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Evaluation of Knowledge Level on Self-Medication for Headache Among Students at Universitas Muhammadiyah Yogyakarta: A Descriptive Study

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ABSTRACT: The extent of understanding regarding self-medication for migraines among students remains comparatively limited. Nonetheless, there has been an increasing trend in the availability of data on medications on the internet. The regular use of over-the-counter (OTC) drugs for headache management requires proactive measures to ensure safe and appropriate self-medication practices. This study seeks to determine the level of knowledge regarding self-medication for headaches among students at Universitas Muhammadiyah Yogyakarta. This study employed a descriptive design, using an observational technique and a cross-sectional methodology, with a sample of 369 students from Universitas Muhammadiyah Yogyakarta. A reliable, standardized online questionnaire was used to evaluate the subjects' knowledge. The data will be presented descriptively to illustrate the students' understanding of self-medication for headaches. The survey indicated that 87.8% of students had a "good" comprehension of self-medication for headaches, with an average score of 85.99. Nonetheless,. However, further action is required to promote safe and responsible self-medication practices among students at Universitas Muhammadiyah Yogyakarta.

Keywords: Headache; Knowledge level; Self-medication; Over-the-counter medicine; OTC

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INTRODUCTION

Self-medication is a common practice among individuals, often used to treat minor illnesses without professional supervision. In Indonesia, a significant proportion of the population – more than 80% – engages in self-medication. The rationale for this is threefold: firstly, it can alleviate symptoms and is safe; secondly, it can save time by eliminating the need for travel and waiting for consultations; and thirdly, it is cost-effective and convenient. (Cotobal-Calvo et al., 2025; Rathod et al., 2023). Among the various ailments prompting self-medication, headache is one of the most frequent, especially among young adults and university students, as it can lead to decreased productivity, academic or work performance, and overall well-being if not treated properly. (Alomoush et al., 2024; Siraj et al., 2022a)

Headache is among the most commonly treated minor illnesses through self-medication. The prevalence of headache disorders is higher among young adults aged between 18 and 24 years. Several studies have demonstrated that a significant proportion of individuals manage headaches through self-medication, with rates ranging from 50% to 90% (Alomoush et al., 2024; Leonardi et al., 2020; Loni et al., 2023; Onofri et al., 2023). The act was influenced by the internet, which has become a primary source of health information for young adults, who increasingly rely on it rather than consulting health professionals. This shift in information sources has led to an increase in cases of self-medication, particularly in the context of selecting medication (Alshahrani et al., 2019). The treatment of self-medication typically involves the administration of over-the-counter (OTC) medications. OTC is a non-prescription medication that is considered to be relatively safe and effective without any direct medical attention or consultation (Akande-Sholabi & Akinyemi, 2023a; Al-Kubaisi et al., 2022; Chautrakarn et al., 2021). In Indonesia, OTC is categorized into three categories: free medicines (green dot), limited free medicines (blue dots), and herbal medicines, available at various retail outlets, including pharmacies, drugstores, minimarts, supermarkets, and grocery stores (Departemen Kesehatan Republik Indonesia, 2007).

Headaches, often perceived as minor and manageable, lead many students to self-medicate using OTC analgesics such as paracetamol and ibuprofen. Therefore, using OTC without proper knowledge of rational drug use can pose a significant risk (Alharthi et al., 2024; Herliani et al., 2022; Parmar et al., 2025). It is essential to enhance understanding of rational drug use, particularly in the context of self-medication among young adults, as this has the potential to carry significant risks (Anusornpanichakul et al., 2024; YILMAZ(KARA) et al., 2016). Several studies highlighted the perception among young adults that OTCs are a safe option due to their limited knowledge and false perceptions. This misperception leads to the belief that OTCs intended for self-administration are used for treating all conditions. It is evident that even the instructions are available in leaflets; however, the level of attention accorded to this matter is essentially negligible (Abraham & Chmielinski, 2018; Akande-Sholabi & Akinyemi, 2023b; Siraj et al., 2022b).

Previous studies on self-medication among university students have largely focused on general practices or specific populations, particularly health sciences students, with limited attention to headache-specific self-medication and detailed knowledge assessment. This study fills the gap by providing a focused evaluation of students' knowledge regarding self-medication for headaches, including understanding of drug selection, dosage, frequency, contraindications, and adverse effects of commonly used OTC

analgesics. Additionally, by involving students from both health and non-health faculties at Universitas Muhammadiyah Yogyakarta, this research offers a more comprehensive and context-specific insight into student health literacy, serving as baseline data for future educational interventions and policy development related to rational drug use. A study at Universitas Muhammadiyah Yogyakarta found that gaps remain in knowledge regarding analgesic self-medication among health sciences and non-health sciences students, which can lead to misuse and potential harm (Putri et al., 2024). Given the high prevalence of headaches and self-medication among university students, evaluating their knowledge level is essential to identify educational needs and promote safer medication practices. This study aims to determine students' knowledge level at Universitas Muhammadiyah Yogyakarta regarding self-medication for headaches, providing insight into current practices and informing strategies to enhance rational drug use in this population.

