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**RESEARCH**

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## Implementation of Telemedicine through "Apoteker Keluarga Online" Application as an Effort for Rational Headache Self-Medication

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### Abstract

People who seek self-medication for acute headaches in pharmacies are not properly diagnosed and treated. Irrational drug use has a high potential for causing medication errors. The AKO application is one of the digital counseling service apps managed by a pharmacist who has a strategic role in educating patients on self-medication behavior in telemedicine services. The objective of this study is to identify the benefits of AKO use in increasing rational self-medication behavior in headache complaints. It is a descriptive analysis study with a case-control design. The population is the Lamongan community who have had headache self-medication. Samples were taken by purposive sampling technique. A total of 130 participants were divided into two groups: the intervention group and the control group. A headache self-medication questionnaire was employed as the instrument. The collected data was then analyzed using the Mann Whitney test to determine the value of the AKO application in increasing knowledge of the rationality of self-medication in headache complaints. The data from the measurement of the level of knowledge of the rationality of headache self-medication revealed that the majority of the intervention group (92.3%) had good knowledge and none had poor knowledge. While there are still respondents with less knowledge (15.3%) in the control group. The statistical test results for the benefits of AKO application assistance on the level of knowledge of the rationality of headache self-medication revealed a p value = 0.000, indicating a significant difference between the intervention and treatment groups. The use of telemedicine via the AKO application can increase public awareness of the rational use of headache medications. Digital health services can be used as a medium for counseling and remote patient health monitoring.

**Keywords:** "Apoteker Keluarga Online", Headache, Self-Medication, Telemedicine.

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## 1. INTRODUCTION

Self-medication is an essential concern at the global level, and is a crucial issue in the health sector. Self-medication is implemented every day in the form of self-care for our health (Mathias et al., 2020). In practice, inappropriate self-medication not only places a burden on the patient, but it also leads to unfavorable health outcomes such as drug resistance, side effects, drug interactions, and even death (Octavia et al., 2019).

According to reports, more than 90% of the population suffers from headache disorders. Approximately half of all headache sufferers and one-third of migraine sufferers believe their condition does not necessitate medical attention. For acute headaches that have not been properly diagnosed and treated, people frequently seek self-medication in pharmacies (Brusa et al., 2019). Research in Arabia reported that almost all of the respondents 98.7% practiced self-medication, encompassing headaches, which was 75.9% (Alshahrani et al., 2019). (Mehuys et al., 2012) revealed a high prevalence of medication errors for headaches. Irrational drug use has a high potential for increasing the incidence of medication errors, intensifying the patient's burden and budget expenditures, as well as side effects and drug use interactions that increase the risk (Octavia, 2019). Migraines affect more than a billion people worldwide and require critical health care resources. The COVID-19 pandemic has prompted a rapid transition to virtual care (Noutsios et al., 2021). Therefore, telemedicine can be a solution for treating patients who experience headaches during the Covid-19 pandemic (Spina et al., 2022).

Telemedicine has the potential to provide affordable, high-quality healthcare. Several factors are considered to contribute to the success of telemedicine programs, encompassing financial sustainability, ease of use, and utilization of existing resources (Jha et al., 2021). Telemedicine reduces the use of personal protective equipment and prevents the spread of COVID-19 by implementing social distancing (Chiang et al., 2021). The *Apoteker Keluarga Online* (AKO) application is one of the digital counseling service applications managed by Pharmacist Agent of Change (Octavia & Susanti., 2022). Community pharmacists possess a strategic position in educating patients on self-medication behavior in telemedicine services (Mehuys et al., 2012). Pharmacists are one of the health professionals who can provide information about drug use (Octavia & Aisyah, 2019). The AKO application will allow the public to connect directly with pharmacists as drug service providers, as well as establish two-way communication. The objective of this study is to identify the advantages of AKO application in increasing rational self-medication behavior in headache patients.

