

ICOPMAP SPECIAL EDITION

RESEARCH ARTICLE

Analgesic self-medication patterns among military health and non-health students: Focused on knowledge and behaviour

Aliyah Nur Ariza¹, Muhamad Azhar¹ , Yandi Permana¹ , Bantari Wisynu Kusuma Wardhani^{1,2} 

¹ Faculty of Military Pharmacy, Republic of Indonesia Defence University, Bogor, West Java, Indonesia

² Research Centre for Pharmaceutical Ingredients and Traditional Medicine, National Research and Innovation Agency (BRIN), Bogor, West Java, Indonesia

Keywords

Analgesics use
Medication use
Pain reliever
Pharmaceutical intervention
Self-medication

Correspondence

Bantari Wisynu Kusuma Wardhani
Research Centre for Pharmaceutical
Ingredients and Traditional Medicine
National Research and Innovation
Agency (BRIN)
Bogor
West Java
Indonesia
bantariwisynu@gmail.com

Abstract

Background: Analgesics are commonly used to relieve pain or discomfort. Their use is often associated with self-medication, either with or without a prescription, depending on students' knowledge and behaviour. **Objective:** This study aims to analyse the patterns of analgesic use among military health and non-health students, focusing on their self-medication practice, knowledge, and behaviour. **Method:** The present study conducted a cross-sectional survey using a validated tool. It comprised military students who studied health and non-health programmes, and non-military students were excluded. Descriptive analysis helped us find trends in self-medication and patterns of analgesic usage. **Result:** The findings indicate that self-medication with a prescription was more prevalent than without a prescription (69.8% vs. 29.9%). Health students demonstrated a higher level of knowledge than non-health students (59.4% vs. 58.2%). Regarding behaviour, non-health students more frequently used analgesics, particularly paracetamol (51.4% vs. 33.3%), while health students were more likely to consult healthcare professionals when experiencing side effects (18.0% vs. 11.1%). **Conclusion:** Military students in health science demonstrated greater knowledge and were more responsible for analgesic use than their counterparts. Its findings highlight the urgent need for educational intervention to promote responsible self-medication practices among military students.

Introduction

Pain is a common clinical manifestation of many diseases. This symptom is often self-medicated by patients (known as self-medication). Self-medication is carried out when patients experience pain without knowing the cause of the symptom. Patients choose self-medication because the drugs used do not require a doctor's prescription, allowing them to treat pain symptoms more quickly (Perrot *et al.*, 2019).

Analgesics are used for self-medication of pain and are often chosen due to their affordability (Salonen, 2018). Nonsteroidal anti-inflammatory drugs (NSAIDs) are commonly used analgesics for pain self-medication. Previous studies have shown that approximately 38.0%

to 97.8% of NSAID analgesic self-medication occurs among healthcare students. However, this still depends on the student's country. (Doomra & Goyal, 2020; Faqih & Sayed, 2021).

Self-medication is common in developing countries and is expected to continue increasing globally. Students are among the groups that frequently use over-the-counter analgesics. According to Behzadifar *et al.* (2020), a review of 89 studies showed that 97.2% of medical students opted for self-medication compared to 44.7% of non-medical students. *et al.*

A study in the United States reported that 19% of individuals used NSAIDs beyond the recommended dosage, and 24% used multiple NSAIDs simultaneously

(Brennan *et al.*, 2021; Cryer *et al.*, 2016). The main reason for NSAID misuse is a lack of understanding regarding the proper dosage (Murphy, 2022). Additionally, improper use of NSAIDs can increase the risk of side effects, including those affecting the gastric mucosa, renal system, cardiovascular system, hepatic system, and hematologic system (Doomra & Goyal, 2020). These risks are even higher in individuals who consume NSAIDs for an extended period or at higher-than-recommended doses. Therefore, it is crucial for the public to receive proper education on the correct use of analgesics, including their indications, dosage, and potential side effects (Brennan *et al.*, 2021).

