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Ethnomedical use of *Dodonaea viscosa* for postpartum perineal wound care among Dani tribe women in Puncak Jaya, Indonesia

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ABSTRACT

Maternal mortality remains a pressing issue in many developing countries, with postpartum infections being one of the leading causes. In remote regions of Indonesia, such as the highlands of Papua, traditional healing practices are still widely adopted due to limited access to formal health services. Among the Dani tribe in Puncak Jaya District, the use of *Dolli* or *Dolingga* (*Dodonaea viscosa*) leaves for perineal wound care after childbirth is a longstanding cultural tradition. This study aimed to explore the ethnomedical practices, preparation methods, and perceived therapeutic effects of *Dolli* leaves in managing postpartum perineal wounds among women in the Dani tribe. A qualitative exploratory design was employed. Data were collected through in-depth interviews with 10 postpartum mothers and 2 key informants, including a health official from the Puncak Jaya District Health Office. Thematic content analysis was applied to identify key patterns and cultural meanings associated with the use of *Dolli* leaves. The use of *Dolli* leaves is a generational practice, valued for its accessibility and safety. Leaves are wilted over fire to release their oils, then layered (approximately 3 cm thick), and applied externally by having the mother sit or lie on them. Most participants reported improved perineal wound conditions within 1–4 days, characterized by dryness, lack of odor, and absence of infection. Mild abdominal discomfort was noted by some, though no adverse effects were reported. Cultural taboos such as not stepping on the leaves were observed during use. The leaves were also applied for neonatal umbilical cord care. The ethnomedical use of *Dolli* leaves for postpartum perineal wound healing reflects culturally embedded knowledge with perceived therapeutic benefits. These findings suggest potential for integrating local ethnomedicine into maternal care in resource-limited settings, pending further clinical and pharmacological validation.

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INTRODUCTION

The maternal mortality rate remains a significant challenge globally, with approximately 830 maternal deaths per day and a widening gap between current achievement and the SDG 3.1 target (<70 per 100,000 live births).(1) Indonesia recorded a maternal mortality rate of 140 per 100,000 in 2023, down from 148 the previous year, but still well above the SDG target and the third highest in Southeast Asia.(2) Papua Province experienced an even higher maternal mortality rate, estimated at 305 per 100,000 live births in 2020–2021 due to high rates of hemorrhage and limited health facilities.(3) In Puncak Jaya Regency, limited access to medical care has led to the use of traditional remedies, such as *Dolli* leaves (*Dodonaea viscosa*) to treat postpartum perineal wounds.(4) This practice was popular at the Mulia Public Health Center throughout 2023 and became part of the community's postpartum perineal wound management. At the Mulia Health Center the number of deliveries assisted by health workers was 7 mothers, the number of deliveries without the assistance of health workers and postpartum care using *Dolli/Dolingga* (*Dodonaea viscosa*) leaves was 11 mothers.

The postpartum period presents a heightened risk for maternal morbidity and mortality, with an estimated 60 % of maternal deaths occurring after delivery—and roughly half within the first 24 hours postpartum.(5) One of the most common complications during this phase is perineal rupture, especially among primigravida, and not infrequently in subsequent births, leading to significant bleeding and infections. If not addressed properly, these wounds can predispose women to pelvic floor dysfunction, prolapse, and fistulas, contributing to long-term morbidity.(6)

In regions like Puncak Jaya, Papua, access to formal health services, antiseptic products, and sanitary supplies (e.g. sanitary pads, sterile dressings) is extremely limited.(7) Many women give birth in contexts without skilled health personnel and without access to modern wound-care products. In such settings, traditional remedies become the default, with heated *Dolli* (*Dodonaea viscosa*) leaves often used to manage perineal bleeding and facilitate wound healing.(8) Supporting this context, several recent quasi-experimental studies in Indonesia have demonstrated that herbal decoctions, such as red betel leaf or Binahong, significantly reduce perineal healing time—from average 7–9 days in control groups to approximately 3–5 days in treatment groups.(9,10) Moreover, a study in Papua (Serui Hospital) identified factors such as poor hygiene, pain management challenges, and limited access to antiseptics as contributors to delayed wound healing in postpartum women.(11) Taken together, these findings underscore a critical research gap: although ethnomedicinal plant use is widespread in remote Indonesian communities, *Dolli* leaf use in perineal wound care has not yet been rigorously evaluated. Given the combination of limited modern medical access in Puncak Jaya and encouraging evidence for other herbal therapies elsewhere in Indonesia, exploring the community-based practice of *Dolli* leaves as an alternative postpartum intervention is both timely and justified. Studying such ethnomedicinal practices can contribute to community-based maternal care models, especially in remote areas where modern medical supplies are scarce.

