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Relationship Between Knowledge Level And Behavior Of Disposing Damaged And Expired Medicine In The Community Of Marga Mulia Village, Kutai Timur Regency

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ABSTRACT

Damaged or expired drugs are drugs conditions whose concentration has been reduced between 25-30% of the initial concentration and physical forms that have changed, drugs whose form or condition can no longer be used. Errors in the disposal of leftover drugs, damaged drugs and expired drugs in the household can result in an increase in drugs waste that can harm the environment and health. The purpose of this study is to determine the level of community knowledge, the description of community behavior and the relationship of knowledge level to the behavior of disposal of damaged and expired drugs in the community of Marga Mulia Village, East Kutai Regency. This study used a quantitative descriptive design, sampling was carried out using a non-probability sampling method with a purposive sampling approach and data collection using questionnaire involving 100 respondents. Based on the results of data analysis, it shows that the level of public knowledge is included in the poor category (36%). Meanwhile, after education, it shows that the level of public knowledge is included in the good category (89%). Depictions of behavior before education with positive (48%) and negative (42%) categories. While post-education behavior with positive (51%) and negative (49%) categories. The results of the analysis using the chi square test before education obtained a value (p = 0.019) which showed that there was a relationship between knowledge of damaged and expired drugs disposal behavior in the community. Meanwhile, after education, a value (p = 0.803) was obtained which showed that there was no relationship between knowledge of damaged and expired drugs disposal behavior in Marga Mulia Village, Kutai Timur Regency.

Keywords: *Knowledge level, behavior, defective drugs, expired drugs, drug disposal*

ABSTRAK

Obat rusak atau kedaluwarsa adalah kondisi obat yang konsentrasinya sudah berkurang antara 25-30% dari konsentrasi awalnya serta bentuk fisik yang mengalami perubahan, obat yang bentuk atau kondisinya tidak dapat digunakan lagi. Kesalahan dalam pembuangan obat sisa, obat rusak dan obat kedaluwarsa dirumah tangga dapat mengakibatkan peningkatan limbah obat yang dapat membahayakan lingkungan dan kesehatan. Tujuan dari penelitian ini untuk mengetahui tingkat pengetahuan masyarakat, gambaran perilaku masyarakat dan hubungan tingkat pengetahuan terhadap perilaku pembuangan obat rusak dan kedaluwarsa di masyarakat Desa Marga Mulia, Kecamatan Kongbeng, Kabupaten Kutai Timur. Penelitian ini menggunakan rancangan desktiptif kuantitatif, pengambilan sampel dilakukan dengan metode non probability sampling dengan pendekatan purposive sampling dan pengumpulan data menggunakan kuesioner yang melibatkan 100 responden. Berdasarkan hasil analisis data menunjukkan bahwa tingkat pengetahuan masyarakat termasuk dalam kategori kurang baik (36%). Hasil sesudah edukasi menunjukkan bahwa tingkat pengetahuan masyarakat termasuk dalam kategori baik (89%). Gambaran perilaku sebelum edukasi dengan kategori positif (48%) dan negatif (42%). Sedangkan perilaku sesudah edukasi dengan kategori positif (51%) dan negatif (49%). Hasil analisis menggunakan uji chi square sebelum edukasi diperoleh nilai (p=0,019) yang menunjukkan bahwa terdapat hubungan antara pengetahuan terhadap perilaku pembuangan obat rusak dan kedaluwarsa di masyarakat. Hasil sesudah edukasi diperoleh nilai (p=0,803) yang menunjukkan bahwa tidak terdapat hubungan antara pengetahuan terhadap perilaku pembuangan obat rusak dan kedaluwarsa di Desa Marga Mulia Kabupaten Kutai Timur.

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Kata Kunci: Tingkat pengetahuan, Perilaku, Obat Rusak, Obat Kedaluwarsa, Pembuangan Obat

INTRODUCTION

Medicines are one of the pharmaceutical wastes that are the largest source of environmental pollution due to inappropriate drug management. Many people dispose of leftover or expired medicines through household waste or water drainage. Mistakes in disposing of leftover medicines, damaged medicines and expired medicines in households can result in an increase in drug waste that can endanger the environment and health (Pramestutie et al., 2021).

