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Improving Knowledge about Drug Use During Fasting through Pharmaceutical Counseling Accompanied by Leaflet

Yuly Peristiowati, [CA]**Rina Widiyawati**
Universitas STRADA Indonesia Kediri
[CA]Coresponding Author

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Abstract

Medication use in patients with chronic diseases during Ramadan is a crucial yet often overlooked public health challenge in the primary health care system in Indonesia. Non-compliance with medication regimens and inappropriate dosage adjustments during fasting can lead to serious complications and even medical emergencies, especially in patients with diabetes and hypertension. This community service activity aimed to evaluate the effectiveness of pharmaceutical counseling, accompanied by leaflets, in enhancing patients' knowledge of medication use during fasting for chronic conditions. This quasi-experimental study was conducted at the Technical Implementing Unit of Kepanjenkidul Health Center, Blitar City, involving 18 patients diagnosed with diabetes and hypertension. The study employed a knowledge questionnaire. The design of this study aims to analyze changes in patient knowledge related to drug use during Ramadan fasting through a structured intervention approach. The results of the activity showed a significant increase in knowledge scores, from an average of 28.33 (pre-test) to 47.11 (post-test), representing a percentage increase of 37.56% (p-value = 0.000, p = < 0.05). In conclusion, pharmaceutical counseling through brochures has shown promise as a strategy for improving patients' understanding of medication management during Ramadan. It is recommended that health centers develop specific counseling protocols and educational materials tailored to the characteristics of patients, particularly those from low-educated and pre-elderly groups. The implementation of this counseling program needs to be integrated into routine pharmaceutical services, with a focus on preparation several weeks before Ramadan to improve medication safety and therapy fulfillment for patients who choose to fast.

✉Correspondence Address:
Universitas STRADA Indonesia Kediri – East Java, Indonesia
Email: apt.rhienawidi@gmail.com
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INTRODUCTION

Ramadan fasting is an obligation carried out by Muslims for a whole month, with abstinence from eating and drinking from sunrise to sunset. For people with chronic diseases such as diabetes mellitus and hypertension, this fasting period creates a critical health dilemma, especially in managing medication regimens that must be carefully balanced with dietary restrictions and hydration needs to avoid complications during this holy month (Amin et al., 2021; Habas et al., 2022). Changes in diet and medication schedules during Ramadan not only disrupt pharmacological stability but also have the potential to trigger life-threatening complications such as severe hypoglycemia, blood pressure instability, and acute cardiovascular events. Individuals with chronic conditions should consult healthcare professionals before and during Ramadan to ensure safe management of their health while observing the fast (Al Rifai et al., 2022; Shiju et al., 2022).

This phenomenon is even more concerning when considering statistics showing that 79% of Muslim patients with chronic conditions still choose to fast despite significant medical risks (Ozturk et al., 2021). Even more concerning, 62% of patients with diabetes mellitus do not have an adequate understanding of adjusting the dosage and schedule of medication during fasting, resulting in an increase in emergency hospitalizations of up to 27% during Ramadan compared to other months (Hassanein et al., 2022; Tourkmani et al., 2016). This knowledge gap creates an urgency for educational interventions that cannot be ignored in Indonesia's primary healthcare system. Implementing targeted educational programs for both patients and healthcare providers is essential to bridge this knowledge gap, ensuring that individuals can make informed decisions about their health while observing religious practices (Bouchareb et al., 2022).

Health centers, as the frontline of public health services, have a strategic position but have not been optimized to provide special periodic pharmaceutical education related to the Ramadan fast. The main obstacles include limited consultation time, the complexity of medical information, and the absence of standard protocols for pharmaceutical counseling during Ramadan at the community health center level (Almansour et al., 2017; Fatiha & Firdaus, 2023). This condition is exacerbated by the varying levels of health literacy in the Indonesian patient population, especially in the pre-elderly and elderly groups who dominate chronic disease patients. This poses a significant challenge to efforts to improve understanding and adherence to treatment, which are critical to effectively managing their health conditions (Kavit et al., 2022; Lu et al., 2023).