Based on the annual report of the Mulia Public Health Center, the most women who performed postpartum care using leaves were in Wandenggobak Village, Mulia District, Puncak Jaya Regency. The author conducted observations and initial interviews on mothers who had given birth and carried out treatment with leaves in July 2021.(12) Midwives must respect the traditions and culture of the local community in carrying out midwifery services.(13) The occupied leaves are replaced once a day and then burned. On the fifth day when he made a home visit and did a genital examination, the perineal wound was dry, odorless and did not emit a scented discharge.

From the description above, the authors are interested in conducting research on how ethnomedicin treatment for postpartum mother's perineal wound healing uses *Dolli/Dolingga (Dodonaea viscosa*) leaves by the Dani tribe, Wandenggobak Village, Mulia District, Puncak Jaya Regency. This study aims to explore the traditional use of *Dolli* leaves

for perineal wound care among postpartum mothers in the Dani tribe, and to assess its potential effectiveness as a culturally rooted alternative treatment.

METHOD

This study used a qualitative exploratory design, conducted from March to June 2023 in Wandenggobak Village, Mulia District, Puncak Jaya Regency, Papua, Indonesia. Data were collected through in-depth semi-structured interviews. The study involved 10 main informants, consisting of postpartum mothers who had used *Dolli* (*Dodonaea viscosa*) leaves for perineal wound care in the last 12 months, and 2 additional key informants, including the Head of the District Health Office and a local traditional birth assistant. Inclusion criteria included postpartum mothers aged 18–45 who had given birth at home and applied *Dolli* leaves as part of their postpartum care. Exclusion criteria were mothers with known perineal complications requiring hospitalization or those who declined audio recording. Interviews lasted approximately 30–45 minutes and were conducted in the local language with the help of a trained interpreter when necessary. All interviews were audio recorded and transcribed verbatim. Data were analyzed using thematic analysis following Braun and Clarke's six-step framework. Coding was conducted manually, and triangulation was applied by comparing interview data with field notes and observations. To ensure trustworthiness, the principles of credibility, transferability, dependability, and confirmability were applied.

RESULTS

This study revealed six major themes related to the use of *Dolli/Dolingga* (*Dodonaea viscosa*) leaves in postpartum care among mothers of the Dani tribe in Puncak Jaya District:

Intergenerational Traditional Knowledge

The use of *Dolli* leaves for postpartum treatment is rooted in longstanding cultural practices passed down through generations. None of the informants could identify the original source of the knowledge. One participant stated:

> *"This practice has existed for as long as I remember. My mother and grandmother also used these leaves after childbirth." (Mother, age 39)*

The absence of written documentation has not impeded the transmission of this practice, which is considered an integral part of maternal care.

Availability and Accessibility of *Dolli* Leaves

Dolli leaves grow abundantly in the region and are readily available in the surroundings—near houses *(honai)*, along roads, riverbanks, and forested areas. This ease of access makes them a practical choice for communities with limited access to formal health products.

> *"We just go outside and pick them. They're everywhere—near the forest, near the house. No need to buy anything." (Traditional Birth Attendant)*

Perceived Safety and Efficacy

All informants expressed high confidence in the safety of *Dolli* leaves. They reported no side effects during or after use, and attributed various postpartum benefits to the leaves, including bleeding control, pain reduction, and accelerated wound healing.