METHODS

This study was conducted from September 2022 to January 2023. It was a descriptive study with an observational design and cross-sectional methodology. Ethical clearance was obtained from Universitas Muhammadiyah Yogyakarta (No. 201/EC-KEPK FKIK UMY/IX/2022). The sample was drawn using simple random sampling from students at Universitas Muhammadiyah Yogyakarta, with a minimum sample size of 369. The inclusion criteria were (1) active student of Universitas Muhammadiyah Yogyakarta, (2) having an experience of headache, (3) being self-medicated, and (4) having filled in the informed consent form. The instrument for this study was an online questionnaire adapted from Busaroh (2020). The questionnaire included 18 questions on the definition, type, aetiology, and prevention of headache; the definition of self-medication; medication dosage and frequency; side effects; and contraindications of OTCs (paracetamol and ibuprofen). It had been validated with an R value (>0.443) and had a Cronbach's Alpha reliability score of >0.76. The Guttman scale was used in the questionnaire with a scale of false (0) and true (1) to answer the questions, except in the section on ibuprofen, the first and second questions were the opposite. The data obtained will be described descriptively to illustrate students' knowledge of self-medication for headaches at Universitas Muhammadiyah Yogyakarta. The average score will be used to evaluate the level of knowledge, which will be categorized into three categories: Good (Score: $\geq$ 76), Moderate (Score: 56 – 75), and Low (Score: < 56) (Masturoh & Anggita, 2018).

RESULT AND DISCUSSION

Characteristic of Respondents

A total of 369 students from Universitas Muhammadiyah Yogyakarta were enrolled in the study. Their characteristics are summarised in Table 1. In this study, female students accounted for the majority of respondents (65.3%), a proportion that aligns with the overall gender distribution at Universitas Muhammadiyah Yogyakarta, where female students outnumber male students. Universitas Muhammadiyah Yogyakarta has eight undergraduate faculties, with the study dominated by the Faculty of Economics and Business (24.1%), followed by the Faculty of Social and Political Sciences (18.2%).

In Figures 1 and 2, headache frequency did not differ: 369 students, 50% of whom frequently had headaches, were mostly female. By headache characteristics, most students

experienced migraine (24,4%) and other headache characteristics (26.3%). Prevalence of headaches was observed to be significantly 2 – 3 times higher in women, most notably among those experiencing migraine. A multitude of studies have indicated that, in addition to the central and peripheral mechanisms, sex hormones, specifically oestrogen, may play a role in the modulation of headaches. Menstruation also showed a significant effect in inducing headaches. Longer and more frequent attacks of headaches and being likely disabled by their attack were found in women, especially when exposed to stress, quantitative demands (high work load, long work hours, inflexible schedule), emotional demands (stressful work atmosphere), and a poor lifestyle (Al-Hassany et al., 2020; Slatculescu & Chen, 2018).

Table 1. Characteristic of enrolled students (n=369).

Category		Frequency	%
Gender			
a.	Male	128	34.7
b.	Female	241	65.3
Faculty			
a.	Islamic studies	34	9.2
b.	Economy and business	89	24.1
c.	Law	35	9.5
d.	Social and political sciences	67	18.2
e.	Medicine and health sciences	37	10
f.	Language education	22	6
g.	Agriculture	34	9.2
h.	Engineering	51	13.8
Class			
a.	2019	123	33.3
b.	2020	187	50.7
c.	2021	59	16

