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Assessment of Public Knowledge Regarding Self-Medication with Ibuprofen In Marang Kayu District: A Quantitative Study

Triswanto Sentat*, Ika Nurjannah, Siti Jubaidah, Heri Wijaya, & Rusdiati Helmidanora

Department of Pharmacy, Sekolah Tinggi Ilmu Kesehatan Samarinda, Samarinda, Kalimantan Timur, Indonesia

ABSTRACT: Self-medication is an approach widely used by the public to treat mild pain symptom by using over-the-counter medications without a prescription from physician. One of the medications that can be used for self-medication is Ibuprofen. Ibuprofen is a drug that can be used for self-medication; however, its use should be under the supervision and guidance of healthcare professionals. This study aims to determine the level of public knowledge regarding the self-medication use of ibuprofen in Marang Kayu District. This research uses a quantitative design with a descriptive approach. Data were collected through questionnaires distributed to 369 respondents selected using purposive sampling. The questionnaire included questions about knowledge aspects regarding ibuprofen and self-medication patterns. The study results showed that the level of public knowledge in Marang Kayu District about Ibuprofen for self-medication was 14.5% (49 respondents) with a high level of knowledge, 31.3% (106 respondents) with a moderate level of knowledge, and the majority, 54.3% (184 respondents), with a low level of knowledge. The results underscore the urgent need for targeted health education programs to improve public awareness and promote safe self-medication practices. Enhancing community knowledge is essential to minimize the risks associated with improper ibuprofen use and to encourage responsible drug consumption.

Keywords: **ibuprofen; self-medication; knowledge Level.**

Introduction

Health is a basic need in human life. Nowadays, people pay more attention to their health, but many of them do self-medication without consulting a doctor or other medical personnel. Self-medication or self-medication is an action taken by people to treat themselves from diseases or symptoms of diseases without a doctor's prescription or consultation with a doctor. Self-medication has the advantage of being cheaper, more time efficient and also easy to obtain, but has disadvantages if the use of the drugs used is not appropriate [1,2]. People do self-medication to overcome complaints and minor illnesses such as fever, pain, dizziness, cough, and others.

Many Indonesian people practice self-medication as a form of effort to cure the illnesses they suffer from by purchasing over-the-counter or limited over-the-counter medications at pharmacies [3]. Data from the Central Statistics Agency (BPS) in 2022 stated that the percentage of Indonesians who self-medicate was 84.34%. This figure is higher when compared to 2021 which was 84.23%. The Central Statistics Agency of East Kalimantan stated that in Kutai Kartanegara, people who self-medicated in 2021 were 58.34% and increased in 2022 to 60.03% [4]. This percentage proves that currently people are more likely to self-medicate than to consult a physician. Medicine that are often used for self-medication are analgesic-antipyretic and anti-inflammatory drugs. One of the analgesic/antipyretic drugs that is often used is ibuprofen. Ibuprofen is a drug that must be used supervised and based on instructions from health workers because ibuprofen has side effects that have the potential to cause stomach disorders. According to the Biopharmaceutical Classification System (BCS), ibuprofen has good permeability to the digestive tract, but its solubility in water is low, and it has a high potential for causing gastric dysfunction if it is not used correctly [5].

Proper self-medication of analgesics/antipyretics (in accordance with the rules) is still relatively low, according to the results of Afifah's research conducted on students at the Madrasah Aliyah (MA) level at the Sunan Bonang Pasuruan Islamic Boarding School, showing that

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***Corresponding Author:** Triswanto Sentat
Department of Pharmacy, Sekolah Tinggi Ilmu Kesehatan Samarinda, Samarinda, Kalimantan Timur, Indonesia, 75124 | Email: acuan3s@gmail.com

23.5% of the knowledge level is classified as lacking, 60.2% are classified as quite good and 16.3% are classified as good [6]. Because generally people buy medicine in retail so they cannot read the information listed on the medicine packaging. In Herli's research, the accuracy of self-medication in the use of ibuprofen by parents for children at pharmacies in Malang City showed that 72.13% (44 respondents) were not correct in using the medicine and only 17.87% (17 respondents) were correct in using the medicine [7].