> *"The leaves never cause problems—no itching, no burning. They help stop the bleeding and heal the wound quickly." (Mother, age 32)*

This belief contributes to the continued preference for traditional treatment, especially in settings where antiseptics or modern wound care products are unavailable.

Versatility of Use Across Age Groups

In addition to postpartum applications, *Dolli* leaves are also used in newborn care, particularly to warm the baby and promote umbilical cord detachment. This multifunctional role reinforces their cultural value in maternal and child health.

> *"We heat the leaves and place them on the baby's stomach and back. It keeps the baby warm and helps the cord fall off faster." (Elder woman, age 61)*

Methods of Preparation and Application

The preparation of *Dolli* leaves is simple and requires minimal resources. The leaves are slightly wilted over a fire to release their oil, then layered to form a pad approximately 3 cm thick. Mothers sit on this pad, or it is placed over affected body parts such as the perineum, chest, or abdomen.

> *"We heat the leaves just a little, not burned, then arrange them so the mother can sit on them after birth." (Traditional Birth Attendant)*

This method allows for external application only; the community strictly avoids internal use.

Cultural Rationale and Functional Benefits

Participants believed the leaves served multiple functions: absorbing postpartum blood, accelerating perineal wound healing, preventing infections, and promoting recovery. The use of *Dolli* leaves is seen not only as a physical remedy but also a cultural obligation.

> *"Without these leaves, recovery would be slower. We trust what our ancestors taught us." (Mother, age 28)*

Triangulation and Data Validation

Findings were confirmed through multiple informants, including postpartum mothers, elder women, and traditional birth attendants. Observations conducted during field visits supported the participants' descriptions. Cross-referencing with local health office staff further validated the commonality and consistency of this practice across the district.

DISCUSSION

This study provides a unique insight into the use of *Dolli* or *Dolingga* leaves (*Dodonaea viscosa*) by the Dani tribe in the Puncak Jaya District as an alternative treatment for postpartum perineal wounds. The findings reveal that this traditional practice is deeply embedded in local knowledge and continues to be used across generations without any recorded documentation or formal transfer of knowledge. Despite the lack of biomedical validation at the local level, community members perceive *Dolli* leaves as effective, accessible, and safe for maternal and neonatal care.

The preparation and application of *Dolli* leaves is remarkably simple, requiring only fire to wilt the leaves, which then release an oily substance believed to enhance their healing properties. The leaves are applied topically to the perineum in postpartum women and to specific areas of newborns' bodies, including the umbilical cord, chest, and extremities. Importantly, no adverse effects were reported by the informants, supporting community beliefs in its safety profile.

These findings resonate with broader ethnopharmacological evidence. Previous literature has confirmed the pharmacological potential of *Dodonaea viscosa*. Al-Snafi (2017) identified multiple bioactive compounds in this plant, including alkaloids, flavonoids, saponins, and phenolics, which are known to possess antimicrobial, anti-inflammatory, antioxidant, and wound-healing properties.(14) Furthermore, Sanchez et al. (2012) demonstrated that hautriwaic acid, a diterpene compound isolated from *D. viscosa*, exhibits significant anti-inflammatory activity in animal models.(15) This supports the empirical effectiveness reported by the Dani tribe in treating postpartum wounds. Similarly, Beshah et al. (2020) documented that *Dodonaea viscosa* has been traditionally used for a wide range of ailments such as burns, rheumatism, skin infections, and wound healing across various cultures. The presence of flavonoids and terpenoids contributes to its anti-inflammatory and antimicrobial effects, both of which are critical in the management of perineal wounds.(8) The alignment between local observations and pharmacological evidence strengthens the case for further exploration of this plant as a complementary therapy in postpartum care. The use of *Dolli* leaves also aligns with Indonesia’s regulatory framework on traditional and complementary medicine. The Ministry of Health has issued several regulations—such as Permenkes No. 61/2016, No. 37/2017, and No. 15/2018—that support the integration of empirically effective traditional practices into national health services.(16)(17)(18) Thus, documenting and validating the Dani tribe's use of *Dolli* leaves

may contribute to policy development in maternal health, especially in resource-limited or culturally sensitive settings.

