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A Wall Magazine of Postpartum Mothers' Health Literacy on Anemia at the Bangetayu Community Health Center, Genuk District

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ABSTRACT

Purpose of the study: This study aimed to map the level of health literacy related to anemia among postpartum mothers at the Bangetayu Community Health Center, Genuk District, Semarang City, focusing on mothers' knowledge, understanding, and awareness of anemia prevention and management during the postpartum period.

Methodology: A descriptive quantitative study with a cross-sectional design was conducted involving 30 postpartum mothers selected through purposive sampling. Data were collected using a validated and reliable questionnaire consisting of 28 items assessing knowledge of postpartum anemia. Univariate data analysis was performed using SPSS version 21 to generate frequency distributions and percentages.

Main Findings: The results showed that most postpartum mothers had a sufficient level of knowledge regarding anemia (76.7%), while 16.7% had good knowledge and 6.7% had poor knowledge. Respondents generally understood the definition, causes, and symptoms of anemia; however, misconceptions persisted regarding iron supplementation duration, nutritional sources of iron, and the long-term impact of anemia on maternal health.

Novelty/Originality of this study: This study provides a structured health literacy mapping of postpartum mothers related to anemia at the primary healthcare level, which has rarely been explored in previous studies. The findings offer practical evidence to support the development of targeted, context-based health education interventions to improve postpartum anemia prevention and maternal health outcomes.

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1. INTRODUCTION

The postpartum period is a crucial phase that begins after the delivery of the placenta and continues until the reproductive organs return to their pre-pregnancy state, typically lasting around six weeks. During this period, mothers are vulnerable to various complications, one of which is postpartum hemorrhage, which can trigger anemia, especially if the hemoglobin level is below 7 g/dL [1]-[3]. Anemia during the postpartum period can cause symptoms such as decreased consciousness, weakness, and impaired vital signs [4]. Given the complexity of this condition, it is crucial for postpartum mothers to have sufficient knowledge to recognize the risks of anemia early on to enable optimal and sustainable recovery, leading to maternal well-being [5]-[7].

The maternal mortality rate (MMR) during the postpartum period still dominates the proportion of cases in Indonesia, including in Central Java, where 67% of deaths occurred after childbirth in 2022 [8]. This fact indicates that the postpartum period is the period most vulnerable to serious complications, with approximately

60% of maternal deaths occurring after delivery, and nearly half of these occurring within the first 24 hours. Postpartum visits are a crucial strategy for early detection of complications and ensuring mothers receive adequate healthcare. However, the effectiveness of these visits is greatly influenced by the level of postpartum maternal health literacy regarding the risk of anemia and an understanding of the importance of ongoing monitoring during the recovery period.

In efforts to prevent anemia complications, the role of health workers, families, and the surrounding community is crucial [9]-[10]. Postpartum mothers are recommended to consume 90 iron supplements, maintain a nutritious diet, and conduct postpartum visits according to standards. Unfortunately, certain cultural conditions, such as Javanese dietary restrictions (*mutih*), often compromise maternal nutritional adequacy and increase the risk of anemia [11], [12]. Furthermore, the WHO reports a relatively high prevalence of postpartum anemia globally, reaching 56% in 2021 [13]. National data also shows an increasing trend in maternal mortality and high rates of anemia in postpartum mothers. Therefore, maternal knowledge about anemia is a fundamental aspect in reducing the risk of postpartum complications and promoting successful maternal health management.

Several previous studies have shown that maternal knowledge is a significant factor influencing the incidence of anemia during the postpartum period. That low knowledge regarding healthy foods and anemia prevention correlates with increased cases of anemia in postpartum mothers, particularly among those with low levels of education [14]-[16]. Another study at the katumbangan community health center also identified social, economic, educational, and health literacy factors as contributing to the high rate of postpartum anemia [17]-[20]. However, most of this research focuses on socio-behavioral factors; few have comprehensively mapped the portrait of postpartum maternal health literacy related to anemia at the health facility level, particularly in urban areas like Semarang City. This gap in research highlights the need for more in-depth explanation.