Low levels of public knowledge regarding drug use can affect the accuracy of drug use [8]. Knowledge is an important domain in the formation of self-medication actions. Actions based on knowledge are better than actions not based on knowledge [9]. Likewise, in the action of using ibuprofen drugs, it must follow the principles of drug use in general, namely appropriately and rationally. The selection of analgesic/antipyretic drugs appropriately must meet the criteria including appropriate indications, appropriate rules of use, appropriate duration of administration, appropriate storage methods, appropriate follow-up, and being aware of drug side effects [10]. According to WHO sufficient knowledge will influence a person to behave or do something. Knowledge is an important factor related to individual behavior and decision making. Good knowledge regarding drugs can have an impact on the success of self-medication. A person's knowledge can be influenced by several factors such as experience, age, education level, income, and environment [11]. This research employs a quantitative approach to asses the public's knowledge level concerning the use of ibuprofen for self-medication in the Marang Kayu District. The result of this quantitative study is expected to be the basis for the development of targeted health education programs to improve public understanding in the safe and responsible use of ibuprofen. Therefore, this study is very important to support efforts to increase awareness and safety of drug use in the community.

Methods

Research Design and Sampling Method

Research involving human subjects must obtain ethical approval from an appropriate committee, as international guidelines emphasize the necessity of protecting participants' rights and welfare through committee review. This requirement is articulated by authoritative documents that set out ethical principles for medical research on humans, underscoring that ethical committee approval is mandatory to ensure research is conducted responsibly and ethically [12,13]. The protocol has been approved by the Research Ethics Committee of the University of Muhammadiyah Lamongan (Ethical approval number: 253/EC/KEPK-S1/06/2024). The preparation stage includes an application for a permit, where the researcher submits an application for a research permit letter to the Marang Kayu district community to the Head of Santan Ilir Village by submitting a research permit letter that has been prepared by the Sekolah Tinggi Ilmu Kesehatan Samarinda.

A prospective study of data collection through a specially designed questionnaire to measure community understanding of self-medication related to ibuprofen in Santan Ilir Village, Marang Kayu District between July and August 2024. All respondents met the inclusion requirements to be eligible if (1) People aged 17-55 years domiciled in Santan Ilir Village, Marang Kayu District; (2) Currently or have done self-medication; and (3) Willing to be respondents. Exclusion criteria were respondents who had difficulty communicating either verbally or in writing. All respondents agreed to participate in the clinical study and signed an informed consent. The questionnaire was administered to the first 30 respondents for validity and reliability testing. The questionnaire with valid and reliable questions will be used on respondents who meet the inclusion and exclusion criteria between July and August 2024. Demographic data collected included age, gender, occupation, and last education of respondents and 20 questions related to their knowledge of ibuprofen for self-medication were obtained for all respondents. Research design and sampling flowchart components can be seen in Figure 1.

Data Analysis

The data obtained in this study have undergone validity and reliability testing using SPSS software to ensure the research instrument's validity and reliability. The entire analysis process aims to provide a comprehensive overview of the public knowledge level in Marang Kayu District regarding the use of ibuprofen for self-medication. The questionnaire data collected from respondents are presented quantitatively in tables. Descriptive analysis is used to describe the characteristics of respondents and detail the research data interpretation. Thus, the entire analysis process will provide a comprehensive overview of the extent of public knowledge, multivariate analysis is conducted using Minitab software to statistically reveal the level of community knowledge about ibuprofen.

Principal Component Analysis (PCA), a multivariate statistical analysis was performed to examine the correlation

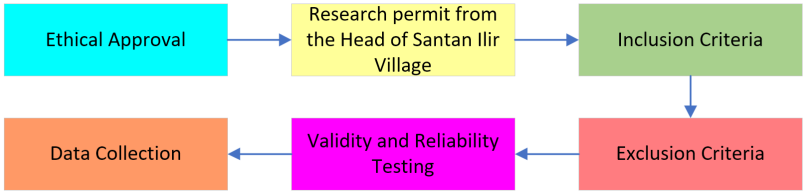

Figure 1. Research design and sampling flowchart components.

between sociodemographic factors and knowledge levels. PCA is a simple, nonparametric method for extracting relevant information from datasets, identifying patterns in data, and expressing differences. PCA is applied for the reduction of dimensionality and multivariate data compression exploration within different fields of science [14,15]. This multivariate analysis were conducted using Minitab according to determine significant relationships between variables such as age, gender, occupation and education level,with the respondents' knowledge about ibuprofen self-medication. The results of these statistical tests provide a clearer understanding of how sociodemographic characteristics may influence public knowledge.

