

Original Research

# Influence of Knowledge, Motivation, and Family Support on Iron Supplement Adherence Among Pregnant Women for Anemia Prevention at a Public Health Center in Bojonegoro, Indonesia

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## ABSTRACT

**Background:** Maternal Mortality Rate (MMR) is a crucial indicator for evaluating the success of a country's health development. In Indonesia, MMR remains high at 97.61 per 100,000 live births in 2020, falling short of the Sustainable Development Goals (SDGs) target of 70 per 100,000 live births by 2030. One contributing factor to this high rate is anemia during pregnancy. This study aims to analyze the influence of knowledge, motivation, and family support on pregnant women's adherence to consuming ferrous iron supplements as a preventive measure against pregnancy-related anemia in the working area of Kalitidu Public Health Center, Bojonegoro Regency. **Methods:** An analytical observational design with a cross-sectional approach was employed. The sample consisted of 167 pregnant women in their first, second, and third trimesters who agreed to participate. Data were collected through questionnaires and document reviews, and analyzed using multiple logistic regression tests. **Results:** Most respondents demonstrated adequate knowledge (89.3%), good motivation (87.3%), and strong family support (86.7%). Statistical analysis revealed a significant influence of knowledge, motivation, and family support on adherence to iron tablet consumption ( $p < 0.05$ ). **Conclusion:** Educational interventions and social support play a vital role in improving compliance with iron supplementation, thereby reducing the prevalence of anemia and supporting the achievement of national MMR reduction targets.

**Keywords:** Knowledge; motivation; family support; ferrous iron tablet; consumption compliance

## 1. INTRODUCTION

Maternal Mortality Rate (MMR) is one of the most critical indicators of a nation's health development success. It reflects the effectiveness of maternal healthcare services and the accessibility of preventive and curative interventions during pregnancy and childbirth. Indonesia continues to face a high MMR, ranking second among Southeast Asian countries.<sup>(1)</sup> In 2020, the national MMR reached 97.61 per 100,000 live births, which remains above the global Sustainable Development Goals (SDGs) target of 70 per 100,000 live births by 2030. According to the Ministry of Health, maternal deaths in Indonesia increased from 4,221 cases in 2019 to 4,627 cases in 2020.<sup>(2)</sup>

In Bojonegoro Regency, the leading causes of maternal death in 2019 included preeclampsia/eclampsia (30.77%), hemorrhage (30.77%), infection (3.85%), cardiac conditions (7.69%), and other comorbidities (26.92%). Anemia during

pregnancy is a significant contributing factor to maternal mortality and remains a pressing public health nutrition issue.<sup>(3)</sup> It is characterized by a deficiency in red blood cells or hemoglobin, resulting in inadequate oxygen transport to meet physiological needs. Data from Kalitidu Public Health Center show an increasing trend in anemia among pregnant women, rising from 6.7% in 2021 to 9.3% in 2022.<sup>(4)</sup>

To address this issue, the Indonesian Ministry of Health recommends the consumption of 90 iron tablets (ferrous supplements) during pregnancy.<sup>(5)</sup> The effectiveness of iron supplementation depends largely on the adherence of pregnant women to the recommended regimen. Despite widespread distribution, poor compliance may limit the impact of supplementation programs on reducing anemia prevalence.<sup>(6)</sup> Iron tablets are essential for meeting the increased iron requirements during pregnancy, but their benefits are only realized when consumed consistently.<sup>(6)</sup>

Adherence to iron supplementation is influenced by several factors, including knowledge, personal motivation, and family support. Adequate knowledge enables pregnant women to understand the importance of iron intake, while intrinsic motivation and social support foster regular consumption habits.<sup>(6)</sup> Given the persistently high maternal mortality rate and the increasing incidence of anemia-related complications, this study aims to analyze the influence of knowledge, motivation, and family support on pregnant women's adherence to iron tablet consumption as a preventive measure against anemia in the working area of Kalitidu Public Health Center, Bojonegoro Regency.<sup>(4)</sup>

This study aims to examine the determinants of pregnant women's adherence to consuming ferrous iron tablets as a preventive measure against pregnancy-related anemia at Kalitidu Public Health Center, Bojonegoro Regency. Specifically, it investigates the influence of maternal knowledge regarding the benefits and importance of iron supplementation on adherence levels, explores the role of maternal motivation in sustaining consistent tablet consumption, and evaluates the contribution of family support in enhancing compliance with iron supplementation programs. By analyzing these three factors, the research seeks to provide a comprehensive understanding of the primary determinants of adherence among pregnant women, thereby offering an evidence-based foundation for the development of more effective and sustainable public health interventions in anemia prevention.