Methods

Materials

The study utilised a questionnaire designed with a Likert scale and descriptive approach, complemented by a literature review. The tools used in this study included a Google Forms questionnaire, Microsoft Excel, Microsoft Word, and the Statistical Package for the Social Sciences (SPSS) software.

Design

This research employed a descriptive analysis design aimed at providing a detailed explanation of the respondents' characteristics and the patterns of analgesic use among students.

Population and sample

The population in this study consists of all second-semester students from health and non-health programmes at the Faculty of Medicine and Health Sciences, the Faculty of Military Pharmacy, the Faculty of Military Mathematics and Natural Sciences, and the Faculty of Defence Science and Technology at the Republic of Indonesia Defence University, Sentul, Bogor. The sampling technique used in this study was purposive sampling.

The inclusion criteria covered second-semester students in the 2023/2024 academic year from both health-related programmes (Military Medicine and Military Pharmacy) and non-health programmes (Military Biology, Military Physics, Military Chemistry, Military Mathematics, Military Civil Engineering, Military Mechanical Engineering, Military Electrical Engineering, and Military Informatics).

Data collection technique

All students involved in the study were gathered and informed about the research. The students were asked to provide their consent by agreeing to the informed consent form available in the Google Form before filling out the questionnaire. The questionnaire was completed based on the student's knowledge and experiences related to the use of analgesics.

Questionnaire

The questionnaire consisted of two types of questions: those with Likert scale responses and those with descriptive responses. There were 22 questions with Likert scale responses and 17 questions with descriptive responses.

Assessment

Validity and reliability test of the questionnaire

The validity and reliability tests were conducted for the questions with Likert scale responses. The questionnaire's validity was assessed using Pearson's correlation validity test. This test compared each question with the entire set of questionnaire items. A question was considered valid if the p -value was < 0.05 . The reliability test was performed using Cronbach's Alpha to evaluate the consistency of the questionnaire's measurements. The questionnaire was deemed reliable if the Cronbach's Alpha value was > 0.6 .

Descriptive test

The descriptive test was conducted to describe the characteristics of the respondents and identify the appropriate patterns of analgesic use based on their responses in the questionnaire. This test was applied to both types of questions in the questionnaire. The descriptive analysis was presented as percentages of the responses from all participants for each question. Additionally, the descriptive test was performed based on the reactions of two major groups: health science students and non-health science students.

Results

The research findings indicate that a significant portion of the respondents who completed the questionnaire consisted of non-health military students (Table I).

Table I: Distribution of gender in health and non-health science students

Respondent characteristics	Health science number (%)	Non-health science number (%)
Male	45 (53.5)	100 (63.69)
Female	39 (46.4)	57 (36.30)
Total	84	157

As illustrated in Figure 1, a total of 72 respondents, representing 29.9% of the sample, reported engaging in self-medication practices, specifically non-prescription use of analgesic medications. Among these respondents, the prevalence was notably higher among Health Students at 36.9%, compared to Non-Health Students, who reported a rate of 26.1%.

