



Exploring the Role of Complementary Herbal Therapies (Red Ginger, Aloe Vera, Tangerang Turmeric, Cinnamon, Binahong Leaves, Green Betel Leaves) in Science Education: A Case Study on the Healing Process of Second-Degree Perineal Wounds in Postpartum Mothers

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Abstract: Regular perineal care is needed to maintain skin integrity and prevent infection, pharmacological treatment has begun to be avoided because the use of antibiotics in postpartum mothers in certain amounts must be limited, so switching to natural therapies such as red ginger, aloe vera, tamarind turmeric, wood sweet, binahong leaves and green betel leaves. This research to determine the effectiveness of complementary therapies (red ginger, aloe vera, tamarind turmeric, cinnamon, binahong leaves, green betel leaves) on the length of healing of perineal wounds in postpartum mothers. Design method this research is quasi experimental with a two group pretest-posttest design. The samples in this study were all postpartum mothers who experienced grade II perineal wounds at PMB Mirah, PMB Sri Poniat, PMB Anita, PMB C, and PMB Indah Meilysa Manik in November 2024 - January 2025 totaling 182 people, the sampling technique was total sampling. The result is complementary therapy is effective in healing perineal wounds, with P-Value of red ginger (0.00), aloe vera leaves (0.00), tamarind turmeric (0.00), cinnamon (0.01), binahong leaves (0.00), green betel leaf (0.03). Complementary therapy (red ginger, aloe vera leaves, tamarind turmeric, cinnamon, binahong leaves, green betel leaves) is effective in healing perineal wounds in postpartum women (P-Value <0.05). It is hoped that midwives can introduce complementary therapies for treating perineal wounds and become a reference in educational institutions.

Keywords: Complementary therapy; Perineal wounds; Postpartum.

Introduction

In the latest report from the World Health Organization (WHO) in 2024, it was revealed that in 2020, the number of maternal deaths recorded was still alarmingly high, reaching 287,000. These deaths occurred during pregnancy or after childbirth. The report from the Directorate General of Public Health of

the Indonesian Ministry of Health for 2024 showed that in 2023, there were 4,482 cases of maternal death recorded in Indonesia. These deaths were generally caused by complications that arose during and after childbirth. In detail, hypertension was responsible for 9.19% of cases, while obstetric hemorrhage contributed 8.03%. Complications during the obstetric process reached 4.55%, followed by infection at 1.92%, and

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abortion-related complications at 1.0%. In addition, complications from unanticipated management reached 0.96%, non-obstetric complications at 0.42%, and other causes at 73.92% (Indonesian Ministry of Health, 2024).

Perineal infections in postpartum mothers are often caused by bacteria originating from various sources. Exogenous bacteria that come from the external environment, autogenous that spread from other areas in the body, and endogenous that come from the birth canal itself are some common causes. Inadequate care of perineal wounds often increases the risk of infection, which in turn can inhibit the healing process of the wound (Utami, 2020).

The incidence of perineal rupture in mothers giving birth in the world in 2020 was 2.7 million cases, where this figure is estimated to reach 6.3 million in 2050. In the Asian continent itself, 50% of mothers giving birth experience perineal rupture (Gusnimar, 2021 in (Indriyani et al., 2024) . Based on data from the 2018 Indonesian Demographic Health Survey (SDKI), it shows that in Indonesia, perineal lacerations or ruptures are experienced by 75% of mothers giving birth vaginally (Indriyani et al., 2024) . Based on the report of the West Java Provincial Health Office, the incidence of perineal rupture in West Java in 2021 was 54% of the total number of deliveries (Indriyani et al., 2024) . Based on the health profile of Bogor Regency in 2018, the incidence of mothers giving birth with perineal rupture in Bogor Regency was 58.18% of the total number of deliveries (Bogor Regency Health Office, 2020) . In Bekasi Regency, the figure is higher, which is around 61% of all postpartum mothers who experienced similar conditions in the same year (West Java Health Office, 2021), while in Central Jakarta, 70% of mothers giving birth experienced grade I-III perineal rupture.

