

Household Drug Use Safety in Terms of Knowledge, Behavior, and Storage in Karan Kidul Village: A Cross-Sectional Study

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ABSTRACT

Introduction: Household drug management, including proper knowledge, behavior, and storage practices, is essential for ensuring medication safety and preventing adverse drug events. Community-level self-medication practices without adequate understanding pose significant health risks.

Objectives: This study aims to determine the level of knowledge, behavior, and drug storage practices among the community of Karan Kidul Village, Gayamdompo, Karanganyar, and to analyze their relationships with household drug use safety.

Method: This was a non-experimental descriptive survey study using a cross-sectional approach. A total of 165 respondents were selected using the Slovin formula from a population of 280 residents. Data were collected through validated and reliable questionnaires covering knowledge, behavior, and drug storage, and were analyzed using univariate and bivariate Chi-Square tests.

Results: The majority of respondents demonstrated good knowledge (42.4%), good behavior (43.6%), and sufficient drug storage practices (51.5%). Safe drug use was reported in 85.5% of respondents. Chi-Square analysis revealed a significant relationship between knowledge, behavior, and drug storage with household drug use safety, with a p-value of 0.000 (< 0.05) for all three variables.

Conclusion: Improving community knowledge, appropriate drug use behavior, and proper drug storage practices may contribute to safer household medication management. Community education on rational drug use, Expired Date versus Beyond Use Date distinctions, and proper storage techniques is strongly recommended.

Keywords: Beyond Use Date, drug storage, household drug use safety, knowledge, self-medication

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Introduction

Medications are substances or combinations of compounds, including biological products, used to influence physiological functions or pathological conditions for purposes of diagnosis, prevention, treatment, rehabilitation, health improvement, or contraception in humans. In healthcare practice, medications play a central role in managing disease and promoting recovery. Rational, safe, and appropriate use of medications can improve patient quality of life, reduce morbidity, and prevent complications. Conversely, inappropriate drug use may lead to adverse effects, drug resistance, and other health problems. Therefore, a sound understanding of medication definitions, functions, and correct use is fundamental to supporting successful therapy and comprehensive healthcare delivery (Rahim et al., 2022).

Community knowledge regarding medications including their proper use, storage, and disposal plays a critical role in ensuring drug safety at the household level. However, numerous studies indicate that public understanding of household drug use safety remains low and uneven, particularly regarding appropriate storage conditions necessary to maintain drug quality and safety (Novitri et al., 2024).

Self-medication behavior contributes significantly to irrational drug use within the community. Practices of self medication without adequate understanding of indications, dosage, and correct administration lead to a range of drug related problems, including incorrect dose determination and use of medications beyond their intended indications. Additionally, communities frequently retain and reuse expired medications without

healthcare supervision, increasing the risk of reduced drug efficacy and adverse health effects (Novitri et al., 2024).

According to data from the Indonesian Central Bureau of Statistics (2024), self medication practices are highly prevalent in Indonesia, with nearly 80% of the population having engaged in self medication at least once. Approximately 35.2% of households reportedly store medications for self medication purposes. Among respondents who practiced self medication, pharmacies (75%) and drug stores or kiosks (16%) were the most common sources of medications. However, not all medications obtained were fully consumed, primarily because patients recovered before completing the course (72%) or because medications had expired or deteriorated (22%) (Wijaya et al., 2023).

Previous research by Hasanah (2025) on community knowledge regarding drug storage and disposal behavior found that public knowledge of proper storage and disposal practices remained low, while behavioral practices were at a sufficient level. Similarly, Sari (2021) reported that community knowledge of drug storage in Banjarbaru, South Kalimantan, fell within the sufficient category, while knowledge of drug disposal was classified as poor.