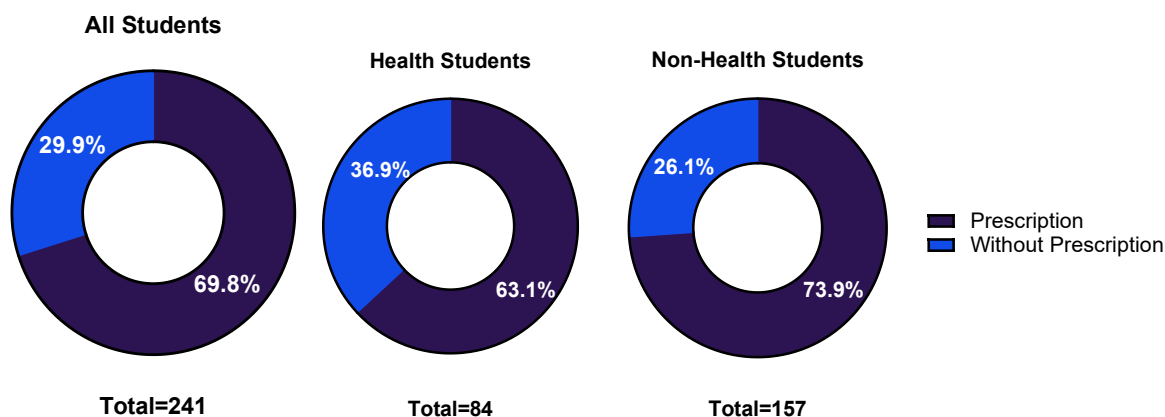


Figure 1: Analgesic self-medication use

In the current study, significant distinctions have been identified between military students who are healthy

and those who are not. Table II illustrates the insights regarding patterns in analgesic usage.

Table II: Knowledge in analgesic usage pattern

Questions	Answer group					
	SD N (%)	D N (%)	N N (%)	A N (%)	SA N (%)	KS N (%)
All over-the-counter pain relievers are safe and effective						
Study programme						
Health	30.8	46.2	7.7	15.4	0	203 (51.7)
Non-health	29.4	29.4	23.5	7.6	0	384 (51.1)
Pain relievers can be used after the expiration date.						
Health	69.2	23.1	7.7	0	0	130 (69.0)
Non-health	64.7	29.4	5.9	0	0	224 (71.5)
Pain relievers do not cause side effects.						
Health	46.2	38.5	15.4	0	0	171 (59.3)
Non-health	23.5	41.2	29.4	5.9	0	325 (58.6)
Pain relievers should be used more cautiously in elderly individuals.						
Health	0	0	0	61.5	38.5	352 (83.8)
Non-health	0	0	0	41.2	58.8	676 (86.1)
Pain relievers for adults can be given to children under 5 years old without consulting a doctor/pharmacist/health professional.						
Health	76.9	15.4	7.7	0	0	140 (66.7)
Non-health	58.8	29.4	5.9	0	5.9	287 (63.4)
Pain relievers used without a doctor's prescription are safe.						

Questions	Answer group						
	SD N (%)	D N (%)	N N (%)	A N (%)	SA N (%)	KS N (%)	
Health	30.8	23.1	46.2	0	0	211 (50.2)	
Non-health	17.6	35.3	35.3	11.8	0	356 (45.3)	
Pain relievers are not affected by storage conditions, temperature, humidity, and light.							
Health	46.2	23.1	30.8	0	0	175 (58.3)	
Non-health	17.6	52.9	23.5	5.9	0	361 (54.1)	
I immediately take a pain reliever whenever I feel pain or discomfort in my body.							
Health	30.8	38.5	23.1	7.7	0	213 (50.0)	
Non-health	23.5	35.3	23.5	17.6	0	369 (47.0)	
I do not need to consult a doctor/pharmacist/other health professional when using pain relievers.							
Health	38.5	30.8	30.8	0	0	185 (56.0)	
Non-health	17.6	41.2	17.6	23.5	0	346 (55.9)	
I always use the same pain reliever for all types of pain I experience.							
Health	23.1	15.4	46.2	15.4	0	213 (49.3)	
Non-health	11.8	35.3	17.6	35.3	0	401 (48.9)	
Overall knowledge						Health	59.4 %
						Non-health	58.2 %

Note: SD= Strongly disagree; D= Disagree; N= Neutral; A= Agree; SA= Strongly agree; KS= Knowledge score; N: Total (%)

Table III indicates that non-health students are more likely to self-medicate, particularly with paracetamol

(51.4% vs 33.3%), highlighting potential concerns regarding uninformed medication use.