Regular perineal care is needed to maintain skin integrity and prevent infection. Proper perineal care includes gentle cleansing with warm water and mild soap, followed by thorough drying and application of a protective cream to protect the skin from moisture and irritation (Pitriani & Afni, 2019) . Efforts to prevent perineal laceration infection can be given with pharmacological and non-pharmacological therapy. Pharmacological therapy is by administering antibiotics and antiseptics (povidone iodine) for the treatment of perineal ruptures, but these drugs and materials have side effects such as allergies, inhibiting the production of collagen which functions to heal wounds (Firdayanti, 2014) . While non-pharmacological therapy that can be given to accelerate wound healing so that infection does not occur is by involving the use of natural ingredients such as red betel leaves, cinnamon, aloe vera, green tea, and pegagan leaves to accelerate the recovery process (Maryamah et al, 2024).

Research by Nurhaeni et.al. (2022) explains that boiled red ginger helps heal perineal wounds because it contains shagaol which can accelerate the inflammation process. Likewise, aloe vera has various compounds that are effective in accelerating wound healing, including saponins, flavonoids, tannins, and polyphenols. Flavonoids in aloe vera function as antibiotics, while alkaloids, tannins, essential oils, eugenol, and saponins play an important role as antibacterials (Maryamah et al, 2024). Turmeric plants are known to have anti-inflammatory (anti-infection) and antioxidant properties. The efficacy of turmeric in wound healing has also been proven (Indriyani et al., 2024) .

Research related to cinnamon conducted by Ariani (2022) showed that giving cinnamon decoction is effective in reducing pain and healing perineal stitches in postpartum mothers. Binahong leaves are also able to accelerate the healing of perineal wounds compared to iodine povidone 10 (Gusnimar et al., 2021) . Research on green betel leaves for perineal wound healing therapy in postpartum mothers conducted by (Simamora et al., 2024) betel leaves are effective in the healing process of perineal wounds because the content in betel leaves has an effect to eradicate *Candida albicans* fungus, and the leaves contain eugenol which can relieve pain in wounds. While the carvacrol content is useful for vaginal discharge and preventing infection.

This study, focusing on postpartum mothers with grade II perineal wounds, addresses the gap in the scientific understanding of herbal therapies and their application in clinical settings. It aims to serve as a case study for incorporating evidence-based science into healthcare practice and education, demonstrating the synergy between complementary therapies and scientific literacy in healthcare settings.

Method

Design

This study employs a quasi-experimental design with a two-group pretest-posttest approach. The sample includes postpartum mothers experiencing second-degree perineal wounds at PMB Mirah, PMB Sri Poniat, PMB Anita, PMB C, and PMB Indah Meilysa Manik, with a total of 182 participants from November 2024 to January 2025. Total sampling was used to select participants.

Data Collection and Pedagogical Integration

Data were collected using an observation sheet, which also included educational components designed to raise participants' awareness of the role of complementary herbal therapies. The intervention group received an educational session about the healing properties of herbs (such as Red Ginger, Aloe Vera,

Tangerang Turmeric, Cinnamon, Binahong Leaves, and Green Betel Leaves) integrated into the treatment protocol. The control group did not receive this additional educational intervention but was given standard care. This educational approach aimed to enhance participants' understanding of the scientific principles behind the therapies used, fostering critical thinking and science literacy.

Group Division

Participants were divided into two groups: the intervention group, which received complementary therapy with an educational component, and the control group, which received standard care without the educational intervention.

Analysis

The analysis involved univariate and bivariate statistical techniques. Paired sample T-tests and Mann-Whitney tests were used to analyze the data, evaluating the differences in healing duration between the two groups.

Pedagogical Relevance

This study emphasizes the integration of scientific education in clinical interventions. By introducing the scientific background of herbal therapies, the study also serves as a model for embedding science literacy and critical thinking into healthcare practices, making it relevant for educational settings where healthcare science is taught.

Result and Discussion

The data presented in the table below show the average healing time for perineal wounds. In the intervention group, the average healing time was 8.5 days, while the control group had an average of 15.5 days. A Mann-Whitney statistical test was performed, resulting in a p-value of 0.00, which is less than 0.05. This indicates that there is a statistically significant difference between the two groups, allowing us to reject the null hypothesis (H_0) and accept the alternative hypothesis (H_a). Therefore, the findings suggest that the use of complementary therapies, including red ginger, is associated with a shorter healing time for second-degree perineal wounds in postpartum mothers at PMB Mirah, Brebes Regency, in 2024.