This research gap highlights the need for more specific studies on how postpartum maternal health literacy including understanding, awareness, and anemia prevention practicesplays a role in the likelihood of complications. Furthermore, preliminary data from the Bangetayu Community Health Center indicates a postpartum anemia rate of 44%, but no research has yet mapped how postpartum maternal knowledge contributes to this high rate [21]-[23]. This is novel in that the research not only describes the prevalence of anemia but also conducts a structured mapping of health literacy, which can form the basis for more targeted educational interventions. Thus, there is an urgency to further examine the role of postpartum maternal health literacy on anemia risk in the local context of the bangetayu community health center (*Puskesmas*).

Based on this urgency, this study aims to map the portrait of postpartum maternal health literacy regarding anemia at the bangetayu community health center, genuk district, Semarang City. This mapping includes aspects of maternal knowledge, understanding, and awareness regarding anemia prevention and management during the postpartum period. The research results are expected to provide a basis for healthcare workers in designing more effective, needs-based educational strategies, so that postpartum anemia prevention efforts can be more targeted and have a real impact in reducing complications and improving maternal health.

2. RESEARCH METHOD

2.1 Research design

The type of research conducted in this study was descriptive quantitative. Descriptive research is research conducted to determine the existence of independent variables, either in one or more variables, without making comparisons or linking them to other variables [25], [26]. This descriptive quantitative research type was chosen because the researcher wanted to understand the knowledge of postpartum mothers about anemia in the Bangetayu Community Health Center Work Area. This study used a cross-sectional design. According to a cross-sectional study is a study to study the dynamics of the correlation between risk factors and effects, using a single approach, observation, or data collection at a single point in time [27]. This means that each research subject is only observed once, and measurements are taken of the subject's character status or variables at the time of the examination.

2.2 Research subjects

The population is the entire research object or objects being studied. These objects can be humans, animals, plants, other inanimate objects, as well as events and phenomena that occur in society or in nature [28]. The population of this study was 151 postpartum women attending their first visit, between 6 hours and 2 days after delivery. A sample is a subset of the population's size and characteristics. If the population is large, and researchers cannot study all members of the population, for example due to limited funds, manpower, or time, then they can use a sample drawn from that population [26]. Therefore, the sampling technique for this study was purposive sampling. Purposive sampling is a sampling technique that considers predetermined criteria. The purposive sampling criteria for this study were postpartum women living in the work area of the Sangatayu

Semarang Community Health Center, postpartum women who were willing to participate, and postpartum women who were willing to participate.

2.3 Research procedure

The research procedure is shown in the diagram below:

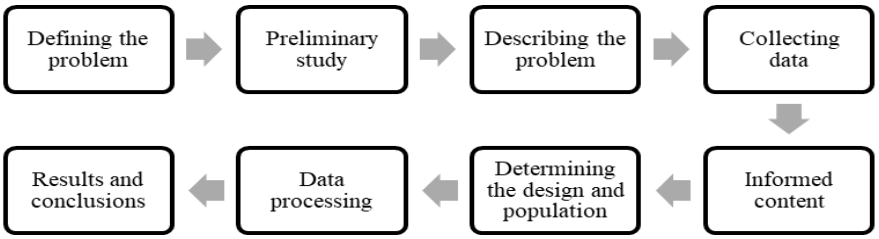

Figure 1. Research Procedure

Primary data is data obtained directly from respondents by data collectors [29]. During the research, questionnaires were used. Primary data were collected from questionnaires to determine postpartum mothers' knowledge of anemia in the Bangetayu community health Center *(Puskesmas)* work area. Secondary data are data sources that do not directly provide data to data collectors [26]. Secondary data were obtained from respondent data obtained from midwives at the Bangetayu Community Health Center.

2.3 Research instrument

The data collection technique for this study was conducted using a questionnaire administered to respondents. The aim was to determine postpartum mothers' knowledge of anemia. The questionnaire used in this study was a statement questionnaire regarding knowledge about anemia in postpartum mothers, consisting of 28 questions with correct and incorrect answer options. A positive answer was given a score of 1; a wrong answer was given a score of 0. An unfavorable answer was given a score of 0; and a wrong answer was given a score of 1. A favorable statement was a statement that supported or sided with the research object. Meanwhile, unfavorable statements are statements that do not support or are not in favor of the research object. The questionnaire outline regarding postpartum mothers' knowledge of anemia is as follows:

Table 1. Questionnaire Outline

Variable	Indicators	Statement favorable	Statement unfavorable
Level of knowledge about anemia	Mothers' knowledge of anemia, including definition, pathophysiology, causes, signs and symptoms, classification of anemia, criteria for anemia, risk factors for anemia, impacts of anemia, anemia management, and anemia prevention.	1, 2, 4, 5, 7, 11, 14, 16,17, 19, 20, 23, 26, 28.	3, 6, 8, 9, 10, 12, 13, 15,18, 21, 22,24, 25, 27.