Pharmaceutical counseling is an approach that has been proven effective in improving patient understanding of drug therapy (Rampamba et al., 2019). A study conducted by Hening *et al*. (2019) showed that counseling conducted by hospital pharmacists can improve clinical outcomes of outpatients with type 2 diabetes mellitus (DM), including a significant decrease in HbA1c values and increased medication adherence. The study confirmed that pharmacists' counseling has a vital role in chronic disease medication management. However, information delivered verbally in counseling sessions is often difficult for patients to remember, especially for those with low education levels or the elderly (Hening et al., 2019).

Educational media, such as leaflets, can be an effective solution to overcome these limitations. Leaflets provide written information that can be accessed by patients at any time, thereby increasing long-term retention of information and knowledge (Schmitz et al., 2017). Research by Sustersic *et al*. (2019) proved that the combination of verbal counseling with printed media can increase patient knowledge by up to 43% compared to verbal counseling alone (Sustersic et al., 2019).

In Indonesia, research related to the effectiveness of pharmaceutical counseling accompanied by leaflets for medication management during fasting is still limited, especially in health center settings. Differences in sociodemographic characteristics and health literacy levels among the Indonesian people compared to those in other countries highlight the need for specific studies in the local context. Technical Implementing Unit of Kepanjenkidul Health Center Blitar City, as a community service location, has a significant number of diabetes and hypertension patients, and the majority of patients are Muslims who are fasting.

This community service aims to measure the effectiveness of pharmaceutical counseling accompanied by leaflets in increasing the knowledge of diabetes and hypertension patients

regarding the use of drugs during fasting. The results of this community service are expected to provide scientific evidence regarding the effectiveness of this intervention method and become the basis for the development of pharmaceutical services in health centers, especially in the context of managing medication during the month of Ramadan.

The scope of this community service includes pharmaceutical counseling interventions accompanied by leaflets for diabetes mellitus and hypertension patients undergoing outpatient care at the Technical Implementing Unit of Kepanjenkidul Health Care Blitar City. The Focus is on changes in the level of knowledge of respondents before and after the intervention, using a pre-test and post-test approach to measure the effectiveness of the intervention. The assessment includes patient knowledge about the right time to take medication, types of drugs that can or cannot be postponed, and actions that need to be taken when experiencing symptoms related to treatment during fasting.

METHODS

This community service utilized a quasi-experimental design with a one-group pre-test post-test approach to measure changes in patient knowledge levels. The research instrument was a knowledge questionnaire using a Likert scale with a score range of 1-5, consisting of 10 questions assessing patients' understanding of medication management during Ramadan fasting. The questionnaire covered key aspects, including medication adjustments, drug consumption techniques, medication timing, signs of dangerous conditions, medical consultations, health risks, condition monitoring, symptom management, and the importance of hydration. Each statement was evaluated with response options: (1) Strongly Disagree, (2) Disagree, (3) Neutral, (4) Agree, (5) Strongly Agree. The total score ranged from 10 to 50, with higher scores indicating better knowledge about medication management during fasting.

The measurements were conducted on the same subject group by comparing pre-test and post-test results to evaluate the effectiveness of the health education intervention in primary healthcare settings (Creswell, JW, 2018). This approach enabled the direct measurement of changes resulting from interventions in actual healthcare contexts.

This community service was carried out at the Technical Implementing Unit of Kepanjenkidul Center located in Tanggung Village, Kepanjenkidul District. The target community is patients with chronic diseases, especially diabetes and hypertension, who are taking medication during the community service activity and are willing to become respondents. Community participation includes active involvement in individual pharmacy counseling sessions, filling out pre-test and post-test questionnaires, and a commitment to apply the knowledge gained in daily medication management, especially during the fasting period.

The implementation of community service activities is carried out through three main stages that are systematically arranged:

1. An initial knowledge assessment was conducted using a pre-test questionnaire to identify patients' basic understanding of drug use during fasting. The questionnaire is given to patients when they visit the health center to pick up routine medication.
2. The second stage features an intervention in the form of individual pharmaceutical counseling, lasting 10-15 minutes per patient. This approach utilizes a therapeutic communication approach tailored to each patient's level of understanding. Counseling is complemented by the provision of specially designed educational leaflets that contain information on how to use medications correctly during fasting, potential side effects, and strategies for managing medication without disrupting fasting.
3. The final stage involves a post-test questionnaire with the same instrument as the pre-test to measure changes in knowledge levels as a result of the intervention.

