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Analysis of Factors Influencing Self-Medication Behavior

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ABSTRACT

Self-medication is a practice of self-treatment that is increasingly common among the public as a response to limited access to health services, high medical costs, and the ease of obtaining medicines without a doctor's prescription. This study aims to analyze the factors that influence self-medication behavior, including knowledge, medical costs, drug advertisements, previous medical experiences, and advice from others. The research approach uses a quantitative method with a survey design. Data were collected through questionnaires from 219 respondents who had purchased drugs without a doctor's prescription, using purposive sampling techniques. Data analysis was performed using binary logistic regression. The results showed that all independent variables simultaneously had a significant effect on self-medication behavior. Partially, knowledge, medical costs, drug advertisements, previous medical experiences, and advice from others were proven to have a positive and significant effect on an individual's tendency to self-medicate. The research model has excellent predictive ability with an accuracy value of 91.8% and a Nagelkerke R Square value of 78.6%. These findings indicate that self-medication behavior is influenced by a combination of personal, economic, informational, and social factors. Therefore, continuous educational efforts and strengthening of regulations related to the use and promotion of drugs are needed to encourage safer and more responsible self-medication practices.

Keywords: *Self-medication, Drug Knowledge, Medical Costs, Drug Advertising, Consumer Behavior.*

1. INTRODUCTION

Self-medication is an increasingly common practice in society, especially in the context of limited access to healthcare. Self-medication without a doctor's prescription is often considered a practical solution to treat minor ailments. The World Health Organization (WHO) defines self-medication as the use of over-the-counter medicines, either from pharmacies or other sources, for the purpose of treating conditions deemed unnecessary for medical intervention [1]. This phenomenon is growing rapidly with increasing public awareness of health, but has also given rise to debate regarding its benefits and risks.

Self-medication is driven by various factors, including economic and social aspects, as well as the availability of drug-related information. The ever-increasing cost of healthcare services is one of the main reasons why people prefer self-medication over consulting a medical professional. Studies in Pakistan show that the majority of individuals prefer to purchase medications without a prescription due to perceived high and unaffordable healthcare costs [2]. Furthermore, easy access to medications without strict supervision also reinforces this practice.

Public knowledge about medications plays a crucial role in determining the safety and effectiveness of self-medication. Individuals who have a good understanding of medication types, dosages, and side effects tend to reduce the risk of medication errors. However, research in Sudan revealed that most people still have low levels of knowledge about the medications they take, increasing the potential for unwanted side effects [3]. Improper use of medications can lead to drug resistance, serious side effects, and even long-term health complications.

Drug advertising in various media is another factor contributing to the rise in self-medication. Promotional messages, which often portray drugs as quick and effective solutions, encourage people to purchase them without considering their long-term effects. Research in Indonesia showed that 86.3% of respondents admitted to using drugs after being exposed to television advertisements, indicating that advertising plays a significant role in shaping self-medication habits in the community [4]. Stricter regulations on drug advertising are needed to reduce the risk of inappropriate and excessive drug use.

Individual experience in managing illness is also a key reason why people choose to self-medicate. Many individuals choose to reuse medications that were previously effective in treating certain symptoms without considering that their health conditions may be different. A study in Jordan found that many people used antibiotics leftover from previous prescriptions or borrowed from friends and family without considering the potential for bacterial resistance and other side effects [5]. This practice risks worsening health conditions due to inappropriate use of medications.

Social factors, such as the influence of family and friends, also play a role in a person's decision to self-medicate. Often, recommendations from loved ones are used as the basis for choosing medications without consulting a medical professional. Research in India shows that advice from family or friends is the primary source of information for most individuals who self-medicate [6]. The lack of adequate health education makes people more susceptible to information that is not always accurate or relevant to their medical conditions.

The practice of self-medication has both advantages and risks that require careful consideration. In some cases, self-medication can provide benefits, such as efficiency in treating minor illnesses, reducing the burden on healthcare services, and increasing community independence in maintaining health. However, if carried out without adequate understanding, this practice carries the risk of dangerous side effects, unwanted drug interactions, and even drug abuse, which can worsen a person's health condition [1]. Therefore, a more thoughtful approach is needed to educate the public about safe self-medication.

