

## INCREASING PUBLIC KNOWLEDGE THROUGH THE GEMA CERMAT AND DAGUSIBU PROGRAMS IN THE MANAGEMENT OF ANTIHYPERTENSION DRUGS

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**Abstract:** *Hypertension is a major non-communicable disease requiring long-term medication management. This community service activity aimed to improve participants' knowledge of antihypertensive medication management through GEMA CERMAT (Smart Community Movement for the Rational Use of Medicines) and DAGUSIBU (Obtain, Use, Store, and Dispose of Medicines Properly). The activity involved 31 Prolanis participants in Mangunrejo Village, Kepanjen District, Malang Regency, using a one-group pre-test and post-test design. Education was delivered through presentations and leaflets, and knowledge was assessed using a 10-item questionnaire. The mean knowledge score increased from  $7.28 \pm 0.683$  before the intervention to  $7.75 \pm 0.916$  after the intervention. The Wilcoxon Signed Rank Test showed a significant difference between pre-test and post-test scores ( $Z = -2.762$ ;  $p = 0.006$ ), with an effect size of  $r = 0.49$ . These findings indicate that GEMA CERMAT and DAGUSIBU education was associated with improved knowledge regarding antihypertensive medication management among Prolanis participants.*

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## Introduction

Hypertension is a non-communicable disease (NCD) that is a major health problem globally and in Indonesia. This disease is known as a silent killer because most sufferers do not show symptoms until complications occur. Uncontrolled hypertension can increase the risk of coronary heart disease, stroke, heart failure, chronic kidney failure, and various other cardiovascular complications. Therefore, controlling hypertension is a priority in efforts to prevent non-communicable diseases through early detection, lifestyle changes, and adherence to antihypertensive therapy (World Health Organization, 2023; Ministry of Health of the Republic of Indonesia, 2019). Hypertension is a chronic disease that requires long-term therapy, so the success of treatment is greatly influenced by patient compliance in taking antihypertensive medications. However, medication adherence remains a challenge in healthcare. Many patients stop taking their medication when their blood pressure has decreased, forget to take their medication, or do not understand the rules for using antihypertensive medications correctly. These conditions can lead to uncontrolled blood pressure, increasing the risk of complications and reducing the patient's quality of life (Ministry of Health of the Republic of Indonesia, 2019; Izeogu et al., 2020).

In Indonesia, hypertension remains a high prevalence. Based on the 2007 Basic Health Research (Riskesdas), the prevalence of hypertension among people aged 18 years and older reached 31.7%. Although the prevalence decreased to 25.8% in the 2013 Riskesdas, the 2018 Riskesdas results showed an increase again to 34.1%. These data indicate that more than a third of Indonesia's adult population suffers from hypertension, making this disease still a public health problem that requires serious attention. (Ministry of Health of the Republic of Indonesia, 2008; Ministry of Health of the Republic of Indonesia, 2013; Ministry of Health of the Republic of Indonesia, 2018). The prevalence of hypertension in Indonesia also shows differences based on population characteristics. According to the 2007 Riskesdas, the prevalence of hypertension in women was slightly higher than in men. Similar results were also found in the 2013 Riskesdas and 2018 Riskesdas, where women had a higher prevalence of hypertension than men. Furthermore, the prevalence of hypertension increases with age, especially in the age group over 55 years. This increased risk is related to the aging process, which causes decreased blood vessel elasticity, increased arterial stiffness, and hormonal changes, particularly in postmenopausal women (Ministry of Health of the Republic of Indonesia, 2008; Ministry of Health of the Republic of Indonesia, 2013; Ministry of Health of the Republic of Indonesia, 2018).

Low medication adherence is often influenced by a lack of public knowledge about hypertension and antihypertensive medication management. Good knowledge of the benefits of therapy, medication usage rules, side effects, and the importance of continued medication use plays a role in improving patient adherence. Conversely, low health literacy can lead to irrational medication use, increase the risk of medication errors, and hinder the achievement of blood pressure targets. Previous research has shown that knowledge level is significantly associated with adherence to antihypertensive medication use (Pristianty et al., 2023; Andala et al., 2024).

