



Herbal Medicine among the Karo People of North Sumatra: A Narrative Review from a Medical Anthropology Perspective

Nabila Nabila*¹ 

¹Faculty of Pharmacy, Institut Kesehatan Helvetia, Medan, 20124, Indonesia

*Corresponding Author: nabila@helvetia.ac.id

ARTICLE INFO

Received 23 May 2026

Revised 20 August 2026

Accepted 18 September 2026

Available online 30 September 2026

E-ISSN: [2745-536X](https://doi.org/10.32734/ijma.v7i2.27437)

How to cite:

Nabila, N. (2026). Herbal medicine among the Karo people of North Sumatra: A narrative review from a medical anthropology perspective. Indonesian Journal of Medical Anthropology, 7(2), 70–80.

ABSTRACT

The Karo of the North Sumatran highlands maintain one of Indonesia's most elaborate herbal traditions, yet research on it consists largely of botanical inventories that say little about how illness is understood, who heals, and why remedies remain in use alongside biomedicine. This narrative review synthesises ethnobotanical, ethnopharmacological, ethnographic, and health-services literature on Karo herbal medicine from a medical anthropology perspective. Peer-reviewed articles, monographs, and policy documents identified through scholarly search engines, publisher platforms, and Indonesian journal portals were synthesised thematically using the frameworks of Kleinman, Foster, and Leslie. The materia medica is extensive: a single market survey in Kabanjahe recorded 344 species in 90 families. This knowledge is organised into named therapeutic genres, namely *param* or *kuning*, *tawar*, *minyak Karo*, *oukup* steam bathing, and *kem-kem* citrus remedies. These practices rest on a relational model of health in which wellbeing depends on the soul (*tendi*) and on proper relations with kin, ancestors, spirits, and the landscape. Care is provided by ritual specialists (*guru sibaso*), herbalists, midwives, market traders, and household caregivers, most of whom learned through inheritance, and patients combine these practitioners with biomedical services in a pattern of medical pluralism. Pharmacological validation remains thin, several widely used plants raise safety concerns, and national regulation has yet to accommodate the ritual and relational dimensions of Karo healing. Future research should pair ethnographic fieldwork with chemically characterised pharmacology, address gender and commercialisation, and follow access-and-benefit-sharing principles that recognise Karo communities as knowledge holders. **Keywords:** Karo, Ethnomedicine, Medical Anthropology, Medical Pluralism, Traditional Healers

ABSTRAK

Masyarakat Karo di dataran tinggi Sumatera Utara memelihara salah satu tradisi pengobatan herbal paling kaya di Indonesia, tetapi penelitian tentangnya sebagian besar berupa inventarisasi botani yang jarang membahas cara penyakit dipahami, siapa yang menyembuhkan, dan alasan ramuan tetap digunakan berdampingan dengan biomedis. Tinjauan naratif ini menyintesis literatur etnobotani, etnofarmakologi, etnografi, dan layanan kesehatan tentang pengobatan herbal Karo dari perspektif antropologi kesehatan. Artikel bertelaah sejawat, monografi, dan dokumen kebijakan yang diperoleh melalui mesin pencari ilmiah, platform penerbit, dan portal jurnal Indonesia disintesis secara tematik menggunakan kerangka Kleinman, Foster, dan Leslie. Materia medika Karo sangat luas: satu survei pasar di Kabanjahe mencatat 344 spesies dari 90 famili. Pengetahuan ini tersusun dalam genre terapi yang bernama, yaitu *param* atau *kuning*, *tawar*, *minyak Karo*, mandi uap *oukup*, dan ramuan jeruk *kem-kem*. Praktik tersebut berlandaskan model kesehatan relasional, yakni kesejahteraan bergantung pada keadaan jiwa (*tendi*) serta hubungan yang tepat dengan kerabat, leluhur, roh, dan lingkungan. Perawatan diberikan oleh spesialis ritual (*guru sibaso*), herbalis, bidan, pedagang pasar, dan pengasuh rumah tangga, yang sebagian besar memperoleh keahlian secara turun-temurun, dan pasien memadukan mereka dengan layanan biomedis dalam pola pluralisme medis. Validasi farmakologis masih terbatas, beberapa



This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International.

<https://doi.org/10.32734/ijma.v7i2.27437>

tumbuhan yang banyak digunakan menimbulkan persoalan keamanan, dan regulasi nasional belum mengakomodasi dimensi ritual dan relasional pengobatan Karo. Penelitian mendatang perlu memadukan kerja lapangan etnografis dengan farmakologi yang terkarakterisasi secara kimia, memperhatikan gender dan komersialisasi, serta menerapkan prinsip akses dan pembagian manfaat yang mengakui masyarakat Karo sebagai pemilik pengetahuan.