The results of the 2018 Basic Health Research (Riskesdas) showed that 50,7% of households store drugs for self- medication. Of the households that store drugs, 35,7% of them store hard drugs, 78,2% over-the-counter drugs, 90,2% antibiotics (of which 86.1% of antibiotics are obtained without a prescription) this triggers new health problems, especially bacterial resistance. As for 15,7% for traditional medicines and 6,4% for unidentified drugs. The proportion of households that store drugs and the average number of drugs stored is 50,7% with an average number of drugs of 3,2%. The high increase in drug consumption can cause the accumulation of unused drugs in households (Ministry of Health of the Republic of Indonesia, 2018).

Based on data from the Central Statistics Agency (BPS), people in East Kalimantan often self-medicate as seen from the increasing data from 2019-2021, where in 2021 the data increased to 84,37%. This can allow for a lot of accumulation of unused, damaged and expired drugs, causing improper disposal of drugs to increase (BPS, 2021).

The impact of accumulation not only causes waste of drugs but improper disposal of unused, damaged and expired drugs can also have a negative impact on the environment and public health. Based on research conducted by Savira et al., (2020) in the community of Pucang Sewu Village, Surabaya showed that 57,9% of 140 respondents disposed of drugs incorrectly. People immediately throw drugs into the trash without separating the drugs first. This can have a negative impact on the environment because it can pollute water, soil, rivers, lakes or even drinking water.

There are several factors that influence the way people dispose of drugs, especially housewives. One important factor is the knowledge of housewives themselves about how to dispose of drugs. Several factors that influence the level of knowledge are education level and age. The higher a person's education level, the better their quality of life will be because higher education produces good knowledge and makes a quality life. Age can also affect because the older a person is, the more knowledge they have (Banggo, 2018).

In previous studies, it was found that the level of public knowledge in Tanah Pati Village, Bengkulu City regarding the storage and disposal of drugs was lacking 8,29%, sufficient 45,07% and good 46,63% (Rikomah, 2020). Based on a preliminary study conducted by the researcher, the results from 10 respondents showed that 8 respondents stated that they did not know how to dispose of drugs properly, usually throwing expired drugs directly into the trash and burning them without separating the packaging first.

Based on the description above , this study is very important to be conducted to determine the level of knowledge of the behavioral patterns of disposing of damaged and expired drugs in the community of Marga Mulia Village, Kongbeng District, East Kutai Regency. In addition, similar research has never been conducted before so that this study is expected to be a picture for the

community of Marga Mulia Village, Kongbeng District, East Kutai Regency about the proper and safe disposal of damaged and expired drugs.

METHOD

Time and Place of research

This research was conducted in January-February 2024. Data collection was carried out directly on the community in Marga Mulia Village, Kongbeng District, East Kutai Regency.

Type of research

This research is a descriptive research type with a quantitative approach and the data used in this study is primary data. Data collection is carried out by filling out a questionnaire by respondents which is carried out directly by researchers to the research sample. This study used a quantitative descriptive design, sampling was carried out using a non-probability sampling method with a purposive sampling approach and data collection using questionnaire involving 100 respondents. The sample in this study is a population that meets the criteria set by the researcher. The criteria used in this study are:

Inclusion Criteria:

1. Willing to be a respondent
2. Aged 17-55 years
3. Able to read and fill out the questionnaire properly

Exclusion Criteria :

1. People who do not fill out the questionnaire completely
2. People who work as health workers

Data collection techniques

The way study started with look after licensing at the Marga Mulia Village Office, East Kutai Regency and managing research ethics through the KEPK of Mulawarman University. After get permission so continue with stage data collection using questionnaires. Before questionnaire shared must validity and reliability tests were conducted to measure the accuracy or validity of a questionnaire. The questionnaire will be given before education and after education which is given a gap of 1 month after education. The data obtained is to assess the relationship between the level of knowledge and community behavior in disposing of damaged and expired drugs. Characteristic data in study this is also described in form percentage for each research variable includes gender, age, last education, job and source of information. The data is also processed in percentage form by entering the score into the formula after adding up the scores for evaluation knowledge and behavior society. While To assess the relationship between knowledge and behavior, *the Independent t- test* is used if normally distributed, and the *chi-square test* if the data is not normally distributed.

Data analysis

The data obtained were analyzed using univariate analysis which aims to explain or describe the characteristics of each research variable including gender, age, last education, occupation and source of information. The data were analyzed in percentage form by entering the score into the formula after the score was added up.

