%) [43]. Similarly, in Egypt, El-Sherief et al (2020) found that paracetamol was the most commonly used analgesic (71.5%), followed by diclofenac and ibuprofen [45].

Also, a study in Nigeria by Enuagwuna et al (2025) reported similar findings, where paracetamol (69.6%) was the most commonly used analgesic, followed by ibuprofen (16.6%) and aspirin (7.0%) [40]. In Iran, Sarahroodi et al (2012) also reported that acetaminophen was the most commonly used analgesic (59.6%) [37].

These similarities indicate that paracetamol remains the first-line analgesic among students in different settings, likely due to its availability and familiarity.

Frequency of Analgesic Use

In this study, most students reported using analgesics rarely or occasionally (44.9%), followed by monthly use (37.8%), while daily use was very low (2.8%). This finding is similar to the study conducted in Nigeria, where most participants reported rare use of analgesics (45.1%) [40].

In contrast, Sarahroodi et al (2012) reported a higher frequency of repeated use, where 35.5% used analgesics more than three times in the last 3 months [37]. Also, Chindhalore et al (2020) found that most students used analgesics once per month [40].

These variations may reflect differences in health-seeking behavior and accessibility of healthcare services across different populations.

Indications of Analgesic Use

Headache was the most common indication in this study (78.9%), followed by fever (50.8%), menstrual pain (44.3%), and musculoskeletal pain (42.1%). This finding is consistent with many previous studies.

In Nigeria, Enuagwuna et al (2025) reported that headache (57.4%) was the most common reason for analgesic use, followed by muscle pain and menstrual cramps [40]. Similarly, in

Libya, Omar et al found that headache was the most common indication (24.90%), followed by menstrual cramps and toothache [24].

In Egypt, El-Sherief et al (2020) also reported that headache was the most frequent cause among both male and female students, with menstrual pain being a major indication among females (48.7%) [45].

These findings consistently show that headache is the leading indication for analgesic use among students across different countries.

Reasons for Analgesic Use (Self-medication)

The most common reasons reported in this study were saving time (42.1%) and the perception that the illness did not merit consulting a doctor (39.9%), followed by distance to healthcare facilities and busy academic schedule.

This is comparable to findings from Pakistan, where Ameer et al (2024) reported that the most common reason was that the disease did not merit consultation (36.34%), followed by saving time (18.52%) and busy academic schedule (15.74%) [43].

Similarly, Patel et al (2025) in India found that perception of illness as minor (63.4%) and lack of time to consult a doctor (41.3%) were major reasons [42]. Chindhalore et al (2020) also reported that quick relief, time saving, and no need to consult a physician were common reasons for self-medication [40].

These findings indicate that convenience, time-saving, and perception of mild illness are key drivers of self-medication among students.

Demographic Differences

The present study showed significant associations between some demographic factors and analgesic use patterns. Age was significantly associated with paracetamol and ibuprofen use, while gender showed a significant association with frequency of use, mild illness perception, and headache. Academic year was also significantly associated with type and frequency of analgesic use.

This is partially consistent with Ameer et al (2024), who reported that the use of analgesics was significantly affected by the year of study [43]. In addition, the systematic review by Behzadifar et al reported that female students used self-medication more than males [3].

However, in Iran, Sarahroodi et al (2012) found that males used analgesics more than females, but without statistical significance [37].

These variations suggest that demographic factors may influence analgesic use differently across populations, but academic level and gender remain important factors in many studies.

Locally:

In Sudan, there is a lack of published studies specifically addressing the pattern of analgesic use among medical students. Most available studies focus on general self-medication practices or healthcare-seeking behavior without detailed analysis of analgesic types, frequency, indications, or demographic differences.

Therefore, the findings of the present study provide important local data and help fill this gap by offering a detailed assessment of analgesic use patterns among medical students in Shendi City.

Chapter Six

- 1. Conclusion**
- 2. Limitations**
- 3. Recommendation**

Conclusion:

This study demonstrated that the use of analgesics among medical students in Shendi City is common, with paracetamol being the most frequently used drug. Most students reported occasional or monthly use, while regular daily use was low. Headache was the main indication for analgesic use, followed by fever, menstrual pain, and musculoskeletal pain.

