

Original Research

# Factors Associated with Treatment Compliance among Hypertension Patients

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## ABSTRACT

**Background:** Hypertension, often referred to as a “silent killer,” is a major health problem because it frequently presents without symptoms. Poor adherence to antihypertensive treatment can lead to uncontrolled blood pressure, resulting in complications and damage to vital organs. This study aimed to identify factors associated with treatment compliance among hypertension patients in Pesisir Barat Regency in 2025. **Methods:** This quantitative research employed a cross-sectional design with data collected through questionnaires. The study involved hypertension patients aged 45–70 years and was conducted from February 20 to March 22, 2025. Data included demographic characteristics and factors related to treatment compliance. Bivariate analysis was conducted using the chi-square test, while multivariate analysis was performed using multiple logistic regression. **Results:** The duration of hypertension was not significantly associated with treatment compliance ( $p = 0.080$ ). In contrast, significant associations were found with knowledge about hypertension ( $p = 0.000$ ), motivation to seek treatment ( $p = 0.000$ ), family support ( $p = 0.002$ ), role of health workers ( $p = 0.000$ ), accessibility of health services ( $p = 0.001$ ), family history of hypertension ( $p = 0.008$ ), and treatment history ( $p = 0.005$ ). **Conclusion:** Several factors were identified as significantly influencing treatment compliance, with the role of health workers emerging as the most dominant factor. Strengthening the role of health workers, alongside family-based interventions and improved access to health services, is recommended to enhance treatment compliance among hypertension patients.

**Keywords:** Therapeutics; hypertension; compliance; treatment

## 1. INTRODUCTION

Health is a multidimensional state encompassing physical, mental, spiritual, and social well-being, enabling individuals to live productively both socially and economically. Hypertension is one of the most significant public health challenges worldwide. According to the World Health Organization,<sup>(1)</sup> an estimated 1.28 billion adults aged 30–79 years suffer from hypertension, an increase from 1 billion cases in 2019. Hypertension is a major risk factor for cardiovascular disease, stroke, kidney failure, and premature death, accounting for approximately 10.8 million deaths annually or 19% of global mortality.<sup>(1)</sup>

In Indonesia, the Basic Health Research reported a sharp rise in non-communicable diseases (NCDs). The prevalence of hypertension among adults  $\geq 18$  years increased from 25.8% to 34.3%. Alarmingly, only 42.6% of hypertensive patients were aware of their condition, and just 27.5% had controlled blood pressure. Similar upward trends were also observed for other NCDs such as diabetes, asthma, stroke, and kidney failure, compounded by

sedentary lifestyles and inadequate fruit and vegetable intake. This situation not only worsens the national health burden but also escalates healthcare costs and demands advanced technology.<sup>(2)</sup>

At the provincial level, Lampung has seen a consistent increase in hypertension prevalence. In 2020, the prevalence was 28.7%, rising to 30.2% in 2021, 32.4% in 2022, and 34.8% in 2023.<sup>(3-5)</sup> This figure exceeds the 2018 national average of 34.1%.<sup>(6)</sup> Within Lampung, Pesisir Barat Regency ranks fifth among 15 regencies/cities with the highest prevalence. The number of hypertension cases increased from 12,347 in 2021 to 13,892 in 2022, and further to 15,618 in 2023.<sup>(7)</sup>

Hypertension is often referred to as a “silent killer” because it frequently develops without symptoms.<sup>(8)</sup> While it commonly occurs in older adults, several studies indicate that hypertension can also emerge during adolescence, with prevalence increasing in recent years. If not properly managed, adolescent-onset hypertension often persists into adulthood, raising the risk of morbidity and mortality. Adherence to antihypertensive medication is essential to prevent complications and maintain stable blood pressure. Hypertensive patients are usually required to take daily medication for life, regardless of whether symptoms are present. Non-adherence can lead to uncontrolled blood pressure, therapeutic failure, and long-term damage to vital organs.<sup>(9)</sup>

Family support plays a critical role in ensuring adherence. Patients who receive adequate support demonstrate better self-care and improved treatment outcomes than those who lack such support.<sup>(10)</sup> Family support may take the form of emotional encouragement, reminders to take medication, or assistance with accessing health services. Sulistyorini and Saputri (2024) highlighted four dimensions of family support: emotional, instrumental, informational, and appraisal support.<sup>(11)</sup> However, findings remain inconsistent. For example, Wu et al. (2019) reported that family support and duration of illness were not significantly associated with adherence in hypertensive patients.<sup>(12)</sup>

