

Effectiveness of Brochures in Improving the Knowledge of PKK Mothers in South Danguran on Self-Medication Drug Use and Disposal

Efektivitas Media Brosur dalam Meningkatkan Pengetahuan Ibu PKK di Danguran Selatan tentang Penggunaan dan Pembuangan Obat Swamedikasi

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Abstract

Limited health knowledge increases the risk of improper use and disposal of self-medication drugs. Educational interventions, such as brochures, are expected to enhance public awareness. This study aimed to evaluate the effectiveness of brochures in improving the knowledge of PKK (Family Empowerment and Welfare) mothers in RT 01 RW 10, South Danguran, regarding the appropriate use and disposal of self-medication. A pre-experimental one-group pre-test-post-test design was employed, involving 37 purposively selected respondents who met the inclusion and exclusion criteria. Univariate analysis was used to describe respondent characteristics, knowledge levels, and survey responses, while bivariate analysis was performed using the Wilcoxon signed-rank test. The results showed that most respondents were aged 46–65 years (64.9%), had a high school education (56.8%), and worked as housewives or labourers (67.6%). Before the intervention, 51.4% of respondents had a moderate level of knowledge, whereas after the intervention, 81% demonstrated a good level of knowledge. The Wilcoxon signed-rank test indicated a significant improvement, with a p-value of <0.001 ($p < 0.05$). In conclusion, brochures were effective in increasing knowledge regarding the use and disposal of self-medication drugs among PKK mothers in RT 01 RW 10, South Danguran.

Abstrak

Pengetahuan kesehatan yang terbatas meningkatkan risiko penggunaan dan pembuangan obat swamedikasi yang tidak tepat. Intervensi edukatif, seperti penggunaan brosur, diharapkan dapat meningkatkan kesadaran masyarakat. Penelitian ini bertujuan untuk mengevaluasi efektivitas media brosur dalam meningkatkan pengetahuan ibu-ibu PKK (Pemberdayaan dan Kesejahteraan Keluarga) di RT 01 RW 10, Danguran Selatan, mengenai penggunaan dan pembuangan obat swamedikasi yang benar. Penelitian ini menggunakan desain pra-eksperimental dengan pendekatan *one-group pre-test-post-test*, melibatkan 37 responden yang dipilih secara purposive sesuai dengan kriteria inklusi dan eksklusi. Analisis univariat dilakukan untuk menggambarkan karakteristik responden, tingkat pengetahuan, dan hasil survei, sedangkan analisis bivariat menggunakan uji Wilcoxon signed-rank. Hasil penelitian menunjukkan bahwa sebagian besar responden berusia 46–65 tahun (64,9%), berpendidikan SMA (56,8%), dan bekerja sebagai ibu rumah tangga atau buruh (67,6%). Sebelum intervensi, sebanyak 51,4% responden memiliki tingkat pengetahuan sedang, sedangkan setelah intervensi, 81% menunjukkan tingkat pengetahuan baik. Uji Wilcoxon signed-rank menunjukkan peningkatan yang signifikan dengan nilai $p < 0,001$ ($p < 0,05$). Kesimpulannya, brosur efektif dalam meningkatkan pengetahuan tentang penggunaan dan pembuangan obat swamedikasi pada ibu-ibu PKK di RT 01 RW 10, Danguran Selatan.

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INTRODUCTION

The use of printed educational materials, particularly brochures, remains a widely adopted strategy in public health communication to enhance knowledge and awareness regarding health behaviors, including the responsible use and disposal of self-medication drugs.¹ A systematic review examines various interventions aimed at reducing inappropriate demand for medical resources, including medications. It highlights the effectiveness of educational materials, such as brochures, in changing health behaviors related to self-medication and drug disposal.²