## 2. RESEARCH METHOD

This research is survey research with descriptive analysis method with case-control design. The population in this study was the Dinoyo village community, Lamongan district who had performed self-medication for headache as many as 379. From the population data, the minimum sample size was calculated by employing the Slovin formula and the minimum sample was 120. Then, an additional 10% was added to anticipate sample drop outs or the data obtained in the research process is incomplete. Thus, the minimum number of respondents is 130 respondents. Purposive sampling was employed for gathering samples. People who had self-medicate for headache, were 18-64 years old, able to operate a smartphone, and willing to be a research participant as evidenced by informed consent were eligible for this study. The total sample of 130 participants was divided into two groups of 65 participants each. As the intervention group, the group that received education and assistance with digital counseling via the AKO application media, and the control group that did not receive assistance.

The instrument used was the Headache Self-medication questionnaire, which was filled out directly by the respondents online and contained 14 validated questions. Statistical analysis was administered on each question item by correlating the question item score with the total score. If the calculated  $r$  value  $>$   $r$  table value with  $\alpha = 5\%$ , the questions in the questionnaire are

declared valid. The value of  $r$  table for 30 respondents is 0.361. Based on the results obtained, it demonstrates that each item of the headache self-medication question has an  $r$  value that is greater than the  $r$  table, which is 0.4, hence, the question item is declared valid and can be employed for research. Each correct answer is provided a score of 1 and the correct answer is provided, incorrectly given a value of 0. The collected data was then analyzed using the Mann Whitney test to determine the value of the AKO application in increasing knowledge of the rationality of self-medication in headache complaints. The limitation of this study is that it does not assess the effectiveness of AKO application in increasing public awareness of rational headache self-medication. This research has gone through an ethical test and was declared ethically feasible with the ethical number 088/EC/KEPK-S2/06/2021 issued by the Health Research Ethics Commission of the University of Muhammadiyah Lamongan.

### 3. RESULTS AND DISCUSSION

The distribution of respondents (Table 1) shows that the total number of participants (N) who participated in this study was 130, divided into two groups of 65 participants each. The control group received no assistance with the AKO application, whereas the intervention group received digital counselling assistance with the AKO application. This study took place between June and October of 2021. The majority of the women in both groups were between the ages of 36 and 45.

**Table 1.** Characteristic of Respondent.

Demography	Intervention Group		Control Group	
	n	%	n	%
<b>Gender</b>				
Male	13	20%	15	23%
Female	52	80%	50	77%
Total	65	100%	65	100%
<b>Age (year)</b>				
18-25				
26-35	14	21.5%	12	18.4%
36-45	35	53.8%	29	44.6%
46-55	14	21.5%	21	32.3%
56-65	2	3%	3	4%
Total	65	100%	65	100%

The findings of the measurement of the level of knowledge of the rationality of headache self-medication (Table 2) reveal that the data are quite different, with the majority of the intervention group (92.3%) having good knowledge and none having poor knowledge. Meanwhile, there are still respondents with less knowledge (15.3%) in the control group.

**Table 2.** The Level of Knowledge of Headache Self-Medication.

Level of Knowledge	Intervention Group		Control Group	
	n	%	n	%
Good	60	92.3%	41	63%
Fair	5	7.6%	14	21.5%
Poor	0	0	10	15.3%
Total	65	100%	65	100%

**Table 3.** A Comparison of Headache Self-Medication between Intervention and Control Groups.

<b>Groups</b>	<b>Mean Rank</b>	<b>z</b>	<b>p</b>
Intervention (n=65)	75.38	-4.119	0.000
Control (n=65)	55.62		

The statistical test of the benefits of AKO application assistance on the level of knowledge of the rationality of headache self-medication (Table 3) revealed a p value = 0.000, indicating a significant difference between the intervention and control groups.

