Journal of Population Therapeutics & Clinical Pharmacology

ORIGINAL RESEARCH ARTICLE
DOI: 10.53555/k0sahf11

STUDY OF THE USE OF OVER-THE-COUNTER ANALGESICS AND SAFETY IN ADULTS

Neeta T Gavimath[1], Pavan Kumar K[2*]

[1]Associate Professor, Department of Pharmacology, Raichur, India
[2*]Professor Department of Psychiatry, Raichur, India

***Corresponding author:** Pavan Kumar K
[*]Professor, Department of Psychiatry, Raichur, India, email id – kallimathpavan@gmail.com

Abstract

Background: Over-the-counter (OTC) analgesics such as paracetamol and NSAIDs are widely used by adults for common ailments like headaches, musculoskeletal pain, and fever.

Objective: To evaluate the patterns of OTC analgesic use and assess the level of safety awareness among adult users.

Methods: This descriptive cross-sectional study was conducted at Navodaya Medical College Raichur, India. It included 255 adult participants selected through non-probability consecutive sampling. A structured, self-administered questionnaire assessed demographic data, analgesic usage patterns, knowledge of dosage, safety practices, and sources of information.

Results: Paracetamol was the most commonly used analgesic (78.4%), followed by ibuprofen (41.2%). Regular use (at least monthly) was reported by 69.8% of participants. Only 38.4% correctly identified the maximum safe dose of paracetamol, and 27.5% knew the appropriate dosing interval for ibuprofen. Simultaneous use of multiple analgesics with overlapping ingredients was reported by 22.4%. Educational status showed a statistically significant association with awareness of drug safety ($p = 0.003$). Despite frequent use, only 19.2% sought professional advice before taking analgesics, and most relied on personal experience or informal sources of information.

Conclusion: It is concluded that OTC analgesic use is widespread among adults, but knowledge of proper dosing and safety precautions remains limited. There is a critical need for targeted educational efforts, clearer labeling, and pharmacist-led counseling to promote responsible self-medication and reduce the risk of avoidable adverse effects.

Keywords: OTC analgesics, self-medication, paracetamol, NSAIDs, drug safety, public health

Introduction

Over-the-counter (OTC) analgesics are among the most widely consumed drugs globally, primarily due to their accessibility, cost-effectiveness, and rapid relief of common pain symptoms [1]. These medicationsincluding acetaminophen (paracetamol), non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen, aspirin, and naproxenare available without a prescription and are often used to treat headaches, musculoskeletal pain, menstrual cramps, toothaches, and fevers [2]. The increasing prevalence of self-medication practices has further normalized the routine use of OTC analgesics, particularly among adults who often rely on them for both acute and chronic pain management [3]. This widespread consumption, however, raises critical questions about the awareness, knowledge, and safety practices associated with their use.While OTC analgesics are

generally safe when taken as directed, inappropriate or excessive use can lead to severe and even life-threatening adverse effects [4]. For example, acetaminophen overdose is one of the leading causes of acute liver failure worldwide, particularly in the United States and the United Kingdom [5]. Similarly, prolonged or high-dose use of NSAIDs has been linked with gastrointestinal bleeding, peptic ulcers, acute kidney injury, and increased cardiovascular risks, especially in elderly populations and those with pre-existing health conditions [6]. Despite clear warnings on packaging and public health campaigns in some countries, many adults continue to misuse these medications due to a lack of awareness, misunderstanding of dosing limits, or underestimation of the risks involved [7].

Compounding the problem is the easy availability of combination products that contain multiple active ingredients. Many cold and flu remedies, for instance, include acetaminophen along with other agents like antihistamines and decongestants. Adults taking these medications concurrently with standalone painkillers may unintentionally exceed safe dosage thresholds [8]. Moreover, in regions where regulatory oversight is weak or absent, the sale of OTC drugs without appropriate labeling or pharmacist counseling further exacerbates the potential for harm. Even in regulated environments, patients often rely on anecdotal advice, social media recommendations, or habitual usage patterns, rather than evidence-based guidelines [9].The trend toward self-diagnosis and self-medication, amplified by the digital age, presents another layer of complexity. Adults now frequently turn to online forums, blogs, and social media influencers for health advice, often bypassing healthcare professionals altogether. Although this autonomy can be empowering, it can also lead to inappropriate drug use, delayed diagnoses, and interactions with other medications or comorbid conditions. This is particularly relevant in cases involving chronic pain or undiagnosed conditions where symptomatic relief masks underlying issues, delaying necessary medical evaluation [10].