Self-medication is a prevalent practice globally, often influenced by ease of access to over-the-counter (OTC) medications, prior experiences, and socio-economic factors. Conducted in Uttar Pradesh, India, this study found a self-medication prevalence of 66.4% among 440 adults. Common reasons included convenience (46%) and lack of time (35.3%). Factors such as urban residence, female gender, skilled occupation, and higher income were significantly associated with self-medication practices.³ The tendency toward self-medication among Indonesian people remains relatively high.⁴ Self-medication poses significant risks, particularly in developing countries like Indonesia. In countries with populations that have limited health knowledge, the likelihood of improper drug use increases.⁵ According to Sari's (2020) research, the respondents' knowledge of drug use, as measured by the average correct response rate, remained below 50%.⁶ Consequently, it was classified as 'insufficient,' with a score of less than 56%.⁷ Insufficient knowledge of proper drug use can lead to suboptimal therapeutic effects and potentially harmful drug interactions, especially when combined with other medications or food.⁸

Furthermore, improper drug use behavior and disposal of medications can lead to serious public health and environmental concerns, such as drug resistance, accidental poisoning, and pharmaceutical pollution. According to the Ministry of Environment and Forestry data, 2022, national waste accumulation exceeded 35 million tons. Household waste accounted for the largest percentage in Indonesia, at 31,66%. Pharmaceutical waste is a common component of household waste.⁹ A study by Savira et al.¹⁰ revealed that 57.9% of respondents failed to dispose of medications properly, often discarding them directly into household trash. This improper disposal contributes to significant environmental harm, contaminating groundwater, rivers, lakes, and water supplies. Improper drug disposal is a widespread problem, as most individuals are unaware of appropriate disposal methods.⁵ The Study conducted in Bandung, Indonesia, found that 95% of households stored unused medicines, with 82.1% disposing of them in household garbage. Notably, 79.5% of respondents had never received information about proper medication disposal practices, and over half were unaware of the environmental and health impacts of improper disposal.¹¹

Recent studies have highlighted the effectiveness of brochures as an accessible, low-cost, and scalable medium for public education. Informational brochures are an effective strategy for increasing drug-related awareness, significantly enhancing individuals' knowledge levels.¹² Brochures are especially useful in conveying focused, easy-to-understand messages supported by visual elements that can aid in knowledge retention and behavioral change. Several intervention-based studies have demonstrated that well-designed brochures can significantly improve knowledge levels in diverse populations when used as part of health promotion strategies. Research by Rasdianah et al.¹³ demonstrated a change in respondents' knowledge levels after receiving education through brochures, with the percentage of those in the 'good' category increasing from 4% to 76%.

Given these concerns, it is essential to provide education on proper medication use and disposal to enhance public knowledge through brochures for PKK (Family Empowerment and Welfare) mothers in RT 01 RW 10, South Danguran. Mothers play a crucial role in managing household health and resource quality, aligning with the PKK movement's objectives of empowering families to achieve well-being, self-sufficiency, and awareness of environmental and legal aspects. This study focused on PKK mothers as key facilitators of information and agents of change within their families and communities.¹⁴

Moreover, the integration of pre-test and post-test assessments in intervention research has become a standard method for evaluating the impact of educational tools, including brochures. This approach allows

for measurable outcomes and helps determine changes in knowledge levels before and after the dissemination of information. Despite their benefits, the effectiveness of brochures may vary depending on factors such as literacy level, cultural context, design quality, and the clarity of the message.^{15,16} For that reason, ongoing research is needed to explore how these materials can be optimized and integrated with other media forms to enhance their reach and impact.

In the context of self-medication, there is a growing recognition of the need to educate the public not only on the proper use of drugs but also on environmentally responsible disposal practices. As public awareness campaigns evolve, brochures continue to serve as a valuable component in multi-modal strategies aimed at fostering safe and informed medication behaviors.¹⁷ Therefore, it is important to conduct this research on the effectiveness of brochure media on the level of knowledge regarding the use and disposal of self-medication drugs among PKK mothers in South Dangan.