In addition to promotive and preventive efforts, the government, through the Social

Security Administering Agency (BPJS) for Health, implements the Chronic Disease Management Program (Prolanis) as a form of integrated health services for National Health Insurance (JKN) participants suffering from chronic diseases, particularly hypertension and diabetes mellitus. Prolanis aims to improve participants' quality of life through regular health monitoring, medical consultations, health education, physical activity, service schedule reminders, and monitoring of medication adherence. Through these activities, it is hoped that patients' blood pressure can be controlled, the risk of complications can be suppressed, and the number of hospitalizations due to hypertension can be reduced (BPJS Kesehatan, 2014; Ministry of Health of the Republic of Indonesia, 2019).

Although the Prolanis Program has been implemented in various primary healthcare facilities, the success of hypertension control is still influenced by the level of patient knowledge and adherence to therapy. Education provided during Prolanis activities is an important component in increasing patient understanding of hypertension, the importance of regular medication use, and healthy lifestyle changes. Therefore, outreach activities through the Smart Community Movement for Using Medicine (GEMA CERMAT) and DAGUSIBU (Get, Use, Store, and Dispose of Medicine Correctly) approaches can complement Prolanis activities in increasing public literacy regarding the rational use of antihypertensive drugs. (BPJS Kesehatan, 2014; Ministry of Health of the Republic of Indonesia, 2015).

## **Research Methods**

### **Research Design**

This community service activity used a pre-experimental design with a one-group pre-test and post-test approach to evaluate the increase in community knowledge after receiving education on antihypertensive medication management. The activity was conducted with participants of the Chronic Disease Management Program (Prolanis) in Mangunrejo Village, Kepanjen District, Malang Regency.

The educational media used were leaflets containing information about hypertension, the use of antihypertensive medications, and the principles of the Smart Community Movement for Using Medicine (Gema Cermat) and DAGUSIBU (Obtain, Use, Store, and Dispose of Medicine Correctly). The leaflets were given to all participants as a learning medium during the counseling session and as educational material that could be reviewed independently after the activity was completed.

Data collection was conducted using pre-test and post-test questionnaires consisting of 10 questions regarding antihypertensive medication management based on the principles of Gema Cermat and DAGUSIBU. The pre-test questionnaire was administered before the counseling session to determine the participants' initial knowledge level, while the post-test questionnaire was administered after the counseling session to evaluate the increase in knowledge following the educational intervention. The data obtained were analyzed descriptively and then statistically tested to determine differences in knowledge levels before and after the counseling session.

## **Implementation Stages**

### **1. Planning**

The planning stage is the initial stage before implementing community service activities. At this stage, coordination was carried out with the Kepanjen Community Health Center and Mangunrejo Village officials to determine the time, location, and targets of the outreach activities. Next, educational needs were identified based on the high number of hypertension cases among Prolanis participants. The team then prepared outreach materials regarding hypertension, the use of

antihypertensive drugs, and the principles of the Smart Community Movement for Using Medicine (Gema Cermat) and DAGUSIBU. In addition, at this stage, educational media in the form of leaflets were prepared and evaluation instruments in the form of pre-test and post-test questionnaires consisting of 10 questions to measure the level of knowledge of participants before and after the outreach.

## 2. Delivery of Material

The implementation phase began with the distribution and completion of a pre-test questionnaire by all participants to determine their initial level of knowledge regarding hypertension and antihypertensive medication management. This was followed by a leaflet-based education session containing information on the definition of hypertension, risk factors, complications of hypertension, the importance of adherence to antihypertensive medication use, and the application of the Gema Cermat and DAGUSIBU principles in daily life. The material was delivered using an interactive lecture method accompanied by discussions and questions and answers so that participants could share their experiences and challenges during antihypertensive therapy. At the end of the session, leaflets were distributed to all participants as educational materials to be studied at home.