The need for stricter regulations and widespread health education are crucial steps to reduce the risks of uncontrolled self-medication. The government and medical professionals have a role to play in raising public awareness about the importance of medical consultation before taking certain medications. Strengthening regulations regarding the distribution of over-the-counter drugs, monitoring drug advertising, and community-based health education programs can help reduce the number of medication errors. Awareness of the benefits and risks of self-medication is expected to encourage the public to be more selective and responsible in choosing self-medication to maintain optimal health.

2. LITERATURE REVIEW

2.1 Self-medication Behavior

Self-medication can be defined as "treatment carried out independently by a person, starting with awareness of the symptoms or symptoms affecting them, leading to the determination and use of medication" [7]. Husaini et al. (in Supriadi et al., 2021) define self-medication as the use of both modern and traditional medicines for self-treatment. [8] define self-medication as self-medication without a doctor's prescription. Based on the above definitions, self-medication can be defined as the process of self-treatment, whether modern or traditional, without a doctor's prescription [7]–[9].

2.2 Knowledge

Knowledge can be understood as a person's ability to recall or recognize various terms, words, inspirations, rules, and similar things [10]. Knowledge is a collection of information that is understood in the human mind regarding a matter, for example regarding disease, sanitation, health, natural disasters, and so on. In the context of self-medication behavior, drug knowledge is defined as an individual's understanding of drug use, including indications, dosage, side effects, and correct usage instructions, which is important to ensure safe and effective self-medication practices [11].

[12] stated that knowledge is related to self-medication behavior. Knowledge has a 67 percent influence [13]. [9] stated that knowledge about medications and health concerns will impact medication use. Based on this description, the following hypothesis can be proposed:

H1: Knowledge has a positive influence on self-medication behavior.

2.3 Medical Costs

According to [14], cost is defined as a measure of the resources a person is willing to give up or sacrifice. Meanwhile, [15] views cost as a sacrifice made to achieve a specific goal, the extent of which is measured through the expenditure or surrender of resources. In the context of self-medication, medical costs can be defined as the sacrifices made to provide treatment for oneself [14], [15].

One of the main reasons for the growing trend of self-medication is rooted in the high price of drugs and the high cost of treatment, coupled with limited educational guidance and knowledge in the health sector. This situation is exacerbated by the widespread distribution of drugs that are easily obtained in shops without a doctor's prescription and lax government oversight of drug distribution, the lack of adequate medical facilities, and the crushing poverty that grips society [16]. Based on analysis of data from the National Economic Census (Susenas) (2019), low-income individuals are more likely to self-medicate with analgesics.

So, the following hypothesis can be proposed:

H2: High medical costs have a positive effect on self-medication behavior.

2.4 Drug Advertisements in the Media

[17] emphasized that advertising can be an alternative means of communicating with the public and can produce positive results. [18] stated that advertising using social networking sites is a globally recognized business promotion method. According to [19], advertising can be understood as a form of persuasion that runs implicitly, based on the exposure of information regarding the advantages or superiority of a product. The Indonesian Advertising Society (MPI) states that advertising is a form of message disseminated to some or all levels of society through a medium. Based on this understanding, drug advertising can be interpreted as an effort of persuasion that takes place indirectly, based on information regarding the advantages contained in a drug product [19].

[17] state that advertising has several fundamental characteristics. Effective advertising needs to provide information in the form of images or audio, presented repeatedly to influence consumers. Messages that are consistently delivered and viewed by customers will influence and increase customer trust. A product is better

visualized in television advertising. Therefore, the presence of these advertisements can persuade people to purchase the promoted product.

One way people actively participate in maintaining their own health is through self-medication. One way people can learn about medicines is through television advertisements. People need information about medicines, and it must be accurate and logical when self-medicating. [8] suggest that television advertisements influence people's decisions about which medicines to use. Harahap et al. (2017) state that advertising plays a 17.3 percent role in encouraging self-medication behavior. Based on this explanation, the following hypothesis can be proposed:

H3: Advertising has a positive influence on self-medication behavior.

2.5 Previous Medical Experience

User experience is an indicator of a person's level of satisfaction with a system, product, or service. Marketers desire a user experience that satisfactorily meets customer needs without adding complexity or disruption. In their study, [20] stated that the majority of respondents self-medicated based on personal experience. This personal experience contributed 31.6 percent to self-medication behavior. [21] stated that a history of previous illnesses, along with recommendations from relatives and friends based on similar experiences, are among the driving forces that strengthen someone's decision to self-medicate. [8] stated that people's knowledge about self-medication is derived from personal experience, information from friends and/or family, and media sources, including internet and television advertisements. Based on this description, previous medical experience can be defined as a history of using medication to treat a previous illness [8], [21]. Therefore, the following hypothesis can be proposed:

H4: Previous medical experience has a positive effect on self-medication behavior.