RESEARCH METHOD

This study employed a quantitative research approach with a pre-experimental design, utilizing a one-group pre-test post-test framework. Data were collected through a non-probability sampling method, specifically purposive sampling, in which participants were selected from a predetermined population based on specific criteria within a certain age range. The study subjects were PKK mothers in RT 01 RW 10, South Dangan. The research population consisted of 80 individuals. The sample size was determined using the formula for paired categorical comparative analysis (matched/crossed-over two groups) as follows:

$$n = \frac{Z\alpha + Z\beta^2 \pi}{(P_1 - P_2)^2}$$

Description:

n = Sample size

Z α = Standard deviation for alpha – Type I error, set at 5%, so Z α = 1.96

Z β = Standard deviation for beta – Type II error, set at 20%, so Z β = 0.84

P₁ = Proportion of the first group, obtained from Lestari's study,¹³ equal to 89% (P₁ = 0.89)

P₂ = Proportion of the second group, obtained from Lestari's study,¹³ equal to 56% (P₂ = 0.56)

Q₁ = 1 - P₁ = 1 - 0.89 = 0.11

Q₂ = 1 - P₂ = 1 - 0.56 = 0.44

π = Magnitude of discordance (disagreement)

$\pi = (P_1Q_2) + (P_2Q_1)$

$\pi = (0.89 \times 0.44) + (0.56 \times 0.11)$

$\pi = 0.4 + 0.06$

$\pi = 0.46$

Thus, the sample size calculation for this study is as follows:

$$n = \frac{(1.96 + 0.84)^2 0.46}{(0.89 - 0.56)^2}$$

$$n = \frac{(2.8)^2 0.46}{(0.33)^2}$$

$$n = \frac{7.84 \times 0.46}{0.11}$$

$$n = \frac{3.6}{0.11}$$

$$n = 32.72 \approx 33 \text{ responden}$$

This study adjusts the required sample size by adding a 10% buffer to accommodate potential dropouts. This additional sample is utilised only if respondents fail to complete the study or withdraw midway due to illness or other factors. The formula for calculating dropouts is as follows:

$$n' = \frac{n}{(1 - f)}$$

Description:

n' = Sample size after adjustment

n = Number of samples calculated based on the previous estimation

f = Predicted dropout percentage of 10% (0.1)

Thus, the calculation for the total sample size to be studied is as follows:

$$n' = \frac{33}{(1 - 0,1)}$$

$$n' = \frac{33}{0,9}$$

$$n' = 36,67 \approx 37 \text{ respondents}$$

This study included 37 respondents who met the specified inclusion and exclusion criteria. The inclusion criteria encompassed respondents aged 17 to 65 years, members of the PKK mothers' group in RT 01 RW 10, South Danguran, and those who had practiced self-medication at home within the past six months. The exclusion criterion was PKK mothers who declined to participate.

The research instrument was a questionnaire assessing self-medication practices and drug disposal methods. Content validity was ensured by developing the questionnaire based on theory and various previous studies, including a survey by Hartika¹⁸ regarding The Level of Students' Knowledge about DAGUSIBU Medications at SMK Multimedia Tumpang, Malang Regency and research by Rasdianah et al.¹³ about education on proper medication use through brochure media for the community. Face validity was ensured by formulating questionnaire statements that were clear, easily understood, and relevant to the research topic. A clinical pharmacist then evaluated the instrument to assess its visual validity and appropriateness for measuring knowledge levels regarding medication use and disposal. Additionally, a validity test was conducted on 30 respondents with characteristics similar to the research participants, specifically PKK mothers in RT 07/RW 02, Kroya Village, Cilacap.

The validity of the questionnaire was assessed using the Pearson Product-Moment correlation. A questionnaire item was considered valid if the calculated r-value exceeded the r-table value (0.361) at a 5% significance level with 30 respondents or if the p-value was ≤ 0.05 . Reliability was evaluated using Cronbach's Alpha, where a questionnaire was deemed reliable if the Cronbach's Alpha coefficient was at least 0.60 and highly reliable if it approached.¹⁹