Certain demographic groups appear to be at higher risk for analgesic misuse. Elderly individuals may suffer from polypharmacy and have impaired metabolism or renal function, increasing susceptibility to side effects [11]. Working adults with stressful lifestyles may use analgesics habitually for tension headaches or back pain without consulting a physician. Meanwhile, younger adults and students may use them preemptively for exam stress, sports-related injuries, or menstrual crampssometimes exceeding recommended doses or using alcohol simultaneously, further raising safety concerns [12].Despite these risks, there remains a significant gap in community-based research on the knowledge, attitudes, and practices surrounding OTC analgesic use, particularly in low- and middle-income countries (LMICs) [13]. In many such settings, analgesics can be purchased freely at street-side pharmacies or general stores, with little regulation or professional oversight. Public health literacy regarding drug interactions, maximum dosages, and potential side effects is often low. Additionally, many adults are unaware of the medical implications of co-morbid conditions like hypertension, diabetes, or hepatic disease on analgesic metabolism and safety [14].

Objective

To evaluate the patterns of OTC analgesic use and assess the level of safety awareness among adult users.

Methodology

This descriptive cross-sectional study was conducted at Navodaya Medical College Raichur, India. It included 255 adult participants selected through non-probability consecutive sampling. A total of 255 adult participants were recruited for the study using a non-probability consecutive sampling technique. The sample size was calculated based on expected prevalence of OTC analgesic use in the population, with a margin of error of 5% and a confidence level of 95%.

Inclusion Criteria:

- Adults aged 18 years and above

- Individuals who reported the use of any OTC analgesic within the last 6 months
- Participants willing to provide informed consent

Exclusion Criteria:
- Individuals with diagnosed chronic pain conditions under supervised prescription analgesic therapy
- Healthcare professionals (to avoid professional bias)
- Individuals unable to complete the questionnaire due to cognitive or language barriers

Data Collection
Data were collected using a structured, self-administered questionnaire developed after a literature review and reviewed by subject experts for content validity. The tool covered sociodemographic details, types and frequency of analgesic use, awareness of recommended dosages, perceived safety, adverse effects, and consultation habits. The questionnaire included both closed-ended and a few open-ended items.The questionnaire was piloted on a group of 15 adults to evaluate clarity, flow, and reliability. Necessary adjustments were made based on feedback before administering it to the full sample. The pilot participants were not included in the final analysis.Trained data collectors approached eligible adults at the study sites, explained the purpose and anonymity of the study, and obtained informed consent. Participants then completed the questionnaire independently or with minimal assistance to avoid response bias. All responses were treated with full confidentiality.

Statistical Analysis
Data were entered and analyzed using SPSS version 26.0. Descriptive statistics such as means, standard deviations, frequencies, and percentages were calculated to summarize the data. Associations between demographic factors and safety awareness measures were assessed using appropriate inferential tests, with a p-value of <0.05 considered statistically significant.

Results
A total of 255 adults participated in the study. The mean age was 34.6 ± 11.2 years. There were 103 males, accounting for 40.4% of the participants, and 152 females, accounting for 59.6%. Regarding educational status, 53 participants (20.8%) had not completed high school, 93 (36.5%) had completed high school, and 109 (42.7%) held a university degree. In terms of employment status, 167 participants (65.5%) were employed, while 88 (34.5%) were either unemployed, students, or engaged in other roles.Paracetamol was the most frequently used over-the-counter analgesic, reported by 200 participants (78.4%). This was followed by ibuprofen, used by 105 participants (41.2%), aspirin by 48 participants (18.8%), and diclofenac by 24 participants (9.4%).