The main instrument used in this activity is a questionnaire on knowledge of drug use during fasting consisting of 10 question items covering aspects of drug consumption time, dose adjustment, handling of side effects, and special conditions that require attention during fasting. In addition, educational leaflets were developed by considering the principles of effective communication using simple language supported by visual illustrations and structured information.

Data collection was conducted through two stages of questionnaire filling: a pre-test to measure baseline patient knowledge and a post-test to evaluate the impact of the intervention. The time

interval between the pre-test and post-test was 30 minutes, where counseling interventions and leaflet distribution were conducted between the two measurements. The research team collected additional data on respondents' demographic characteristics and treatment history to enrich the contextual analysis.

Data analysis was conducted using a comprehensive quantitative approach. The first stage of analysis involved a data normality test using the Shapiro-Wilk test to determine the distribution of the data. Based on the results of the normality test, if the data was normally distributed, the analysis was continued with a paired t-test. However, if the data were not normally distributed, the analysis used the Wilcoxon Signed-Rank Test as a non-parametric alternative to measure the significance of the difference in pre-test and post-test scores, with a significance level of $p < 0.05$. Descriptive statistics in the form of mean, median, standard deviation, minimum, and maximum values were calculated to describe the data distribution comprehensively. Additional analysis in the form of a percentage increase in knowledge for each dimension was conducted to identify the aspects most affected by the intervention. All statistical analyses were performed using SPSS software version 24.

RESULTS

The study involved 18 respondents with varying sociodemographic and clinical characteristics. Based on the data in Table 1, respondents were dominated by women (55.56%), and the majority were in the pre-elderly category (45-59 years), with a percentage of 61.11%. In terms of education, most respondents had a low level of education (elementary and junior high school), with a rate of 44.44%, followed by secondary education (38.89%) and higher education (16.67%).

In terms of disease diagnosis, 55.56% of respondents suffered from hypertension, 22.22% suffered from diabetes, and another 22.22% had a diagnosis of both. This distribution reflects the profile of chronic diseases that are commonly found in the community and is the basis for the importance of education on the use of drugs during fasting for this population.

Table 1. Sociodemographic and Clinical Data of Respondents

Respondents Characteristics		Total (n=18)	Percentage (%)
Gender			
Man		8	44,44
Woman		10	**55,56**
Age (years)			
19 to 44	(mature)	1	5,56
45 to 59	(pre-elderly)	11	**61,11**
60 to 69	(elderly)	5	27,78
Greater than or equal to 70	(high-risk elderly)	1	5,56
Pendidikan			
Low	(elementary & junior high)	8	**44,44**
Middle	(high school)	7	38,89
High	(college or university)	3	16,67
Diagnosis			
Hypertension		10	**55,56**
Diabetes		4	22,22
Hypertension and Diabetes		4	22,22

The study's results showed a significant increase in knowledge in patients with diabetes and hypertension after being given a pharmaceutical counseling intervention accompanied by a leaflet. As shown in Table 2, the average value of the respondents' pre-test scores was 28.33 (SD = 9.456), which then increased to 47.11 (SD = 3.692) in the post-test, representing an average percentage increase of 37.56%.

The Wilcoxon statistical test confirmed the significance of the difference with a p-value of 0.000 ($p < 0.05$), indicating that the pharmaceutical counseling intervention, accompanied by leaflets, was effective in improving patient knowledge. The decrease in the standard deviation value from 9.456 in the pre-test to 3.692 in the post-test indicated

better homogeneity of knowledge among respondents after the intervention.

The data shows that all respondents experienced an increase in knowledge scores with varying percentages. The lowest percentage increase was 4% (respondents 18), and the highest reached 72% (respondents 8). The increase in the median score from 29.00 in the pre-test to 49.00 in the post-test, as well as the narrowing of the post-test score range (40-50) compared to the pre-test (14-47), indicates the success of the intervention in increasing and standardizing the level of knowledge of respondents.

Overall, the results of this study indicate that pharmaceutical counseling accompanied by leaflets is an effective method to increase the knowledge of diabetes and hypertension patients about the use of drugs during Ramadan fasting in community health centers.