## 2. METHODS

This study employed an analytical observational design with a cross-sectional approach, aiming to examine the relationship between independent variables and pregnant women's adherence to iron supplementation. The research was conducted over a five-month period, from May to September 2025. Ethical approval of this study had been obtained from the research ethics committee of Politeknik Kesehatan Kementerian Kesehatan Surabaya with the reference number EA/3798/KEPK-Poltekkes\_Sby/V/2025.

The study population consisted of 294 pregnant women in their first, second, and third trimesters residing in the working area of Kalitidu Public Health Center, Bojonegoro Regency. A total of 167 pregnant women who met the inclusion criteria and agreed to participate were selected as research respondents.

Inclusion criteria for this study included: 1) Willingness to participate in the study; and 2) Pregnant women in their first, second, or third trimester residing in the Kalitidu Public Health Center area.

A simple random sampling technique was used to select participants. Data collection was carried out using structured questionnaires and direct field observations. Types of data included: a) Primary data, which was collected through questionnaires administered directly to respondents and through direct observation; b) Secondary data, which were obtained from existing official records and documents available at the research site, namely Kalitidu Public Health Center, Bojonegoro Regency. These documents included maternal health records, antenatal care reports, and administrative archives related to iron tablet distribution and compliance monitoring.

The collected data were analyzed using multiple logistic regression to determine the influence of knowledge, motivation, and family support on pregnant women's adherence to consuming ferrous iron tablets for the prevention of pregnancy-related anemia at Kalitidu Public Health Center. The software used was: SPSS (Statistical Package for the Social Sciences).

## 3. RESULTS

### 3.1 Study Site Description

Kalitidu Public Health Center is a primary healthcare facility operating under the Bojonegoro District Health Office. It provides general health services

on weekdays and offers mental health consultations every Tuesday and Thursday from 08:00 to 12:00. The center is located on Bojonegoro–Cepu Highway, Brenggolo Village, Kalitidu Subdistrict, Bojonegoro Regency.

### 3.2 Univariate Analysis

Based on Table 1, among the 167 respondents, the majority were aged between 20 and 35 years (91.01%), reflecting a predominance of women in the reproductive age group. Most respondents had completed secondary education at the high school level (51.50%), and a significant proportion were privately employed (89.22%). In terms of family characteristics, 60.47% of respondents had fewer than two children, while 48.50% were primigravida, indicating their first pregnancy. Furthermore, birth spacing was predominantly distributed between less than two years and more than ten years (53.30%). These demographic characteristics provide an essential contextual foundation for analyzing the factors that influence pregnant women's adherence to iron supplementation programs during pregnancy.

**Table 1.** Description: characteristics of respondents (n=167)

Characteristic and category	Frequency	Percentage
Mother's age		
<20 years	3	1.79
20–35 years	152	91.01
>35 years	12	7.20
Mother's education		
Elementary school	2	1.20
Junior high school	29	17.36
Senior high school	86	51.50
Bachelor's degree	50	29.94
Mother's occupation		
Farmer	14	8.38
Private sector	149	89.22
Civil servant/military	4	2.40
Number of children		
≤2	101	60.47
>2	66	39.53
Parity		
Primigravida	81	48.50
Multigravida	75	44.92
Grandemulti	11	6.58
Pregnancy interval		
2–10 years	78	46.70
<2 – >10 years	89	53.30

### 3.3 Variable Description

This section presents the distribution of key independent variables—knowledge, motivation, and family support—and their relationship with the dependent variable, namely adherence to ferrous iron tablet consumption among pregnant women at Kalitidu Public Health Center, Bojonegoro Regency. Table 2 shows that the majority of respondents (89.3%) demonstrated adequate knowledge regarding iron tablet consumption for anemia prevention. Table 2 also indicates that the majority of respondents (87.3%) exhibited high levels of motivation to adhere to ferrous iron tablet consumption for anemia prevention.