The scores obtained are then converted into percentages and categorized as follows:

1) Good: If the subject is able to answer 76-100% of all statements correctly.
2) Adequate: If the subject is able to answer 56-75% of all statements correctly.
3) Poor: If the subject is able to answer <56% of all statements correctly.

Validity is the level of reliability and validity of the measuring instrument used. Validity testing is the agreement between the data reported by the researcher and the data directly obtained from the research subjects. Validity testing is used to measure the validity of a questionnaire. A questionnaire is considered valid if the statements in the questionnaire adequately convey what it is intended to measure. Validity testing for each question is performed if the calculated r value is greater than the table r value at the significance level ($\alpha = 0.05$), the instrument is considered invalid. If the calculated r value is less than the table r value, the instrument is considered invalid. This validity testing aims to verify whether the questionnaire content accurately measures what it is intended to measure and is sufficiently understood by all respondents [30]. This validity test was conducted on 25 respondents in the bangetayu community health center working area, excluding those sampled in this study. The results of the validity analysis are shown in the following table:

Table 2. Validity test

No	R_{count}	R_{Table}	Information
1.	0,483	0,3365	Valid
2.	0,629	0,3365	Valid
3.	0,464	0,3365	Valid
4.	0,442	0,3365	Valid
5.	0,530	0,3365	Valid
6.	0,515	0,3365	Valid
7.	0,552	0,3365	Valid
8.	0,552	0,3365	Valid
9.	0,697	0,3365	Valid
10.	0,482	0,3365	Valid
11.	0,587	0,3365	Valid
12.	0,455	0,3365	Valid
13.	0,473	0,3365	Valid
14.	0,424	0,3365	Valid
15.	0,495	0,3365	Valid
16.	0,578	0,3365	Valid
17.	0,495	0,3365	Valid
18.	0,415	0,3365	Valid
19.	0,482	0,3365	Valid
20.	0,453	0,3365	Valid
21.	0,637	0,3365	Valid
22.	0,705	0,3365	Valid
23.	0,451	0,3365	Valid
24.	0,420	0,3365	Valid
25.	0,465	0,3365	Valid
26.	0,426	0,3365	Valid
27.	0,448	0,3365	Valid
28.	0,566	0,3365	Valid

Reliability testing is conducted after validity testing, and this test is based on the validity of statements or questions. The cronbach's alpha in this study was 0.3365. The criteria for reliability testing are:

1) If the cronbach's alpha value is > 0.3365, the instrument has good reliability; in other words, the instrument is reliable or trustworthy.
2) If the cronbach's alpha value is < 0.3365, the instrument being tested is unreliable.

The following table shows the results of the reliability test in this study:

Table 3: Reliability Test

Cronbach's alpha	Description
0,730	Reliable

Based on table 3 the cronbach's alpha result for the variable "postpartum mothers' knowledge level about anemia" is 0.730, therefore, the reliability test for this variable can be declared reliable.

2.4 Research Ethics

According to [31], research ethics are ethical guidelines that apply to all research activities involving researchers, those being studied (research subjects), and the community that will be impacted by the research results. The purpose of research ethics is to consider and prioritize the rights of respondents. Researchers should understand the applicable ethics when conducting research.

2.5 Data Analysis

Univariate analysis aims to explain or describe the characteristics of each variable. The form of univariate analysis depends on the type of data. Generally, this analysis only produces frequency distributions and percentages for each variable. For example, the frequency distribution of respondents based on age, gender, education level, and so on [32]. This analysis was conducted to determine the mean, median, maximum, minimum, and positive/negative attitudes using SPSS (statistical package for the social sciences) statistic 21. The variable analyzed was the level of knowledge of postpartum mothers about anemia. The results were then entered into a frequency table.