Table 1. Demographic Characteristics

Variable	**Categories / Values**
Age (years)	Mean ± SD = 34.6 ± 11.2
Gender	Male = 103 (40.4%)
	Female = 152 (59.6%)
Education	Below high school = 53 (20.8%)
	High school = 93 (36.5%)
	University = 109 (42.7%)
Employment status	Employed = 167 (65.5%)
	Unemployed/Other = 88 (34.5%)
Analgesic use	
Paracetamol	200 (78.4%)
Ibuprofen	105 (41.2%)
Aspirin	48 (18.8%)
Diclofenac	24 (9.4%)

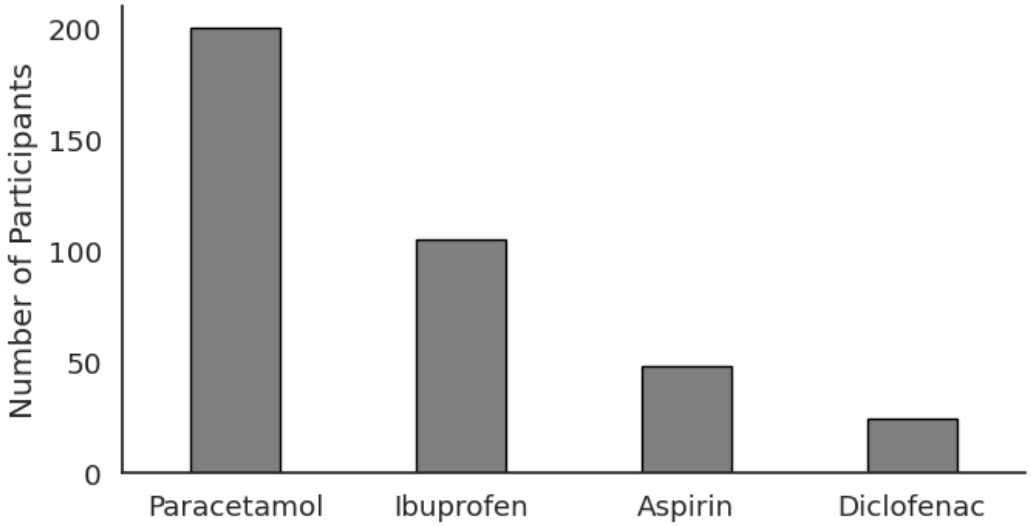

Figure 1: Type of OTC analgesics used

Regarding frequency of use, 178 participants (69.8%) reported using OTC analgesics monthly, 59 (23.1%) used them weekly, and 18 (7.1%) used them occasionally. The most common indication for use was headache, reported by 169 participants (66.3%). Muscle or joint pain was cited by 83 participants (32.5%), fever by 63 participants (24.7%), and menstrual pain by 50 participants (19.6%).

Table 2. Frequency of Analgesic Use

Use pattern	n (%)
Monthly	178 (69.8%)
Weekly	59 (23.1%)
Occasionally	18 (7.1%)
Indications	
Headache	169 (66.3%)
Muscle/Joint pain	83 (32.5%)
Fever	63 (24.7%)
Menstrual pain	50 (19.6%)

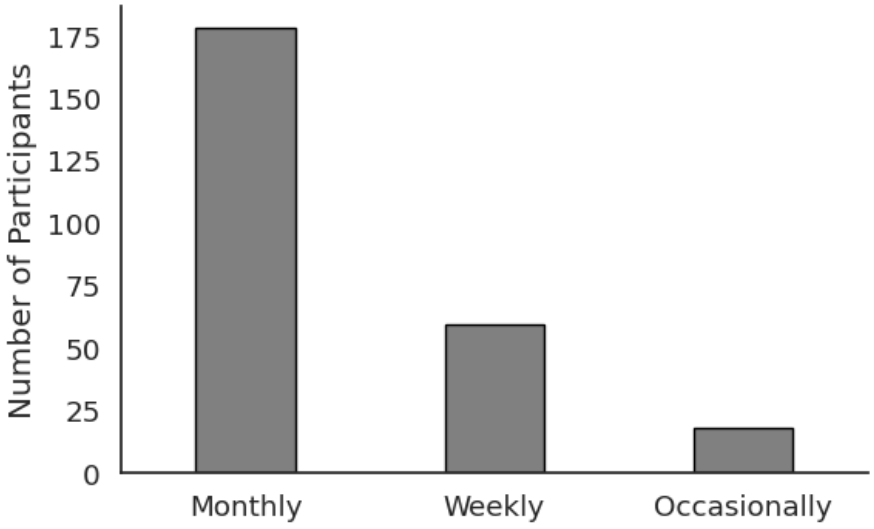

Figure 2: Frequency of analgesic use

In terms of safety awareness, 98 participants (38.4%) correctly identified the maximum daily dose of paracetamol, while 70 participants (27.5%) were aware of the correct dosing interval for