**Table 2.** Influence of pregnant women's knowledge and motivation on adherence to ferrous iron tablet consumption for anemia prevention at Kalitidu Public Health Center, Bojonegoro Regency (n = 167)

Variable	Non-compliant		Compliant	
	n	%	n	%
<b>Knowledge</b>				
Fair	32	84.2	6	15.8
Average	3	10.7	25	89.3
Good	15	14.9	86	85.1
<b>Motivation</b>				
Low motivation	37	56.1	29	43.9
Good motivation	13	12.9	88	87.1

Table 3 reveals that the majority of respondents (86.7%) reported receiving strong family support in relation to iron tablet consumption for anemia prevention.

**Table 3.** Influence of family support on pregnant women's adherence to ferrous iron tablet consumption for anemia prevention at Kalitidu Public Health Center, Bojonegoro Regency (n = 167)

Family support	Disobey		Obey	
	n	%	n	%
Lack of support	35	64.8	19	35.2
Good support	15	13.3	98	86.7

### 3.4 Multivariate Analysis

Table 4 demonstrates that, based on partial multivariate analysis, the variables of knowledge, motivation, and family support significantly influence pregnant women's adherence to ferrous iron tablet consumption ( $p < 0.05$ ). Among these, motivation

emerged as the most dominant factor, with the highest Wald value (13.133), indicating its strong predictive

power in shaping compliance behavior at Kalitidu Public Health Center, Bojonegoro Regency.

**Table 4.** Multivariate logistic regression analysis of the influence of knowledge, motivation, and family support on pregnant women's adherence to ferrous iron tablet consumption at Kalitidu Public Health Center, Bojonegoro Regency (n = 167)

B	S.E.	Wald	df	Sig.	Exp(B)			
Knowledge	0.964	0.287	11.261	1	0.001	2.621	1.493	Significant
Motivation	1.666	0.460	13.133	1	0.000	5.290	2.149	Significant
Family support	1.535	0.500	9.424	1	0.002	4.639	1.742	Significant
Constant	-6.308	1.082	34.010	1	0.000	0.002		

Table 5 illustrates the direct and indirect relationships among family support, knowledge, motivation, and adherence to ferrous iron tablet consumption. Structural model analysis demonstrates that motivation is the strongest direct driver of adherence to ferrous iron tablet consumption ( $T = 4.006, p < 0.001$ ), while family support acts as a foundational factor by significantly enhancing knowledge ( $T = 8.361, p < 0.001$ ).

Furthermore, knowledge acts as a critical intermediary, influencing both motivation ( $T = 2.760, p = 0.006$ ) and compliance ( $T = 3.842, p < 0.001$ ), with family support also providing a significant direct effect on compliance ( $T = 3.290, p = 0.001$ ). Motivation emerged as a key determinant of compliance behavior, underscoring the importance of internal drive in shaping health-related actions among pregnant women.

**Table 5.** Model 1 illustrates the direct and indirect relationships among variables

Variables	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics ( O/STDEV )	p-values
Family support → Compliance	0.264	0.271	0.080	3.290	0.001
Family support → Knowledge	0.561	0.564	0.067	8.361	0.000
Family support → Motivation	0.157	0.167	0.094	1.663	0.097
Knowledge → Compliance	0.322	0.319	0.084	3.842	0.000
Knowledge → Motivation	0.264	0.256	0.096	2.760	0.006
Motivation → Compliance	0.267	0.260	0.067	4.006	0.000

The structural model analysis, as presented in Table 6, reveals significant relationships among the studied variables. Family support was found to have a highly significant positive influence on knowledge ( $T = 8.389, p < 0.001$ ) and exerted a significant direct effect on compliance with ferrous iron tablet consumption ( $T = 3.433, p = 0.001$ ). This suggests that reinforcement from family members not only enhances the subjects' understanding but also directly drives adherence to the treatment. Furthermore, knowledge significantly

predicted both motivation ( $T = 4.897, p < 0.001$ ) and compliance ( $T = 3.936, p < 0.001$ ), indicating that a well-informed individual is more likely to be motivated and diligent in their supplement intake. Finally, motivation emerged as a critical determinant of compliance, showing a strong significant effect ( $T = 3.973, p < 0.001$ ). These findings demonstrate that family support and knowledge serve as fundamental precursors that strengthen motivation, ultimately leading to higher adherence to ferrous iron supplementation.