The frequency of headaches in this study is presented in Figure 1. The characteristic of headache is displayed in Figure 2. University students are mostly experiencing headaches, with a prevalence ranging from 9% to 27,9%. Other than occupation, age is another significant factor that several studies discussed, that most students had their first migraine attack at 18 – 22 years old, likely due to increased challenges, stressors, fatigue, and extensive screen time (Axiotidou et al., 2025). This prolonged effect of headache could affect their academic and personal lives. A study from Egypt included 3720 university students, of whom 94.4% experienced headaches, had lower GPA scores, and had their daily activities severely impacted (El-sayed et al., 2025). Migraine are one of the most prevalent headache types in students (Axiotidou et al., 2025) We also found that migraine, as the prevalent headache type (24,4%), affected students at Universitas Muhammadiyah Yogyakarta (Figure. 2). Insufficient sleep was named as the most common cause of headache in the study (Figure. 3), which correlated with studies that stated that poor sleep quality has a direct increase in migraine and tension-type headache (Cho et al., 2020; Simanjuntak et al., 2024) To treat this condition, respondents showed a preference for self-medicating with paracetamol (70.73%) and ibuprofen (13.27%) (Figure. 4). Both medications are the first-line therapy for headaches; however, as a self-limiting disease,

headaches usually do not require any pharmacological intervention, but a variety of approaches, such as relaxation, lifestyle adjustment, and stress management, are considered to have long-term effects (International Headache Society, 2018). The study found that 10.59% of respondents did not take any medication to relieve their headaches. The ethiology of headache is shown in Figure 3. Figure 4 shows the completed data on how students at Universitas Muhammadiyah Yogyakarta relieve headaches.

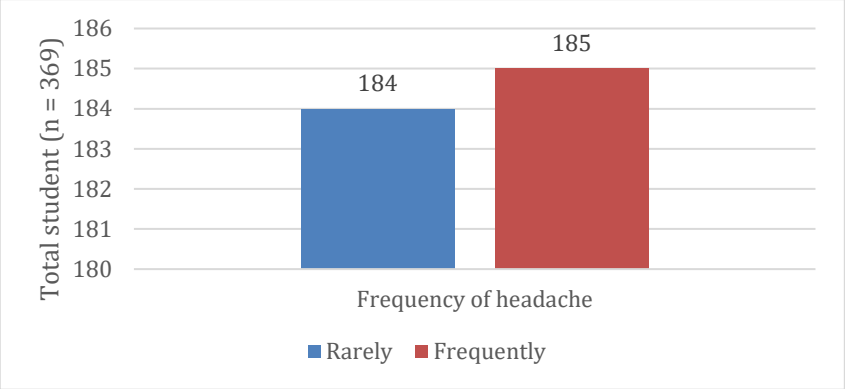

Figure 1. Frequency of headache

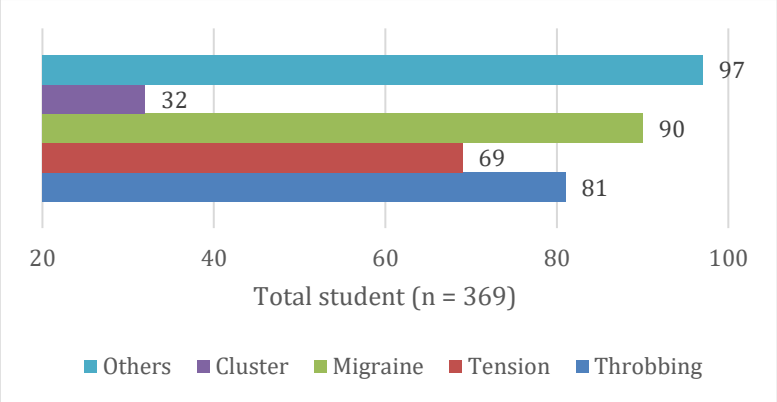

Figure 2. Characteristic of a headache.

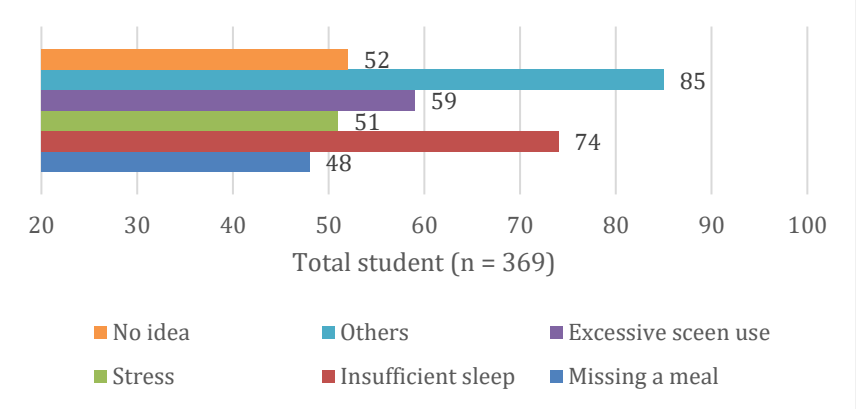

Figure 3. Aetiology of headache.