The assessment of the level of knowledge will be assessed through a questionnaire in part II. The knowledge questionnaire consists of 10 questions measured by the Guttman scale. For each question, it has a value of 1 for each correct answer, while the wrong answer gets a value of 0. The correct answer is the answer that matches the answer key. The knowledge data obtained is given a value and grouped into categories that match the literature.

After conducting a knowledge assessment, a classification is carried out on the respondents' level of knowledge.

The classification levels are divided into:

1. Knowledge category is good if the value is > 76-100%
2. Category knowledge is sufficient if the value is 60-75%
3. Knowledge category is lacking if the value is < 60%

The assessment of the level of behavior will be assessed through a questionnaire in section III. The behavioral questionnaire consists of 8 questions whose measurement scale uses an ordinal scale with a score value determined by the researcher. If the behavioral data has been assessed, the data is calculated using the T score formula so that it can be classified into positive or negative behavioral categories. The formula for assessing positive or negative behavior is shown by the equation :

$$Formula = 50 + 10\ (\frac{X - \bar{x}}{\mathrm{SD}})$$

Description:

X = respondent score$\bar{x}$ = average score of respondents

SD = standard deviation The score results are then classified into:

1. Positive behavior if the score is ≥ 50.00
2. Negative behavior if the score is < 50.00

Assessment of the relationship between knowledge and behavior is carried out using the *Independent t- test* if normally distributed, and the *chi-square test. square* if the data is not normally distributed. The correlation value is interpreted using the following criteria: Sig. > 0.05 = no correlation, Sig. < 0.05 = there is a correlation.

Tools and Materials

Tools

The tools used for this study include data collection sheets, laptops equipped with SPSS version 26 applications, questionnaires that have been tested for validity and reliability, printers, mobile phones and stationery.

Materials

The materials used in this study are the answers to the results of the questionnaires that have been filled out by respondents in Marga Mulia Village, Kongbeng District, East Kutai Regency.

RESULT AND DISCUSSION

Validity and Reliability Test of Research Measurement Tools

Table 1. Results of Validity Test Questionnaire Knowledge

Statement	r count	r table	Information
Statement 1	0.518	0.361	Valid
Statement 2	0.485	0.361	Valid
Statement 3	0.546	0.361	Valid
Statement 4	0.449	0.361	Valid
Statement 5	0.474	0.361	Valid
Statement 6	0.449	0.361	Valid
Statement 7	0.746	0.361	Valid
Statement 8	0.594	0.361	Valid
Statement 9	0.672	0.361	Valid
Statement 10	0.662	0.361	Valid

Table 2. Results of Validity Test Questionnaire Behavior

Statement	r count	r table	Information
Statement 1	0.434	0.361	Valid
Statement 2	0.410	0.361	Valid
Statement 3	0.481	0.361	Valid
Statement 4	0.525	0.361	Valid
Statement 5	0.407	0.361	Valid
Statement 6	0.517	0.361	Valid
Statement 7	0.440	0.361	Valid
Statement 8	0.657	0.361	Valid

Validity test is used to measure the accuracy or validity of a questionnaire. This test is calculated by comparing the calculated r value with the r table. If the calculated r greater than r_{table} then the questionnaire item from that variable can be said to be valid.

This study contains a questionnaire containing 10 statements and 8 statements used to measure variables at the level of knowledge and behavior. This validity test was conducted on 30 respondents, namely the community in Marga Mulia Village, Kongbeng District Regency Kutai East with r_{table} For N=30 is h 0.361. The results of the validity test show that 10 statements of knowledge are valid with a value ranging from 0,449 to 0,742 and 8 statements of behavior are also valid with a value ranging from 0,407 to 0,657 so that the questionnaire can be used as a data collection tool in this research.

Table 3. Results of Reliability Test Questionnaire Knowledge

Variables	Mark *Cronbach's Alpha*	Information
Knowledge	0.752	Reliable

Table 4. Results of Reliability Test Questionnaire Behavior

Variables	Mark *Cronbach's Alpha*	Information
Behavior	0.719	Reliable

After the validity test is carried out, the next step is to carry out a reliability test. A questionnaire is said to be reliable if the answers to the statements are consistent or stable. The reliability test can be calculated using the *Cronbach's formula Alpha* (α) and is said to be reliable if the value of α= 0.6. Based on the results obtained, it shows that the reliability test of the knowledge and behavior questionnaire produces *a Cronbach's value Alpha* (α) exceeds 0.6, namely with a value of 0,814 and 0,719. Thus, the statement items on knowledge and behavior are stated to be reliable or consistent in measuring these variables, so they can be used as data collection tools in this study.