**Table 6.** Path coefficient diagram for Model 2, illustrating the strength and direction of relationships among the variables

Variables	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics ( O/STDEV )	p-values
Family support → Compliance	0.264	0.262	0.077	3.433	0.001
Family support → Knowledge	0.561	0.563	0.067	8.389	0.000
Knowledge → Compliance	0.322	0.329	0.082	3.936	0.000
Knowledge → Motivation	0.352	0.356	0.072	4.897	0.000
Motivation → Compliance	0.267	0.259	0.067	3.973	0.000

## 4. DISCUSSION

Based on the demographic data collected from 167 respondents, the majority (91.01%) were within the ideal reproductive age range of 20–35 years. This age bracket is widely recognized in obstetric literature as optimal for pregnancy and childbirth due to several physiological and psychological factors.<sup>(7)</sup> Women aged 20–35 typically exhibit lower obstetric risk profiles compared to those in younger or older age groups. At this stage, the uterus is biologically mature and well-prepared to support gestation.<sup>(8)</sup> Additionally, women in this age range generally possess greater emotional stability and mental readiness, which are crucial for managing the demands of pregnancy, childbirth, and postpartum care. Their capacity to nurture both themselves and their newborns is often more developed, contributing to better maternal and neonatal outcomes.<sup>(9)</sup>

The data revealed that a majority of respondents (51.50%) had completed secondary education, corresponding to the high school level. This level of education plays a pivotal role in shaping health-related knowledge, attitudes, and practices, particularly in maternal and child health contexts.<sup>(10)</sup> Secondary education equips individuals with foundational literacy and critical thinking skills that enhance their ability to access, understand, and apply health information. Women with high school education are more likely to engage in antenatal care, recognize early warning signs during pregnancy, and adhere to recommended health behaviors.<sup>(11)</sup> Moreover, they tend to have greater autonomy in making informed decisions regarding reproductive health and family planning.

The findings indicate that a significant proportion of respondents (89.22%) were privately employed. This high percentage reflects the active participation of women in the formal workforce, which may influence various aspects of health, particularly in the domains of reproductive and maternal health.<sup>(12)</sup> Private sector employees often experience structured work routines accompanied by time constraints and occupational stress, which can affect their health-seeking behaviors.<sup>(13)</sup> These factors may lead to delays in attending antenatal care visits or limited participation in health education programs. However, employment in the private sector is also frequently associated with higher educational attainment and access to healthcare benefits, such as employer-provided health insurance. These advantages can enhance awareness, facilitate timely access to medical

services, and promote adherence to recommended health practices.<sup>(14)</sup>

The data indicates that 60.47% of respondents had fewer than two children, suggesting that the majority were either primiparous (first-time mothers) or had limited parity. This demographic profile has important implications for maternal health services and reproductive health education.<sup>(15)</sup> Women with fewer children often exhibit higher levels of engagement with antenatal care services, particularly during their first pregnancy, due to heightened awareness and concern for maternal and fetal outcomes.<sup>(16)</sup> Primiparous women may also experience increased anxiety and require more comprehensive support and counseling throughout the pregnancy and postpartum period. Their health-seeking behavior tends to be more proactive, especially when supported by adequate education and access to healthcare facilities.<sup>(17)</sup>

From a public health perspective, the predominance of low-parity respondents presents an opportunity to strengthen early maternal health interventions.<sup>(18)</sup> Tailored educational programs focusing on birth preparedness, newborn care, and family planning can be particularly effective for this group. Moreover, understanding the needs and challenges faced by women with fewer children can inform policies aimed at improving maternal and child health outcomes across different parity levels.