Kata kunci: *Karo, Etnomedisin, Antropologi Kesehatan, Pluralisme Medis, Pengobat Tradisional*

1. Introduction

Traditional medicine remains a routine part of health care in Indonesia. In a nationally representative survey of 31,415 adults conducted in 2014–2015, 24.4% reported using a traditional practitioner or traditional medicine in the preceding four weeks (Pengpid & Peltzer, 2018). The best-known form of this practice is *jamu*, the herbal medicine of Java, which has been the subject of considerable pharmacological and regulatory attention (Elfahmi et al., 2014). Indonesia's other several hundred ethnic groups also maintain their own medical traditions, and these have received far less systematic attention outside botanical inventories.

The Karo, one of the Batak-speaking peoples of North Sumatra, are a clear example. Karo healing is visible in daily life: herbal oils and pastes are sold in the markets of Kabanjahe and Berastagi, steam baths are prepared for new mothers, and household gardens supply both food and medicine (Silalahi et al., 2015; Silalahi & Nisyawati, 2018, 2019). Over the past decade a substantial ethnobotanical literature has documented the plants involved (Aritonang et al., 2024; Gani et al., 2024; Sari et al., 2025). Most of this literature, however, treats Karo medicine as a list of species and uses. It seldom asks how Karo people understand the causes of illness, what social positions healers occupy, how people decide between a healer and a clinic, or how market expansion, religious change, and state regulation are reshaping practice.

Medical anthropology offers tools for these questions. Kleinman (1978, 1980) proposed that medical systems are cultural systems in which illness is given meaning, and that every society's health care system contains overlapping popular, folk, and professional sectors. Foster (1976) distinguished personalistic aetiologies, in which illness results from the purposeful action of a spirit, ancestor, or person, from naturalistic aetiologies that explain illness in terms of impersonal forces or bodily imbalance. Leslie (1976) showed that Asian societies typically sustain several medical traditions at once, so that pluralism is the ordinary condition rather than a transitional stage. These frameworks have not yet been applied systematically to the Karo evidence.

This review therefore brings together the ethnobotanical, ethnopharmacological, ethnographic, and health-services literature on Karo herbal medicine and interprets it from a medical anthropology perspective. It addresses four questions: (1) how Karo people conceptualise health and illness; (2) who provides herbal and ritual care, and how that knowledge is transmitted; (3) what the principal therapeutic forms are and what is known about their pharmacology and safety; and (4) how Karo medicine is positioned within medical pluralism, markets, and national health policy. The review closes with a research agenda.

2. Method

2.1 Review design

This is a narrative (non-systematic) review. A narrative design was chosen because the relevant evidence is methodologically heterogeneous, spanning quantitative ethnobotany, qualitative ethnography, phenomenology, linguistics, pharmacology, and legal documents, and because the aim was interpretive synthesis rather than estimation of a pooled effect. The review was prepared with reference to the Scale for the Assessment of Narrative Review Articles (SANRA), which emphasises a justified aim, a described literature search, appropriate referencing, scientific reasoning, and relevant presentation of data (Baethge et al., 2019).

2.2 Literature search

Literature was identified through searches of scholarly search engines, publisher platforms, and Indonesian journal portals using combinations of the terms "Karo", "Batak Karo", "ethnobotany", "ethnomedicine", "ethnopharmacology", "traditional medicine", "healer", "*oukup*", "*minyak Karo*", "*param*", "*tawar*", "*guru sibaso*", "*Pemena*", and "*erpangir ku lau*". Reference lists of retrieved articles were screened for additional

sources. Foundational texts in medical anthropology and Karo ethnography, and Indonesian and international policy documents on traditional medicine, were added purposively.

2.3 Eligibility and synthesis

Sources were included if they reported primary data on the medicinal use of plants, animals, or other materials by Karo people; described Karo healers, healing rituals, or concepts of illness; or provided pharmacological, safety, or policy evidence directly relevant to widely used Karo remedies. English- and Indonesian-language sources were eligible. Studies of other Batak groups were retained where they offered a useful comparison. No formal risk-of-bias assessment was performed, consistent with the narrative design. Evidence was organised thematically around the four review questions and interpreted using the frameworks of Kleinman (1978, 1980), Foster (1976), and Leslie (1976).

3. Results and Discussion

The synthesis is organised around the four review questions. Sections 3.1 and 3.2 describe the social and cosmological context in which Karo people interpret illness; Section 3.3 examines healers and the organisation of care; Sections 3.4 and 3.5 describe the materia medica and its therapeutic genres; and Sections 3.6 to 3.9 consider markets, medical pluralism, pharmacological evidence and safety, and policy. Research gaps and the limitations of the review are addressed in Sections 3.10 and 3.11. The principal empirical studies on which the synthesis draws are summarised in Table 1.