2.6 Other People's Advice

One of the most important factors in consumer decision-making is word-of-mouth communication. [22] state that word-of-mouth communication refers to consumer-to-consumer communication about products from sources without commercial interests. Information provided by consumers is often perceived as more reliable and powerful than direct brand marketing messages. Customers tend to trust references and reviews from friends, family, or other users more than brand advertising or marketing. Based on this description, word-of-mouth can be defined as consumer-to-consumer communication about medicinal products without commercial interests [22].

In their research, [23] identified others' advice as a driving factor for self-medication. [20] corroborated [23] statement. In their research, [20] found that 29.2 percent of respondents self-medicated because of others' advice. Based on this reasoning, the following hypothesis can be proposed:

H5: Other people's suggestions have a positive influence on self-medication behavior.

2.7 Research Model

The relationship between the constructs studied can be shown in Figure 1.

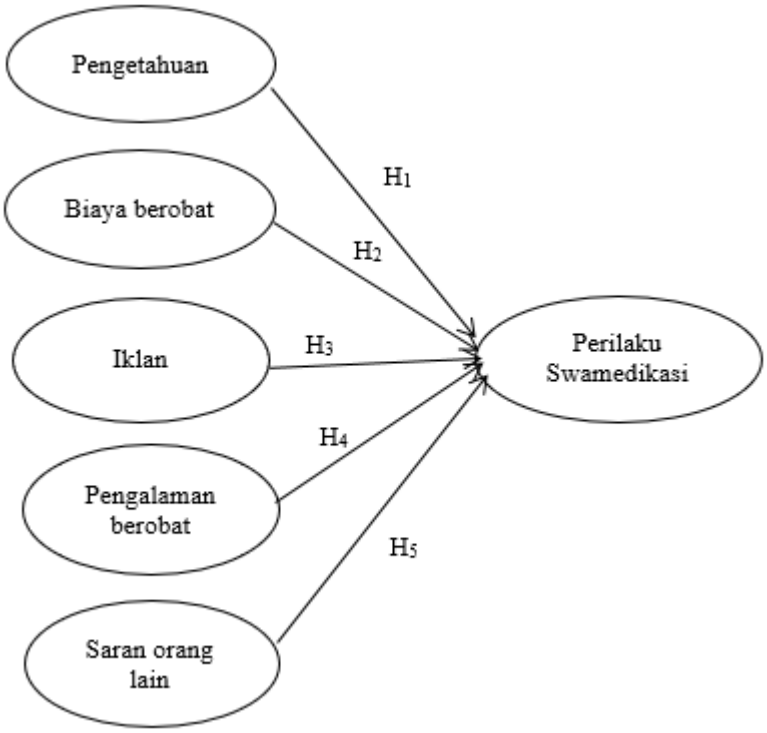

Figure 1. Research Model

The research model describes self-medication behavior as being influenced by knowledge, medical costs, drug advertising, medical experience and other people's advice.

3. METHODS

3.1 Research Design

This research approach is quantitative because it utilizes statistical analysis to test the relationships between variables in the model. The research design is a survey. This design was chosen because it produces high external validity. High external validity has consequences for the broad generalizability of research results.

3.2 Research Limitations

This study has several limitations set to clarify the scope of the study, ensuring more focused and relevant results. This study focuses on mild to moderate illnesses commonly treated through self-medication, such as flu, headaches, muscle aches, and mild digestive disorders. The focus of this study is directed at a variety of medications available without a doctor's prescription, including herbal remedies, over-the-counter pharmaceutical products, and various other forms of alternative medicine. The study's respondents included individuals from various social backgrounds, including those with and without health insurance.