The study revealed that 48.50% of respondents were primigravida, indicating that nearly half of the participants were experiencing their first pregnancy. This finding is significant, as primigravida women often present unique clinical and psychosocial needs compared to multiparous women.<sup>(19)</sup> First-time mothers are generally more susceptible to anxiety and uncertainty due to unfamiliarity with the physiological and emotional changes associated with pregnancy. They may require more intensive antenatal education, emotional support, and guidance throughout the gestational period. Additionally, primigravida status has been associated with a higher risk of certain obstetric complications, such as prolonged labor, preeclampsia, and cesarean delivery, necessitating closer monitoring and individualized care plans.<sup>(20)</sup>

The study found that 53.30% of respondents reported birth spacing ranging from less than 2 years to over 10 years. This wide variation in interpregnancy intervals reflects diverse reproductive choices and circumstances, each with distinct implications for

maternal and child health. Short birth intervals, particularly those less than 2 years, have been associated with increased risks of adverse outcomes such as preterm birth, low birth weight, and maternal nutritional depletion. These risks arise due to insufficient time for maternal physiological recovery and limited resources for optimal infant care. Conversely, extended birth spacing beyond 10 years may also present challenges, including increased maternal age-related risks and potential complications during subsequent pregnancies.<sup>(21)</sup> Promoting optimal birth spacing—typically recommended between 2 to 5 years—can contribute to improved health outcomes for both mothers and children. Health systems should prioritize counseling on birth interval planning, ensuring that women are empowered with knowledge and access to contraceptive options that support informed reproductive decisions.<sup>(22)</sup>

The findings show that the majority of respondents (89.3%) demonstrated adequate knowledge regarding iron tablet consumption for anemia prevention. This result aligns with recent research conducted by Aisyah Diani et al. (2024) from Universitas Airlangga, which found that knowledge and positive attitudes significantly influence adherence to iron supplementation among adolescent girls.<sup>(23)</sup> Good understanding of the benefits of iron tablets, appropriate timing of consumption, and awareness of potential side effects are key factors in improving compliance. Another study by Winarni et al. (2024), published in *The Open Public Health Journal*, also supports this finding, emphasizing that effective school-based education can enhance adolescent girls' awareness of iron supplementation as a strategy to prevent anemia.<sup>(24)</sup>

The consistency between this study and previous research highlights the positive impact of health education interventions delivered by healthcare providers and educational institutions. These efforts form a strong foundation for strengthening iron supplementation programs, particularly among women of reproductive age and adolescents.<sup>(25)</sup> Knowledge is the result of recalling past experiences—whether intentional or unintentional—following observation or sensory perception of a particular object, which can become a critical component in shaping behavior. This concept underscores the importance of knowledge in determining compliance with iron tablet consumption, particularly among pregnant women.<sup>(26)</sup>

Adequate knowledge enables expectant mothers to understand how to properly consume iron tablets,

recognize their benefits, and be aware of the potential consequences of non-compliance.<sup>(27)</sup> This includes understanding the role of iron supplementation in preventing anemia, supporting fetal development, and maintaining maternal health during pregnancy. When women are well-informed, they are more likely to adhere to recommended practices and integrate iron-rich foods into their daily diet.<sup>(28)</sup> Research by Krisdai et al. (2022) found a significant relationship between knowledge and compliance with iron tablet consumption among pregnant women in the Poasia Health Center area.<sup>(29)</sup> Similarly, Hamzah et al. (2021) emphasized that knowledge about iron tablets influences dietary behavior, particularly in selecting foods rich in iron to support supplementation efforts.

The finding that 87.3% of respondents demonstrated high levels of motivation to adhere to ferrous iron tablet consumption for anemia prevention reflects a promising trend in public health behavior. Motivation is a critical determinant of adherence to preventive health measures, particularly in the context of micronutrient supplementation.<sup>(30)</sup> This result suggests that the majority of individuals surveyed possess a strong internal drive to maintain their health and prevent iron-deficiency anemia, which remains a prevalent issue in many developing regions.<sup>(31)</sup> A study by Wulandari et al. (2022) demonstrates that structured and continuous health education can enhance motivation and adherence to iron tablet consumption among pregnant women.<sup>(32)</sup>

Several factors may contribute to this elevated level of motivation. First, health awareness and education play a pivotal role; increased knowledge regarding the consequences of anemia and the clinical benefits of iron supplementation significantly shapes positive health attitudes and behaviors. Furthermore, support from healthcare providers—including regular counseling, consistent follow-up, and professional encouragement—serves to enhance patient motivation and reinforce the necessity of adherence to the supplement regimen. Additionally, social and cultural influences, such as robust family support, peer encouragement, and community-based health campaigns, contribute to the normalization of iron tablet consumption, transforming it into a socially reinforced behavior.<sup>(30)</sup>