Despite growing evidence on community drug management, existing studies have predominantly focused on either knowledge or storage practices in isolation, without simultaneously examining the interrelationships among knowledge, behavior, and storage as integrated determinants of household drug use safety. Furthermore, prior research has largely been conducted in urban settings or at the district level, leaving community-level dynamics in semi-urban villages underexplored. This study addresses this gap by simultaneously assessing three dimensions knowledge, behavior, and drug storage and their associations with household drug use safety in a single community-level setting. This integrated approach constitutes the primary novelty of the present study. Based on the Health Belief Model and Theory of Planned Behavior, drug use behavior is influenced by knowledge, perception of benefits and barriers, attitudes, and social norms.

Karan Kidul Village, Gayamdompo, Karanganyar, was selected as the study site based on preliminary observations indicating widespread suboptimal medication practices, including continued use of medications beyond their Beyond Use Date (BUD), non adherence to dosing schedules, and limited awareness of proper storage conditions. To date, no published study has examined household drug use safety in this specific community, further underscoring the relevance and originality of this study.

This study was motivated by preliminary observations conducted through brief interviews and direct observations in Karan Kidul Village, Gayamdompo, Karanganyar Regency. Findings revealed that most community members lacked adequate knowledge of proper medication use, particularly following the opening of primary packaging. This was reflected in behaviors such as prolonged use of medications beyond their Beyond Use Date (BUD), non-adherence to prescribed dosing schedules, insufficient understanding of proper storage conditions, and habitual use of medications without healthcare recommendations. These behaviors pose risks to household drug use safety, including reduced therapeutic efficacy, unwanted adverse effects, and medication errors that may endanger public health. Therefore, research on household drug use safety from the perspectives of knowledge, behavior, and storage is critically needed to improve medication safety and quality at the community level.

Method

This study employed a non-experimental research design with a descriptive survey approach, conducted among community members of Karan Kidul Village, Gayamdompo, Karanganyar. The study was carried out between February and April 2026. The study population comprised 280 residents of Karan Kidul Village, RT 02/10, Kelurahan Gayamdompo, Kabupaten Karanganyar, Central Java. A sample of 165 respondents was determined using the Slovin formula with a 5% margin of error. Sampling was conducted

using a simple random sampling technique, in which all eligible residents meeting the inclusion criteria had an equal probability of being selected as respondents.

Inclusion criteria required respondents to be household members aged ≥ 18 years who were responsible for medication use and storage at home, possessed medications at the time of the study, were literate, and provided informed consent. Respondents with healthcare related educational backgrounds or occupations, those who did not complete the questionnaire, and those with communication or cognitive impairments were excluded.

Data were collected using a structured questionnaire encompassing three domains: knowledge (7 items), drug storage (8 items), and behavior (7 items). Prior to the main study, the questionnaire was validated and tested for reliability using 30 respondents not included in the main sample. Validity testing yielded an r -table value of 0.361; items with r -count $>$ r -table were retained. Of 24 initial items, 22 were declared valid. Reliability testing confirmed the instrument was consistent and dependable (Al Hakim et al., 2021; Shalihah et al., 2025). Each item was scored on a binary scale (correct = 1, incorrect = 0) for the knowledge domain, and on a Likert type scale (1–4) for the behavior and storage domains. Total scores for each domain were then categorized as follows: Good ($\geq 76\%$ of maximum score), Sufficient (56–75%), and Poor ($< 56\%$), adapted from Arikunto's scoring classification (2013). The knowledge domain yielded a maximum score of 7, drug storage a maximum of 8, and behavior a maximum of 7, with the household drug use safety variable assessed as a composite outcome categorized as Safe or Unsafe based on a predetermined cut-off score.

Data analysis was conducted using SPSS software. Univariate analysis was used to describe the distribution of respondent characteristics and variable frequencies. Bivariate analysis employed the Chi-Square (χ^2) test to assess relationships between categorical variables, with a significance threshold of $\alpha = 0.05$.