Characteristics Respondents

Based on the results of data collection that has been carried out by distributing questionnaires to 100 community respondents in Marga Mulia Village, East Kutai Regency, the following data was obtained: Respondent characteristics regarding the level of knowledge and behavior of the community regarding the disposal of damaged and expired drugs in Marga Mulia Village, East Kutai Regency as following:

Table 5. Frequency distribution of respondent data based on gender

Type Sex	Frequency (n)	Percentage (%)
Man	41	41
Woman	59	59
Total	100	100

Respondent characteristics based on gender are mostly women. This is because the research was conducted in the morning and evening so that women have more opportunities to be respondents because they have more free time at home compared to men. In addition, the differences gender can influence knowledge and behavior regarding health, where women care more about health than men (Suhardin, 2016).

Table 6. Frequency distribution of respondent data based on age

Age	Frequency (n)	Percentage (%)
17 – 35 years	72	72
36 – 55 years	28	28
Total	100	100

The characteristics of respondents based on age are the most 17 – 35 year. Matter This in accordance with data resident The community in Marga Mulia Village, East Kutai Regency, namely the majority of the community is aged between 17-35 years. At that age, it is an age range that is easy to accept and remember related information provided. As a person gets older, the more information he or she will obtain, thus creating a sense of curiosity to seek information about science. In addition, at a certain age or approaching old age, the ability to understand and thought patterns will decrease, thus affecting a person's memory.

Table 7. Distribution frequency data Respondent based on education

Last education	Frequency (n)	Percentage (%)
SD	6	6
Junior High School/ MTs	16	16
	46	46
College tall	32	32
Total	100	100

Respondent characteristics based on their last education, namely high school and college. It can be seen that the people in Marga Mulia Village have completed 12 years of compulsory school education on average, so it is expected that respondents have good knowledge and insight. Education can be one of the factors that can influence a person's knowledge. Education will influence a person's learning process where the higher a person's education, the easier it will be for that person to receive information and the more rational and careful they will be in acting for their health (Fuaddah, 2015). Information also greatly influences a person's knowledge, where the easier it is to obtain information, the faster a person will gain new knowledge.

Table 8. Distribution frequency data Respondent based on work

Work	Frequency (n)	Percentage (%)
Civil servant	5	5
Employee private	27	27
Mother household	31	31
Etc	37	37
Total	100	100

Respondent characteristics based on occupation are mostly others (laborers, farmers, TK2D, priests, students, and unemployed) and housewives. Other jobs and housewives are the most respondents. This is because housewives have more free time and other jobs are jobs that are widely done by the community in Marga Mulia Village, East Kutai Regency. The work that a person does plays an important role in increasing individual knowledge through work experience, knowledge management, and social interaction in the workplace (Leonardo, 2021).

Level Knowledge Based on Respondent Characteristics

Table 9. Distribution Level Knowledge Respondents Before Education Based on Gender

Gender	Before Education					
	Good		Enough		Not enough	
	Number (n)	%	Number (n)	%	Number (n)	%
Man	10	10	12	12	19	19
Woman	20	20	22	22	17	17

Table 10. Distribution Level Knowledge Respondents After Education Based on Gender

Gender	After Education					
	Good		Enough		Not enough	
	Amount (n)	%	Amount (n)	%	Amount (n)	%
Man	31	31	10	10	0	0
Woman	57	57	2	2	0	0

The results of the distribution of knowledge levels based on gender are best for women. In this study, the number of female respondents was more involved than men, because women have more free time. Women also tend to pay more attention to health issues. This is in accordance with previous research, namely that women tend to be more curious than men. Possibility difference level knowledge between man and women are caused by women being more concerned about health which includes medicines including drug disposal. In addition, the sources of information that women get are likely to be more lots because woman often interact and more active from men in the social world of society such as PKK (Primary and Secondary) activities.