Result and Discussion

Validity Test and Reliability Test

Based on the results of the validity test, all questions were declared valid, then for the reliability test, it is 0.831, where the results can be stated as reliable and trustworthy.

Respondent Characteristics

Age

The respondents obtained were 369 respondents within aged 17-55 years as shown in Table 1. Based on the data above between age and level of knowledge, it was found that the 26-35 year old age group had high knowledge with the largest number compared to other age groups, namely 5.0%. Meanwhile, the 17-25 age group and the 46-55 age group have the largest number of people with low knowledge with a percentage of 17.7% and 15.9%.

Respondents aged 26-35 years have a better level of knowledge compared to other age groups, although the 17-25 year age group has a slightly smaller difference in figures, but in the overall population, the majority are still at a low level of knowledge.This can be caused by factors such as easier access to information through digital media and better responsibility to health education in the modern era. Older age groups such as 46-55 years showed low level of knowledge. Possible causes include lack of access to relevant information, or self-medication habits based on experience without updating knowledge with the latest information. The results of this study are in line with previous research conducted rural communities of North Sumatra, which stated that public knowledge about drugs is low in major. The study also showed that health education and access to the right information greatly affect the level of public knowledge about drug use [16].

Gender

From the 369 respondents recorded, the proportion of female respondents (56.9%) was greater than that of male respondents (43.1%). The details are as shown in Table 2.

The results of this study indicate that there are

Table 1. Respondents' knowledge level with age characteristics.

Age (Years)	Number (People)	Level of Knowledge					
		High		Moderate		Low	
		N	%	N	%	N	%
17-25	113	15	4.4	38	11.2	60	17.7
26-35	72	17	5.0	30	8.8	25	7.4
36-45	78	13	3.8	20	5.9	45	13.3
46-55	76	4	1.2	18	5.3	54	15.9
Total	339	49	14.5	106	31.3	184	54.3

Table 2. Respondents' knowledge level with gender characteristics.

Gender	Number (People)	Level of Knowledge					
		High		Moderate		Low	
		N	%	N	%	N	%
Male	149	15	4.4	38	11.2	96	28.3
Female	190	34	10.0	68	20.1	88	26.0
Total	339	49	14.4	106	31.3	184	54.3

differences in the level of knowledge between male and female regarding the use of ibuprofen for self-medication. Female appear to have better knowledge than male as indicated by a higher percentage for the moderate and high categories in female (20.1% and 10%) compared to male (11.2% and 4.4%). Meanwhile, the percentage for the low category is higher in male (28.3%) compared to female (26%). It can be concluded that female are more familiar with health information and participate more in self-medication practices compared to male. The pervious study findings revealed the factors (such as gender, education, income, and occupation) that significantly associate with parents' drivers to search for health-related information online. Female intend to be more careful and seek more information about medicine use compared to male. This may be due to the role of mother in the household who take more care of family health and home medicine [17–20].

Occupation

Housewives and private employees are the largest occupational groups in this study. Detailed data can be seen in Table 3.

Housewives showed high and medium levels of knowledge with 4.4% and 10.9% respectively. These results are in line with previous research, stating that housewives tend to have higher knowledge about self-medication because they often access health information [17].

Last Education

Respondents with a high school education background were the largest group in this study. Complete data can be seen in Table 4. The group with a high school education background had 69 respondents (20.4%) with moderate knowledge and 32 respondents (9.4%) with high knowledge, but the number of respondents with low knowledge was greater (30.1%). Meanwhile, the group with college education showed a proportion of moderate knowledge (4.7%) and high knowledge (4.4%) about the use of ibuprofen more than low knowledge (3.9%). Public knowledge about the use of over-the-counter drugs such as NSAIDs is correlated with education levels and access to information. The study found that internet access and the availability of adequate health services play a significant

Table 3. Respondents' knowledge level with occupation characteristics.