Table 1. Selected empirical studies of Karo medicine included in the review

Study	Setting	Design and participants	Principal findings
Silalahi et al. (2015)	Kabanjahe traditional market	Market survey; in-depth interviews with all medicinal plant traders; observation	344 species, 217 genera, 90 families; Zingiberaceae, Poaceae, and Asclepiadaceae most species-rich; Shannon–Wiener index 5.637
Silalahi (2016)	Berastagi and Kabanjahe markets	Interviews and participatory observation with herbal traders	20 types of preparation (<i>param</i> , <i>tawar</i> , massage oils); 12–18 preparations per trader; mainly curative use
Batubara et al. (2017)	Berastagi District	Interviews; species use value	69 species used in <i>oukup</i> ; <i>Zingiber officinale</i> highest species use value (2.30)
Silalahi & Nisyawati (2018)	30 home gardens in 7 villages, Karo District	Home-garden inventory; diversity indices	85 edible and medicinal species in 43 families; 52 species cultivated
Purba et al. (2018)	Six Karo villages	Ethnobiological survey	29 plant species from 17 families used in <i>terites</i> ; valued mainly for digestive complaints
Silalahi & Nisyawati (2019)	Kabanjahe and Berastagi markets; Kaban Tua and Tanjung Julu villages	Interviews with 50 informants (9 traders, 9 midwives, 32 mothers)	59 species, 37 genera, 25 families used in steam bathing; <i>G. leucocarpa</i> and <i>C. porrectum</i> especially valued
Sembiring et al. (2020)	Seven sub-districts, Karo Regency	Qualitative interviews with 17 key informants; survey of 40 patients	Skill-based care 67%, herbal 27%, combined 6%; 70% of practitioners aged ≥51 years; 71% learned by inheritance; most unlicensed
Suza et al. (2020)	Karo patients with diabetic foot ulcer	Hermeneutic phenomenology; 10 participants	Five themes; beliefs in supernatural causation, ceremonies, and herbal remedies used alongside biomedical care
Nasution et al. (2022)	North Sumatra	Descriptive ethnomedical study	Four core treatment forms: <i>param/kuning</i> , <i>tawar</i> , <i>minyak Karo</i> , <i>oukup</i>
K. B. Ginting (2023)	Naman Village, Naman Teran	Descriptive qualitative study of producers, managers, and consumers	Five variants of <i>minyak Karo</i> ; 5–8 h cooking process
Aritonang et al. (2024)	Berastagi	Ethnopharmacological survey	Documents ingredients and uses of <i>minyak Karo</i>
Gani et al. (2024)	Kuala Sub-district, Langkat	205 informants (25 key informants); cultural significance index and use value	49 taxa; <i>Kaempferia galanga</i> highest in cultural significance and use value; leaves most used; flatulence most treated
Rahayu et al. (2024)	Karo communities, North Sumatra	Ethnobotanical survey	8 <i>Citrus</i> species, 15 local names, 9 health conditions in <i>kem-kem</i> medicine

Study	Setting	Design and participants	Principal findings
Tarigan (2025)	Karo community	Ethnography; pragmatic (speech-act) analysis	Five categories of speech acts integral to preparation of <i>minak pengalun</i>
Sari et al. (2025)	Karo communities	Qualitative ethnobotanical study	78 species in 26 families; Zingiberaceae dominant; leaves 55%, rhizomes 25%

Note. Studies are listed chronologically. Figures are those reported in each source.

3.1 Kinship, land, and religion

The Karo live mainly in the highlands of Karo Regency and the surrounding lowlands of North Sumatra. Their social organisation rests on five patrilineal clans (*merga silima*) and on a triadic system of kin relations linking wife-givers (*kalimbubu*), clan mates (*senina*), and wife-takers (*anak beru*), each of which carries ritual obligations toward the others (Singarimbun, 1975). This kinship structure matters for medicine. Healing ceremonies, like weddings and funerals, are occasions on which these obligations are enacted, and the well-being of a patient is understood to depend in part on the proper performance of kin relations.

Religious change has shaped the Karo medical landscape. Christian missions began work among the Karo in 1890, and missionaries characterised indigenous rites such as the *erpangir ku lau* purification ritual as the worship of spirits; Sebayang et al. (2022) argue that this depiction was largely a colonial construction. Today most Karo are Christian or Muslim, while a minority maintain the indigenous religion now called *Pemena* ("the first"), and ethnic, religious, and class identities intersect in complex ways (Kipp, 1993). The result is a population in which herbal practices remain widely shared, while the ritual and spiritual dimensions of healing are the subject of more varied and sometimes ambivalent attitudes.