3.3 Variable Measurement

Measurement of variables is done by creating operational definitions of each construct. Operational definitions contain elements of conceptual definitions, variable indicators, and measurement scales used. Self-medication behavior is measured using a dichotomous scale based on experience: (1) ever done self-medication (scored 1), (2) never done self-medication (scored 0). Knowledge is measured using a five-point Likert scale based on the following indicators: (1) Knowledge of drug indications, (2) Knowledge of recommended dosages, (3) Knowledge of drug

side effects, (4) Knowledge of drug usage rules, (5) Knowledge of drug contraindications. Medical costs are measured using a five-point Likert scale based on the following indicators: (1) Perception of drug prices, (2) Transportation costs to obtain drugs, (3) Health consultation costs, (4) Financial ability to purchase drugs, (5) Perception of the cost-effectiveness of self-medication compared to medical consultations. Drug advertising is measured using a five-point Likert scale based on the following indicators: (1) information role, (2) persuasion role to buy, (3) reminder role. Treatment experience was measured using a dichotomous scale based on experience: (1) drug performance exceeded expectations, (2) drug performance met expectations. Recommendations from others were measured using a five-level Likert scale, with the following indicators as the basis: (1) the influence of advice from family, (2) the influence of advice from close friends, (3) the influence of advice from colleagues or social circles, (4) the level of trust in other people's experiences in choosing drugs, (5) the frequency of receiving recommendations from others about drugs.

3.4 Instrument Testing

A questionnaire is considered valid if the factor loading value listed in the Rotated Component Matrix table reaches or exceeds 0.4 and is consistently extracted from a similar factor. Instrument reliability testing is carried out using the Cronbach Alpha (α) method. A questionnaire item is declared reliable if the Cronbach Alpha value exceeds 0.6.

3.5 Population and Sample

In this study, the population was all consumers who had ever purchased medication at a pharmacy without a doctor's prescription. The sample size ranged from 100 to 200 respondents. The sample was determined using purposive sampling, a conscious selection method by the researcher, who selected individuals deemed capable of providing information aligned with the research objectives.

3.6 Method of collecting data

The data sources in this study were obtained directly from the respondents' responses, namely by submitting a number of written questions to the study subjects that were closely related to the main problem to be studied. The determination of the value of each question used a Likert scale based on 5 points, namely: (Score 1) Strongly Disagree, (Score 2) Disagree, (Score 3) Quite Agree, (Score 4) Agree, (Score 5) Strongly Agree.

3.7 Data analysis

In this study, data analysis and hypothesis testing were conducted using logistic regression analysis with the inclusion of mediating variables. This study employed binomial logistic regression analysis, considering that the dependent variable was categorical data, indicating whether the respondent had ever undergone self-medication (scored 1) or never (scored 0). The results of the logistic regression analysis are shown in three outputs: model significance test (Hosmer and Lemeshow), partial regression coefficient significance test, and determination coefficient (Nagelkerke R Square).

4. RESULTS AND DISCUSSION

4.1 Sample Description

1. Sample Description by Gender

Respondent characteristics based on gender were classified into two categories: male and female. Details of the sample distribution by gender are presented in Table 1.

A significant difference in the number of respondents was observed by gender, with more female respondents than male. This finding suggests that women have a stronger tendency to self-medicate. This situation likely stems from women's relatively higher level of health awareness and

their tendency to independently search for and gather health information. This finding also demonstrates the importance of considering gender in analyzing self-medicating behavior, particularly in relation to the influence of knowledge, medical costs, drug advertising, medical experience, and advice from others.

2. Sample Description by Province of Domicile

Based on the respondent domicile distribution table, the majority of participants were from Java, representing 187 people, or approximately 85.39% of the total 219 respondents. This indicates that the study primarily recruited respondents residing on Java, known as the center of economic activity and the center of healthcare services in Indonesia.

The distribution of respondents, the majority of whom are from Java Island, may influence the characteristics of the self-medication behavior studied, considering that health access and culture in this area may be different compared to other regions.

3. Sample description by Age (Table 3)

No	Age	Amount	Percentage
1	17-25	100	45.66
2	26-35	116	52.97
3	36-45	3	1.37
	Total	219	100.00

The majority of respondents were recorded as being in the 26–35 age range, totaling 116 people (52.97%), followed by the 17–25 age group, at 100 people (45.66%). Meanwhile, only 3 respondents (1.37%) were in the 36–45 age range.

4. Sample description based on Education Level

The majority of respondents had a high school/vocational high school education (45.66%) and a bachelor's degree (39.27%). Respondents with a diploma (D3) and master's/doctoral degree (S2/S3) education accounted for 8.68% and 5.02%, respectively, while the fewest had a junior high school education (1.37%). This distribution demonstrates the variation in education levels that may influence self-medication behavior in this study.