ibuprofen. A total of 144 participants (56.5%) reported reading the label before use. However, 57 participants (22.4%) admitted to using overlapping products that contained the same analgesic ingredient. Only 14 participants (5.5%) reported experiencing adverse effects, which included gastrointestinal upset and dizziness.

Table 3. Awareness and Safety Practices

Parameter	**n (%)**
Correctly identified max dose of paracetamol	98 (38.4%)
Knew ibuprofen dosing interval	70 (27.5%)
Read label before use	144 (56.5%)
Used overlapping analgesics	57 (22.4%)
Experienced adverse effects	14 (5.5%)

114 participants (44.7%) relied on personal experience, 77 (30.2%) on advice from family or friends, 67 (26.3%) on social media or internet sources, and 49 (19.2%) consulted healthcare professionals.

Table 4. Sources of Analgesic Information

Source	n (%)
Personal experience	114 (44.7%)
Family / friends	77 (30.2%)
Social media / internet	67 (26.3%)
Health professional	49 (19.2%)

Among those with less than high school education, 30.2% reported reading labels and 18.9% knew the maximum dose of paracetamol. Among high school graduates, 48.4% read labels and 35.4% knew the maximum dose. Among university graduates, 73.4% read labels and 61.5% knew the correct dosage. This association was statistically significant with a p-value of 0.003.

Table 5. Education Level vs Safety Awareness

Education level	Read labels (%)	Knew max dose (%)	p-value
Below high school	30.2	18.9	
High school	48.4	35.4	
University	73.4	61.5	0.003