Occupation	Number (People)	Level of Knowledge					
		High		Moderate		Low	
		N	%	N	%	N	%
Student	11	0	0.0	3	0.9	8	2.4
College Student	48	4	1.2	16	4.7	28	8.3
Farmer	20	3	0.9	4	1.2	23	6.8
Fisherman	13	0	0.0	5	1.5	8	2.4
Civil servant	12	6	1.8	1	0.3	5	1.5
Private employee	79	12	3.5	24	7.1	43	12.7
Self-employed	14	3	0.9	4	1.2	7	2.1
Housewife	94	15	4.4	37	10.9	42	12.4
Other/unemployed	38	6	1.8	12	3.5	20	5.9
Total	339	49	14.5	106	31.3	184	54.3

Table 4. Respondents' knowledge level with last education characteristics.

Last Education	Number (People)	Level of Knowledge					
		High		Moderate		Low	
		N	%	N	%	N	%
Kindergarten	5	0	0.0	0	0.0	5	1.5
Elementary School	38	1	0.3	8	2.4	29	8.6
Junior High School	46	1	0.3	13	3.8	32	9.4
High School	203	32	9.4	69	20.4	102	30.1
College	44	15	4.4	16	4.7	13	3.8
No Education	3	0	0.0	0	0.0	3	0.9
Total	339	49	14.5	106	31.3	184	54.3

role in increasing public knowledge about the use of over-the-counter drugs [21,22]. A study conducted by Harahap in three pharmacies of Panyabungan City, Indonesia. Based on this research, it can also be seen that the level of knowledge is related to the last level of education. It was found that education has a significant influence on public health knowledge [23]. The results of this study are in line with previous findings, where the group with higher education also showed a higher level of knowledge about ibuprofen.

Questionnaire Results

Based on the questionnaire results in Table 5, it can be seen that respondents' level of knowledge is that numbers 2, 7, 9, 13, 16 and 17 are classified as low in knowing the correct answer. With over half of the respondents (54.3%) categorized as having poor knowledge, it highlights a significant gap in understanding the correct dosage, potential side effects, and contraindications of this commonly used over-the-counter drug. This lack of knowledge can lead to inappropriate use, increasing the risk of adverse effects such as stomach irritation and other complications. The findings align with previous research indicating that self-medication without adequate knowledge can compromise drug safety and effectiveness.

The study underscores the importance of targeted health education to improve safe self-medication practices. Many respondents were unaware of critical aspects such as the need to avoid ibuprofen during pregnancy or the importance of consulting healthcare professionals before prolonged use. The data suggest that enhancing public access to reliable health information, especially in rural

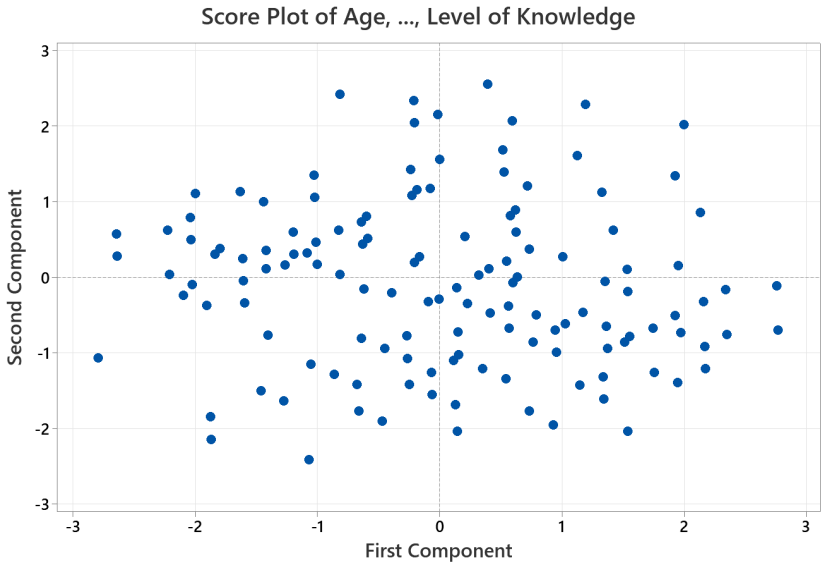

Figure 2. PCA score plot of respondents' distribution across principal components.

Table 5. Respondent questionnaire results.