Headache disorders are regarded as common complaints among the general public. According to statistics, 90% of people have a headache episode at least once a year (Brusa et al., 2019). However, only 2.7% of migraine patients consulted a medical facility, and 59.4% of primary headache patients never consulted a doctor about their headaches (Suzuki et al., 2014). Therefore, most headache patients may cope with the pain by having over-the-counter medications (Mizusawa et al., 2013).

According to the findings, the majority of respondents were female. Migraine is more common in women and people with lower levels of education (Brusa et al., 2019). It is similar to the results of previous studies that the epidemiology of headaches occurs in the age range of 15-64 years and is common in middle-aged women in the range of 36-49 years. It is directly associated with daily life and socio-economic activities (Katsuki et al., 2022).

Self-medication behavior is frequently performed in cases of mild disease, one of which is headache. According to the study's findings, women were more dominant in self-medication for headaches because women paid more attention to their health conditions, so they would be cautious when doing self-medication and consuming the types of over-the-counter medicines used for self-medication. This is consistent with the findings of Karimy et al. (2019), who discovered that 76% of women had used self-medication in the past. Many of the reasons for self-medication stem from the belief that self-medication is considered harmless (41%), and that the symptoms experienced are not severe enough to necessitate special medical treatment (Karimy et al., 2019). It is different, in accordance with Tesfamariam et al., (2019) that the ease of accessibility factor underlies the behavior of people's self-medication in India (21.55%) (Tesfamariam et al., 2019). Age can also influence drug selection in the community for self-medication. The majority of respondents are over the age of 18. Adults use self-medication drugs more frequently because of the influence of activity-intensive factors that cause symptoms such as headaches to appear, necessitating the use of self-medication drugs to treat the disease they are experiencing, as opposed to adolescents who are physiologically stronger and thus use drugs less frequently.

Tesfamariam et al. (2019) explained that when people first started self-medication, pharmacists were the most sought after for information or instructions on how to use drugs (34.8%), followed by those who needed medical consultation from doctors (27.1%), others (21%) sought advice from friends and relatives, and the rest (3.4%) used the internet or mobile applications as a source of information. The level of knowledge of the intervention group who received assistance from pharmacists had a higher percentage of 'good' knowledge than the control group, indicating that public trust in the role of pharmacists is still quite high. Pharmacists who work in a variety of settings and health care facilities interact with patients either directly or indirectly. They can respond quickly to public health emergencies by developing professional service guidelines for pharmacists working in various health facilities, ensuring an effective drug supply system, monitoring and resolving drug shortage issues, establishing and promoting remote pharmacy services, counseling communities on basic infection prevention, and educating patients about proper use of personal protective equipment (Octavia & Utami, 2022). When people do not understand the role of pharmacists, the purpose of providing drug information may be incomplete and unclear, increasing the risk of medication

errors and reducing therapeutic goals achievement (Pratiwi et al., 2020). Provision of drug information can increase rationality in treatment (Inayatillah et al., 2023). At all levels of healthcare delivery, patients, healthcare professionals, regulators, and the pharmaceutical industry must work together to reduce the risk of medication errors (Octavia et al., 2021).

Self-medication for headaches necessitates the pharmacist's involvement in the selection of the appropriate self-medication. Research from Mourya et al., (2019), the most common symptoms experienced by the community are fever (31.55%) and headache (30%), so the use of over-the-counter drugs and over-the-counter drugs, including analgesics, which are the drug choices most frequently purchased by the public, is limited. In Pharmacies in India (Mourya et al., 2019) The level of public knowledge in general about the indications and how to use analgesics such as NSAIDs (Non Steroid Anti-Inflammatory Drugs) possesses a good level of knowledge, this also still requires pharmacist monitoring in the duration of analgesic use, to prevent risk of drug-related problems (Utami et al., 2020). Most people choose self-medication only to suppress disease symptoms, but research in the control group shows that there are still respondents who lack sufficient knowledge and understanding of the proper use of self-medication. Based on this, pharmacists are desperately needed in drug information and counseling services as in the research of Mourya et al., (2019). Almost 51.55% of respondents require counseling with pharmacists before deciding which self-medication drug to use.