Table 1. Effectiveness of Red Ginger Use on Perineal Wound Healing Time Grade II in Postpartum Mothers at PMB Mirah Brebes Regency in 2024

Group Type	Perineal Wound Healing		Mean	SD	P Value
	Category	F			
Intervention group	Fast	10	8.50	127.5	0.000
	Normal	4			
	Slow	1			
Control group	Fast	1	15.50	232.5	
	Normal	13			
	Slow	1			

Based on the Table 1, it can be seen that the average healing time for perineal wounds in the intervention group was 6.20 days and in the control group 10.33 days. Based on the paired T test, a p-value of 0.00 <0.05 was obtained, so it can be concluded that H_0 is rejected while

H_a is accepted, which means that the use of *Aloe vera* leaves are effective in the healing time of grade II perineal wounds in postpartum mothers at PMB Sri Poniat Karawang in 2024.

Table 2. Effectiveness Use of Aloe Vera on the Healing Time of Perineal Wounds Grade II in Postpartum Mothers at PMB Sri Poniat Karawang in 2024

Group Type	Perineal Wound Healing		Mean	SD	P Value
	Category	F			
Intervention group	Fast	9	6.20	1.320	0.000
	Normal	6			
	Slow	0			
Control group	Fast	0	10.33	2.059	
	Normal	14			
	Slow	1			

Based on the Table 2, it can be seen that the average healing time for perineal wounds in the intervention group was 4.6 days and in the control group 7.5 days. Based on the *Mann-Whitney statistical test*, a *p-value* of $0.00 < 0.05$ was obtained, so it can be concluded that H_0

is rejected while H_a is accepted, which means that the administration of turmeric and tamarind is effective in the healing time for grade II perineal wounds in postpartum mothers at PMB Anita, Bekasi Regency in 2024.

Table 3. Effectiveness of Turmeric and Tamarind Administration on the Healing Time of Perineal Wounds Degree II at TPMB Anita, Amd. Keb Bekasi Regency in 2024

Group Type	Perineal Wound Healing		Mean	SD	P Value
	Category	F			
Intervention group	Fast	11	4.60	1.054	0.007
	Normal	4			
	Slow	0			
Control group	Fast	2	7.53	1.841	
	Normal	7			
	Slow	6			

Based on the Table 3, it can be seen that the average healing time for perineal wounds in the intervention group was 5.2 days and in the control group 6.8 days. Based on the *Mann-Whitney statistical test*, a *p-value* of $0.00 < 0.05$ was obtained, so it can be concluded that H_0 is

rejected. While H_a was accepted, which means that boiled cinnamon water is effective in the healing time of grade II perineal wounds in postpartum mothers at PMB C, Kemayoran District, Central Jakarta in 2024.

Table 4. Effectiveness of Cinnamon Boiled Water on Healing Time of Second Degree Perineal Wounds For Postpartum Mothers at PMB C, Kemayoran District, Central Jakarta in 2024

Group Type	Perineal Wound Healing		Mean	SD	P Value
	Category	F			
Intervention group	Fast	8	5.27	1.944	0.019
	Normal	5			
	Slow	2			
Control group	Fast	3	6.80	1.373	
	Normal	7			
	Slow	5			

Based on the Table 5, it can be seen that the average healing time for perineal wounds in the intervention group was 5.8 days and in the control group 8.9 days. Based on the *Mann-Whitney statistical test*, a *p-value* of $0.00 < 0.05$ was obtained, so it can be concluded that H_0 is

rejected. While H_a was accepted, which means that boiled binahong leaf water is effective in the healing time of grade II perineal wounds in postpartum mothers at PMB Ade Khilwatun, Babelan District, Bekasi Regency in 2024.

Table 5. Effectiveness of Boiled Binahong Leaf Water on the Healing Time of Grade II Perineal Wounds in Postpartum Mothers at PMB Ade Khilwatun, Babelan District, Bekasi Regency in 2024

Group Type	Perineal Wound Healing		Mean	SD	P Value
	Category	F			
Intervention group	Fast	8	5.80	1.256	0.007
	Normal	5			
	Slow	3			
Control group	Fast	2	8.92	1.897	
	Normal	4			
	Slow	10			

Based on the Table 6, it can be seen that the average healing time for perineal wounds in the intervention group was 4.5 days and in the control group 9.8 days. Based on the *Mann-Whitney statistical test*, a *p-value* of $0.00 < 0.05$ was obtained, so it can be concluded that H_0 is

rejected. While H_a was accepted, which means that boiled betel leaf water has an effect on the healing time of second degree perineal wounds in postpartum mothers at PMB Indah Meilysa Manik, Bogor Regency in 2020.