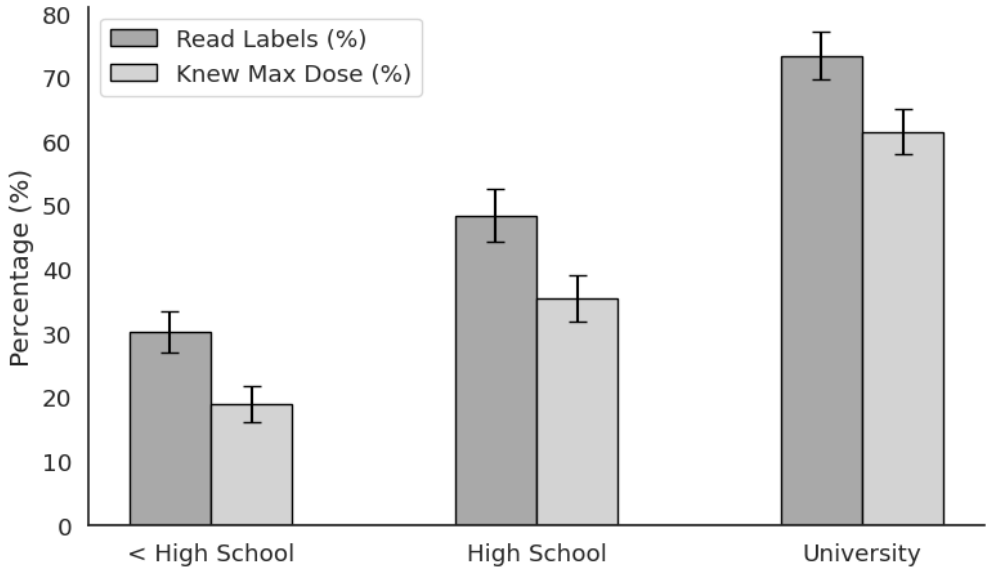

Figure 3: Safety awareness by education level

Discussion

This study explored the use of over-the-counter (OTC) analgesics among adults, revealing important trends in usage patterns and safety awareness. The findings highlight that OTC analgesics, especially paracetamol and ibuprofen, are widely used across the adult population, with a substantial proportion relying on them for common ailments such as headache, body pain, fever, and menstrual cramps. While this demonstrates the central role of OTC medications in self-care, it also brings to light concerning gaps in knowledge and safe usage practices.A majority of participants reported using OTC analgesics regularly, with nearly 70% using them at least monthly and over 20% using them weekly. Paracetamol emerged as the most frequently used agent, followed by ibuprofen. Although both drugs are effective and relatively safe when used correctly, many participants lacked knowledge of their correct dosing [15]. Less than half could correctly identify the maximum allowable daily dose of paracetamol, and a similar proportion were unaware of the safe dosing interval for ibuprofen. This lack of awareness increases the risk of unintentional overdosing, especially in individuals who use these medications frequently or in combination with other products [16].

The study also uncovered a worrying trend of polypharmacy, with over 20% of respondents admitting to using multiple OTC products simultaneously that contained the same active ingredient. This raises the risk of cumulative toxicity, particularly with paracetamol, which has a narrow safety margin [17]. Furthermore, only a minority of participants reported reading the label or package insert before use, and even fewer consulted a healthcare provider. This reflects a casual attitude toward self-medication and points to a gap in health literacy.Education level showed a clear association with safety practices. Participants with university-level education demonstrated significantly better awareness of safe dosage and were more likely to read medication labels. This suggests that targeted educational initiatives focusing on less-educated populations may be effective in reducing unsafe self-medication practices [18].

Gender-specific differences were also observed. Female participants used analgesics more frequently for headaches and menstrual-related pain, while male participants more commonly used them for musculoskeletal complaints [19]. These patterns are consistent with known differences in pain perception and health-seeking behavior between genders and highlight the need for personalized messaging in health education campaigns.Interestingly, although only 5.5% of participants reported experiencing adverse effects, this figure may be an underestimation. Mild symptoms such as gastric discomfort or dizziness may not be recognized as drug-related, or users may not report them unless they are severe [20]. This underreporting suggests that the real burden of side effects may be higher, particularly among frequent users or individuals with preexisting health conditions.Another notable finding was the heavy reliance on informal sources of information such as personal experience, family or friends, and online platforms. While accessible, these sources may not always provide accurate or comprehensive guidance, and their growing influence highlights the importance of public health campaigns and digital literacy initiatives.This study has several strengths, including a well-sized and diverse sample. However, it also has limitations. Being cross-sectional, it captures a snapshot in time and cannot establish causality. The data are self-reported, which may introduce recall bias or social desirability bias. Moreover, the study was conducted in a specific population, which may limit generalizability.

Conclusion

It is concluded that the use of over-the-counter (OTC) analgesics is highly prevalent among adults, with paracetamol and ibuprofen being the most frequently consumed medications. While these agents offer convenient and effective relief for common ailments, the study highlights a concerning lack of knowledge regarding correct dosage, potential risks, and appropriate usage practices. A significant proportion of individuals self-medicate without reading drug labels or seeking professional advice, increasing the risk of unintentional overdose, drug interactions, and adverse effects.Educational status was found to be strongly associated with safer usage behaviors, indicating

that public health interventions must prioritize health literacy, especially among less-educated populations.