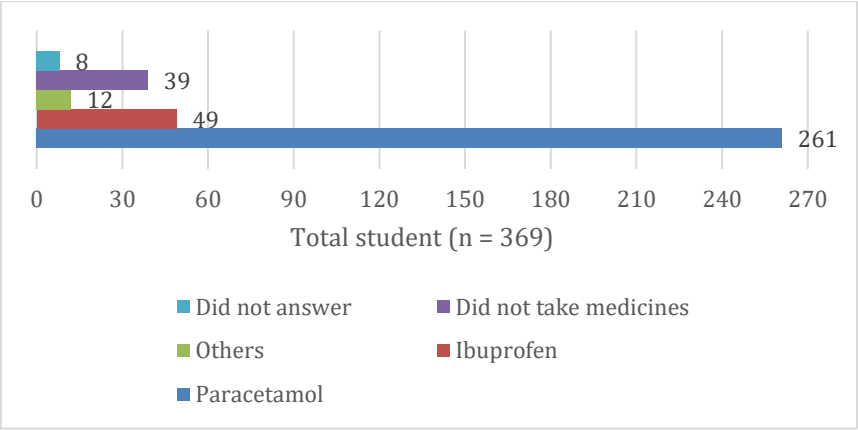

Figure 4. The most commonly used medication for headaches is.

Overview of Student's Knowledge Level of Self-medication for Headache

Based on Figure 5, we found that the Faculty of Medicine and Health Sciences better understood self-medication for headache, as they had received education on this topic. However, other faculty respondents exhibited minimal differences in their understanding of the topic presented in the Figure. 6, with only 12.19% exhibiting a moderate understanding. Other students had good knowledge of self-medication for headaches, contributing 87,8% to the study, with an average score of 85,99. The results showed that most students in the study were literate enough about self-medication.

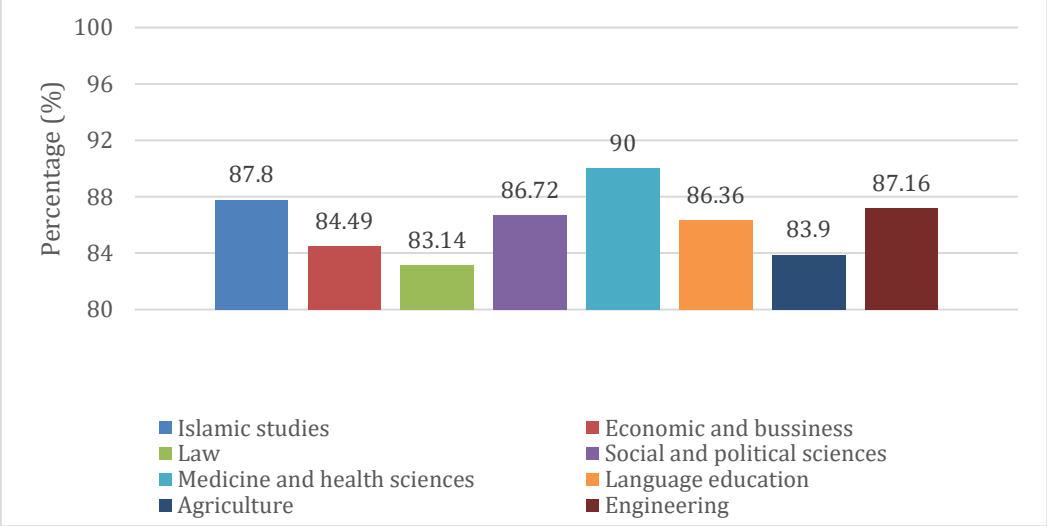

Figure 5. Level of knowledge in self-medication of headache among faculty.

Evaluation of Knowledge Level on Self-medication of Headache by Sections

Definition, type, causes, and prevention of headache

We used an online questionnaire to assess the students' knowledge level. The questions were easy to answer, requiring only a selection of 0 (false) or 1 (true). Figures 7 and 8 portray students' knowledge of the definition and types of headaches. Figure 7 shows that most students correctly answered the definition of headache, which was: (1) headache

is a normal thing that happens in individuals, (2) headache is an uncomfortable feeling indicated by pain in the head. However, in Figure 8, we found that students were more divided in their answers. The types of headaches asked about were: (1) headaches have two types: primary and secondary, (2) tension, migraine, and cluster headaches are classified as primary, and (3) secondary headaches are caused by head and neck trauma, medication withdrawal, or infection. This section reveals that the students did not understand the type of headache. Figure 9 showed that students were aware that excessive screen time was the cause, and the rest were for headache prevention; this information was gathered in questions 1 and 3. In question 2, many respondents answered "false" when asked if excessive caffeine causes headaches.