Table III: Behaviour pattern in analgesic self-medication

No.	Characteristic	Health N (%)	Non-health N (%)
1.	Analgesic use is done when		
	a. Light pain	4 (5.6)	17 (23.6)
	b. Whenever feeling pain	7 (9.7)	12 (16.6)
	c. When I cannot go	17 (23.6)	10 (13.9)
	d. Other	3 (4.2)	2 (2.8)
2.	Pain relievers used for self-medication		
	a. Paracetamol	24 (33.3)	37 (51.4)
	b. Mefenamic acid/Ponstan	5 (6.9)	3 (4.2)
	c. Diclofenac sodium/Cataflam	2 (2.8)	1 (1.4)
3.	Where do you get information about the medication		
	a. Previous experience	4 (5.6)	17 (23.6)
	b. Family/Friends	14 (19.4)	15 (20.8)
	c. Doctor/Pharmacist/Other healthcare workers	13 (18.0)	8 (11.1)
	d. Internet/Social Media	0	1 (1.4)
	e. TV commercials	0	0
4.	Why use pain relievers without a prescription		
	a. Cheap	0	3 (4.2)
	b. Easy to get	7 (9.7)	11 (15.3)
	c. Previous pain experienced	10 (13.9)	15 (20.4)
	d. Not trusting doctors	0	0
	e. Pain relievers available at home	14 (19.4)	12 (16.6)
5.	Who recommends the pain relievers		
	a. Pharmacist	5 (6.9)	8 (11.1)
	b. Previous doctor's prescription	7 (9.7)	9 (12.5)
	c. Friends/Family	17 (23.6)	21 (29.2)
	d. Internet/social media	2 (2.8)	3 (4.2)
	e. TV commercials	0	0

No.	Characteristic	Health N (%)	Non-health N (%)
6.	Complaints for which pain relievers are used		
	a. Headache	9 (12.5)	16 (22.2)
	b. Muscle pain	0	3 (4.16)
	c. Toothache	3 (4.2)	5 (6.9)
	d. Menstrual pain	8 (11.11)	2 (2.8)
	e. Fever	11 (15.3)	15 (20.4)
7.	Actions taken when experiencing side effects		
	a. Stop the medication	2 (2.8)	10 (13.9)
	b. Use other medication to stop side effects	2 (2.8)	3 (4.2)
	c. Seek help from family/friends	3 (4.2)	5 (6.9)
	d. Go to the hospital	9 (12.5)	7 (9.7)
	e. Do nothing	0	0
8.	What to do if the pain doesn't go away		
	a. Increase the dose	0	4 (5.6)
	b. Switch to a stronger over-the-counter medicine	2 (2.8)	2 (2.8)
	c. Ask family/friends	4 (5.6)	3 (4.2)
	d. Consult a healthcare provider	21 (29.2)	27 (37.5)
	e. Do nothing	3 (4.2)	5 (6.9)
9.	Where do you store the medication		
	a. In a bag	0	3 (4.2)
	b. In a medicine box	8 (11.1)	27 (37.5)
	c. In the bedroom/ on the table (open space)	18 (25.0)	8 (11.1)
	d. In the fridge	2 (2.9)	1 (1.4)
	e. In the bathroom	0	0
10.	Where do you obtain the pain reliever		
	a. Pharmacy	24 (33.3)	29 (40.3)
	b. Health center/hospital	2 (2.8)	3 (4.2)
	c. Doctor's practice	2 (2.8)	4 (5.6)
	d. Minimarket	3 (4.2)	4 (5.6)
	e. Small store/market	0	1 (1.4)
11.	When did you consume the pain reliever		
	a. One month ago	0	0
	b. One week ago	22 (30.6)	36 (50.0)
	c. 3 days ago	5 (6.9)	5 (6.9)
	d. Yesterday	3 (4.16)	0
	e. 30 minutes ago	1 (1.38)	0
12.	How often do you use pain relievers		
	a. Always (every day)	0	2 (2.8)
	b. Often (once a week)	1 (1.4)	0
	c. Occasionally (once a month)	12 (16.7)	12 (16.7)
	d. Rarely (more than once a month)	18 (25.0)	27 (37.5)
	e. Never	0	0