Pharmacists have a professional responsibility to provide logical advice in the selection of rational self-medication so that it can have a positive impact on improving the patient's quality of life, which is supported by the provision of information on safe and appropriate drug use, such as drug indications, how long is the ideal time to use it, what is the dosing regimen, and when to stop the drug. Community pharmacists must also stay involved in coordinated and adaptive efforts to the necessary changes in pharmaceutical practice. It is critical to be aware of potential emergencies at the pharmacy at all times (Utami et al., 2021).

The AKO application was developed with the goal of educating the public on the benefits of rational self-medication. The AKO application facilitates two-way communication between pharmacists, agents of change, and members of the public who are connected to the WhatsApp application, allowing respondents to consult about drug-related issues. The availability of direct communication between pharmacists and respondents will make it easier for people to obtain appropriate drug use solutions from pharmacists. The study's findings show that the intervention group, which received treatment with education and assistance through applications, had a higher level of knowledge than the control group. The use of the AKO application is an online pharmacy service innovation that is implemented directly by pharmacists and is easily accessible at any time through the playstore. As is the case with mobile e-health which contains online medical services (telemedicine). E-health is an information and communication technology in the health sector. People will more easily understand and recognize various types of drugs, encompassing how to use drugs properly and correctly. Mobile applications make it easier for people to identify or access various information on their own medicines (Muzakir, 2018). Telemedicine has proven to be beneficial to the community because it reduces travel time and costs when compared to in-person consultations, particularly during the COVID-19 pandemic, which forces people to confine themselves to their homes or visit health facilities (Calton, Abedini & Fratkin, 2020), (Bashshur et al., 2020).

Telemedicine is already employed in most countries as a tool to enhance health services. There are shortcomings in the use of telemedicine such as technological barriers, it becomes a big problem when the application is implemented by people who are less savvy about technology (Scott Kruse et al., 2018). Telemedicine is now a modern health-care delivery system thanks to advancements in telecommunications technology. Telemedicine improves

services such as specialized care, patient consultation, remote patient monitoring, and health education without requiring patients to leave their homes. Telemedicine benefits include increased compliance, decreased anxiety, improved quality of life, and patient empowerment through active participation in their own illness management (Chen, 2017).

The importance of a pharmacist will be highlighted because this application includes self-medication educational materials that are useful in everyday life. Educational materials are packaged in a simple and straightforward manner, with categories for self-medication use at various ages ranging from child to elderly self-medication. DAGUSIBU provides basic drug education through its materials (how to get, use, store, and dispose of drugs). The community requires health information and education about drugs and how to choose the right drugs so that individuals and the community can participate in therapy and drug use decisions in order to achieve optimal results, improve quality of life, be more responsible for health, independent, and capable of rational and safe self-medication. Pharmacists can help to close current population health gaps, which can have a direct impact on patients' medication adherence and overall health status (Livet et al., 2021). The education will keep the community from promoting commercial drugs, which are widely disseminated on social media. In today's digital technology era, the community desperately needs education and assistance through applications. People will become more aware of the existence of pharmacists. Tele-pharmacy has the potential to improve pharmaceutical care service delivery by lowering medication errors, increasing access to health professionals and facilities in remote and rural areas, and reducing adverse drug events (Tegegne et al., 2023).

This study has limitations in conducting research, specifically limitations when testing information (assessment) from pharmacists to respondents; respondents frequently encounter obstacles in responding to assessment data needed by a pharmacist, so several assessments are required. To complete patient assessment data, it should take several form options and access options, such as video calls on the application page.

#### 4. CONCLUSION

The use of telemedicine via the AKO application can increase public awareness of the rational use of headache medications. Digital health services can be used as a medium for counseling and remote patient health monitoring.

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