Findings revealed that the majority of respondents (86.7%) reported receiving strong family support regarding iron tablet consumption for anemia prevention, underscoring the critical role of familial influence in shaping health behaviors. Family support

functions as a powerful external motivator, particularly in preventive health practices that require consistent adherence, such as micronutrient supplementation.<sup>(33)</sup> These results align with recent studies emphasizing the importance of social and familial environments in promoting compliance with iron tablet intake. For example, emotional and logistical support from spouses and parents positively influenced pregnant women's adherence to iron supplementation programs.<sup>(34)</sup> The primary support system for providing direct care in both healthy and ill conditions is the family. For pregnant women, the most essential source of support is the husband. The types of support that families, especially husbands, can provide include informational, emotional, instrumental, and appraisal support.<sup>(35)</sup>

The impact of family support on adherence can be explained through several key mechanisms. First, emotional reinforcement from family members—such as encouragement, a sense of security, and shared responsibility—serves to strengthen internal motivation and reduce resistance to supplementation. Second, family involvement provides practical assistance, where tangible aid like reminders to take tablets, help in accessing healthcare services, and support in managing potential side effects directly facilitates adherence. Finally, family support exerts a normative influence; when healthy behaviors, such as consistent supplement intake, are integrated into the household routine, individuals are more likely to adopt and sustain these behaviors over the long term.<sup>(33)</sup>

This finding highlights that family support significantly enhances knowledge and motivation, which in turn positively influences adherence.<sup>(36)</sup> Motivation emerges as the strongest direct predictor of adherence, underscoring the importance of internal drive in shaping health behaviors.<sup>(37)</sup> The impact of family support on adherence can be explained through several key mechanisms. First, emotional reinforcement from family members, such as encouragement, a sense of security, and shared responsibility, serves to strengthen internal motivation and reduce resistance to supplementation. Second, family involvement provides practical assistance, where tangible aid like reminders to take tablets, help in accessing healthcare services, and support in managing potential side effects directly facilitates adherence. Finally, family support exerts a normative influence; when healthy behaviors, such as consistent supplement intake, are integrated into the household routine,

individuals are more likely to adopt and sustain these behaviors over the long term.<sup>(33)</sup>

These findings reinforce that family support and intrinsic motivation are essential components in the success of preventive health interventions, particularly iron supplementation for anemia prevention.<sup>(36)</sup> Family involvement acts as a behavioral reinforcer, not only through emotional encouragement but also by facilitating access to health information and resources. This multidimensional support strengthens individuals' understanding of anemia and the importance of consistent supplementation, promoting a more proactive approach to health maintenance.<sup>(33)</sup>

Motivation stands out as the most powerful direct predictor of adherence, affirming the role of internal drive in shaping health behavior. When individuals possess high levels of intrinsic motivation—driven by personal health goals, perceived benefits, and self-confidence—they are more likely to comply with preventive interventions. This aligns with health behavior theories such as the Health Belief Model and the Theory of Planned Behavior, which emphasize the role of personal beliefs and intentions in determining health actions.<sup>(30)</sup>

Furthermore, the synergistic effect between family support and motivation suggests that psychosocial factors should be prioritized in public health strategies. Interventions that combine education with family-based approaches have the potential to yield higher adherence rates and more sustainable health outcomes. These findings are consistent with recent research identifying family dynamics and motivational constructs as key determinants of success in anemia prevention programs.<sup>(36)</sup>

## 5. CONCLUSION

This study reveals that knowledge, motivation, and family support play a crucial role in enhancing pregnant women's adherence to ferrous iron tablet consumption at community health centers (*Puskesmas*). Adequate knowledge, strong motivation, and robust family support significantly contribute to improved compliance. Among these factors, family support emerged as the most dominant influence on adherence behavior. Further studies are recommended to employ a longitudinal design to observe changes in adherence behavior from early to late pregnancy stages and explore additional psychosocial factors such as stress levels, trust

in healthcare providers, and cultural beliefs that may influence adherence to iron supplementation.

### Ethical Approval

Ethical approval of this study had been obtained from the research ethics committee of Politeknik Kesehatan Kementerian Kesehatan Surabaya with the reference number EA/3798/KEPK-Poltekkes\_Sby/V/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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