The empirical use of *Dolli* leaves (*Dodonaea viscosa*) by the Dani tribe aligns with the broader pharmacological understanding of the plant's wound-healing and anti-inflammatory properties. Al-Snafi (2017) and Beshah et al. (2020) established the foundational pharmacognosy of *D. viscosa*, identifying its rich content of flavonoids, tannins, and diterpenoids, which contribute to antimicrobial and tissue-regenerating activity.(14)(8) These findings are substantiated by recent studies such as Nayeem et al. (2021), which demonstrated the wound contraction and epithelialization-promoting effects of *D. viscosa* leaf extract in diabetic rats, showing accelerated healing within 14 days compared to controls.(4) Furthermore, Carvalho et al. (2023) identified potent flavanoid activity in ethanolic extracts of *D. viscosa*, correlating directly with the leaf's traditional use for perineal wound recovery.(19) Such alignment between traditional knowledge and modern science highlights the potential for *Dolli* leaf-based therapies to complement postpartum care, especially in low-resource, culturally distinct settings. However, while these studies support the bioactivity of *D. viscosa*, none have evaluated its contextual use in postpartum maternal care, as practiced by the Dani, suggesting a unique ethnomedicinal contribution from this study.

The traditional use of *Dolli* leaves by the Dani tribe demonstrates a distinctive, practical application that relies on heating the leaves until they wilt and release an oily substance, subsequently applied topically to perineal wounds and the newborn's umbilical area. This method requires minimal tools and reflects strong cultural adaptation to resource-limited environments. In contrast, modern pharmaceutical preparations of *Dodonaea viscosa* have utilized advanced extraction methods (e.g., ethanol or dichloromethane-based) to isolate bioactive compounds such as hautriwaic acid, flavonoids, and diterpenes, which are then formulated into standardized ointments, gels, or nanoparticles to ensure dosage precision and controlled bioavailability.(20)(15)(21) While modern approaches offer measurable pharmacokinetics and regulatory control, they often lack the cultural embeddedness and accessibility found in indigenous practices. This comparison underscores the potential of integrating validated traditional methods, such as the Dani practice, into complementary health services, especially in alignment with WHO strategies for traditional medicine integration in primary care.

Despite these promising findings, this study is limited by its qualitative design and reliance on self-reported data. Future studies should consider biochemical analyses and clinical trials to establish the efficacy, safety, and dosage standards of *Dolli* leaves in postpartum care. Collaboration between biomedical researchers, ethnobotanists, and indigenous communities will be crucial in validating traditional knowledge and integrating it into evidence-based practice.

CONCLUSION

This study highlights the ethnomedical practice of using *Dolli*/*Dollingga* (*Dodonaea viscosa*) leaves by the Dani community in Puncak Jaya Regency as an effective traditional approach for postpartum care. The leaves are applied externally to accelerate perineal wound healing, absorb postpartum blood, and facilitate umbilical cord detachment in newborns, with no reported adverse effects. These findings suggest that *D. viscosa* leaves have potential anti-inflammatory and antibacterial properties that may complement modern postpartum care, particularly in resource-limited settings. Beyond their cultural significance, the continued use of this plant contributes to maternal and neonatal health while preserving indigenous knowledge. Future efforts should focus on integrating safe and beneficial ethnomedical practices into maternal health programs, while also conducting further pharmacological and clinical studies to validate efficacy and safety. Strengthening collaboration between traditional healers, midwives, and health authorities could ensure that this local wisdom supports evidence-based maternal care and addresses health disparities in remote areas.

AUTHOR CREDIT STATEMENT

KK: Conceptualization, Methodology, Data Collection, Formal Analysis, Writing – Original Draft; **SM, HH**: Supervision, Validation, Writing – Review & Editing, Visualization; **YR, MF**: Investigation, Resources, Project Administration, Writing – Review & Editing; **SPI**: Writing – Review & Editing.

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DECLARATION OF COMPETING INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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