5. Description of Respondent Responses in Variables

a. Distribution of Respondents' Responses on the Knowledge Variable

Based on the descriptive analysis results in the table above, it is clear that the majority of respondents have a high level of knowledge about drugs. This is indicated by the consistently high percentage of "Agree" and "Strongly Agree" responses across indicators PO.1 through PO.5. As shown in PO.2, 53% of respondents strongly agree and 35% agree. Meanwhile, low-level responses such as "Disagree" or "Strongly Disagree" almost never appear. Thus, it can be concluded that respondents have a good level of knowledge about drugs, which has the potential to positively influence their self-medication behavior.

b. Distribution of Respondents' Responses to the Medical Costs variable

The table above shows that the majority of respondents agreed or strongly agreed with all self-medication behavior indicators related to medical costs (BB.01 – BB.05). On average, more than 88% of respondents expressed a positive attitude towards these statements. For example, in indicator BB.01, 56% of respondents strongly agreed and 33% agreed, indicating that high medical costs are a major driving factor for self-medication. This data is consistent with other indicators, such as BB.03 and BB.05, which also show high levels of agreement.

c. Distribution of Respondents' Responses to the Treatment Experience Variable

Based on data on indicators PB.01 and PB.02 which measure the perception of danger towards self-medication, it was found that the majority of respondents stated that they agreed and strongly agreed.

d. Distribution of Respondents' Responses to the Other People's Suggestions variable

Based on data from the SO (Other People's Advice) indicator, the majority of respondents agreed or strongly agreed that advice from others influenced their decision to self-medicate. For item SO.05, 49% of respondents strongly agreed, the highest among the five items, indicating that respondents tended to follow the advice or experience of others in choosing or using medication independently. No respondents strongly disagreed, and only one respondent disagreed (for SO.01), strengthening evidence that interpersonal influence is an important aspect of people's self-medicating behavior.

4.2 Data Analysis Results

In this study, statistical analysis was conducted using binary logistic regression. This logistic regression involved four types of model testing: an overall model assessment (Overall Model Test), a goodness-of-fit test (Goodness-of-Fit Test), a coefficient of determination measurement, and a classification matrix analysis. All testing stages were conducted using Microsoft Excel and SPSS version 30 software.

It is known that the Hosmer and Lemeshow Goodness of Fit test produces a chi-square value of 7.259 with a significance level of 0.509. The test results show that the probability value (P-value) is equal to or greater than 0.05, namely $0.509 \geq 0.05$, so the null hypothesis (H_0) is accepted. This condition indicates that there is no significant difference between the model and empirical data, thus the regression model used in this study is considered appropriate and capable of predicting observational values.

The results of the logistic regression analysis obtained a coefficient of determination value, indicated by the Nagelkerke R Square, of 0.786. This value indicates that the independent variables consisting of knowledge, medical costs, drug advertising, medical experience, and advice from others are able to explain the dependent variable, namely self-medication behavior, by 78.6%. The remaining 21.4% is explained by other variables not included in this research model.

The logistic regression analysis revealed that the model's overall predictive ability for self-medication behavior was 91.8%. This means the model correctly predicted 91.8% of all cases. For the category of ever self-medicating (Y = 1), the model correctly predicted 155 out of 160 cases, resulting in a 96.9% accuracy rate for this category. For the category of never self-medicating (Y = 0), the model correctly predicted 46 out of 59 cases, resulting in a 78.0% accuracy rate. This demonstrates the model's excellent classification performance in predicting both categories of self-medication behavior, those who did and those who did not.

The Omnibus Tests of Model Coefficients test is used to simultaneously test whether all independent variables consisting of knowledge, medical costs, drug advertising, medical experience, and advice from others are able to influence the dependent variable, namely self-medication behavior.

Based on the results of the Omnibus test, the Chi-square value obtained was 170.648 with a degree of freedom (df) of 5 and a significance value (p-value) of 0.000.

Based on these results, it is concluded that the variables Knowledge (X1), Medical Costs (X2), Drug Advertising (X3), Medical Experience (X4), Advice from others (X5) have a simultaneous influence on Self-Medication Behavior (Y).