3. RESULTS AND DISCUSSION

This research was conducted in Bangetayu sub-district. Bangetayu sub-district is included in the Genuk sub-district, Semarang City, Central Java, Indonesia. The Bangetayu Community Health Center's operating hours are Monday - Saturday, 07.00-14.00 WIB. Health care services at Bangetayu Community Health Center are implemented through 6 main activities in an integrated and comprehensive manner, including KIA, KB, nutrition improvement efforts, environmental health, eradication of infectious diseases (P2M), health promotion, treatment and school health efforts, dental and oral health efforts, elderly health efforts and traditional medicine development efforts. In serving patients, especially outpatients, Bangetayu Community Health Center applies the service time standards set by the government in the Decree of the Minister of Health No. 129 / MENKES / SK / II / 2008 concerning Minimum Hospital Service Standards, namely outpatient service standards with a waiting time of ≤ 60 minutes. The Bangetayu Community Health Center (Puskesmas) consists of two general practitioners, two dentists, six nurses, and seven midwives.

This research was conducted from August 23-26 and September 5, 2023, in the Bangetayu community health center working area in genuk district, Semarang City, Central Java. Data collection for postpartum women in August was conducted using enumerators. The enumerators provided questionnaires to enumerators at the Bangetayu Community Health Center for any postpartum women seeking check-ups or check-ups. The researchers explained the purpose of their visit, obtained informed consent, and then invited respondents to complete the questionnaire, including general information. They then chose "True" or "False" answers. They then asked them to return the completed questionnaires to the researchers. The researchers then verified that all questionnaires were completed. Thirty respondents met the inclusion criteria. Table 4. Research Results: Frequency Distribution of Postpartum Mothers' Knowledge of Anemia in the Bangetayu Community Health Center Work Area, Genuk District, Semarang City, Central Java, 2023

Table 3. Frequency distribution of respondents by education in the bangetayu community health center work area

No	Education Level	Frecuensy (n)	Presentase (%)
1	Junior High School	6	20,0 %
2	High School	21	70,0 %
3	University	3	10,0 %
4	Total	30	100,0 %

Table 3 shows that the majority of respondents, based on their educational background, had a high school education (21 respondents, 70.0%).

Table 4. Frequency distribution of respondents by occupation in the bangetayu community health center work area

No	Employment Level	Frekuensi (n)	Presentase (%)
1	Laborers	4	13,3 %
2	Households	24	80,0 %
3	Others	2	6,7 %
4	Total	30	100,0 %

Table 4. shows the characteristics of respondents based on occupation: the majority worked as housewives (24 women, 80.0%).

Table 5. Frequency distribution of respondents based on parity in the bangetayu community health center work area

No	Parity Level	Frekuensi (n)	Presentase (%)
1	Primipara	10	33,3 %
2	Multipara	20	66,7 %
3	Total	30	100,0 %

Based on table 5, the characteristics of respondents based on parity show that the majority of respondents had given birth two to four times (multiparity), amounting to 20 (66.7%).

Table 6. Frequency distribution of respondents by age in the bangetayu community health center work area.

No	Age group	Frekuensi (n)	Presentase (%)
1	20-35 years	28	93,3 %
2	>35 years	2	6,7 %
3	Total	30	100,0 %

Table 6 shows the characteristics of respondents by age, with the majority aged 20-35, representing 28 respondents (93.3%).

Table 7. Research results based on the level of knowledge of postpartum mothers about anemia in the bangetayu community health center work area

No	Knowledge Level	Frekuensi (n)	Presentase (%)
1	Good	5	16,7 %
2	Sufficient	23	76,7 %
3	Poor	2	6,7%
4	Total	30	100 %

Table 7 shows that the level of knowledge of postpartum mothers about anemia in the Bangetayu Community Health Center, Genuk District, Semarang City, in 2023 was in the sufficient category, with 23 respondents (76.7%).