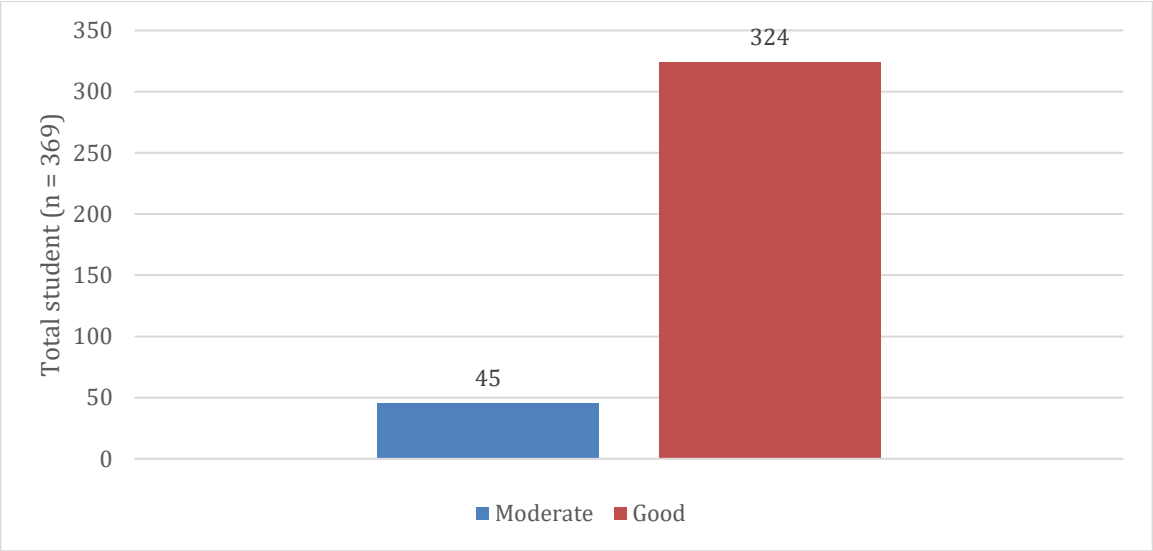

Figure 6. Level of knowledge in self-medication of headache.

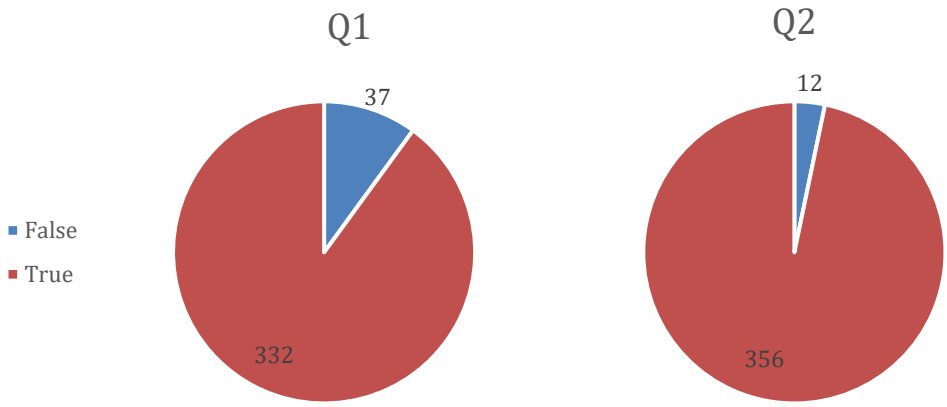

Figure 7. Definition of headache.