The results of the computed r value for the validity test in this study ranged from (-0.039) to 0.708, and the p-value for the validity test ranged from <0.001 to 0.839. Nine of the 40 items were deemed invalid, while 31 were determined to be valid. The valid items adequately represented all the indicators, so the invalid questions were discarded or removed. Additionally, the reliability test results indicated that Cronbach's Alpha value was 0.886, which is considered highly reliable.¹⁹

Data analysis for this study was conducted using a statistical software package with two types of data analysis: univariate analysis to identify characteristics such as age, education, occupation, level of knowledge, and questionnaire scores of the respondents and bivariate analysis to assess the effectiveness of brochures in improving respondents' knowledge about self-medication practices and drug disposal. Knowledge level categorization was determined by calculating the percentage of correct answers. The percentage scores were then classified into three categories: good (76–100%), moderate (56–75%), and insufficient ($<56\%$).

The Wilcoxon Signed-Rank Test, a non-parametric statistical test, was used in this analysis to compare two related samples or repeated measurements on the same subjects (paired samples), specifically the pre-test and post-test knowledge levels of PKK mothers in South Danguran Village. This test was selected because the research data were nominal, consisting of categorical variables that could be classified and counted based on frequency, such as knowledge levels. Therefore, the Wilcoxon Signed-Rank Test was deemed appropriate for this study. The decision criterion for this test was as follows: if the p-value was ≤ 0.05 , the brochures were considered effective in enhancing knowledge. Conversely, if the p-value was > 0.05 , the brochures were deemed ineffective in improving knowledge about the use and disposal of self-medication drugs among PKK mothers in South Danguran. This study was ethically reviewed and approved by the Health Research Ethics Committee of RSUD Dr. Moewardi under approval number 424/II/HREC/2024 on 16 February 2024.

RESULT AND DISCUSSION

The study on the effectiveness of brochures in improving knowledge about self-medication drug use and disposal among PKK mothers in South Danguran used a questionnaire as its instrument. This study involved 37 respondents who met the inclusion and exclusion criteria. After agreeing to participate, the respondents first completed a pre-test questionnaire. They then received education through brochures and reviewed the content of the brochures. Subsequently, the respondents filled out a post-test questionnaire. The purpose of distributing the brochures was to evaluate their effectiveness in enhancing respondents' knowledge about self-medication drug use and disposal. This research was conducted from September 2023 to April 2024.

This study examined the characteristics of PKK mothers in RT 01 RW 10, South Danguran, focusing on age, education, and occupation. As presented in **Table 1**, most respondents were elderly (46–65 years old), comprising 24 individuals or 64.9% of the total sample. This finding was consistent with Puspasari et al.,²⁰ who investigated the relationship between knowledge levels and community attitudes towards DAGUSIBU oral medication, where the elderly age group was also the largest, accounting for 52% of the sample.

Table 1. Age Characteristics

Age	Total	
	n	%
Teenagers (17-25 years)	0	0
Adult (26-45 years)	13	35,1
Elderly (46-65 years)	24	64,9
Total	37	100

Source: Primary Data, 2024

Older people generally acquire greater knowledge as they gain wisdom and access to a wider range of information and experiences.²¹ Similarly, Suwaryo dan Yuwono²² argues that age influences cognitive ability and intellectual development, contributing to an improved understanding.

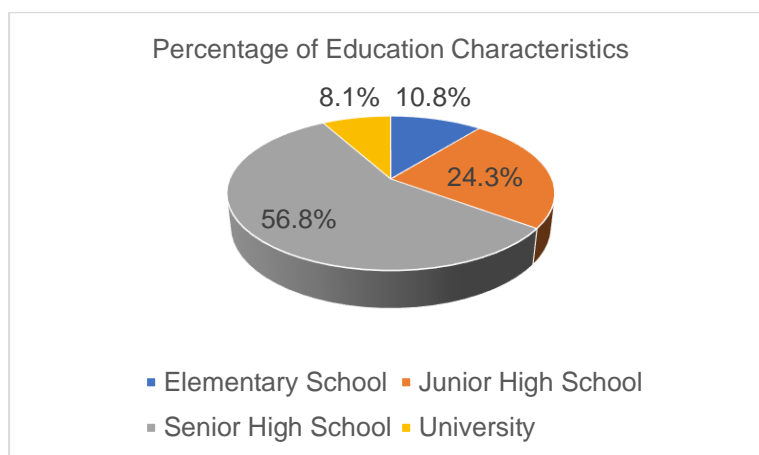


Figure 1. Percentage of Education Characteristics
(Source: Primary Data, 2024)