Table 2. Respondents Total Pre-test and Post-test Scores

Respondent	Total Score		Improved Score	% Increase
	Pre-test	***Post-test***		
1	47	50	3	6,00
2	28	42	14	28,00
3	35	50	15	30,00
4	26	48	22	44,00
5	17	50	33	66,00
6	18	49	31	62,00
7	35	46	11	22,00
8	14	50	36	72,00
9	31	49	18	36,00
10	32	50	18	36,00
11	21	45	24	48,00
12	19	41	22	44,00
13	40	50	10	20,00
14	30	40	10	20,00
15	28	47	19	38,00
16	35	50	15	30,00
17	15	50	35	70,00
18	39	41	2	4,00
Total	**510**	**848**	**338**	**37,56**
Min-Max Value	**41 - 47**	**40 - 50**		
Mean	**28,33**	**47,11**		
Median	**29,00**	**49,00**		
SD	**9,456**	**3,692**		
***p- value* Wilcoxon**	**0,000**			

DISCUSSION

The results of this study show essential facts related to the increase in knowledge of diabetes and hypertension patients about the use of drugs during Ramadan fasting after receiving pharmaceutical counseling intervention accompanied by leaflets. These facts include:

1. There was a significant increase in knowledge of 37.56% overall after the intervention, with a p-value = 0.000 ($p < 0.05$). This study is consistent with previous research findings. In a related study, Patel et al. (2015) found that patients with chronic conditions such as diabetes have specific information needs related to medication management during fasting, and providing appropriate information can significantly improve adherence to medication regimens (Patel et al., 2015). Meanwhile, Grindrod and Alsabbagh (2017) emphasized the importance of educational materials specifically designed to help patients understand medication adjustments during fasting (Grindrod & Alsabbagh, 2017).

2. The average pre-test score of 28.33 increased to 47.11 on the post-test, indicating substantial improvement in patient understanding. This finding is in line with research by Chaudhary et al. (2017), which showed that pharmaceutical counseling can dramatically improve patient understanding of medication management, especially for patients with chronic diseases (Chaudhary et al., 2017).
3. The decrease in standard deviation from 9.456 to 3.692 indicates that the homogeneity of knowledge has improved after the intervention. This decrease in variability shows a more uniform understanding among respondents, which is essential for consistent health behavior modification. Holst et al. (2022) highlighted that knowledge homogenization is crucial in public health interventions, as it suggests that educational strategies can effectively bridge individual knowledge gaps. These findings are significant in the context of health disparities, as indicated by Bates et al. (2019), who argue that standardizing health knowledge can lead to more equitable health outcomes across different segments of the population (Bates et al., 2018; Holst et al., 2022).
4. All respondents experienced an increase in knowledge scores, with varying percentages ranging from 4% to 72%, demonstrating nuanced intervention impacts. Such broad improvements suggest that educational approaches can be tailored to individual learning needs and backgrounds. Research by Abu et al. (2020) suggests that individual variation in knowledge acquisition is normal and can be influenced by factors such as prior health literacy, personal motivation, and learning style. The fact that even the lowest improvement was only 4% suggests minimal baseline effectiveness of the intervention across all participants (Abu et al., 2020).
5. The characteristics of respondents were dominated by women (55.56%), pre-elderly age group (61.11%), and low education (44.44%), with a primary diagnosis of hypertension (55.56%). These characteristics are consistent with the findings of Pintz et al. (2021), who noted that middle-aged women with chronic conditions often face unique healthcare communication challenges. The success of interventions across this demographic segment suggests a robust and adaptive educational approach. In addition, Lambert et al. (2021) emphasized the importance of tailoring health interventions to specific demographic groups, especially those with low educational backgrounds and chronic diseases. The current study shows the potential for effective knowledge transfer across population segments (Lambert et al., 2021; Pintz et al., 2021).