Results

Table 1. Frequency Distribution of Respondents by Age

Age	Frequency (N)	Percentage (%)
≤ 25 years	37	22.4
26–35 years	40	24.2
36–45 years	34	20.6
46–55 years	43	26.1
56–65 years	11	6.7
Total	165	100%

The largest age group was 46–55 years (26.1%), followed by 26–35 years (24.2%). The dominance of respondents aged 36–55 years indicates that most participants are adults who are likely responsible for managing medications for their families, making them a relevant group for assessing household drug use safety.

Table 2. Frequency Distribution of Respondents by Gender

Gender	Frequency (N)	Percentage (%)
Male	38	23.0
Female	127	77.0
Total	165	100%

The study included 165 respondents, with females dominating at 77.0% compared to males at 23.0%. This reflects women's primary role in managing household health and medication decisions. Therefore, health education on medication safety should be targeted primarily toward women.

Table 3. Frequency Distribution of Respondents by Education Level

Education	Frequency (N)	Percentage (%)
Elementary School	28	17.0
Junior High School	44	26.7
Senior High School	84	50.9
Higher Education	9	5.5
Total	165	100%

Most respondents had a senior high school education (50.9%), followed by junior high school (26.7%) and elementary school (17.0%). Only 5.5% had higher education. This indicates that the majority had a moderate education level, so medication information should be made accessible for a high school education background.

Table 4. Frequency Distribution of Respondents by Profession

Profession	Frequency (N)	Percentage (%)
Homemaker	22	13.3
Labor	39	23.6
Private sector employee	79	47.9
Tailor	2	1.2
Entrepreneur	5	3.0
Security officer	1	0.6
Farmer	13	7.9
Driver	1	0.6
Unemployed	3	1.8
Total	165	100%

Most respondents worked as private sector employees (47.9%), followed by laborers (23.6%) and homemakers (13.3%). Other professions, such as farmers, entrepreneurs, and the unemployed, accounted for less than 10% of the sample. This indicates that the majority of participants were from the working-age group with formal or informal employment.

Table 5. Frequency Distribution of Respondents by Knowledge Level

Knowledge	Frequency(N)	Percentage (%)
Good	70	42.4
Sufficient	66	40.0
Poor	29	17.6
Total	165	100%

Most respondents had good knowledge (42.4%), followed by sufficient (40.0%) and poor (17.6%). This indicates that most participants had adequate medication knowledge, but 17.6% still had poor understanding.

Table 6. Frequency Distribution of Respondents by Drug Storage Practice

Drug Storage	Frequency(N)	Percentage (%)
Good	33	20.0
Sufficient	85	51.5
Poor	47	28.5
Total	165	100%

Most respondents had sufficient drug storage practice (51.5%), followed by poor (28.5%) and good (20.0%). This shows that medication storage was mostly acceptable but not yet optimal.

Table 7. Frequency Distribution of Respondents by Drug Use Behavior

Behavior	Frequency(N)	Percentage (%)
Good	72	43.6
Sufficient	66	40.0
Poor	27	16.4
Total	165	100%

Most respondents had good drug use behavior (43.6%), followed by sufficient (40.0%) and poor (16.4%). This indicates that most participants used medications appropriately.

Table 8. Frequency Distribution of Respondents by Drug Use Safety

Drug Use Safety	Frequency(N)	Percentage (%)
Safe	141	85.5
Unsafe	24	14.5
Total	165	100%

Most respondents had safe drug use (85.5%), while 14.5% had unsafe practices. This indicates that the majority of participants used medications safely, but unsafe practices still occurred in nearly one in seven respondents.

Table 9. Relationship Between Knowledge and Household Drug Use Safety

Knowledge	Safe (f)	Safe (%)	Unsafe (f)	Unsafe (%)	Total (f)	Total (%)	p-value
Good	70	100.0	0	0.0	70	100	0.000
Sufficient	60	90.9	6	9.1	66	100	
Poor	11	37.9	18	62.1	29	100	
Total	141	85.5	24	14.5	165	100	

All respondents with good knowledge practiced safe drug use (100.0%), while the majority of those with poor knowledge were classified as unsafe (62.1%). The Chi-Square test yielded a p-value of 0.000 (< 0.05).