No.	Question Statement	True		False		Abstain	
		N	%	N	%	N	%
1.	Ibuprofen can be used to relieve fever	299	88.2	5	1.5	35	10.3
2.	Use of ibuprofen can cause stomach irritation	150	44.2	41	12.1	148	43.7
3.	Ibuprofen is a type of medicine to relieve pain and inflammation, not an antibiotic	217	64.0	8	2.4	114	33.6
4.	Ibuprofen can be used to relieve muscle pain	254	74.9	20	5.9	65	19.2
5.	Children under 12 years old should not take ibuprofen unless advised by a doctor	184	54.3	14	4.1	141	41.6
6.	Ibuprofen can be taken with alcoholic beverages	290	85.5	8	2.4	41	12.1
7.	Rules for use of ibuprofen 3-4 times a day	143	42.2	22	6.5	174	51.3
8.	Ibuprofen is a safe medicine to be consumed routinely without a doctor's prescription	175	51.6	11	3.2	153	45.1
9.	Some people can experience allergic reactions after using ibuprofen.	144	42.5	29	8.6	166	49.0
10.	Even though the medicine has not run out, the use of ibuprofen should not be stopped even though the fever is no longer there.	162	47.8	47	13.9	130	38.3
11.	Pregnant women are advised to use ibuprofen, especially in the last trimester of pregnancy	278	82.0	2	0.6	59	17.4
12.	Using ibuprofen in the right dose can help reduce toothache and headache.	294	86.7	8	2.4	37	10.9
13.	Ibuprofen can be used to treat infections caused by bacteria.	99	29.2	37	10.9	203	59.9
14.	Babies under 6 months old may be given ibuprofen without a doctor's recommendation.	211	62.2	21	6.2	107	31.6
15.	Ibuprofen medicine in syrup form, the dose can be measured using a measuring spoon.	282	83.2	9	2.7	48	14.2
16.	Ibuprofen should not be used with other medicines that have similar effects.	144	42.5	21	6.2	174	51.3
17.	Ibuprofen use will not cause a significant decrease in blood pressure.	48	14.2	68	20.1	223	65.8
18.	It is important to always consult a doctor before using ibuprofen for a long period of time	236	69.6	2	0.6	101	29.8
19.	Breastfeeding mothers can use ibuprofen if it is in accordance with the dosage.	228	67.3	13	3.8	98	28.9
20.	Store ibuprofen in a cool, dry place and avoid direct sunlight.	317	93.5	1	0.3	21	6.2

areas like Marang Kayu, is essential. This could involve community health programs, better labeling on medication packaging, and leveraging digital platforms to disseminate accurate drug use guidelines.

Multivariate Analysis

Given the large number of respondent data and several characteristics in this study, we used multivariate statistical analysis to comprehensively understand the relationship between several characteristics and the level of knowledge. The dataset provided includes the characteristics of 339 respondents, including gender, age, occupation, last education and level of knowledge.

Principal Component Analysis (PCA) is a simple nonparametric method to extract relevant information from a dataset, identify patterns in the data, and express differences. PCA is applied for dimensionality reduction and exploration of multivariate data compression in various fields of science. The distribution score plot of 339 respondents across the principal components can be seen in Figure 2. The first component and second component show how the variables in the dataset contribute to the respondents' level of knowledge.

The PCA loading plot of the characteristics can be seen in Figure 3. PCA reveals two main characteristics that have the most influence on the respondent data in