Table 8. Frequency distribution of responses regarding postpartum mothers' knowledge

No	Statement	Number of answers (%)	
		Correct	Wrong
1.	Anemia is also known as a lack of red blood cells.	30 (100%)	0 (0%)
2.	A postpartum woman is considered anemic if her blood production is below 7 g/dL.	30 (100%)	0 (0%)
3	Excessive blood loss after childbirth does not cause anemia.	25 (83,3%)	5 (16,6%)
4.	Iron deficiency is the main cause of anemia.	28 (93,3%)	2 (6,6%)
5.	Common signs of anemia include fatigue, tiredness, lethargy, and weakness.	30 (100%)	0 (0 %)
6.	Iron supplements do not affect a mother's blood production.	29 (96,6 %)	11 (36,6%)
7.	Green vegetables, nuts, and animal protein contain a lot of iron.	17 (56,6%)	13 (43,3%)
8.	Hookworm infection does not cause anemia.	17 (56,6%)	13 (43,3%)
9.	Anemia does not cause weight loss.	16 (53,3%)	14 (46,6%)
10	Iron supplements do not have to be taken.	18 (60%)	12 (40%)
11	Iron deficiency anemia occurs due to insufficient iron intake in the diet.	27 (90%)	3 (10%)
12.	Pale eyelids are not a sign of anemia.	16 (53,3%)	14 (46,6%)
13	How to take iron supplements with tea and milk.	24 (80%)	6 (20%)
14	Low blood pressure is a sign of anemia in postpartum women.	24 (80%)	6 (20%)
15	Postpartum women are not allowed to eat seafood or eggs due to their fishy odor.	25 (83,3%)	5 (16,6))
16	Washing hands before eating and after activities can prevent anemia.	22 (73,3%)	8 (26,6%)
17	Loss of appetite is a sign of anemia.	13 (43,3%)	7 (23,3%)
18	Pale palms and nails are not symptoms of anemia.	19 (63,3%)	11 (36,6%)
19	Decreased breast milk production is a consequence of anemia.	13 (43,3%)	17 (5,1%)
20	Papaya contains a lot of iron.	23 (76,6%)	7 (23,3%)
21	Frequent dizziness is not a symptom of anemia.	13 (43,3%)	17 (50,1%)
22	Anemia does not negatively impact postpartum mothers.	15 (50%)	15 (50%)
23	Anemia during pregnancy is a risk factor for anemia after delivery or during the postpartum period.	27 (90%)	3 (10%)
24	Iron deficiency does not affect red blood cell production.	11 (36,6%)	19 (63,3%)
25	Iron deficiency anemia is a deficiency of folic acid and vitamin B12.	18 (60%)	12 (40%)
26	Young maternal age is not a risk factor for anemia in postpartum mothers.	17 (56,6%)	13 (43,3%)
27	Postpartum mothers need to take iron supplements for one year.	5 (16,6%)	25 (83,3%)
28	Postpartum mothers are recommended to take one 60 mg iron supplement daily.	29 (96,6%)	1 (3,3%)

Table 8 above, based on the analysis of each item, shows that the highest number of respondents correctly answered number 1 (30) followed by number 2 (30) and number 5 (30). Several respondents incorrectly answered number 19 (17) and number 22 (15). Furthermore, respondents incorrectly answered unfavorable statements (17) and number 21 (50.1%), followed by number 22 (15), 15 (50.0%), and 25 (83.3%) for number 27. Several respondents correctly answered the unfavorable statements: 25 respondents (83.3%) answered item 3, 24 respondents (80%) answered item 13, and 25 respondents (83.3%) answered item 15.

Based on the research results in table 3 the majority of respondents had a high school education, 21 (70.0%). This knowledge is influenced by education level; the higher the education level, the easier it is for a person to receive information, thus increasing their knowledge. Conversely, a lower level of education will affect a person's ability to grasp the information they receive [33]. This aligns with the theory that knowledge can be gained from experience, both personal and the experiences of others.

The findings of this study reveal several important demographic and cognitive characteristics of postpartum mothers related to their knowledge of postpartum anemia. Overall, the respondents were predominantly housewives, multiparous mothers, and within the productive reproductive age range of 20–35 years. These characteristics collectively contribute to shaping the level of maternal knowledge and provide a meaningful context for interpreting the study results. In terms of occupational status, the majority of respondents were housewives (80.0%). Employment status plays a significant role in determining access to information and opportunities for social interaction. Housewives tend to have more flexible time to engage with their social environment, including family members, peers, mass media, and healthcare professionals [34].