As shown in **Figure 1**, the highest proportion of respondents in terms of educational background had completed high school, totaling 21 individuals (56.8%). This finding aligns with the study by Agustin,²³ which reported that most respondents in research on community knowledge of DAGUSIBU oral medication had a high school education (63%).

This study aligns with the research by Sulistyowati et al.,²¹ who found that higher education levels positively influence an individual's knowledge and comprehension across various subjects. Additionally, Souhuwat et al.²⁴ and Mutmainah et al.²⁵ further asserted that education affects the learning process; as a person's level of education increases, they become more adept at absorbing information.

The most common occupation among respondents in this study falls under the 'other' category (housewives and laborers), comprising 25 respondents (67,6%) (**Table 2**). This finding was consistent with Irsila's²⁶ research, which found that the dominant occupational characteristic among respondents in a study on DAGUSIBU medication knowledge was housewives, totaling 42 respondents (46%). Similarly, Ra'is et al.²⁷ reported that in their study on the relationship between knowledge levels and self-medication behavior with analgesics, the predominant occupational category was laborers, with 42 respondents (42%).

Table 2. Occupation Characteristics

Occupation	Total	
	n	%
Farmer	0	0
Civil servant	1	2,7
Self-employed	4	10,8
Business	7	18,9
Others (housewives and labourers)	25	67,6
Total	37	100

Source: Primary Data, 2024

Individuals whose work involves more cognitive tasks than physical labor are likely to experience improvements in intellectual performance and memory retention.²² In the workplace, there are opportunities for interaction with colleagues, information exchange, and mutual motivation, which can enhance their insights and understanding.²⁸

Table 3. Knowledge Level Before Receiving Brochure Media

Knowledge Level Categories	Pre-Test	
	n	%
Good (76-100%)	6	16,2
Moderate (56-75%)	19	51,4
Insufficient (<56%)	12	32,4
Total	37	100

Source: Primary Data, 2024

According to **Table 3**, the respondents' knowledge levels before receiving the brochure were categorized as follows based on the pre-test results: 'good' (6 respondents, 16.2%), 'moderate' (19 respondents, 51.4%), and 'insufficient' (12 respondents, 32.4%). At the start of the pre-test, the predominant knowledge level was 'moderate'. This finding is consistent with the research conducted by Ramadhiani et al. (2023), which found that in the pre-test regarding respondents' knowledge of DAGUSIBU medication, the dominant knowledge level category was 'moderate,' with a frequency of 18 respondents (51,40%). This result differs from the study by Hartika¹⁸, where the predominant category in the pre-test for SMK Multimedia Tumpang students in Malang regarding DAGUSIBU medication was 'insufficient,' with the highest number of respondents, totaling 102 (60%).

The respondents' education level in this research is predominantly in Senior High School (56,8%), and they mostly work as housewives and laborers (67,6%). This may affect the majority of knowledge pre-tests showing a moderate level (51,4%), which also stated by Yulianti and Anisa that there was a significant correlation between age ($p = 0,024$), education ($p = 0,001$), and employment status ($p = 0,007$) regarding the knowledge around self-medication in Society in Central Java, Indonesia. Yulianti and Anisa found that most respondents had completed high school (38,9%), and their occupation was housewife (29,3%), which indicates the same proportion as this research.²⁹ Research by Al-Qahtani et al. describes the same results: age ($p = 0.007$), education ($p = 0,014$), and occupation ($p = <0,001$) had significant correlations with knowledge, attitude, and practice.³⁰