Several other studies also highlight multiple factors influencing adherence. Prihatin et al. (2022) found that education level, duration of hypertension, knowledge about hypertension, family support, health worker roles, and motivation significantly influenced adherence ( $p < 0.05$ ), while gender, employment status, health insurance, and healthcare access showed no significant association.<sup>(13)</sup> Similarly, Pratiwi et al. (2020) reported that education ( $p = 0.024$ ), socio-economic status

( $p = 0.002$ ), knowledge ( $p = 0.001$ ), and motivation ( $p = 0.015$ ) were associated with adherence, while residential status, healthcare accessibility, and family support were not.<sup>(14)</sup> These discrepancies suggest that adherence is a multifactorial issue, and the impact of individual factors may vary across populations.

A pre-survey in Pesisir Barat Regency further demonstrated the urgency of the problem. The prevalence of hypertension was 37.2% in 2023, higher than the provincial average of 34.8%. At the Krui Health Center, 2,534 individuals (37.8%) aged  $\geq 15$  years were diagnosed with hypertension, with 2,590 patients receiving health services. The Krui Health Center serves a population of 19,225, with 13,913 residents aged  $\geq 15$  years and 8,569 in the productive age group (15–59 years). Of these, 4,892 individuals had been reached by health programs in 2023. Krui Health Center operates through eight posbindu (community-based health posts), distributed across six villages and two sub-districts. Hypertension cases recorded at these posbindu included 26 patients in Seray Village, 21 in Pahmungan Village, 20 in Way Redak, 18 in Pasar Krui, and smaller numbers in Rawas, Pasar Kota, Kampung Jawa, and Sukanegara villages.<sup>(5)</sup>

These findings emphasize that adherence is a crucial determinant of hypertension management, especially since patients require long-term therapy. Non-adherence remains influenced by multiple and sometimes inconsistent factors such as age, gender, education, occupation, duration of illness, motivation, and family support. This variability highlights the importance of conducting localized research to identify context-specific determinants. This study is particularly important because hypertension continues to rise globally, nationally, and locally. Known as a “silent killer,” it can cause devastating complications—including stroke, kidney failure, and heart disease—if not properly controlled. In Pesisir Barat Regency, the upward trend in cases underscores the need for targeted interventions and effective adherence strategies.<sup>(7)</sup>

The purpose of this study was to identify factors influencing medication adherence among hypertensive patients, focusing on variables such as knowledge, motivation, family support, role of health workers, healthcare accessibility, family history, and medication history. This research provides novelty by concentrating on Pesisir Barat, a region with limited prior studies, while emphasizing the role of health workers as a dominant factor affecting adherence. The results are expected to

inform the design of community-based health interventions, improve primary healthcare services, and guide future research in chronic disease management, particularly hypertension.

## 2. METHODS

### 2.1 Study Design

This study used a quantitative approach with a cross-sectional design to determine the relationship between various factors and compliance with treatment among hypertension patients in Pesisir Barat Regency in 2025.

### 2.2 Study Location and Period

The research was conducted in the working areas of three health centers: South Krui, Krui, and Karya Penggawa. Data collection was carried out from February 24 to March 20, 2025, with specific periods being February 24–28, 2025 in South Krui, March 1–7, 2025 in Krui, and March 8–20, 2025 in Karya Penggawa.

### 2.3 Study Population and Sample

The study population included all hypertension patients aged 45–70 years who were recorded at the health centers in the selected areas. The sample size was determined using the proportion formula, resulting in 106 respondents. Inclusion criteria were hypertension patients aged 45–70 years who visited health services, were able to communicate effectively, and were willing to participate. Exclusion criteria were patients with cognitive impairment, severe mental disorders, or critical conditions.

### 2.4 Data Collection

Data were collected through structured interviews using a questionnaire that had been tested for validity and reliability. The questionnaire covered demographic data and study variables, including knowledge, motivation, family support, role of health workers, accessibility of health services, family history of hypertension, and treatment history.