## 3. Evaluation

The evaluation phase was conducted after all the counseling materials were delivered. Participants were asked to complete a post-test questionnaire using the same instrument as the pre-test to determine changes in their level of knowledge after attending the counseling. The pre-test and post-test results were then summarized and analyzed to assess the effectiveness of the activity. Data analysis was conducted descriptively to describe participant characteristics and score distribution, followed by a normality test using the Shapiro–Wilk test. Because the data were not normally distributed, differences in pre-test and post-test scores were analyzed using the Wilcoxon Signed Rank Test with a 95% confidence level ( $\alpha = 0.05$ ). In addition, the effect size ( $r$ ) was calculated to determine the extent of the counseling's influence on increasing participants' knowledge. The results of this evaluation were used as an indicator of the success of the Gema Cermat and DAGUSIBU counseling implementation in improving public knowledge regarding antihypertensive medication management.

## Results and Discussion

Community service activities were carried out in Mangunrejo Village with the theme of the Smart Community Movement for Using Medicine (GEMA) outreach. CERMAT) and DAGUSIBU (Obtain, Use, Store, and Dispose of Medicines Correctly). This activity aims to increase public knowledge regarding the rational use of medicines, thereby minimizing medication errors in the family environment. The activity began with a pretest, followed by the delivery of material using presentation media and leaflets, a discussion and question-and-answer session, and concluded with a posttest to evaluate the level of knowledge of participants after receiving the counseling.

The activity was attended by 31 participants from the Mangunrejo Village community. Evaluation was conducted to determine the effectiveness of the outreach on improving participant knowledge using descriptive statistical analysis and the Wilcoxon Signed Rank Test.

### Results

#### 1. Sample Characteristics

Based on the results of the analysis of participant characteristics, the GEMA CERMAT and DAGUSIBU counseling activities in Mangunrejo Village were attended by 31 participants, consisting of 10 male participants (31.3%) and 21 female participants (68.8%). Based on age groups, the largest number of participants were in the 56–65 years age range, with 12 people (40.6%), followed by 45–55 years old with 9 people (28.1%), 66–75 years old with 6 people (18.8%), and 76–85 years old with 4 people (12.5%). These results indicate that the majority of counseling participants were women and included in the elderly age group, which is a high-risk group for hypertension.

The predominance of female participants in this activity is in line with the results of the 2007, 2013, and 2018 Basic Health Research (Riskesdas), which showed that the prevalence of hypertension in women tends to be higher than in men. In the 2007 Riskesdas, the prevalence of hypertension based on blood pressure measurements was 31.9% in women and 31.3% in men. Furthermore, in the 2013 Riskesdas, the prevalence of hypertension in women was 28.8%, higher than the 22.8% in men. This condition was also still seen in the 2018 Riskesdas, which showed that women had a higher prevalence of hypertension than men. The high prevalence of hypertension in women is thought to be related to hormonal changes after menopause, increasing age, obesity, and lifestyle factors that affect blood pressure. (Ministry of Health of the Republic of Indonesia, 2008; Ministry of Health of the Republic of Indonesia, 2013; Ministry of Health of the Republic of Indonesia, 2018). The 300:200 treatment obtained the lowest color score (2.51), while the 400:100 and 500:0 treatments obtained scores of 3.74 and 4.03, respectively. These results indicate that the higher the proportion of palm sugar, the darker the color of the drink. Differences in assessments may also be influenced by the panelists' visual conditions and lighting (Rahayu et al., 2019).

Based on age distribution, the majority of participants were in the 56–65 age group (40.6%). These results align with national data showing that the prevalence of hypertension increases with age. The 2007 Basic Health Research (Riskesdas) reported that the prevalence of hypertension increases from adulthood to old age. This finding was further reinforced by the 2013 Basic Health Research (Riskesdas), where the prevalence of hypertension reached 45.9% in the 55–64 age group, increasing to 57.6% in 65–74 years, and 63.8% in those aged  $\geq 75$  years. The same pattern was also shown by the 2018 Basic Health Research (Riskesdas), where the age group above 55 years had the highest prevalence of hypertension. This condition occurs because the aging process causes decreased blood vessel elasticity, increased arterial stiffness, and changes in cardiovascular system function that contribute to increased blood pressure. (Ministry of Health of the Republic of Indonesia, 2008; Ministry of Health of the Republic of Indonesia, 2013; Ministry of Health of the Republic of Indonesia, 2018).