Table 4. Knowledge Level After Receiving Brochure Media

Knowledge Level Categories	Post-Test	
	n	%
Good (76-100%)	30	81
Moderate (56-75%)	7	19
Insufficient (<56%)	0	0
Total	37	100

Source: Primary Data, 2024

Table 4 shows that after receiving the brochure media, the study's data show that the highest frequency of post-test questionnaire responses falls within the 'good' knowledge level category, with 30 respondents (81%). This result is consistent with the research conducted by Ramadhiani et al.,³¹ which found that the level of knowledge in the community of Desa Kerujon about DAGUSIBU medication, initially categorized as 'moderate,' improved to the 'good' category in the post-test, with the highest number of respondents being 29 individuals (82.9%).²²

The analysis of all knowledge level categories in this study indicates that most respondents improved their knowledge after receiving education through brochures. However, the post-test results reveal that seven respondents (19%) remained in the "moderate" knowledge category. It may be attributed to certain questionnaire items that some respondents answered incorrectly.

In the post-test questionnaire results, question number 11 had the highest frequency of incorrect answers, with 20 respondents (54,1%) incorrectly answering how to administer ear drops to children, specifically by pulling the ear upward and backward. According to the Ministry of Health,³² the correct method for administering ear drops to children is to pull the ear downward and backward. It indicated that while respondents' overall knowledge level improved, the percentage of correct answers for each question item from the pre-test to the post-test reveals the items that respondents knew and did not know.

Table 5. Wilcoxon Signed Rank Test Result

Knowledge Level Categories	Pre-Test		Post-Test		p-value
	n	%	n	%	
Good (76-100%)	6	16,2	30	81	<0,001 (p<0,05)
Moderate (56-75%)	19	51,4	7	19	
Insufficient (<56%)	12	32,4	0	0	
Total	37	100	37	100	

Source: Primary Data, 2024

Brochure media was considered effective if it could enhance respondents' knowledge about the use and disposal of self-medication drugs. Therefore, the Wilcoxon Signed Rank Test was used to evaluate the effectiveness of the brochure media in improving the knowledge of PKK mothers in RT 01 RW 10 South Dangan.

Table 5 describes the p-value (significance level) for the effectiveness of brochure media in enhancing respondents' knowledge in this study was <0.001 ($p < 0.05$). It indicates that the brochure media is effective as it successfully improved respondents' knowledge before and after the education on the use and disposal of self-medication drugs. This finding is consistent with the research by Rasdianah et al. (2022), which showed a significant difference in community knowledge (p-value 0.001) before and after the education and distribution of brochures about proper medication use and disposal.³²

Respondents' knowledge acquisition effectiveness is closely linked to the media used. Brochures were selected because they present information concisely and clearly, making it easier to understand.³³ However, this differs from the findings of Roseanne (2023), which indicated that the effectiveness of video and brochure media on DAGUSIBU for household mothers' behavior in managing syrup medication in Purwosari Laweyan Surakarta showed an average score of 9.66 for the video group, compared to only 5,71 for the brochure group. This discrepancy is attributed to direct explanations using audio-visual media (video), which

are preferred as they stimulate both the visual and auditory senses, leading to a greater increase in knowledge or understanding.³⁴

The primary limitation of this study is that the validity test was conducted solely through questionnaire distribution without including the brochure media used. Another limitation is that the study measured only respondents' knowledge levels without analyzing changes in their attitudes and behaviors. Ideally, research that incorporates attitude and behavior assessments aims to influence respondents' lifestyles and enhance their understanding and knowledge, particularly regarding the use and disposal of self-medication drugs.

CONCLUSION

This study demonstrates that educational interventions using brochure media can significantly enhance community knowledge regarding the proper use and disposal of self-medication drugs. The substantial improvement in knowledge among PKK mothers in RT 01 RW 10 South Danguran highlights the importance of accessible and targeted health education strategies. By empowering individuals with accurate information, such initiatives contribute to promoting responsible self-medication practices and minimizing potential health and environmental risks associated with improper drug use and disposal.

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CONFLICT OF INTERESTS

The authors declare no conflicts of interest.

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