### 2.5 Data Analysis

Data analysis was conducted in two stages. First, univariate analysis was used to describe respondent characteristics. Second, bivariate analysis with the chi-square test was used to examine associations between variables. Finally, multivariate analysis with multiple

logistic regression was performed to identify dominant factors related to medication adherence.

### 2.6 Ethical Considerations

Ethical approval for this study was obtained from the Health Research Ethics Committee of Mitra Indonesia University, under approval number 001/UMI/KEPK/2025. Written informed consent was obtained from each respondent prior to data collection. Researchers ensured confidentiality and privacy by not including names or personal identifiers in the research report.

## 3. RESULTS

### Respondents Characteristics

Frequency distribution of duration of hypertension, knowledge, motivation, family support, role of health workers, accessibility, family history, treatment history, and treatment compliance in Pesisir Barat Regency have been represented in Table 1. Most respondents had hypertension for  $\leq 5$  years (53.3%). Longer illness duration is often associated with declining adherence as patients feel bored or perceive themselves as healthy despite their condition.<sup>(15)</sup> Thus, prolonged disease duration may lower motivation for regular treatment. Knowledge levels were almost evenly distributed, though slightly more patients had poor knowledge (51.5%). Patients with good knowledge tend to understand disease risks and treatment benefits, which supports adherence.<sup>(16)</sup> Other studies confirm that better knowledge is linked to higher treatment compliance.<sup>(17)</sup> Lack of awareness remains a barrier in this population.

More than half of respondents reported low motivation (52.1%). Motivation is shaped by internal drive and external encouragement, particularly from family. Puspita (2016) found that 91% of patients with high motivation also had strong family support.<sup>(16)</sup> This suggests that interventions should address both personal and social factors to enhance motivation. Low family support was reported by 52.7% of respondents. Family involvement provides informational, emotional, and instrumental assistance that encourages adherence. Patients without adequate support may feel neglected, reducing their willingness to follow treatment plans. Similar findings were reported by another study, where low family support was common and negatively influenced adherence.<sup>(18)</sup>

**Table 1.** Frequency distribution of duration of hypertension, knowledge, motivation, family support, role of health workers, accessibility, family history, treatment history, and treatment compliance in Pesisir Barat Regency, 2025

Variable	Category	Frequency (n)	Percentage (%)
Long-term Hypertension	≤ 5 years	89	53.3
	> 5 years	78	46.7
Knowledge	Good	81	48.5
	Poor	86	51.5
Motivation to Seek Treatment	High	80	47.9
	Low	87	52.1
Family Support	High Support	79	47.3
	Low Support	88	52.7
Role of Health Workers	Good	84	50.3
	Bad	83	49.7
Accessibility	Close	67	40.1
	Far	100	59.9
History of Hypertension	Has History	69	41.3
	No History	98	58.7
Treatment History	> 2 years	68	40.7
	≤ 2 years	99	59.3
Treatment Compliance	Full Compliance	73	43.7
	Non-Compliant	94	56.3

Half of the respondents perceived the role of health workers as good (50.3%). Health workers are the primary source of disease information and provide essential counseling, service quality, and motivation.<sup>(19)</sup> Studies show that respectful, communicative health workers positively influence treatment behavior.<sup>(16)</sup> Thus, improving patient-provider interactions may enhance compliance. Most respondents (58.7%) had no family history of hypertension. A positive family history often raises awareness and motivates individuals to seek regular care. Conversely, the absence of such history may reduce perceived susceptibility. KC et al. (2023) also found family history to be common among hypertensive patients, indicating hereditary and behavioral influences.<sup>(20)</sup>

The majority of respondents (59.3%) had been on treatment for ≤ 2 years. Shorter treatment duration was associated with lower adherence, as reported in prior studies. Over time, patients may better understand treatment routines, though prolonged therapy can also risk boredom. More respondents were non-compliant (56.3%) than compliant (43.7%). Compliance requires consistent medication use and follow-up visits, which many patients fail to maintain. National data also show high rates of non-adherence among hypertensive patients.<sup>(6)</sup> These findings highlight the urgent need for interventions targeting behavioral, social, and system-level barriers to adherence.