**Table 1. Sample Distribution Table**

|       |       | JENIS_KELAMIN |         |               |                    |
|-------|-------|---------------|---------|---------------|--------------------|
|       |       | Frequency     | Percent | Valid Percent | Cumulative Percent |
| Valid | L     | 10            | 31.3    | 31.3          | 31.3               |
|       | P     | 21            | 68.8    | 68.8          | 100.0              |
|       | Total | 31            | 100.0   | 100.0         |                    |

**Table 2. Sample Distribution Table Based on Age**

|       |         | AGE       |         |               |                    |
|-------|---------|-----------|---------|---------------|--------------------|
|       |         | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | 45 - 55 | 9         | 28.1    | 28.1          | 28.1               |
|       | 56 - 65 | 12        | 40.6    | 40.6          | 68.8               |
|       | 66 - 75 | 6         | 18.8    | 18.8          | 87.5               |
|       | 76 - 85 | 4         | 12.5    | 12.5          | 100.0              |
|       | Total   | 31        | 100.0   | 100.0         |                    |

## Participant Knowledge Evaluation Results

### 1. Descriptive Analysis of Pretest and Posttest Scores

Knowledge evaluation was conducted using questionnaires before (pretest) and after (posttest) the counseling. The analysis showed that the average pretest score was  $7.28 \pm 0.683$ , while the average posttest score increased to  $7.75 \pm 0.916$ . The minimum score for both measurements was 6, while the maximum score was 9.

The results showed an average increase in knowledge scores of 0.47 points after participants received the counseling. This increase indicates that the material provided improved participants' understanding of the correct use of medications based on the principles of GEMA CERMAT and DAGUSIBU.

**Table 3. Descriptive Analysis Table**

|                    | N  | Minimum | Maximum | Mean | Standard Deviation |
|--------------------|----|---------|---------|------|--------------------|
| PRETEST            | 31 | 6       | 9       | 7.28 | .683               |
| Posttest           | 31 | 6       | 9       | 7.75 | .916               |
| Valid N (listwise) | 31 |         |         |      |                    |

### 2. Normality Test

Before hypothesis testing, the data were first tested for normality using Shapiro-Wilk. The test results showed that the significance value for both the pretest and posttest was 0.000 ( $p < 0.05$ ), indicating that the data were not normally distributed.

Based on these results, the analysis of differences in knowledge before and after counseling used the Wilcoxon Signed Rank Test because it is a nonparametric test that is suitable for paired data with non-normal distribution.

**Table 4. Normality Test Table**

|          | Kolmogorov-Smirnov <sup>a</sup> |    |      | Shapiro-Wilk |    |      |
|----------|---------------------------------|----|------|--------------|----|------|
|          | Statistics                      | df | Sig. | Statistics   | df | Sig. |
| PRETEST  | .441                            | 31 | .000 | .636         | 31 | .000 |
| Posttest | .294                            | 31 | .000 | .806         | 31 | .000 |

### 3. Hypothesis Testing

The Wilcoxon test results showed a Z value of -2.762 with a significance value of 0.006 ( $p < 0.05$ ). A significance value less than 0.05 indicates a significant difference between the pretest and posttest scores. Thus, the GEMA CERMAT and DAGUSIBU outreach programs have been shown to significantly increase public knowledge regarding the correct use of medications.

The magnitude of the extension's influence was calculated using the formula  $r = Z/\sqrt{N}$  and obtained an effect size value of 0.49. Based on Cohen's interpretation, this value is in the moderate to large category.

These results indicate that counseling not only provides a statistically significant difference, but also has a fairly strong impact in increasing public knowledge regarding the rational use of drugs.