Table 6. Effectiveness of Green Betel Leaf Boiled Water on Healing Time of Perineal Wounds Grade II for Postpartum Mothers at PMB Indah Meilysa Manik Bogor Regency in 2024.

Group Type	Perineal Wound Healing		Mean	SD	P Value
	Category	F			
Intervention group	Fast	9	4.5	1.743	0.033
	Normal	4			
	Slow	2			
Control group	Fast	3	9.8	1.895	
	Normal	7			
	Slow	5			

The data presented in Table 6 clearly show a significant difference in the healing times of perineal wounds between the intervention group and the control group. The intervention group, which used green betel leaf boiled water as a treatment, demonstrated faster healing compared to the control group. Specifically, 9 out of 15 participants in the intervention group experienced fast healing, in contrast to only 3 out of 15 participants in the control group.

The mean healing time in the intervention group was 9 days, while the control group had a slightly longer mean healing time of 9.8 days. The standard deviation for the intervention group (4.5) is also lower than that of the control group (9.8), indicating less variability in healing times among the participants receiving the intervention. This suggests that the green betel leaf boiled water treatment is not only effective but also consistent in its impact on healing, which is a promising outcome for postpartum mothers experiencing perineal wounds.

Furthermore, the statistical significance of the results is supported by the p-value of 0.033, which is below the commonly accepted significance level of 0.05. This confirms that the intervention (green betel leaf boiled water) contributed to a statistically significant improvement in the healing time of perineal wounds compared to the control group, which did not receive this herbal treatment.

Discussion

Effectiveness of Red Ginger Use on Healing Time of Grade II Perineal Wounds in Postpartum Mothers at PMB Mirah Brebes Regency in 2024

The results of the analysis obtained an average healing time for perineal wounds in the intervention group of 8 days and in the control group of 15 days. Based on the statistical test, a p-value of $0.00 < 0.05$ was obtained, so it can be concluded that H_0 is rejected while H_a is accepted, which means that the use of red ginger is effective in the healing time for grade II perineal wounds in postpartum mothers at PMB Mirah, Brebes Regency in 2024.

The results of this study are consistent with the research of Mariyatul Qiftiyah (2021) which found that

giving red ginger to postpartum mothers can reduce the severity of their perineal wound discomfort. The anti-inflammatory properties of gingerol and ginger rhizome, found in red ginger, can reduce pain and inflammation. Zingiberin, kemferia, limonene, broneol, cineol, zingiberol, linalool, geraniol, kavikol, zingiberol, gingerol, and shogaol are among the two to three percent of essential oils found in ginger rhizomes. Researchers recommend that postpartum mothers who experience perineal wounds use red ginger as a therapy because its efficacy has been proven in wound healing.

Effectiveness The Use of Aloe Vera on the Healing Time of Grade II Perineal Wounds in Postpartum Mothers at PMB Sri Poniat Karawang in 2024

The results of the analysis obtained an average healing time for perineal wounds in the intervention group of 6.20 days and in the control group of 10.33 days. Based on the statistical test, a p-value of $0.00 < 0.05$ was obtained, so it can be concluded that H_0 is rejected while H_a is accepted, which means that the use of *aloe vera* leaves is effective in the healing time for grade II perineal wounds in postpartum mothers at PMB Sri Poniat Karawang in 2024.

The findings of this study are consistent with a study conducted by Renny Dwijayanti (2024), which found that the average time for perineal wound healing after applying aloe vera was 4.72 days, while the control group experienced healing in 7.35 days.), based on the results of the study it is known that the use of aloe vera can have a good effect on perineal wound healing because aloe vera mucus includes several compounds such as vitamin E and vitamin C and several amino acids, which can play an important role in accelerating wound healing, in addition to the role of vitamin C in increasing collagen production and protecting DNA synthesis, as well as the function of vitamin E as an effective antioxidant in the perineal wound healing process, postpartum mothers who experience wounds in the perineal area are advised to use aloe vera. The use of aloe vera as a treatment method can help speed up the healing process of perineal wounds.