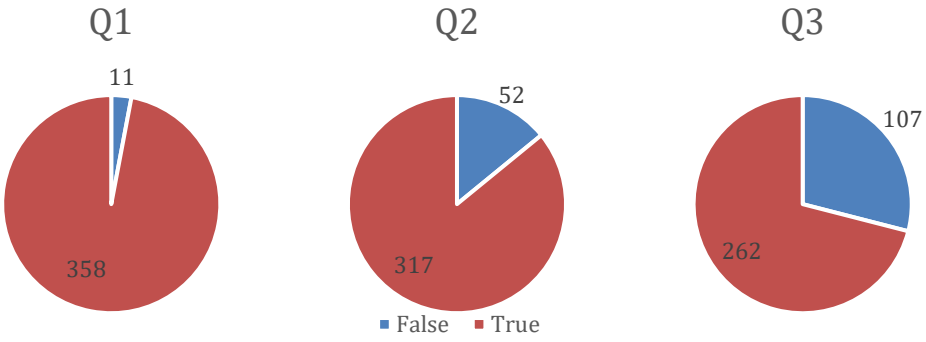

Figure 8 Type of headache

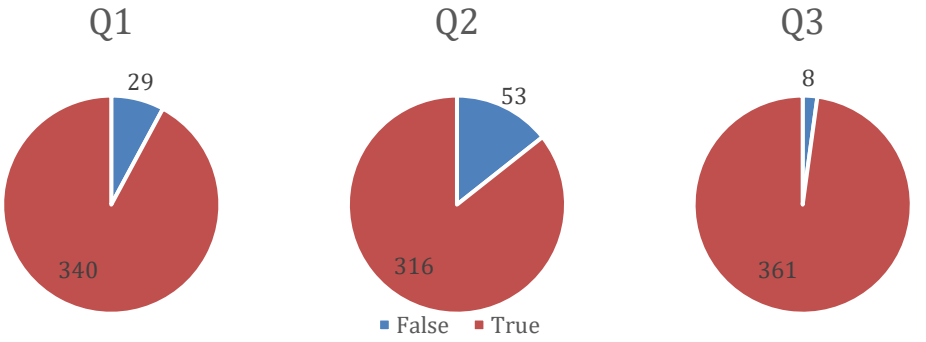

Figure 9. Etiology and prevention of headache.

Students demonstrated a good understanding of the topics covered in the section on the definition, types, causes, and prevention of headaches. However, it must be noted that more than 14% of respondents incorrectly answered about the categorization of primary and secondary headaches and whether excessive consumption of caffeine causes headaches or not. Excessive consumption (> 100 mg/day) of caffeine can be a trigger of migraine attacks and caffeine-withdrawal headache (Zduńska et al., 2023; Zhang et al., 2023). Following analysis of the data, it was determined that students require further education on these topics, particularly about identifying headaches and their causes. This is key, as it enables students to recognize when to seek professional help, facilitating the identification of effective treatment options for various headache types, preventing complications, and enhancing their overall quality of life.

Self-medication and OTCs

In this section, the definition of self-medication was explored: (1) self-medication is an act by individuals treating self-recognized illness with medicinal drugs, (2) treatment in self-medication refers to the administration of any medicinal drugs and herbs without a prescription. Figure 10 presents students' knowledge of the definition of self-medication. Most students answered "true" to both questions. In Figure 11, to gather information on self-medication for treating headaches, the following questions were asked: (1) Can

ibuprofen be used to treat headaches in cases of self-medication? and (2) Can paracetamol be used to treat headaches in cases of self-medication? The majority of students were familiar with ibuprofen and paracetamol as options for self-medication of headaches.
Students' knowledge of self-medication is represented in Figures 10 and 11, which show that the majority of students have a good understanding of this topic. Similar results have been found in related studies, particularly among medical and pharmacy students, who demonstrate a higher level of knowledge of self-medication (Brian et al., 2025; Mahmood et al., 2024). Meanwhile, results may differ among non-medical students and are generally lower than those of medical students (Octavia et al., 2023; Tesfaye et al., 2020). However, our study found that the proportion of respondents who answered incorrectly was only 2-7% among medical and non-medical students.