Table 10. Relationship Between Drug Storage and Household Drug Use Safety

Drug Storage	Safe (f)	Safe (%)	Unsafe (f)	Unsafe (%)	Total (f)	Total (%)	p-value
Good	33	100.0	0	0.0	33	100	0.000
Sufficient	82	96.5	3	3.5	85	100	
Poor	26	55.3	21	44.7	47	100	
Total	141	85.5	24	14.5	165	100	

Respondents with good storage practices all demonstrated safe drug use (100.0%), while nearly half of those with poor storage were classified as unsafe (44.7%). The Chi-Square test p-value was 0.000 (< 0.05).

Table 11. Relationship Between Behavior and Household Drug Use Safety

Behavior	Safe (f)	Safe (%)	Unsafe (f)	Unsafe (%)	Total (f)	Total (%)	p-value
Good	72	100.0	0	0.0	72	100	0.000
Sufficient	61	92.4	5	7.6	66	100	
Poor	8	29.6	19	70.4	27	100	
Total	141	85.5	24	14.5	165	100	

All respondents with good behavior demonstrated safe drug use (100.0%), while the majority of those with poor behavior were unsafe (70.4%). The Chi-Square test p-value was 0.000 (< 0.05).

3.1 Respondent Characteristics

The predominant age group was 46–55 years (26.1%), followed by 26–35 years (24.2%). The majority of respondents were female (77.0%), reflecting the socially constructed role of women as primary caregivers and household medication managers in Indonesian communities (Yuliastika & Amirulah, 2023; Purmafitriah et al., 2026). In terms of education, most respondents had senior high school attainment (50.9%), while only 5.5% had higher education. The largest occupational group was private sector employees (47.9%), followed by laborers (23.6%).

These demographic characteristics are relevant to household drug use safety outcomes. According to Purmafitriah et al. (2026), age influences drug management behavior through accumulated experience, although experience alone without formal health education may reinforce incorrect habits. Yuliastika & Amirulah (2023) and Rahma et al. (2025) further noted that higher education and occupational context affect receptivity to health information and capacity to apply safe medication practices. Therefore, health education interventions should prioritize women with senior high school education as the primary target audience to improve knowledge and behavior related to safe household drug use.

3.2 Responden by Gender

The findings show that the majority of respondents in this study were female, accounting for 127 respondents or 77.0%, while males were only 38 respondents or 23.0%. This gender distribution indicates that women play a more dominant role in household health management, including medication administration and safety practices at home. The result is consistent with the socio-cultural context in Indonesia, where women are often positioned as the primary caregivers for family members. Therefore, health education interventions related to medication safety should be designed to be more accessible and targeted toward women as the main decision-makers in the household. Increasing women's health literacy is expected to reduce medication errors and improve overall family health outcomes.

3.3. Respondents by Education Level

Most respondents had a senior high school education, accounting for 50.9%, followed by junior high school at 26.7% and elementary school at 17.0%, while only 5.5% had higher education. This indicates that the overall education level of respondents is moderate. Education level is closely related to health literacy, which influences the ability to understand medication instructions and health information. Respondents with higher education tend to have better critical thinking and are more capable of processing complex health messages. Therefore, health education regarding medication safety should use simple, clear, and non-technical language to ensure it is accessible to respondents with elementary and junior high school backgrounds. Tailoring health communication to different education levels is important to improve understanding and promote safe drug use behavior in the community.

3.4 Respondents by Profession

Most respondents had a senior high school education, accounting for 50.9%, followed by junior high school at 26.7% and elementary school at 17.0%, while only 5.5% had higher education. This indicates that the overall education level of respondents is moderate. Education level is closely related to health literacy, which influences the ability to understand medication instructions and health information. Respondents with higher education tend to have better critical thinking and are more capable of processing complex health messages. Therefore, health education regarding medication safety should use simple, clear, and non-technical language to ensure it is accessible to respondents with elementary and junior high school backgrounds. Tailoring health communication to different education levels is important to improve understanding and promote safe drug use behavior in the community.