References

1. Karłowicz-Bodalska, K., Sauer, N., Jonderko, L., &Wiela-Hojeńska, A. (2023). Over the Counter Pain Medications Used by Adults: A Need for Pharmacist Intervention. *International Journal of Environmental Research and Public Health*, *20*(5), 4505. https://doi.org/10.3390/ijerph20054505
2. Duyster, T., McMillan, S. S., Whately, E., & Kelly, F. S. (2021). What Do Young Adults Think about the Safety of Over-the-Counter Analgesics? Findings from a Cross-Sectional Survey. *Pharmacy*, *9*(1), 54. https://doi.org/10.3390/pharmacy9010054
3. Slater D, Kunnathil S, McBride J, Koppala R. Pharmacology of nonsteroidal anti-inflammatory drugs and opioids. SeminInterventRadiol. 2010;27(4):400-11. doi:10.1055/s-0030-1267855.
4. Thapa P, Kc B, Lee SWH, et al. Managing pain in low resource settings: healthcare professionals' knowledge, attitude and practice regarding pain management in western Nepal. J Pain Res. 2022;15:1587-99. doi:10.2147/JPR.S360243.
5. Badzi CD, Ackumey MM. Factors influencing use of analgesics among construction workers in the Ga-East municipality of the Greater Accra region, Ghana. Ghana Med J. 2017;51(4):156-63. doi:10.4314/gmj.v51i4.3.
6. Daifallah A, Jabr R, Al-Tawil F, et al. An assessment of parents' knowledge and awareness regarding paracetamol use in children: a cross-sectional study from Palestine. BMC Public Health. 2021;21(1):380. doi:10.1186/s12889-021-10432-5.
7. Rider AC, Dang BT, Caretta-Weyer HA, Schertzer KA, Gisondi MA. A mixed-methods needs assessment to identify pharmacology education objectives for emergency medicine residents. J Am Coll Emerg Physicians Open. 2022;3(2):e12682. doi:10.1002/emp2.12682.
8. Alorfi NM, Ashour AM, Algarni AS, et al. Assessment of the community pharmacists' knowledge and attitudes toward pain and pain management in Saudi Arabia. Int J Gen Med. 2022;15:8527-37. doi:10.2147/IJGM.S387066.
9. The Lancet Regional Health – Western Pacific. Chronic pain in Asia: we don't have to endure. Lancet Reg Health West Pac. 2023;33:100782. doi:10.1016/j.lanwpc.2023.100782.
10. Mohamed Zaki LR, Hairi NN. A systematic review of the prevalence and measurement of chronic pain in Asian adults. Pain ManagNurs. 2015;16(3):440-52. doi:10.1016/j.pmn.2014.08.012.
11. Andres TM, McGrane T, McEvoy MD, Allen BFS. Geriatric pharmacology: an update. Anesthesiol Clin. 2019;37:475-492.
12. GłównyUrządStatystyczny. Sytuacjaosóbstarszych w Polsce w 2020 roku. Available from: https://stat.gov.pl/obszary-tematyczne/osoby-starsze/osoby-starsze/sytuacja-osob-starszych-w-polsce-w-2020-roku,2,3.html
13. Wieczorowska-Tobis K, Rajska-Neumann A, Grześkowiak E. Metodyunikaniajatropatogeniinaprzykładzielekówstosowanych w chorobachukładusercowo-naczyniowego: How to avoid iatrogenic syndromes in subjects treated with cardiovascular drugs? Geriatria. 2009;3:92-96.
14. Morin L, Johnell K, Laroche ML, Fastbom J, Wastesson JW. The epidemiology of polypharmacy in older adults: register-based prospective cohort study. Clin Epidemiol. 2018;10:289-298.
15. Doan J, Zakrzewski-Jakubiak H, Roy J, Turgeon J, Tannenbaum C. Prevalence and risk of potential cytochrome P450-mediated drug–drug interactions in older hospitalized patients with polypharmacy. Ann Pharmacother. 2013;47:324-332.
16. Majnarić LT, Wittlinger T, Stolnik D, Babič F, Bosnić Z, Rudan S. Prescribing analgesics to older people: a challenge for GPs. Int J Environ Res Public Health. 2020;17:4017.

17. O'Donoghue AC, Johnson M, Sullivan HW, Parvanta S, Ray S, Southwell BG. Aging and direct-to-consumer prescription drug television ads: effects of individual differences and risk presentation. J Health Commun. 2019;24:368-376.
18. Wójta-Kempa M, Krzyżanowski DM. Correlates of abusing and misusing over-the-counter pain relievers among adult population of Wrocław (Poland). Adv Clin Exp Med. 2016;25:349-360.
19. Marttinen MK, Kautiainen H, Haanpää M, Pohjankoski H, Hintikka J, Kauppi MJ. Analgesic purchases among older adults: a population-based study. BMC Public Health. 2021;21:256.
20. Prostran M, Vujović KS, Vučković S, Medić B, Srebro D, Divac N, et al. Pharmacotherapy of pain in the older population: the place of opioids. Front Aging Neurosci. 2016;8:144.