Discussion

Validity test & reliability test

The validity test results of the questionnaire showed that out of 22 Likert-scale questions, 10 were deemed valid (Appendix A). A questionnaire is considered valid if the p -value is < 0.05 (Sanaky *et al.*, 2021). This indicates that these 10 questions tend to lead respondents to provide consistent and definite answers. Therefore, these valid questions effectively capture responses that are aligned with the research objectives by eliminating subjective bias and ensuring reliable quality. The reliability test results (Appendix B) indicate that the questionnaire is reliable and

consistently obtains data from respondents (Oktavia *et al.*, 2018).

Gender profile among respondents

The research findings indicate that the majority of respondents who completed the questionnaire were non-health military students (Table I). In fact, the number of non-health military students surpasses that of health military students. Additionally, the respondents were homogeneous, consisting only of second-semester students. Therefore, the study results may not fully represent all academic levels within their department. Moreover, most respondents were male,

accounting for more than 54% of the total participants. This forms the novelty of the research, as it aims to examine the pattern of analgesic use among health and non-health military students—an aspect that has not been explored in previous studies (Becker, 2022).

Generally, gender can influence responses to questionnaires, as noted by Smith (2008). Its study revealed that women have a higher participation rate in online surveys than men (Smith, 2008). However, this is inconsistent with the study by Becker (2022), which stated that the difference in survey participation between men and women is not statistically significant. Saleem (2024) revealed that prescription misuse intention among university students has no considerable gender differences in normative pressure and attitudes (Saleem & Rizvi, 2024).

Knowledge of analgesic usage

Respondents were asked about their analgesic usage, followed by detailed questions on prescription-based use and self-medication practice. Those who reported using analgesics without a prescription were directed to the next section of the questionnaire. As shown in Figure 1, a total of 72 respondents (29.9%) reported self-medication practice (Health Students 36.9% and Non-Health Students 26.1%) (non-prescription-based use) for analgesic drugs. The findings of this study indicate self-medication with analgesics is prevalent among military students, with notable differences. Health students demonstrated a slightly higher level of knowledge regarding analgesic use, as reflected in their knowledge score, which is presented in Table I (59.4% vs 58.2%).

These findings indicate that non-health students adopt a more cautious and considerate approach, which helps prevent misuse (36.9% vs. 26.1%). Previous research has shown that analgesic usage patterns are more prevalent among health students at the University due to their academic background and exposure to pharmaceutical education (El-Sherief *et al.*, 2020). These findings align with this trend, as health students were more likely to seek medical advice when experiencing side effects of analgesic use (18% vs 11.1%). These differences underscore the impact of formal education on medication safety awareness. However, a concerning observation was that a significant proportion of both groups demonstrated misconceptions regarding the safety of over-the-counter analgesics. It reflected an incorrect understanding that pain reliever drugs do not cause side effects (46.2% of Health Students and 23.5% of Non-Health Students). It could suggest the educational intervention in the subsequent study to give a better, well-documented understanding of risks with improper

analgesic use, such as gastrointestinal, renal, and cardiovascular complications. Others in Indonesia have also reported that the educational background of health students contributes to greater awareness and understanding of responsible self-medication practices (Putri & Rahajeng, 2024).

Health students disagreed strongly with the safety and effectiveness of using over-the-counter analgesics (30.8%), compared to 29.7% of non-health students. Additionally, analgesic purchases are frequently inconsistent with medical indications, and patients often adjust dosage schedules without professionals' guidance. Excessive analgesic use can result in renal and liver damage, as well as gastrointestinal bleeding (Maharianingsih *et al.*, 2022). Regarding expired medications, a higher percentage of health students strongly disagreed with their use (69.2%) compared to non-health students (64.7%). However, the knowledge score (KS) indicated that Health Students scored 2.4% lower than non-Health Students. This might be due to awareness among health students that expired drugs often retain more than 90% of their active concentration, leading some to believe they remain effective. Despite this, previous research has shown that expired medications may lose efficacy and pose a potential health risk (Putri *et al.*, 2022).