The Effectiveness of Turmeric and Tamarind Administration on the Healing Time of Grade II Perineal Wounds at TPMB Anita, Amd. Keb Bekasi Regency in 2024

The results of the analysis obtained an average healing time for perineal wounds in the intervention group of 4.6 days and in the control group of 7.5 days. Based on the *Mann-Whitney statistical test*, a *p*-value of $0.00 < 0.05$ was obtained, so it can be concluded that H_0 is rejected while H_a is accepted, which means that the administration of turmeric and tamarind is effective in the healing time for grade II perineal wounds in postpartum mothers at PMB Anita, Bekasi Regency in 2024.

The results of this study are in line with the results of the study (Andanawarih & Ulya, 2021) which stated that the average healing of perineal wounds given turmeric tamarind was 6.21 days, while the average healing of perineal wounds not given turmeric tamarind was 8.42 days. The results of the T test showed a *p* value = 0.001, which means that there is an effectiveness of the use of turmeric tamarind on healing perineal wounds in mothers in the work area of the Ngesrep Health Center and the Srondol Health Center, Central Java.

The Curcumin content in turmeric has several important benefits in the wound healing process. First, curcumin can reduce the activity of the Cyclooxygenase (COX) enzyme, which inhibits the conversion of arachidonic acid to prostaglandins. This reduces inflammation and increases blood vessel permeability. By reducing the factors that cause inflammation, curcumin also reduces the activation and adhesion of neutrophil cells, which helps shorten the inflammatory phase. As the healing phase progresses to the proliferation phase, curcumin increases the production of various growth factors such as PDGF, TGF- β , FGF, EGF, and VEGF by macrophages and endothelial cells. The increase in these factors supports the wound healing process by accelerating the migration of important cells such as keratinocytes and macrophages, accelerating the formation of new cells, increasing the formation of new blood vessels, and increasing the production of collagen and granulation tissue. All of this helps wound contraction and accelerates the overall healing process (Ballentyne.M 2019 in (Mutia, 2020).

Tamarind itself has antibacterial, anti-inflammatory, and antioxidant activities. This activity can also help the wound healing process so that wounds can heal faster (Daniyan, 2008 in (Susanti, 2021)). Meanwhile, according to Gayathri (2004) in (Susanti, 2021), tamarind fruit can accelerate the healing of open wounds by increasing wound contraction and accelerating the migration of epithelial cells under the wound. The author suggests that health workers, especially midwives, provide counseling to postpartum mothers to introduce perineal wound care using

turmeric and tamarind as a non-pharmacological treatment to accelerate the healing of perineal wounds.

Effectiveness of Cinnamon Boiled Water on the Healing Time of Grade II Perineal Wounds in Postpartum Mothers at PMB C, Kemayoran District, Central Jakarta in 2024

The results of the analysis obtained an average healing time for perineal wounds in the intervention group of 5.2 days and in the control group of 6.8 days. Based on the *Mann-Whitney statistical test*, a *p*-value of $0.00 < 0.05$ was obtained, so it can be concluded that H_0 is rejected while H_a is accepted, which means that cinnamon boiled water is effective in healing the duration of grade II perineal wounds in postpartum mothers at PMB C, Kemayoran District, Central Jakarta in 2024.

In line with the research results of Aprilliani et al. (2024) there is the effectiveness of cinnamon decoction on healing perineal wounds in postpartum mothers with a perineal wound score before being given cinnamon decoction of 6 and after being given cinnamon decoction of 0. Cinnamon (*Cinnamomum verum*) has anti-inflammatory, antioxidant, and antimicrobial properties that are very beneficial in the wound healing process (Winarto, 2023). This anti-inflammatory helps speed up the healing process by reducing edema and pain associated with perineal wounds. In addition, the antioxidant properties of cinnamon help protect tissue from oxidative damage, which is important for accelerating cell regeneration. It is hoped that health workers, especially midwives, can maximize care by providing therapy using cinnamon decoction to help speed up the healing process of perineal wounds so that postpartum mothers and their families can do it independently.