### *Factors Influencing Treatment Compliance among Hypertension Patients*

This study investigated various factors influencing treatment compliance among hypertension patients aged 45–70 years in Pesisir Barat Regency. The analysis combined all studied variables into one summary, including duration of hypertension, knowledge, motivation, family support, role of health workers, accessibility of health services, family history of hypertension, and treatment history. The results revealed that most of these factors were significantly associated with treatment compliance, except for the duration of hypertension, which showed no significant relationship.

The duration of hypertension did not demonstrate a significant association with compliance ( $p = 0.080$ ). Although patients with a disease duration of more than five years tended to be less compliant, this relationship was not statistically significant. This suggests that treatment adherence is not solely determined by how long patients have lived with hypertension. Over time, some patients may experience “treatment fatigue” or frustration when they do not observe significant health improvements, which can reduce adherence. This finding is consistent with studies by Dhrik et al. (2023) and Pratiwi et al. (2020), which also reported no significant relationship between duration of illness and compliance.<sup>(14,21)</sup> However, other research, such as that of

Hamrahan et al. (2022), has suggested that shorter illness duration may improve compliance because patients are more fearful and curious during the early stages of diagnosis.<sup>(22)</sup> Thus, the role of time in shaping compliance

appears complex and may be influenced by patient perceptions, health education, and continuous support from the health system.

**Table 2.** Relationship between various factors and treatment compliance of hypertension patients

Variable	Treatment Compliance		Total	p-value	OR (95% CI)
	Compliant n (%)	Non-Compliant n (%)			
Duration of Hypertension				0.080	–
≤ 5 years	45 (50.6)	44 (49.4)	89		
> 5 years	28 (35.9)	50 (64.1)	78		
Knowledge				0.000	7.99
Good	55 (67.9)	26 (32.1)	81		
Poor	18 (20.9)	68 (79.1)	86		
Motivation				0.000	3.34
High	47 (58.8)	33 (41.3)	80		
Low	26 (29.9)	61 (70.1)	87		
Family Support				0.002	2.83
High	45 (57.0)	34 (43.0)	79		
Low	28 (31.8)	60 (68.2)	88		
Role of Health Workers				0.000	26.31
Good	64 (76.2)	20 (23.8)	84		
Poor	9 (10.8)	74 (89.2)	83		
Accessibility				0.001	3.00
Near	40 (59.7)	27 (40.3)	67		
Far	33 (33.0)	67 (67.0)	100		
Family History				0.008	2.44
Yes	39 (56.5)	30 (43.5)	69		
No	34 (34.7)	64 (65.3)	98		
Treatment History				0.005	2.57
> 2 years	39 (57.4)	29 (42.6)	68		
≤ 2 years	34 (34.3)	65 (65.7)	99		

In contrast, knowledge was strongly associated with compliance ( $p = 0.000$ ;  $OR = 7.99$ ). Patients with poor knowledge were nearly eight times more likely to be non-compliant with treatment compared to those with good knowledge. This highlights the critical role of awareness and understanding in shaping health behaviors. Patients who lack information about the risks of uncontrolled hypertension, the importance of regular medication, and potential complications are more prone to neglect their treatment. Therefore, health education interventions should remain a cornerstone of hypertension management programs. Motivation also significantly influenced treatment compliance ( $p = 0.000$ ;  $OR = 3.34$ ). Respondents with low motivation were more than three times as likely to be non-compliant compared to those with higher motivation. Motivation reflects patients' willingness and internal drive to follow medical advice, maintain healthy lifestyles, and consistently take

medication. Hypertension is often asymptomatic, which makes it challenging for patients to stay motivated since they may not feel ill even when their blood pressure is uncontrolled. Wu et al. (2019) argued that high motivation serves as a psychological driver that sustains long-term adherence, while low motivation leads to neglect and treatment discontinuation.<sup>(12)</sup> Thus, strategies to enhance motivation—such as regular counseling, motivational interviewing, and peer support programs—may help sustain adherence over time.

Family support was another significant factor related to compliance ( $p = 0.002$ ;  $OR = 2.83$ ). Respondents with low family support were nearly three times more likely to be non-compliant. Family members often play a key role in reminding patients to take medication, providing emotional encouragement, accompanying them to health facilities, and ensuring healthy dietary practices at home. Studies by Burnier (2024) and Luo et

al. (2024) confirm that supportive families contribute to higher adherence rates, particularly in chronic conditions requiring long-term treatment.<sup>(23,24)</sup> When family support is lacking, patients may feel isolated or less accountable, resulting in irregular medication intake. Hence, involving families in health education and treatment planning may improve compliance outcomes.