Table 11. Distribution Level Knowledge Respondents Before Education Based on Age

Age	Before Education					
	Good		Enough		Not enough	
	Number (n)	%	Number (n)	%	Number (n)	%
17-35 year	24	24	25	25	23	23
36-55 year	6	6	9	9	13	13

Table 12. Distribution Level Knowledge Respondents After Education Based on Age

Age	After Education					
	Good		Enough		Not enough	
	Number (n)	%	Number (n)	%	Number (n)	%
17-35 year	69	69	3	3	0	0
36-55 year	19	19	9	9	0	0

The best results of the distribution of knowledge levels based on age are at the age of 17-35 years. In this study, the age of 17-35 years was mostly involved as respondents because of population data. in Marga Mulia Village, East Kutai Regency, the majority of the population's age range is 17-35 years. The age of 17-35 years is a productive age that has a broader level of knowledge and is expected to be able to understand the information provided more easily The best results of the distribution of knowledge levels based on age are at the age of 17-35 years. In this study, the age of 17-35 years was the most involved as respondents because of population data. In Marga Mulia Village, East Kutai Regency, the majority of the population age range is 17-35 years. The age of 17-35 years is a productive age that has a broader level of knowledge and is expected to be able to understand the information provided more easily.

Based on several studies, there is a significant relationship between age and a person's level of knowledge. Sitepu *et al.,* (2023) found that respondents who were in the early adulthood age range, namely 26 to 35 years, tended to have a higher level of knowledge than other age groups regarding knowledge about DAGUSIBU in the Central Lampung region. This is in line with the results of

Ikaditya's study (2016) which stated that posyandu cadres over the age of 35 years had better knowledge about stunting than younger cadres. In addition, Wulandari and Hidayat (2021) also reported a positive correlation between age and the level of knowledge of the community in Welahan Wetan Village regarding the prevention of infectious diseases. These findings indicate that age plays an important role in shaping a person's knowledge, possibly due to greater experience and exposure to information gained with age.

Table 13. Distribution Level Knowledge Respondents Before Education Based on Education

Last education	Before Education					
	Good		Enough		Not enough	
	Amount (n)	%	Amount (n)	%	Amount (n)	%
SD	1	1	2	2	3	3
Junior High School/ MTs	2	2	2	2	12	12
High School/Vocational School	12	12	19	19	15	15
College	15	15	12	12	5	5

Table 14. Distribution Level Knowledge Respondents Before Education Based on Education

Last education	After Education					
	Good		Enough		Not enough	
	Number (n)	%	Number (n)	%	Number (n)	%
SD	1	1	5	5	0	0
Junior High School/ MTs	10	10	6	6	0	0
High School/Vocational School	45	45	1	1	0	0
College	32	32	0	0	0	0

The results of the data obtained based on the last education with good knowledge are high school and college. This can happen because respondent most educated senior high school even universities, so that they have a good grasp of information obtained from both the media and officers. health. This is in accordance with research that has been conducted by Yuneta *et al.,* (2019), knowledge is closely related to education, that someone who has a higher education will have more and broader knowledge.

Table 15. Distribution Level Knowledge Public Before Education Based on Work

Work	Before Education					
	Good		Enough		Not enough	
	Number (n)	%	Number (n)	%	Number (n)	%
Civil servant	1	1	3	3	1	1
Employee private	6	6	9	9	12	12
Housewife	11	11	11	11	9	9
Etc	12	12	11	11	14	14

Based on the data obtained, the level of knowledge both are found in other jobs (laborers, farmers, TK2D, priests, students, students and not working) and housewives. Other jobs are included in the category of good knowledge because the work environment interacts a lot with other people, so that someone can gain experience and knowledge both directly and indirectly. Housewives are included in good knowledge because in this study they are dominated by women with jobs as housewives.

Table 16. Distribution Level Knowledge Public After Education Based on Work

Work	After Education					
	Good		Enough		Not enough	
	Number (n)	%	Number (n)	%	Number (n)	%
Civil servant	5	5	0	0	0	0
Employee private	25	25	2	2	0	0
Housewife	28	28	3	3	0	0
Etc	26	26	11	11	0	0

Housewives in this study play a greater role as the main party in taking care of the family at home, one of which is playing a role in managing medicines used at home. In addition, housewives have better knowledge because housewives have more time at home so that they are more likely to interact with people around them to increase their insight and housewives have duties and responsibilities in managing medicines at home (Banwat *et al.,* 2016).