Discussion

Knowledge of Household Drug Use

The majority of respondents had good knowledge (42.4%), followed by sufficient (40.0%) and poor (17.6%) levels. These results are more favorable than those reported by Sari et al. (2021) and Yuliastika & Amirulah (2023). This relatively better outcome may be attributed to three factors. First, 50.9% of respondents were senior high school graduates. Higher education enhances health literacy and the ability to process health information, as also reported by Yuliastika & Amirulah (2023). Second, easier access to digital media, including

YouTube, Instagram, and WhatsApp, has expanded community exposure to rational drug use education campaigns. Furthermore, nearly half of the respondents (47.9%) worked in the private sector, suggesting that routine use of smartphones contributed to their access to health-related information.

However, good knowledge did not always correspond with good practice. Despite adequate knowledge, 16.4% of respondents exhibited poor behavior. This knowledge-behavior gap, also found by Rahma et al. (2025) and Purmafitriah et al. (2026), indicates that behavior is shaped not only by information but also by attitudes, social norms, economic factors, and healthcare access. Furthermore, 17.6% of respondents still had poor knowledge, which poses risks of irrational drug use, medication errors, and antimicrobial resistance. As emphasized by Utama & Zhohiroh (2023), passive information is insufficient; structured pharmaceutical counseling is needed to translate knowledge into safe drug use practices.

Drug Storage Practices

Drug storage practices were predominantly sufficient (51.5%), with 28.5% classified as poor and 20.0% as good. This pattern aligns with Sari et al. (2021) and indicates that suboptimal storage is a broader national concern. The gap between awareness and practice may be attributed to several factors. First, the education curriculum lacks specific guidance on storage requirements for different dosage forms, so even among the 50.9% of senior high school graduates, understanding of conditions for tablets, suppositories, and reconstituted syrups remains limited. Second, limited access to pharmacy services in this semi-urban area reduces opportunities for storage counseling at dispensing, which Rahma et al. (2025) identified as a key predictor of improper storage in rural and semi-urban communities. Third, time constraints among private sector employees (47.9%) and laborers (23.6%) contribute to unsafe practices, such as storing medications in bags, vehicles, or kitchens exposed to heat and humidity. Fourth, confusion between Expired Date (ED), Beyond Use Date (BUD), and Period After Opening (PAO) leads to continued use of medications beyond their safe period after opening, as reported by Madury et al. (2025).

Given these findings, pharmacist led home medication reviews and targeted community education are urgently needed. As emphasized by Utama & Zhohiroh (2023), improper storage can result in drug degradation, formation of toxic breakdown products, and premature expiration, thereby compromising household medication safety. Furthermore, Starlista et al. (2025) stated that passive information dissemination is insufficient to change behavior; interactive approaches such as home visits, demonstration sessions, and visual storage guides are more effective in translating knowledge into consistent practice.

Drug Use Behavior

Good drug use behavior was observed in 43.6% of respondents, with 40.0% at a sufficient level and 16.4% at a poor level. Although these figures are lower than those reported by Yuliastika & Amirulah (2023), they remain more favorable than the national pattern of irrational self-medication. The gap between knowledge and behavior can be explained by several factors. First, self medication practices are often habitual and transmitted across generations in Indonesian communities. Wijaya et al. (2023) noted that behaviors such as sharing medications, discontinuing treatment upon symptom relief, and reusing leftovers are commonly learned from family or neighbors rather than based on pharmaceutical rationale. Second, limited reinforcement from healthcare providers in semi urban settings reduces opportunities for correction and feedback on medication practices. Third, cognitive factors influence behavior, as individuals who have not experienced adverse effects from previous unsafe practices may develop low perceived susceptibility and reduced motivation to change, consistent with the Health Belief Model. Fourth, social and economic factors contribute to unsafe behavior. In communities where medication sharing is normalized as

mutual assistance, and among lower-income groups such as laborers (23.6%) and farmers (7.9%), cost saving considerations may take priority over safety.