This study also examined whether analgesics cause side effects. The KS score shows that both students recognise that drugs have potential side effects. Research confirms that adverse effects are unintended consequences of treatment, which, although not the primary therapeutic goal, significantly impact a patient's condition and often manifest following drug administration (Bone, 2023).

Non-health students exhibited a higher KS (86.1%) than health students (83%). Ideally, health students should demonstrate a stronger understanding of the increased susceptibility of geriatric patients to adverse effects from analgesics, such as NSAID-induced gastritis and corticosteroid-associated bone density reduction (Roth, 2012; Ilias *et al.*, 2022). Nonetheless, the KS score for this question was the highest among the nine assessed, suggesting that both students recognise the need for cautious analgesic use in the elderly. Other studies indicate that age-related physiological changes significantly influence drug metabolism and sensitivity, necessitating careful dose adjustments. Analgesics for geriatric patients should be initiated at the lowest effective dose and titrated gradually based on patients' tolerance and therapeutic response (Barus, 2015).

As for paediatric use, 76.9% of military health students disagreed with administering analgesics for the elderly to children under five, compared to 58.8% of military non-health students. The KS score shows that health

students scored 3.2% higher than non-health students. Analgesics should always be consulted with a doctor, as paediatric dosages differ from adult dosages. Pharmaceutical companies always prepare specific products for paediatric patients with appropriate dosages. This finding was supported by results in another question about using analgesics without consulting a doctor, where 38.5% of health students strongly disagreed, compared to 17.6% of military non-health students. The KS scores for health and non-health students on this parameter are 50.2% and 45.3%, respectively. Over-the-counter analgesics can be obtained at pharmacies where patients can consult with pharmacists. Consulting a pharmacist at the pharmacy can help ensure patient safety in medication use (Maharianingsih *et al.*, 2022).

Furthermore, this study revealed that health students have a slightly better understanding of the factors contributing to drug stability compared to non-health students (58.3% vs. 54.0%). It reflects their knowledge that temperature, humidity, and light degrade drug-active substances through oxidation. (Winter *et al.*, 2013). According to previous research, drug stability can decrease, resulting in a decrease in drug concentration or activity. Drug degradation can result from improper storage, including exposure to inappropriate temperatures and humidity levels (Zaini & Gozali, 2016). The next question addressed the consumption of analgesics when experiencing pain; the KS score showed that health students scored 50.07%, while non-health students scored 47.01%. This value suggests that healthy students understand the body's homeostatic mechanism, which can suppress inflammation, making analgesic drugs unnecessary. According to previous literature, when experiencing pain, it is recommended to try simple remedies first, such as natural ingredients or increasing rest. The recommendation to try more straightforward remedies first stems from the frequent misuse of analgesics for purposes outside their intended therapeutic use (Mita & Husniet *al.*, 2017). This research also supports the use of the same analgesic for the same type of pain. Among military health students, 23.1% strongly disagreed, while only 11.8% of military non-health students strongly disagreed. However, the KS score indicates that both health (49.29%) and non-health (48.92%) students do not yet understand that every pain felt in a specific body part and every level of VAS requires a different medication. The same analgesic cannot be used for all types of pain because pain has various classifications, and not all types need the same medication (Mita & Husniet *al.*, 2017).

The behaviour of analgesic usage pattern

Self-medication with over-the-counter analgesics is a common practice among university students. In this study, notable differences are observed between healthy and non-healthy military students (Table II). Understanding these patterns is crucial in identifying gaps; the behaviour pattern is determined through other sections in the questionnaire.