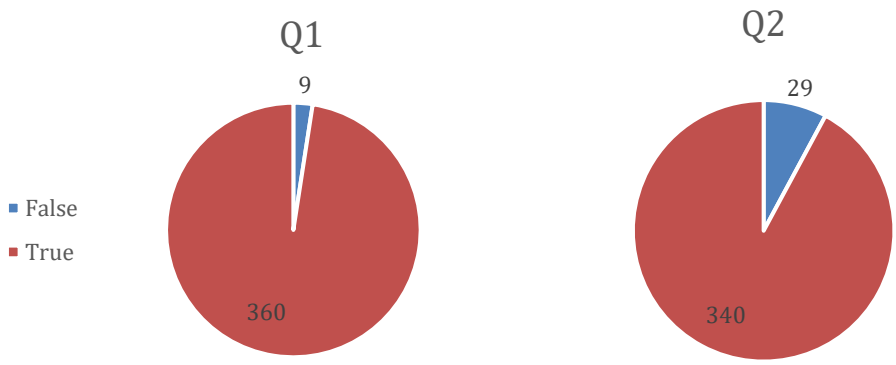

Figure 10. Definition of Self-medication

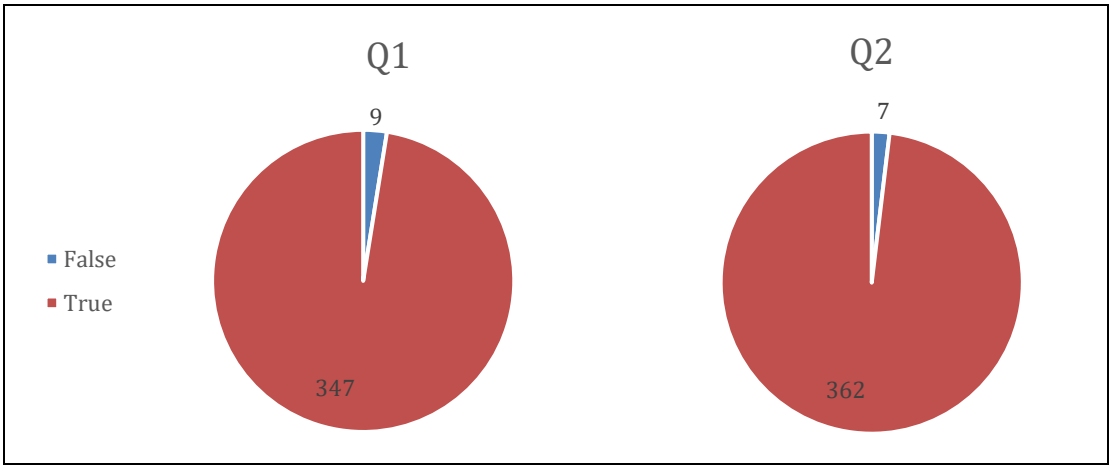

Figure 11. Self-medication for Headache

Self-medication: Paracetamol and Ibuprofen

Paracetamol and ibuprofen are OTCs and options for self-medicating headaches. In this section, we explored the dose, frequency, and contraindications of paracetamol with

the students. The first question addressed the appropriate dosage of paracetamol for treating headaches: 500 mg, 3 – 4 times daily. The next question was about the dosage of paracetamol for children aged 6–12 years: 250mg –500 mg, 3–4 times daily. The final question addressed contraindications, emphasizing that paracetamol is contraindicated for individuals with liver dysfunction. In Figure 12, most students answered correctly to the first question; however, more students selected the incorrect answer for the other questions, indicating a need for further education on paracetamol dosage for children and its contraindications.

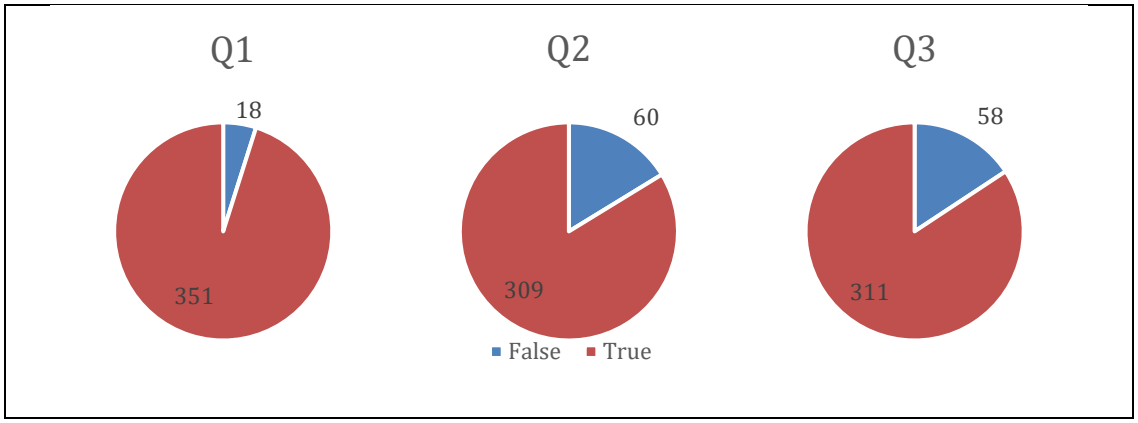

Figure 12. Dose, frequency, and contraindication of paracetamol.

In this study, ibuprofen was identified as the second-most-common OTC medication for headache. The study revealed that only 148 students (40.1%) answered the initial question correctly. The question addressed the appropriate dosage of ibuprofen in adults: 200 mg/day. This question has to be answered as "false". The second question was about the best time to take ibuprofen: before or after meals. Same as the first question, it has to be answered "false", resulting in 369 students, only 33,87% answered correctly (Figure 13). The final question addressed the potential side effects of ibuprofen on the gastrointestinal tract, including nausea, vomiting, and diarrhea. This question received the most accurate responses, with 312 students providing the correct "true" answer.