The persistence of poor behavior in 16.4% of respondents, despite relatively good knowledge (42.4%), underscores the need for behavioral interventions beyond information provision. The strong association between poor behavior and unsafe drug use outcomes (70.4%) highlights that attitudinal barriers, social norms, and structural access to pharmacist consultation must be addressed. As emphasized by Purmafitriah et al. (2026), sustained reinforcement, behavioral modeling, and understanding of consequences are essential for establishing correct behavior. Furthermore, Utama & Zhohiroh (2023) recommended that community-based programs should move beyond didactic education toward participatory approaches such as group discussions, role playing, and peer education to effectively modify deep seated behavioral patterns.

Drug Use Safety

The majority of respondents demonstrated safe drug use practices (85.5%), while 14.5% were classified as unsafe, indicating that most participants have applied safe medication principles in household settings. However, this proportion of unsafe practices remains a concern as it may lead to medication errors, drug interactions, and adverse drug reactions. Therefore, continuous health education and nursing interventions through primary healthcare services, pharmacist counseling, and community-based programs are needed to reinforce safe medication behavior and improve overall medication safety at the household level (Louhisalmi *et al.*, 2025).

Drug use safety refers to the appropriate and responsible use of medications to maximize therapeutic benefits while minimizing the risk of adverse effects, medication errors, and drug interactions. According to the World Health Organization, safe medication practices include using the correct medicine, in the correct dose, at the correct time, for the correct duration, and following proper storage and disposal procedures (Alfian *et al.*, 2023). Medication safety is recognized as a fundamental component of patient safety because inappropriate medication use may lead to preventable harm, increased healthcare costs, and reduced quality of life. In household settings, family members play an important role in ensuring medications are used according to healthcare professionals' instructions and are kept away from children and other vulnerable individuals.

The present finding is consistent with previous studies reporting that good knowledge and awareness are associated with safer medication practices. A study by (Fathnin *et al.*, 2026) found that educational interventions significantly improved medication safety behaviors, including adherence to prescribed regimens, appropriate storage, and recognition of medication errors. Likewise, research published in the journal BMC Health Services Research reported that improving medication literacy contributes to safer medication use and reduces preventable medication related problems in the community. These findings suggest that continuous education and effective communication between healthcare providers and patients are key strategies for promoting medication safety (Julaiha, 2024).

Relationship Between Knowledge and Household Drug Use Safety

Chi-Square analysis confirmed a statistically significant relationship between knowledge and household drug use safety (p -value = 0.000). All respondents with good knowledge (100%) demonstrated safe drug use, while 62.1% of those with poor knowledge were classified as unsafe. This gradient indicates that knowledge functions not merely as a correlate but as a meaningful determinant of safe medication practices. This finding aligns with Purmafitriah et al. (2026) and Utama & Zhohiroh (2023), who identified knowledge deficits as a root cause of irrational drug use. The underlying mechanism is that individuals who understand correct dosing, proper storage, expiry parameters, and risks of self-medication are better equipped to make informed decisions. This relationship can be

explained through the concept of medication literacy, defined as the ability to obtain, understand, evaluate, and apply medication related information. As noted by Novitri et al. (2024), individuals with higher medication literacy are more likely to follow prescriptions, recognize adverse effects, and avoid inappropriate self medication, whereas limited literacy increases the risk of dosing errors, premature discontinuation, medication sharing, and improper storage.

These results underscore the critical role of healthcare professionals, particularly pharmacists and nurses, in improving household drug safety. Regular counseling, individualized education, and community based health promotion can strengthen both knowledge and medication literacy. As stated by MadaDolorosa Septin Lovendri (2023), continuous education is essential to translate information into consistent safe practices. Furthermore, Tricia Andini & Suci Hanifah (2025) emphasized that integrating medication safety education into routine primary healthcare services, including guidance on storage, adherence, expiry recognition, and drug disposal, can reduce unsafe behaviors and improve medication safety outcomes at the household level.