The role of health workers emerged as the most dominant factor in this study ( $p = 0.000$ ;  $OR = 26.31$ ). Respondents who perceived the role of health workers as poor were 26 times more likely to be non-compliant compared to those who viewed it positively. This finding underscores the central role of healthcare providers in ensuring adherence. Effective communication, clear instructions, regular follow-up, and supportive attitudes from health workers enhance patient trust and encourage compliance. Conversely, inadequate counseling, limited interaction, or negative experiences with health services may discourage patients from adhering to treatment regimens. Therefore, continuous training and capacity building for health workers are essential to strengthen patient-centered care. Accessibility of health services was also significantly associated with compliance ( $p = 0.001$ ;  $OR = 3.00$ ). Patients who lived farther from health facilities were three times more likely to be non-compliant than those residing nearby. Distance, transportation costs, and travel time may become barriers to regular check-ups and timely medication refills. Safitri et al. (2019) and Pratiwi et al. (2021) similarly reported that poor accessibility reduces healthcare utilization, leading to treatment gaps. Ensuring equitable distribution of health services, improving transportation support, and strengthening community-based health delivery systems could help overcome this barrier.<sup>(14,25)</sup>

Family history of hypertension also played a role in compliance ( $p = 0.008$ ;  $OR = 2.44$ ). Patients without a family history of hypertension were more likely to be non-compliant compared to those with a family history. One possible explanation is that individuals with a family history may have witnessed the health consequences of uncontrolled hypertension in relatives, making them more aware of the importance of treatment adherence. On the other hand, those without such experience may underestimate the seriousness of the disease, leading to non-compliance. This emphasizes the importance of patient education regardless of family background, to ensure all individuals understand the potential risks of hypertension. Lastly, treatment history was significantly related to compliance ( $p = 0.005$ ;  $OR = 2.57$ ). Patients with

shorter treatment history ( $\leq 2$  years) were 2.5 times more likely to be non-compliant than those with longer treatment history. This suggests that patients who have been in treatment for longer may develop a habit of taking medication regularly and recognize its importance. However, prolonged treatment may also lead to treatment fatigue in some cases, highlighting the need for ongoing monitoring and support. Overall, this study shows that treatment compliance in hypertension patients is a multifactorial issue, shaped by individual, family, and health system factors. The most influential determinant was the role of health workers, which indicates that strengthening healthcare delivery and patient-provider relationships can have the greatest impact on improving adherence. In addition, improving knowledge, enhancing motivation, increasing family involvement, ensuring accessible services, and tailoring interventions based on treatment history are all essential strategies for addressing non-compliance. These findings are in line with previous research and provide valuable insights for local health authorities in designing targeted interventions to reduce hypertension complications in Pesisir Barat Regency.

### *Multivariate Analysis of Factors Influencing Treatment Compliance*

Based on Table 3, the subvariable duration of hypertension ( $p = 0.058$ ) was excluded from the multivariate test because its  $p$  value was  $> 0.25$ . The remaining subvariables—family history of hypertension, history of hypertension treatment, role of health workers, access to health services, knowledge, motivation, and family support—were included in the next stage since their  $p$  values were  $< 0.25$ .

At the second stage (Table 4), the role of health workers ( $p = 0.000$ ) and accessibility of health services ( $p = 0.022$ ) remained significant ( $p < 0.05$ ). Subvariables with  $p$  values  $> 0.05$ —family history, treatment history, knowledge, motivation, and family support—were removed from the model.

Only the role of health workers remained significant ( $p = 0.000$ ), and therefore was included in the final model (Table 5). The final multivariate model identified the role of health workers as the most influential factor in treatment compliance. Patients who perceived good support from health workers were 23.8 times more likely to adhere to hypertension treatment compared to those with poor support ( $OR = 23.795$ , 95%  $CI: 9.917-57.087$ ,  $p < 0.05$ ).