**Table 5. Wilcoxon Signed Rank Test Results Table**  
**Test Statistics**

|                        | Posttest -<br>Pretest |
|------------------------|-----------------------|
| Z                      | -2,762 <sup>b</sup>   |
| Asymp. Sig. (2-tailed) | .006                  |

#### a. Wilcoxon Signed Ranks Test

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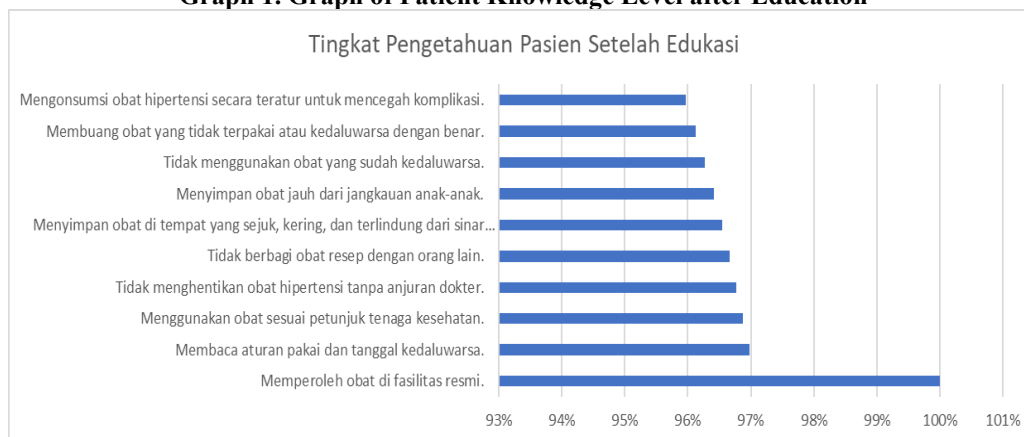
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b. Based on negative ratings.

The description of the patient's level of knowledge after education based on the post-test results can be seen in the following graph:

**Graph 1. Graph of Patient Knowledge Level after Education**



## Photo or Image



Figure 1. Delivery of GEMA CERMAT and DAGUSIBU extension materials.



Figure 2. Participants completing the pretest and posttest.



Figure 3. Discussion and question and answer session.



Figure 4. Group photo of participants and the KKN team after the activity was completed.

## Discussion

The evaluation results showed that the counseling on the Smart Community Movement for Using Medicine (GEMA CERMAT) and DAGUSIBU was able to improve participants' knowledge regarding antihypertensive medication management. This was indicated by an increase in the average knowledge score from 7.28 in the pre-test to 7.75 in the post-test. The Wilcoxon Signed Rank Test results showed a  $p$  value of 0.006 ( $p < 0.05$ ), which indicates a significant difference between participants' knowledge. before and after counseling. Furthermore, the effect size of 0.49 indicates that the educational intervention had a moderate to large impact on improving participants' knowledge. These results align with research by Ampofo et al. (2020), which found that direct health education can improve patient knowledge and encourage behavioral changes in managing chronic diseases, including hypertension. Similarly, research by Pristianty et al. (2023) showed that increased knowledge contributes to increased patient compliance in the rational use of antihypertensive medications (Ampofo et al., 2020; Pristianty et al., 2023).

The leaflets used during the counseling sessions were thought to play a significant role in

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improving participant understanding, particularly among the 56–65 age group, which represented the largest age group (40.6%). Leaflets are advantageous because they present information concisely, use simple language, are accompanied by easy-to-understand illustrations, and can be taken home so participants can review the material. According to the Indonesian Ministry of Health, printed media such as leaflets are an effective health promotion tool for increasing public knowledge because they can reinforce information obtained through oral counseling. Furthermore, in the elderly, the use of simple visual media helps improve memory and understanding of the health information presented (Indonesian Ministry of Health, 2014; Notoatmodjo, 2018).