Relationship Between Drug Storage and Household Drug Use Safety

A statistically significant relationship was established between drug storage practices and household drug use safety (p -value = 0.000). All respondents with good storage practices demonstrated safe drug use (100%), while 44.7% of those with poor storage practices were classified as unsafe. This finding underscores the direct link between storage behavior and safety outcomes at the household level. Medications stored under inappropriate conditions such as excessive heat, humidity, or direct light exposure are susceptible to physicochemical degradation that can reduce efficacy or generate harmful products (Utama & Zhohiroh, 2023). Sari et al. (2021) and Yuliastika & Amirulah (2023) similarly affirmed that proper storage including maintaining room temperature, protecting from sunlight, keeping medicines in original packaging, and storing out of children's reach is essential to preserve drug quality and prevent therapeutic failure or adverse reactions. The high proportion of unsafe drug use among respondents with poor storage practices highlights that even when medications are prescribed and used correctly, improper storage may compromise their stability and therapeutic value before administration (Salsabila, 2026).

These results emphasize the need to strengthen public education on safe medication storage through community based interventions. As noted by Prasmawari et al. (2021), pharmacists should systematically provide storage counseling at the point of dispensing, beyond dosage and administration instructions. Kusuma et al. (2023) further recommended routine monitoring of storage conditions, regular checking of expiration dates, and prompt disposal of expired medicines as part of household medication management. In line with Wulandari et al. (2025), educational campaigns delivered through primary healthcare centers, community pharmacies, and digital platforms can enhance awareness and reinforce appropriate storage behaviors. Integrating storage education into routine pharmaceutical care by pharmacists, nurses, and other healthcare professionals is essential to improve medication safety, reduce preventable drug-related problems, and promote responsible medication management at the household level.

Relationship Between Behavior and Household Drug Use Safety

A statistically significant relationship was also found between drug use behavior and household drug use safety (p -value = 0.000). All respondents with good behavior (100%) demonstrated safe drug use, while the majority of those with poor behavior (70.4%) were classified as unsafe the strongest gradient observed across all three variables in this study.

This finding is consistent with Purmafitriah et al. (2026), who demonstrated that knowledge-based behavior that is, behavior grounded in genuine understanding rather than habit or social imitation shows greater durability and is more consistently associated with

safe outcomes. Rahma et al. (2025) identified a persistent gap between knowledge and practice in community drug management, noting that some individuals stored and disposed of medications incorrectly despite possessing theoretical knowledge, suggesting that behavioral determinants extend beyond the cognitive domain to include attitudinal, social, and structural factors.

Utama & Zhohiroh (2023) conceptualized drug use behavior as a sequential decision-making process, beginning with the choice to self-medicate and extending through medication selection, dosing adherence, storage, and disposal. Safe behavior at each stage including adherence to recommended dosing schedules, avoidance of unsanctioned drug use, refusal to share medications, and correct disposal of expired or unused drugs collectively determines the overall safety profile of household drug use safety. The finding that poor behavior was the variable most strongly associated with unsafe drug use outcomes in this study highlights the need for behavioral interventions that address not only knowledge deficits but also attitudinal barriers, social norms around self-medication, and structural factors such as access to pharmacist consultation at the community level (Renata et al., 2023).

Conclusions and Recommendations

The results of the study indicate that the knowledge and drug use behavior of the community in Karan Kidul Village are categorized as good, while drug storage practices are categorized as sufficient. This indicates that household medication safety is influenced by knowledge, behavior, and drug storage practices. Therefore, it is recommended that pharmacists enhance education and counseling through the GEMA CERMAT (Gerakan Masyarakat Cerdas Menggunakan Obat) program, particularly targeting communities with low knowledge and inadequate drug storage practices. Future researchers are also suggested to examine additional variables such as socioeconomic status and access to health information to provide a more comprehensive overview of household medication safety.

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