The effectiveness of pharmaceutical counseling accompanied by leaflets in improving patient knowledge is in line with several theories in the fields of health education and clinical pharmacy:

1. Health Communication Theory: This study confirms that effective health communication involving a combination of verbal (counseling) and visual (leaflet) communication can significantly improve patient understanding. The effectiveness of this combined approach is based on the principles of health communication, which emphasize the need for communication methods that are tailored to the needs and characteristics of the audience (Aghazadeh & Aldoory, 2023). The importance of this integrated approach is not only to help patients understand the information well but also to encourage them to make better decisions regarding their health.
2. Adult Learning Theory: This theory states that adults learn more effectively when information is presented in a way that is relevant to their situation and involves a variety of learning modalities. The combination of counseling and leaflets fulfills this principle by providing specific information about the use of drugs during fasting and involving auditory and visual modalities (Babb, 2022). Thus, this approach not only improves patients' understanding of treatment but also encourages their active involvement in the healthcare process.
3. Health Literacy Theory: This study demonstrates that the significant increase in knowledge in the low-education group supports the theory that educational interventions tailored to health literacy levels can reduce knowledge gaps across sociodemographic groups (Lazzeroni, 2020). Understanding the social and cultural context of the audience is also a key factor in designing effective educational interventions, which ensures that the messages delivered are genuinely received and understood.

Based on the results of the study, it can be interpreted that:

1. Pharmaceutical counseling accompanied by leaflets is an effective and practical intervention method for improving the knowledge of patients with chronic diseases about drug use during the Ramadan fast. This approach succeeded in significantly increasing patient understanding and standardizing the level of expertise among respondents.
2. The more significant increase in knowledge in respondents with low pre-test scores indicates that this intervention is very beneficial for patients with limited initial knowledge. These significant knowledge improvements show the potential for interventions to reduce the knowledge gap in the patient population.
3. The dominance of respondents with low education and the pre-elderly age category reflects the profile of patients who generally need special education about the use of drugs during fasting. Interventions tailored to these characteristics have proven effective in improving their understanding.
4. The decrease in the standard deviation of post-test scores indicates that the intervention not only improved overall knowledge but also narrowed the gap in understanding between respondents, creating a more uniform knowledge base for better medication management.
5. The success of this intervention has important clinical implications because adequate knowledge about the use of drugs during fasting can reduce the risk of treatment-related complications and improve therapy compliance in patients with diabetes and hypertension.

Overall, this study emphasizes the importance of a structured and patient-specific educational approach to improving knowledge about medication use during Ramadan fasting, especially for patients with chronic diseases such as diabetes and hypertension.

CONCLUSION

Community service activities in the form of pharmaceutical counseling accompanied by leaflets have succeeded in achieving their objectives in improving the health literacy of diabetes and hypertension patients related to drug use during fasting at the health center. The combined education method applied has proven to be an effective strategy to improve patient understanding of proper medication management during Ramadan. This approach is expected to support medication adherence and prevent unwanted health complications in patients with chronic conditions. Similar educational interventions could be recommended as part of routine health service programs at health centers to prepare patients for the fasting period.

SUGGESTION

Based on the results of this community service activity, it is recommended that pharmacy counseling, accompanied by leaflets, be implemented as a standard service in health centers for patients with diabetes and hypertension during Ramadan. A significant increase in knowledge (37.56%) indicates that this method is effective in overcoming the problem of drug use during fasting. Health centers should develop special counseling protocols and educational materials that are appropriate to patient characteristics, especially for low-educated and pre-elderly groups. Pharmacists' training in therapeutic communication techniques also needs to be improved. This counseling program should be integrated into routine pharmacy services, with special emphasis several weeks before Ramadan, to improve medication safety and therapy compliance for patients who choose to fast despite having chronic diseases.

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CONFLICTS OF INTEREST

The author declares that there is no conflict of interest in implementing and reporting this community service activity. There are no financial, consulting, institutional, or other relationships that could cause bias or conflict of interest in preparing and presenting the results of this activity.

AUTHOR CONTRIBUTIONS

The first and second authors jointly contributed to conceptualizing the research design, developing the study methodology, analyzing data, and drafting the scientific manuscript. The first author was primarily responsible for statistical data processing, interpreting research findings, and developing the conceptual framework. The second author specifically performed pharmaceutical counseling and leaflet distribution to respondents at the Kepanjenkidul Community Health Center. Both authors read, reviewed, and approved the final manuscript for publication.

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