Profile Level Knowledge and Behavior Before And After Education

Table 17. Profile of knowledge level of disposal of damaged and expired drugs in Marga Mulia Village, Kongbeng District , East Kutai Regency before and after education.

No	Statement questionnaire	Before Education (%)	After Education (%)
1	Contents drug No need issued from packaging on when will thrown away	40	83
2	All drug Which Already expired can thrown away in place rubbish	21	74
3	Medicines in the form of tablets and pills must destroyed moreover formerly before being thrown away	31	71
4	Disposal drug Which No appropriate dangerous for environment	94	98
5	Drugs half congested (like cream) And ointment) can thrown away direct to rubbish bin	22	78
6	Throw away drug Which not exactly can misused	92	100
7	Preparation of syrup medicine that changes color, smell and texture so Still can be used	100	100
8	Drug in form stock syrup may thrown into running water such as a sink or toilet	64	77
9	Drug syrup Which Already opened, after 3 the moon is still possible drunk	96	100
10	Drug remainder in form liquid can be saved in the refrigerator *(freezer)* so that still durable	80	92

Table 18. Distribution frequency level knowledge Respondent about the disposal of damaged and expired drugs in the Village Marga Mulia, Kongbeng District , East Kutai Regency before and after education

Level of Knowledge	Before Education		After Education	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Good	30	30	89	89
Enough	34	34	11	11
Not enough	36	36	0	0
Total	**100**	**100**	**100**	**100**

Based on the results of the knowledge data of the Marga Mulia Village community, among others, is not good about disposing of damaged and expired drugs. In this study, most people do not know about the correct way to dispose of drugs. Things that can be done to improve public knowledge are by providing education using leaflets containing methods and pictures of how to dispose of drugs correctly.

Based on the results related to how to dispose of drugs. The results obtained before the education of public knowledge were carried out were still lacking because the public still disposed of drugs. directly into the trash without separating it from its packaging first. Disposal of damaged and expired drugs cannot be directly into the trash together with its packaging. Drugs to be discarded need to be processed first and each drug has a different process depending on the form of the drug. For example, ointment-form drugs need to be cut first and disposed of separately between *the tube and the cap.* Syrup form drugs should be disposed of into the drain after diluting the contents of the drug with water (Ministry of Health of the Republic of Indonesia, 2018). Drugs need to be disposed of properly in order to prevent environmental pollution and avoid misuse by individuals who irresponsible (Savira *et al.,* 2020).

Based on the impact of improper drug disposal, the results obtained showed that the majority of respondents have good knowledge related to the impact of improper drug disposal. Improper drug disposal of unused drugs will be a problem that will impact health and the environment (Ambianti *et al.*, 2022). Damaged and expired drugs are hazardous and toxic materials (B3 waste). Therefore, management of B3 waste in households is important to prevent the risk of accidental poisoning of family members, as well as cases of drug abuse including preventing illegal drug sources (Rasdianah, 2022).

Based on the storage and changes in syrup preparations, it shows that the majority of respondents have good knowledge regarding the storage and changes in syrup preparations. Syrup drugs that have experienced changes in color, odor, and texture are characteristics drug which already damaged or expired so that this medicine should not be taken. Liquid medicine/ syrup should be stored at room temperature 25-30 ^{o} C, not in the refrigerator. Medicines stored in the refrigerator (2-8 ^{o}C) such as suppositories so that the medicine does not melt.

Based on the table, the results of the level of public knowledge about the disposal of damaged and expired drugs in Marga Mulia Village, East Kutai Regency can be seen before and after education. Based on the results before the education, public knowledge about the disposal of damaged and expired drugs was in the sufficient category. This is because there are already many information media related to health, medicines and others that can be obtained through *mobile phone* and television. The knowledge that a person has allows the person to do things that can be beneficial for him/her from the information obtained.