The main reasons for self-medication were saving time and the perception that the illness did not require medical consultation. In addition, some demographic factors, particularly age, gender, and academic year, showed significant associations with certain patterns of analgesic use.

Overall, the findings highlight that self-medication with analgesics is widely practiced among medical students, mainly driven by convenience and perceived mild illness.

Limitation:

- The study relied on self-reported data, which may be subject to recall bias or inaccurate responses.
- The study was conducted among medical students in selected universities in Shendi City, which may limit the generalizability of the findings.
- The cross-sectional design does not allow establishing causal relationships between variables.

Recommendation:

- To increase awareness among medical students about the rational use of analgesics and the risks of self-medication.
- To implement educational programs and workshops to promote safe and appropriate medication use.
- To encourage students to seek proper medical consultation, especially for recurrent symptoms.
- To regulate the accessibility of analgesics without prescription.
- To conduct further studies involving larger and more diverse populations.

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Annexes

- 1. Questionnaire**
- 2. Informed consent**
- 3. Map**
- 4. Picture**

1. Study questionnaire (English version)

Section 1: Demographic characteristics of the participants

1. Age (in years)

☐ 18–20

☐ 21–23

☐ 24–26

☐ ≥ 27

2. Gender

☐ Male

☐ Female

3. University

4. Academic year

☐ First year

☐ Second year

☐ Third year

☐ Fourth year

☐ Fifth year

☐ Final year

☐ Sixth year

5. Residence during study period

☐ University hostel

☐ With family

☐ With friends

6. Monthly allowance / income (optional)

☐ <100,000 SDG

☐ 100,000 - 200.000 SDG

☐ ≥ 200.000 SDG

7. Presence of chronic illness

☐ Yes

☐ No

8. If yes, what is it (if no write No)?

Section 2: Types of analgesia:

9. Which type(s) of analgesics have you used during the last 3 months?

(You may select more than one answer)

☐ Paracetamol

☐ Ibuprofen

☐ Diclofenac

☐ Aspirin

☐ Mefenamic acid

☐ Tramadol

☐ Codeine

☐ Morphine

10. If you use other than above analgesia, write it (If no write No)

11. Which analgesic do you use most frequently?

☐ Paracetamol

☐ Ibuprofen

☐ Diclofenac

- ☐ Aspirin
- ☐ Mefenamic acid
- ☐ Tramadol
- ☐ Codeine
- ☐ Morphine
- ☐ Other _____

Section 3: Frequency of use analgesia:

12. During the last 3 months, how often have you used analgesics?

- ☐ Rarely / Occasionally – less than once per month
- ☐ Monthly – 1–3 times per month
- ☐ Weekly – 1–6 times per week
- ☐ Daily – every day

13. Do you take analgesics regularly for a specific condition?

- ☐ Yes
- ☐ No

14. If yes, what's the condition (if no write No)

Section 4: indication of analgesic use

15. What are the main symptoms you have used analgesics during the last 3 months?(Select all that apply)

- ☐ Headache / Migraine
- ☐ Musculoskeletal pain (e.g., back pain, joint pain)
- ☐ Menstrual pain / Dysmenorrhea
- ☐ Dental pain / Toothache
- ☐ Fever / Flu symptoms

- ☐ Abdominal pain / Gastric pain
- ☐ Academic stress / Exam-related tension
- ☐ Other (specify): _____

Section 5: Reasons associated with self-medication by analgesia

During the last 3 months, what were your reasons for using analgesics?