Respondent characteristics indicate that the majority were women (68.8%), while men made up 31.3%. Based on age group, the majority of respondents were in the 56–65 age range (40.6%), followed by those aged 45–55 (28.1%), 66–75 (18.8%), and 76–85 (12.5%). These characteristics are consistent with the 2018 Basic Health Research (Riskesdas) data, which shows that the prevalence of hypertension is higher in women than in men and increases with age. This condition is influenced by physiological changes due to the aging process, such as decreased blood vessel elasticity, as well as hormonal changes in women after menopause, which increase the risk of hypertension. Therefore, the target of the outreach activities is appropriate for community groups at high risk of developing hypertension and requiring education regarding the correct use of medication (Ministry of Health of the Republic of Indonesia, 2018; Ministry of Health of the Republic of Indonesia, 2019).

This outreach activity also supports the implementation of the Chronic Disease Management Program (Prolanis) organized by BPJS Kesehatan. Prolanis aims to improve the quality of life of patients with hypertension and diabetes mellitus through an integrated promotive, preventive, curative, and rehabilitative approach. One of the main components of Prolanis is health education to improve patients' ability to manage their illness independently. Counseling on GEMA CERMAT and DAGUSIBU complements Prolanis activities by providing an understanding of how to properly obtain, use, store, and dispose of antihypertensive medications. The increased knowledge gained by participants is expected to support medication adherence, improve therapy success, and reduce the risk of hypertension complications. (BPJS Kesehatan, 2014; Ministry of Health of the Republic of Indonesia, 2015).

Overall, the results of the activity showed that the education provided was able to improve participants' understanding of antihypertensive medication management. This was evidenced by an increase in knowledge scores after the counseling and statistical results that showed a significant difference between pre-test and post-test scores. Good knowledge is one of the important factors that influence health behavior, including compliance in taking antihypertensive medications as recommended by health professionals. With increased participant understanding of the principles of GEMA CERMAT and DAGUSIBU, it is hoped that participants will be able to apply rational medication use in their daily lives so that blood pressure control becomes more optimal and the risk of complications due to hypertension can be minimized (Andala et al., 2024; Ministry of Health of the Republic of Indonesia, 2019). The lighter color in the 300:200 treatment was due to the use of more granulated sugar, while the 400:100 and 500:0 treatments produced a darker color due to the higher palm sugar content. These results align with Ratnasari et al. (2022) and Suryani et al. (2025) who stated that the addition of palm sugar increases the intensity of the brown color in the product.

## Conclusion

Community service activities through outreach on the Smart Community Movement for Using Medicine (GEMA CERMAT) and DAGUSIBU (Obtain, Use, Store, and Dispose of Medicine Correctly) for Prolanis hypertension participants in Mangunrejo Village, Kepanjen District, have been well implemented. This activity used educational media in the form of

leaflets accompanied by pre- and post-tests to evaluate the level of participants' knowledge regarding antihypertensive medication management.

The evaluation results showed that the counseling was able to improve participants' knowledge regarding the use of antihypertensive drugs. This was demonstrated by an increase in the average score from 7.28 in the pre-test to 7.75 in the post-test, as well as the results of the Wilcoxon Signed Rank Test which showed a significant difference between before and after the counseling ( $p = 0.006$ ). The effect size value of 0.49 indicates that the educational intervention had a moderate to large effect on improving participants' knowledge.

The majority of counseling participants were women (68.8%), with the largest age group being 56–65 years (40.6%), which is a group with a higher risk of hypertension based on Riskesdas data. The use of leaflets as an educational medium helped participants understand the material on hypertension, the use of antihypertensive drugs, and the principles of GEMA CERMAT and DAGUSIBU, thus supporting the goal of the Chronic Disease Management Program (Prolanis) in improving patients' ability to manage their disease independently.

Based on these results, it can be concluded that the GEMA CERMAT and DAGUSIBU outreach programs are effective forms of education to increase public knowledge regarding antihypertensive medication management. Similar activities are expected to be implemented continuously as part of the Prolanis education program in primary healthcare facilities to improve medication adherence, optimize blood pressure control, and reduce the risk of complications from hypertension.

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