Table 3. Multivariate first stage

Sub-variables	p-value	Description
Duration of hypertension	0.058	Not suitable for multivariate model
Family history of hypertension	0.006	Suitable for multivariate model
History of hypertension treatment	0.004	Suitable for multivariate model
Role of health workers	0.001	Suitable for multivariate model
Affordability of access to health services	0.001	Suitable for multivariate model
Knowledge of hypertension	0.000	Suitable for multivariate model
Motivation to seek treatment	0.000	Suitable for multivariate model
Family support	0.000	Suitable for multivariate model

Table 4. Second stage multivariate

Sub-variables	B	Wald	Sig	OR	CI 95%
Family History of Hypertension	0.108	0.004	0.947	1.114	0.045 - 27.771
History of Hypertension Treatment	-2.500	1.523	0.217	0.082	0.002 - 4.353
Role of Health Workers	4.378	22.040	0.000	79.658	12.809 - 495.402
Affordability of Access to Health Services	2.817	5.211	0.022	16.721	1.489 - 187.742
Knowledge of Hypertension	-0.817	0.783	0.376	0.442	0.072 - 2.701
Motivation to Seek Treatment	-0.680	0.293	0.588	0.507	0.043 - 5.932
Family Support	0.052	0.002	0.964	1.053	0.113 - 9.848

Table 5. Multivariate third and final stage

Sub-variable	B	Wald	Sig	OR	CI 95%
<b>Multivariate Third Stage</b>					
Role of health workers	3.169	50.383	0.000	23.795	9.917 - 57.087
Affordability of Access to Health Services	0.378	0.778	0.378	1.459	0.630 - 3.376
<b>Multivariate Final Stage</b>					
The role of health workers	3.169	50.383	0.000	23.795	9.917 - 57.087

The final multivariate model identified the role of health workers as the most influential factor in treatment compliance. Patients who perceived good support from health workers were 23.8 times more likely to adhere to hypertension treatment compared to those with poor support (OR = 23.795, 95% CI: 9.917–57.087,  $p < 0.05$ ). These findings are consistent with Prasetya et al. (2024), who reported a significant relationship between health workers' roles and compliance among hypertensive outpatients ( $p = 0.015$ ). The professional interaction between health workers and patients provides feedback, explains causes and treatments, and ensures patient understanding. Supportive communication, prompt treatment, and clear explanations about medication contribute to patient satisfaction and regular health service visits. Health workers' attitudes and behaviors—such as friendliness, good communication, timely service, and clear instructions on medication use—strengthen patients' positive behaviors and increase adherence. Thus, the role of health workers is a critical determinant

of compliance with hypertension treatment in this population.

### Limitations

This study has some limitations. The cross-sectional design restricts the ability to establish causal relationships between the identified factors and treatment compliance. The study was also conducted in a single district, which may limit the generalizability of the findings to broader populations. In addition, self-reported responses from patients may be subject to recall bias or social desirability bias. Future studies with larger, more diverse populations and longitudinal designs are recommended to validate and expand these findings.

## 4. CONCLUSION

This study concludes that most of the examined factors are significantly associated with treatment compliance among hypertension patients in Pesisir Barat

Regency in 2025. These factors include knowledge of hypertension, motivation to seek treatment, family support, the role of health workers, accessibility of health services, family history of hypertension, and treatment history. In contrast, the duration of hypertension did not show a significant relationship. The key finding highlights that the role of health workers is the most dominant factor influencing compliance, with an Exp(B) value of 23.79. These results strongly support the study's objective by confirming that several factors contribute to treatment compliance in hypertension patients.

As a recommendation, strengthening the role of health workers in educating and assisting hypertension patients on a continuous basis is essential, for example through home visits and community-based counseling programs. Family-based interventions are also needed to enhance emotional and instrumental support for patients. Local governments, particularly the Health Office, should improve access to health services and ensure the sustainable availability of antihypertensive drugs. Future research is recommended to adopt a longitudinal design and consider additional variables such as dietary compliance, physical activity, and psychological well-being to gain a more comprehensive understanding.

### Ethical Approval

Ethical approval for this study was obtained from the Health Research Ethics Committee of Mitra Indonesia University (approval number 001/UMI/KEPK/2025).

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### Competing Interests

All the authors declare that there are no conflicts of interest.

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### Underlying Data

Derived data supporting the findings of this study are available from the corresponding author on request.

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