This study examines the self-medication behaviours of military health and non-health students, focusing on their analgesic preferences, source of information, and response to side effects (Table III). The findings indicate that non-health students are more likely to self-medicate, particularly with paracetamol (51.4% vs 33.3%), highlighting potential concerns regarding uninformed medication use. By examining these trends, this study provides insight into the factors influencing self-medication and highlights the importance of educational interventions in promoting responsible analgesic use among military students.

Furthermore, the study revealed that many Non-Health Students relied on their personal experience (23.6%) and recommendations from relatives (20.8%) as primary sources of information about analgesic use, whereas Health Students were more likely to consult healthcare professionals (18.0%). This discrepancy highlights the need for educational interventions to ensure that students, particularly those in outside health disciplines, have access to reliable information regarding medication safety.

The table illustrates the self-medication patterns of analgesic use among health and non-health students. Non-health students use analgesics more frequently, particularly Paracetamol (51.38% vs. 33.33%). This indicates that non-health students have a low level of awareness regarding the use of analgesics. This finding is supported by Chindhalore *et al.* (2020), whose study showed that 54.16% of students (65 non-health students and 52 health students) used analgesics for self-medication to accelerate pain relief without being aware of the usage warnings (15.74%) (Chindhalore *et al.*, 2020). The use of paracetamol in the healthcare field is recognised as one of the safest analgesics. The behaviour of both healthy and non-healthy students reflects a good understanding of selecting analgesics. Putri and Rahajeng (2024) also stated that 54% of students use paracetamol for pain relief (The primary sources of information are personal experience and recommendations from family/friends, while health students refer more to medical professionals (18.05% vs. 11.11%). Health students strongly rely more on healthcare professionals for guidance on analgesic use in self-medication (Aboalrob *et al.*, 2023). The main reasons for using analgesics without a prescription are

previous pain experience and medication availability at home. If pain persists, most students seek medical consultation; however, when experiencing side effects, health students are more likely to discontinue the medication or seek medical assistance, whereas non-health students tend to take no action (Kumar *et al.*, 2016).

Based on the explanation above, it is crucial to emphasise that non-health students need to enhance their awareness of self-medication, particularly regarding drug acquisition, proper usage, storage, and necessary actions in case of adverse effects. This aligns with the findings of Chindhalore *et al.* (2020), Putri and Rahajeng (2024), and Malli *et al.* (2023), who have stated that educational initiatives are essential for improving students' awareness of self-medication.

This study has several limitations, including the smaller number of military health students compared to non-health military students and those in other universities, as well as the dominance of male students, which may affect the representativeness of the findings. Therefore, further research with a broader sample scope and comparative studies across universities is needed to gain a more comprehensive understanding of analgesic use patterns among military health and non-health students.

Conclusion

This study shows that military students in health programmes have better patterns of analgesic use compared to non-health students. This is supported by a higher level of knowledge regarding the safety, effectiveness, and risks of analgesic use, including an understanding of side effects and the importance of consulting medical professionals. While many students still practice self-medication, health students tend to be more cautious in selecting, using, and storing medications compared to non-health students. Findings highlight the need for targeted pharmaceutical education in military academies to ensure responsible analgesic use, especially among non-health students.

Acknowledgment

The authors would like to express their sincere gratitude to the Pharmacology and Toxicology Laboratory, Faculty of Military Pharmacy, the Republic of Indonesia Defence University, for their significant contribution to the completion of this manuscript.

Author contribution

ANA: data collection; MA&YP: data analyses. BW: supervising. All authors participated in the writing of the manuscript.

Source of funding

The Faculty of Military Pharmacy, Republic of Indonesia Defence University.

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Appendix A: Validity test

Indicator	P Value	Remarks
Q18	0.000	Valid
Q20	0.012	Valid
Q21	0.000	Valid
Q22	0.010	Valid
Q24	0.025	Valid
Q25	0.011	Valid
Q27	0.000	Valid
Q28	0.000	Valid
Q30	0.000	Valid
Q31	0.006	Valid

Appendix B: Reliability test of the questionnaire

Cronbach's Alpha	Total item (N)
0.707	10