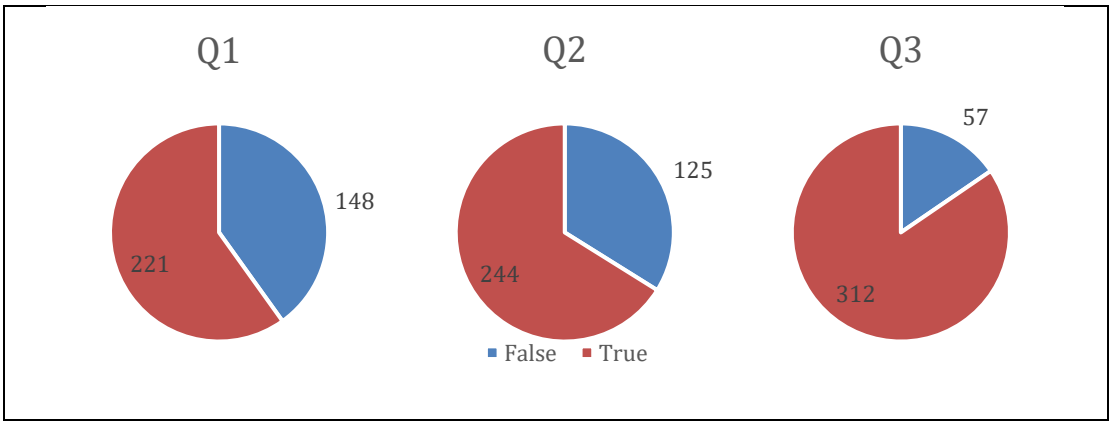

Figure 13. Dose, frequency, and adverse effects of ibuprofen.

This study identified the most frequently used medication in cases of individuals attempting to self-treat headaches. Respondents demonstrated a higher level of knowledge about paracetamol than about ibuprofen, as illustrated in Figures 12 and 13. The respondents indicated a comprehensive understanding of the recommended paracetamol dosage for adults: 500 mg, administered 3 to 4 times daily. However, we found that there is still insufficient knowledge in identifying paediatric doses and contraindications. In addition, studies have shown that awareness of paracetamol's risks and correct uses is universal, which can lead to overuse (Tjaja et al., 2025; Yadav et al., 2016) Even though ibuprofen is one of the OTCs for headaches, it is not widely used by the respondents in this study, which results in a significant gap in the responses to the related question (recommended dose, best time to take ibuprofen, and adverse effects). Faiqihi & Sayed (2020) reported that 79% of the participants who self-medicated were unaware of the doses of NSAID, including ibuprofen (Faqihi & Sayed, 2020). Another study found that most Ibuprofen users had insufficient knowledge of its risks (Almohammed, 2023). The results on the use of paracetamol and ibuprofen for self-medication of headaches are similar to those from other studies. This shows we need to improve our understanding of this topic to ensure safe, responsible self-medication habits. Although most students demonstrated good knowledge of headache self-medication, gaps remain in understanding correct dosing and drug safety, particularly for NSAIDs. These findings highlight the need for continuous pharmacist-led education and campus-based health promotion to ensure safe and rational self-medication practices. Future studies should evaluate the effectiveness of targeted educational interventions and their impact on students' actual medication use behaviour.

This study used a cross-sectional design, which limits the ability to identify causal relationships between knowledge levels and self-medication habits. Data were gathered via a self-administered online questionnaire, which may be susceptible to response and social desirability biases. The study exclusively examined students from one university, thereby limiting the applicability of the findings to other student demographics or contexts. This study exclusively evaluated knowledge levels and did not measure real self-medication practices or clinical consequences.

CONCLUSION

Most students demonstrated a "good" level of understanding of self-medication for headaches, with an average score of 85.99. However, there is a need for additional efforts to promote safe and responsible self-medication practices among students at Universitas Muhammadiyah Yogyakarta.

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AUTHOR CONTRIBUTION

AKS: Concepts and ideas; design; definition of intellectual content; literature search; experimental studies; data analysis; manuscript editing.
PU: Concepts and ideas; design; definition of intellectual content; data analysis; manuscript review.
DYP: Literature search; data analysis. Experimental studies; manuscript preparation.

ETHICS APPROVAL

This study had been approved by the ethics commission of the Faculty of Medicine and Health Sciences of Universitas Muhammadiyah Yogyakarta with the number 201/EC-KEPK FKIK UMY/IX/2022.

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