After education, results were obtained showing an increase in public knowledge after education using *leaflets.* which contains writing and images used as information media. The level of knowledge of respondents before and after education was carried out, was analyzed statistically to determine whether there was a significant difference or not in the results before and after respondents regarding knowledge of disposing of damaged and expired drugs. The data was tested whether it was normally distributed or not using the *Kolmogorov - Smirnov test* And results mark sig . before And after

education is <0,05 so that the data obtained is said to be distributed abnormally. Furthermore, the *Mann -Whitney test was carried out* to determine whether or not there was a significant difference before and after education. The results of the *Mann -Whitney test* showed a U value of 1537,500 and a W value of 6587.500. When converted to a Z value, the value is -8,584. The sig value or *p value* of 0,000 < 0,05, then in general statistics there is a difference in knowledge about level knowledge before and after education, in the form of an increase in respondent knowledge, which means that the education that has been provided has an influence on changes in respondent knowledge.

Table 19. Profile of behavior in disposing of damaged and expired drugs in Marga Mulia Village, East Kutai Regency before and after education.

No	Statement	Before Education (%)	After Education (%)
1	**Type drug Which No used At home**		
Anti-pain and fever reducer		60	66
Antibiotics		27	27
Drug pressure		24	18
Drug sugar		5	3
Vitamin C		2	5
Other (like drug allergy)		8	7
2	**Form stock drug Which No used At home**		
Tablet		56	64
Syrup		41	42
Capsule		21	26
Powder		8	5
Ointment		5	8
Cream		5	4
Suppositories		4	3
Patch / patch		4	3
Gel		3	2
3	**Reason own drug No used At home**		
Already healed from a disease		60	68
As supply If at any time Sick		29	30
Often forgot to take medicine		7	10
Recipe drug Which given doctor too Lots		6	8
Accept recipe new from the doctor		4	9
4	**Routine check time expired drug**		
Yes		64	71
No		36	29

No	Statement	Before Education (%)	After Education (%)
5	**Time disposal drug**		
Moment drug Already expired		65	67
Drug Already No used in the long term time which is old		27	29
Drug Already damaged		5	7

No Once throw away medicine		4	3
6	**Method disposal drug No used At home**		
Thrown Away to trash bin		59	56
Burn with waste House ladder		33	30
Streaming drug to channel water or toilet		5	8
Return to pharmacy		0	4
7	**Method disposal drug**		
Direct thrown away to trash can		78	41
Damaging the packaging, drug information, personal data, separating drugs from the packaging, destroying drugs first, mixing them with land or powder used coffee, put it in a closed plastic bag, Then direct thrown away to barrel waste (Provision) Tablet)		18	33
Damaging the packaging, drug information, personal data, removing the contents of the syrup and putting it in a plastic bag, then adding solid waste such as coffee grounds, then closing the plastic bag and throwing away the plastic bag. drug to barrel rubbish (Provision) Liquid/ Syrup)		1	21
Damaging packaging, drug information, personal data, removing ointment/cream contents, mixing with soil or powder coffee, insert to in plastic closed, then cut the ointment/cream tube first and discard it separately from the cap in place rubbish (Provision) Ointment/Cream)		2	4
8	**Source information about disposal drug**		
Knowledge Alone		58	54
Pharmacist and doctor		13	18
Midwife, nurse, And practitioner health other		11	15
Friends/relatives		10	9

Based on the data in the table above, it shows that the most frequently used types of drugs are analgesics (pain relievers and fever reducers) and antibiotics. This is in accordance with the results of other studies which show that analgesics are one of the drugs that are widely used for self medication, especially to treat headaches, joint pain, and others. Many people use analgesics at least once a month, so many people keep this drug as stock in case they experience symptoms of the disease at any time (Halim et al., 2018). Then, antibiotics are the second most widely stored drug group in households in Marga Mulia Village.

Based on the dosage form, the most widely used drugs are tablets, syrups, and capsules. This is because the dosage form of tablets, syrups, and capsules is most preferred by the majority of people for self-medication. Tablets are chosen because of the ease of dosage and storage, as well as a longer shelf life. Syrups are preferred especially by children and people who have difficulty swallowing tablets. Capsules are often considered practical and have a more neutral taste than syrups (Putri, 2020). This results in an increasing accumulation of unused drugs because the drugs are only used when symptoms arise and are stored as supplies when sick.