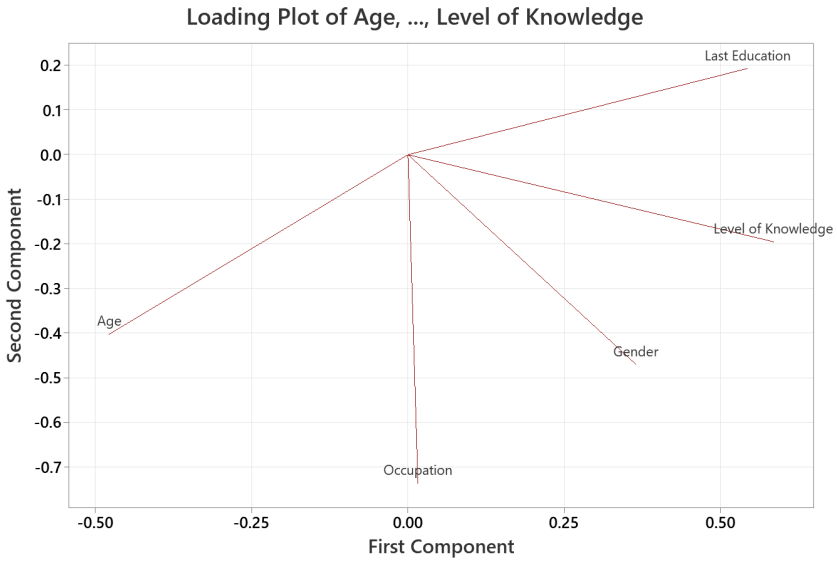

Figure 3. PCA loading plot of respondent characteristics with knowledge level.

general, namely: age and last education. Figure 3 shows that age characteristics as the First Principal Component (PC1) have a strong relationship to the level of knowledge, but have a negative direction, meaning that the older a person is, the level of knowledge tends to decrease. The Second Principal Component (PC2) is the last education, this characteristic also shows a strong and positive influence, indicating that the respondent's last education is closely related to their level of knowledge. The higher the education, the higher the level of knowledge that the respondent has, higher formal education often includes more materials and learning experiences. Gender and occupation characteristics have relatively little influence on PC1 and PC2. Access to individuals with higher education may have better access to sources of information and resources that support learning, while the older a person is, the level of knowledge tends to decrease, this may occur if the individual does not continue to learn or adapt to new information.

Level of Knowledge

Based on the results of the analysis shown on Table 6, data obtained from 339 respondents showed that the majority of respondents were in the Low category, which was 54.3% (184 respondents), followed by the Moderate category of 31.3% (106 respondents), and the High category of 14.5% (49 respondents). Based on these data, it can be concluded that in general the level of public knowledge in the area regarding the use of ibuprofen for self-medication still needs to be improved.

Several demographic factors influence the level of knowledge among the community. Younger adults aged 26-35 years tend to have better knowledge, likely due to greater access to digital information and health education. Education level also plays a crucial role; respondents with higher formal education demonstrated significantly better understanding of ibuprofen use. Gender differences were observed as well, with females generally showing higher knowledge levels than males, possibly because women often take more responsibility for family health and seek out health information more actively. Occupation also matters, with housewives and private employees showing relatively higher knowledge, which may be linked to their frequent engagement with health-related information.

Table 6. Categories of respondents' knowledge levels.

Knowledge Levels	Number (People)	Percentage (%)
High	49	14.5
Moderate	106	31.3
Low	184	54.3
Total	339	100

This study is supported by previous research conducted by Wahyudi which showed that in urban areas, the distribution of information regarding over-the-counter drugs is more evenly distributed compared to rural areas. The study found that the level of knowledge of urban communities regarding ibuprofen was at a higher level compared to rural communities [16].

From all these results, it can be concluded that the general level of public knowledge in Marang Kayu sub-district about ibuprofen for self-medication is at a poor level. With the majority of respondents demonstrating low awareness of proper dosage, side effects, and contraindications, there is a clear need for enhanced public health education. Therefore, healthcare authorities and pharmacists should play a proactive role in educating the public about the rational use of drugs like ibuprofen. Improving knowledge will not only reduce the risk of adverse drug reactions but also promote more effective and responsible self-care practices in the community. As their health literacy increases, the risk of medication errors can be minimized, and they will be well-equipped to take care of themselves and those around them, so this community education becomes the first step to creating a more health-conscious society in the future [24]. This study provides valuable insights for healthcare providers and policymakers aiming to develop effective interventions to support rational drug use in the community.

Conclusion

Based on the research that has been conducted, it shows that the level of public knowledge in Marang Kayu sub-district about ibuprofen for self-medication, namely 14.5% respondents showed high level of knowledge, 31.3% respondents had a moderate level of knowledge, and 54.3% respondents showed poor knowledge. The results underscore the urgent need for targeted health education programs to improve public awareness and promote safe self-medication practices. Enhancing community knowledge is essential to minimize the risks associated with improper ibuprofen use and to encourage responsible drug consumption.

Conflict of Interest

The authors have no conflicts of interest regarding this investigation.

Acknowledgement

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