Referring to the results of the analysis of logistic regression, the logistic regression equation can be arranged and formulated as follows:

Y = -48.983 + 0.818 Knowledge + 0.372 Medical Costs + 0.437 Drug Advertisements + 0.778 Medical Experience + 0.519 Other People's Suggestions + e

4.3 Discussion

1. The Influence of Knowledge on Self-Medication Behavior

The analysis results show that the Knowledge variable has a significant effect on Self-Medication Behavior with a significance value of 0.000 and an Exp(B) value of 2.266. This means that individuals who have a better level of knowledge regarding drug use have a 2.266 times greater chance of self-medication compared to individuals with low knowledge. Knowledge has a very important role in shaping an action. The results of experience and research show that behavior based on knowledge tends to be more durable than behavior that is not based on knowledge [24]. This is also in line with the results of previous research conducted by [25]which showed that knowledge is a key factor in determining a person's attitude towards self-medication.

2. The Influence of Medical Costs on Self-Medication Behavior

The variable of Medical Cost also showed a significant influence with a significance value of 0.018 and Exp(B) = 1.451. This indicates that the higher an individual's perception of the cost of formal medical treatment (e.g., at a clinic or hospital), the greater their tendency to choose self-medication, which is 1.451 times greater. According to the WHO, as cited in [26], several factors that encourage self-medication behavior without a doctor's prescription, one of which is the cost of treatment. High costs make some people reluctant to go to health facilities and prefer to buy over-the-counter drugs as an alternative that is considered cheaper and more accessible. The increase in self-medication practices is influenced by various factors, one of which is the high cost of medical services that encourages people to choose self-medication as a solution that is considered faster and more affordable [27].

3. The Influence of Drug Advertising on Self-Medication Behavior

The Drug Advertising variable showed a significant effect with a significance value of 0.031 and Exp(B) = 1.547. This means that individuals who are intensively exposed to drug advertising are 1.547 times more likely to self-medicate. [28] stated that drug advertising influences people's decisions to purchase drugs and self-medicate. Attractive and convincing advertisements can encourage people to treat themselves without medical consultation because they are considered practical and fast. This is in line with research by [29] which stated that drug advertising influences self-medication behavior in the community.

4. The Influence of Medical Experience on Self-Medication Behavior

The variable Treatment Experience significantly influences self-medication behavior, with a significance value of 0.008 and Exp (B) = 2.177. This means that individuals with positive experiences in self-medication are 2.177 times more likely to self-medicate again. Past experiences that are considered successful, such as treating a minor illness with over-the-counter medication and achieving recovery, can strengthen a person's confidence to repeat the behavior in the future. This indicates that personal experience is a powerful form of social learning in habit formation. This aligns with research conducted by [30], which explains that previous experiences with similar symptoms are one of the reasons people choose to self-medicate.

5. The Influence of Advice from Others on Self-Medication Behavior

The variable Advice from Others also showed a significant effect, with a significance value of 0.002 and an Exp(B) value of 1.680. Thus, individuals who received advice from family, friends, or relatives regarding medication use were 1.680 times more likely to self-medicate. This is in line

with research conducted by [31], which stated that 72.9% of people used medication recommended by others.

From the overall discussion, it can be concluded that all independent variables in the model are the two most dominant factors that encourage individuals to choose self-medication.

CONCLUSION

The results of the study indicate that knowledge, medical costs, drug advertising, previous medical experience, and advice from others have a positive and significant influence on self-medication behavior, both partially and simultaneously. This research model has excellent predictive ability with an accuracy of 91.8% and a Nagelkerke R Square value of 78.6%, meaning that most of the variation in self-medication behavior can be explained by these five variables. These findings indicate that self-medication behavior in the community is the result of a combination of mutually reinforcing personal, economic, social, and informational factors, so that interventions to reduce the risk of self-medication need to consider all of these aspects in an integrated manner.

LIMITATIONS OF THE RESEARCH AND SUGGESTIONS FOR FUTURE RESEARCH

This study was limited to five key variables, and the majority of respondents resided on the island of Java, making the results less representative of all regions in Indonesia. The cross-sectional study design also limits understanding of changes in self-medication behavior over time. Future research is recommended to add additional variables, expand the scope, and use longitudinal methods for more comprehensive results.

MANAGERIAL IMPLICATIONS

The government needs to increase public education on the safe use of over-the-counter medications and tighten regulations on drug advertising in the media. Pharmacies and pharmacists must maximize their role as providers of accurate and easy-to-understand drug information. The pharmaceutical industry is expected to include clear usage information on packaging and prioritize responsible promotion.

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