There are several reasons why people have unused medicines at home, namely because they feel they have recovered from an illness, then as a supply if they experience symptoms of the disease at any time, and many respondents often forget to take their medicine. This is based on research by Yimenu (2020) which found that one of the most common reasons for the increasing accumulation

of unused medicines is that patients often forget to take their medicine. Based on checking the expiration date and time of drug disposal, it shows that most respondents routinely check the expiration date of the medicine as much as 64% and as many as 36% do not routinely or never check the expiration date of the medicine. This is the same as the behavior of respondents regarding the time of disposal of drugs which is most often done by respondents when the medicine has expired, the medicine has not been used for a long time and when the medicine is damaged. Usually, existing medicines are no longer used because the condition has recovered and the medicine is damaged/expired or the amount of medicine is excessive. It is necessary to educate the public about the importance of paying attention to the expiration date of the medicine and more socialization to the public about BUD (Beyond Use Date).

The most common way respondents dispose of medications is by throwing drugs directly into the trash, burning them with household waste, and disposing of them in the drainage systems. Research conducted by Augia (2022) shows that nearly half of the respondents (41,5%) dispose of leftover medications in household trash, and most have not received information on the correct disposal methods for medications. This highlights the need for better education and regulation regarding the management of household medical waste to prevent negative impacts on the environment and public health. According to Grace & Rindarwati (2021), the habit of throwing away unused drugs carelessly is increasing. The majority of people still do not know how to dispose of unused drugs, improper disposal of drugs can have a negative impact in the form of pollution. land, water, and environment. From method disposal This medicine, there are no people who return damaged and expired medicines to the pharmacy. This is because the community has never received information about returning medicines to the pharmacy.

Based on sources of information on drug disposal, it shows that most respondents dispose of drugs based on their own knowledge. This shows that the low level of information received by the public to manage drugs properly is because most people have never received information about the practice of disposing of drugs properly. Therefore, pharmacists need to provide education and collect unused, expired or unwanted drugs from the public (Prasmawari et al., 2021).

Relationship between Knowledge and Behavior of Disposing of Damaged and Expired Drugs

Table 20. Results test *chi square* knowledge And behavior before education

Knowledge	Behavior				*p* -value
	Positive	%	Negative	%	
Good	8	26,7	22	73,3	0,019
Enough	20	58,8	14	41,2	
Not enough	20	55,6	16	44,4	

Table 21. Results test *chi square* knowledge And behavior after education

Knowledge	Behavior				*p* -value
	Positive	%	Negative	%	
Good	45	50,6	44	49,4	0,803
Enough	6	54,6	5	45,5	
Not enough	0	0	0	0	

Based on testing the relationship between knowledge and drug disposal behavior before education, the behavioral categories obtained were negative with percentage respondent the biggest is respondents with sufficient knowledge level 58,8%, category positive behavior with the largest percentage of respondents is respondents with a good level of knowledge 73,3% and the *p value of the chi* test results *square* is 0,019. This value is less than the critical value of 0,05 so that the research hypothesis is accepted and it is obtained that there is a relationship between knowledge and drug disposal behavior in Marga Mulia Village, East Kutai Regency. While testing the relationship between knowledge and drug disposal behavior after education, the negative behavior category was obtained with the largest percentage of respondents being respondents with a sufficient level of knowledge of 54,5%, the category positive behavior with the largest percentage of respondents is respondents with a good level of knowledge of 49,4% and the *p value of the chi-square* test results *square* is 0,803. This value is more than the critical value of 0,05 so that the research hypothesis is rejected and it is found that there is no relationship between knowledge and drug disposal behavior in Marga Mulia Village, East Kutai Regency.

CONCLUSION

The level of public knowledge before education shows that the level of public knowledge is in the poor category (36%). While after education shows that the level of public knowledge is in the good category (89%). The description of the behavior of disposing of damaged and expired drugs shows that before education, the negative behavior category with the largest percentage of respondents was respondents with sufficient knowledge (58,8%), the positive behavior category with the largest percentage of respondents was respondents with good knowledge (73,3%). While after education, the negative behavior category with the largest percentage of respondents was respondents with sufficient knowledge (54,5%), the positive behavior category with the largest percentage of respondents was respondents with good knowledge (49,4%). The results of data analysis before education using the *chi test square* the results obtained showed that there was a relationship between knowledge and the behavior of disposing of damaged and expired drugs (p = 0,019). Meanwhile, data analysis after education showed that there was no relationship between knowledge and the behavior of disposing of damaged and expired drugs (p = 0,803).

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