Parity also emerged as an important characteristic, with most respondents classified as multiparous (66.7%). Previous childbirth experience allows multiparous mothers to accumulate experiential knowledge, particularly regarding postpartum conditions and complications such as anemia. However, this study reinforces the view that parity alone does not automatically determine knowledge level. Instead, maternal motivation, willingness to seek information, and the availability of health education play a more decisive role in shaping knowledge acquisition. This aligns with prior research emphasizing that experiential learning must be accompanied by continuous access to accurate health information to be effective.

Age distribution showed that most postpartum mothers were within the 20–35-year age group (93.3%), which is considered a mature reproductive age with relatively low obstetric risk. Age is widely recognized as a factor influencing cognitive development and information processing capacity. Mothers in this age group tend to demonstrate more mature psychological and cognitive functioning, enabling them to receive, interpret, and apply health information more rationally. Consequently, age maturity contributes positively to knowledge acquisition and health awareness, as supported by earlier studies [35], [36].

Regarding overall knowledge levels, the majority of postpartum mothers demonstrated adequate knowledge of postpartum anemia (76.7%), while only a small proportion exhibited insufficient knowledge (6.7%). Knowledge is a fundamental cognitive domain that underpins awareness and health-related behavior. Adequate knowledge enables mothers to recognize symptoms, understand preventive measures, and adopt appropriate health-seeking behaviors. These findings are consistent with existing literature stating that increased knowledge strengthens awareness and encourages behavior aligned with health recommendations [37], [38].

Educational background further reinforced this pattern, as respondents with a high school education predominantly demonstrated adequate knowledge. Higher educational attainment facilitates information processing, critical thinking, and receptivity to health messages. This result corroborates earlier findings by [39], which reported that maternal education significantly influences knowledge levels regarding postpartum anemia. Similarly, housewives in this study were found to possess sufficient knowledge, consistent with previous studies reporting that occupational status, when combined with access to information and healthcare services, supports knowledge development.

When examined collectively, the results of this study fill an important research gap by highlighting how demographic factors such as age, parity, occupation, and education interact to shape postpartum mothers' knowledge of anemia within a community health center setting. Unlike previous studies that examined these variables independently, this study integrates them into a comprehensive analysis, offering a more contextual understanding of maternal knowledge patterns [40]. The novelty of this research lies in its contextualized assessment of postpartum anemia knowledge among mothers attending a primary healthcare facility, emphasizing real-world demographic dynamics rather than isolated variables.

From a practical perspective, the findings have important implications for maternal health programs. Health promotion strategies should be tailored to demographic characteristics, particularly targeting mothers with lower educational backgrounds or limited access to health information. Healthcare providers, especially midwives and community health workers, play a crucial role in reinforcing postpartum education through structured counseling, digital health information, and community-based interventions.

Despite its contributions, this study has several limitations. The sample size was relatively small and limited to a single community health center, which may restrict the generalizability of the findings. Additionally, the study relied on self-reported data, which may be subject to response bias. Future research is recommended to

employ larger, multi-center samples and incorporate mixed-method approaches to explore not only knowledge levels but also attitudes and practices related to postpartum anemia prevention.

4. CONCLUSION

Based on the results and discussion of this study on postpartum mothers' knowledge of anemia in the Bangetayu Community Health Center (Puskesmas Bangetayu), Genuk District, Semarang City, Central Java, it can be concluded that the majority of respondents had a high school education (70.0%), were housewives (80.0%), were multiparous (66.7%), and were in the reproductive age range of 20–35 years (93.3%). Overall, postpartum mothers demonstrated adequate knowledge about anemia during the postpartum period, indicating that demographic factors such as education, occupation, parity, and age play an important role in shaping maternal health knowledge. Therefore, it is recommended that the Bangetayu Community Health Center strengthen its information, education, and communication (IEC) program delivered by midwives, particularly focusing on the prevention of postpartum anemia and the importance of consuming iron tablets during the postpartum period. This study recommends that ongoing follow-up on compliance with iron tablet consumption is also very important to ensure that postpartum mothers not only receive information but are also able to implement it effectively, thereby improving maternal health outcomes and preventing postpartum anemia.

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USE OF ARTIFICIAL INTELLIGENCE (AI)-ASSISTED TECHNOLOGY

The authors confirm that no artificial intelligence (AI)-assisted technologies were utilized in the preparation, analysis, or writing of this manuscript. All stages of the research process, including data collection, data interpretation, and the development of the manuscript, were conducted solely by the authors without any support from AI-based tools.

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