Effectiveness of Boiled Binahong Leaf Water on the Healing Time of Grade II Perineal Wounds in Postpartum Mothers at PMB Ade Khilwatun, Babelan District, Bekasi Regency in 2024

The results of the analysis obtained an average healing time for perineal wounds in the intervention group of 5.8 days and in the control group of 8.9 days. Based on the *Mann-Whitney statistical test*, a *p*-value of $0.00 < 0.05$ was obtained, so it can be concluded that H_0 is rejected while H_a is accepted, which means that boiled binahong leaf water is effective in healing the duration of grade II perineal wounds in postpartum mothers at PMB Ade Khilwatun, Babelan District, Bekasi Regency in 2024.

Supported by ole h Gusnimar e's research t al. (2021), there is pe affect PE mbe rian re busan binahong leaves are able to me mpe rce pat pe Nye wound healing rine um compared to iodine povidone 10%. Binahong leaves can stimulate be alte rnative te neat, complete me

nte r to postpartum mothers who me suffered lacerations right rine um. Be based on research results t that te This is what Sugiyarto & Kuswadi did in Nurhalimah e t al. (2024) It is known that binahong leaves contain active flavonoids, alkaloids, phenolics , and saponins. The active flavonoids play a direct role as antibiotics by interfering with the function of microorganisms such as bacteria and viruses. The pharmacological activity of flavonoids is as anti - inflammatory, analgesic, and antioxidant. In a study it was also mentioned that as a wound medicine, binahong contains several chemical compounds, namely flavonoids, oleic acid, protein, saponins, and ascorbic acid. Based on this, it is recommended that postpartum mothers with perineal wounds pay more attention to personal hygiene so that perineal wounds can be treated quickly and well.

The Effectiveness of Green Betel Leaf Boiled Water on the Healing Time of Grade II Perineal Wounds in Postpartum Mothers at PMB Indah Meilysa Manik, Bogor Regency in 2024

The results of the analysis obtained an average healing time for perineal wounds in the intervention group of 4.5 days and in the control group of 9.8 days. Based on the *Mann-Whitney statistical test* , a *p- value* of 0.00 <0.05 was obtained, so it can be concluded that *H₀* is rejected while *H_a* is accepted, which means that boiled betel leaf water on the healing time for grade II perineal wounds in postpartum mothers at PMB Indah Meilysa Manik, Bogor Regency in 2024.

This study is in line with the study (Simamora et al., 2024) on the Effectiveness of Betel Leaf Decoction on Healing Perineal Wounds at the PPK Clinic 1 Yonkes 1 Kostrad Bogor, West Java in 2023 with 30 postpartum mothers as respondents. The results of the study obtained statistical test results *p-value* of 0.024 (*p* <0.05), which means there is a significant difference between the average duration of healing of perineal wounds in the intervention group and the control group. Green betel leaves contain a lot of essential oils 1-4.2% as a fragrant aroma in betel leaves), essential oils contain betiophenol, sesquiterpenes, diastase starch 0.8-1.8%, sugar, and tannins (chemical compounds used to kill or inhibit the growth of microorganisms in living tissue such as the surface of the skin) and anti-inflammatory (chemical compounds used to eliminate inflammation). And kavikol 7.2-16.7% which functions as an antiseptic (a substance that can inhibit the growth of germs) (Siswanti et al., 2022).

According to the author, perineal wound care is closely related to perineal wound healing because the better the wound care given, the faster the wound healing will be. So the author suggests that postpartum mothers who experience grade 2 perineal wounds are

given boiled betel leaves, which is an alternative therapy and is very effective in treating various skin conditions such as infections and contains many health benefits as explained above.

Conclusion

Complementary therapy (red ginger, aloe vera leaves, tamarind turmeric, cinnamon, binahong leaves, green betel leaves) is effective in healing perineal wounds in postpartum mothers (*P-Value* <0.05).

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Author Contributions

L.F, A.H & B.P.R., contributed to study conception and design, data collection, analysis and interpretation of results, draft manuscript preparation, reviewed the results and approved the final version of the manuscript. I.M, K.A.P, R.M & S., contributed to data collection, analysis and interpretation of results, draft manuscript preparation, reviewed the results and approved the final version of the manuscript.

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Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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