(You may select more than one answer)

- ☐ Doctor/Clinic is far from home
- ☐ High consultation fee of the doctor
- ☐ I have an old prescription for the same medicine
- ☐ Doctor is busy with many patients
- ☐ To save time
- ☐ I have medicines from family members
- ☐ I don't trust the doctor or pharmacist's advice
- ☐ Busy academic schedule
- ☐ Disease did not merit consulting a doctor
- ☐ Other (please specify): _____
- ☐ I haven't self-prescribed in the last 3 months

2. الإستهبيان:

القسم 1: الخصائص الديموغرافية للمشاركين

العمر (بالسنوات)

20-18 ☐

23-21 ☐

26-24 ☐

29-27 ☐

30 أو أكثر ☐

الجنس

ذكر ☐

أنثى ☐

الجامعة

السنة الدراسية

الأولى ☐

الثانية ☐

الثالثة ☐

الرابعة ☐

الخامسة ☐

السادسة ☐

النهائية ☐

مكان الإقامة خلال فترة الدراسة

سكن الجامعة ☐

مع الأسرة ☐

مع الأصدقاء ☐

مصرف شهري / دخل (اختياري)

أقل من 100,000 جنيه سوداني ☐

100,000-200,000 جنيه ☐

أكثر من 200,000 جنيه ☐

وجود مرض مزمن

☐ نعم → اذكر: _____

☐ لا

القسم 2: أنواع المساكن المستخدمة

ما نوع/أنواع المساكن التي استخدمتها خلال آخر 3 أشهر؟ (يمكن اختيار أكثر من خيار)

☐ باراسيتامول

☐ ايبوبروفين

☐ ديكلوفيناك

☐ أسبرين

☐ ميفيناميك أسيد

☐ ترامادول

☐ كودين

☐ مورفين

☐ أخرى: _____

أي مسكن تستخدمه أكثر من غيره؟

☐ باراسيتامول

☐ ايبوبروفين

☐ ديكلوفيناك

☐ أسبرين

☐ ميفيناميك أسيد

☐ ترامادول

☐ كودين

☐ مورفين

☐ أخرى: _____

القسم 3: تكرار استخدام المساكن

خلال آخر 3 أشهر، كم مرة استخدمت المساكن؟

☐ نادرًا / أحيانًا – أقل من مرة واحدة في الشهر

☐ شهريًا – 1-3 مرات في الشهر

☐ أسبوعيًا – 1-6 مرات في الأسبوع

☐ يوميًا – كل يوم

هل تستخدم المسكنات بانتظام لحالة معينة؟

☐ نعم → اذكر الحالة: _____

☐ لا

القسم 4: أسباب استخدام المسكنات

ما هي الأسباب الرئيسية التي استخدمت المسكنات من أجلها خلال آخر 3 أشهر؟ (يمكن اختيار أكثر من خيار)

☐ صداع / صداع نصفي

☐ آلام العضلات / المفاصل (مثل آلام الظهر أو المفاصل)

☐ آلام الحيض / عسر الطمث

☐ ألم الأسنان / مشاكل الأسنان

☐ حمى / أعراض الانفلونزا

☐ آلام البطن / المعدة

☐ ضغط دراسي / توتر امتحانات

☐ أخرى: _____

القسم 5: العوامل التي تؤدي لاستخدام المسكنات

خلال الأشهر الثلاثة الماضية، ما هي أسبابك لاستخدام المسكنات دون استشارة طبيب؟

(يمكنك اختيار أكثر من إجابة)

☐ العيادة/الطبيب بعيد عن المنزل

☐ رسوم استشارة الطبيب مرتفعة

☐ لدي وصفة طبية قديمة لنفس الدواء

☐ الطبيب مشغول مع عدد كبير من المرضى

☐ لتوفير الوقت

☐ لدي أدوية من أفراد العائلة

☐ لا أثق بنصيحة الطبيب أو الصيدلي

☐ جدول الدراسة المزدحم

☐ المرضى لا يستدعي استشارة الطبيب

☐ -أسباب أخرى (يرجى التحديد)

لم أقم بوصف المسكنات لنفسي خلال الأشهر الثلاثة الماضية ☐

3.Written content

Participation in this research is entirely voluntary. All information provided in response to the attached questionnaire was handled confidentially and in an organized manner to ensure participants' privacy. This includes the use of serial numbers only, without recording any direct personal identifiers such as names, phone numbers, or home addresses.

Participants have the right to be informed of the results of the study. We confirm that there are no risks to participants involved in this research after obtaining approval from the relevant authorities. There are no financial benefits associated with participation in this study.

All participants have the right to withdraw from the study at any time without providing any reason.

Thank you for your cooperation and participation.

Signature of consent: _____.

4. Map



5. Photo