3.2 Tendi, spirits, and the causes of illness

The Karo concept of the person includes a soul, *tendi*, whose presence and strength are essential for health. In Karo ethnography, *tendi* can be startled, can wander, or can be detained by spirits, and its loss is associated with weakness and illness; spirits of the dead (*begu*) and other nonhuman beings may cause misfortune when relations with them are neglected (Steedly, 1993). J. B. Ginting et al. (2026) describe the health philosophy of *Pemena* as fundamentally relational: health is a state of balanced relations among humans, ancestral spirits, protective spirits, and the life force, and illness signals a disruption that requires repair at once in the spiritual, social, and ecological spheres. Purification at springs (*erpangir ku lau*) and the mediation of *guru sibaso*, the spirit mediums who communicate with ancestors, are central remedies within this framework (J. B. Ginting et al., 2026; Steedly, 1993).

In Foster's (1976) terms, Karo aetiology combines personalistic and naturalistic explanations. Much everyday illness, such as flatulence, fever, sprains, fatigue, or postpartum weakness, is attributed to bodily conditions like cold, wind, or exhaustion and is treated with herbs, oils, massage, and steam (Gani et al., 2024; Silalahi & Nisyawati, 2019). Persistent, unusual, or socially disruptive illness is more likely to be read as a sign of spiritual or relational trouble. A comparable dual classification of "natural" and "supernatural" disease has been documented among the neighbouring Batak Mandailing, where a large share of the recorded medicinal species were used against spirit-caused disorders (Silalahi et al., 2022). This dual structure explains why a single plant may be applied as a physical remedy in one context and as a protective or ritual substance in another.

Karo aetiology also persists in the context of chronic disease. In a phenomenological study of ten Karo patients living with diabetic foot ulcers, participants described beliefs in supernatural causation, took part in traditional ceremonies, and used herbal treatments alongside hospital care (Suza et al., 2020). The finding suggests that explanatory models of this kind are not confined to older generations or to rural settings, and that they shape the way biomedical treatment is received.

3.3 Healers and the social organisation of care

Karo healing is provided by a spectrum of actors that maps closely onto Kleinman's (1980) popular and folk sectors. At the popular end are household caregivers, especially women, who prepare everyday remedies from home gardens and market ingredients. Silalahi and Nisyawati (2018) recorded 85 edible and medicinal species in 30 Karo home gardens across seven villages, illustrating how medicinal knowledge is embedded in ordinary domestic ecology. Mothers and traditional midwives are central to postpartum care, including the preparation of steam baths (Silalahi & Nisyawati, 2019).

The folk sector includes specialist herbalists, masseurs, bone-setters, and ritual specialists. The term *guru* designates a person with specialised knowledge, and *guru sibaso* refers specifically to mediums who communicate with the dead (Steedly, 1993). Steedly's ethnography showed that mediums' narratives of their encounters with spirits were also commentaries on displacement and historical change in colonial and postcolonial Karoland, a reminder that healing roles carry social meanings beyond therapy. Linguistic work on the preparation of *minak pengalun*, a Karo medicinal oil, shows that speech acts such as instructions, vows, and ritual declarations are integral to preparation and are understood as part of what makes the remedy effective (Tarigan, 2025). For practitioners, the words spoken over a remedy are part of the remedy.

Quantitative information on practitioners remains scarce. In a study of traditional health providers in seven sub-districts of Karo Regency, Sembiring et al. (2020) interviewed 17 key informants and surveyed 40 patients. Most practitioners provided skill-based treatments such as massage (67%), while 27% relied mainly on herbal remedies and 6% combined the two. Seventy per cent of practitioners were aged 51 years or older, 71% had acquired their knowledge through inheritance, most also worked as farmers, and most practised without a formal permit. The age profile and the dependence on intergenerational transmission point to a real risk of knowledge loss, a concern echoed in ethnobotanical studies (Gani et al., 2024).

Market traders form a further, and often overlooked, category of knowledge holders. The medicinal plant traders of Kabanjahe market possess detailed knowledge of plant identities, preparations, and indications, and they link rural producers and collectors with a wider body of consumers (Silalahi et al., 2015). Their role places them between Kleinman's folk and popular sectors and links Karo medicine to the regional cash economy.

3.4 Botanical breadth of the *materia medica*

The Karo *materia medica* is among the best documented in Indonesia. The Kabanjahe market survey recorded 344 species belonging to 217 genera and 90 families, with Zingiberaceae, Poaceae, and Asclepiadaceae the most species-rich families (Silalahi et al., 2015). Field studies in individual communities report smaller but still substantial inventories: 49 taxa among the Karo of Kuala Sub-district, Langkat, where *Kaempferia galanga* had the highest cultural significance and use value and flatulence was the most frequently treated complaint (Gani et al., 2024), and 78 species in 26 families in a recent study dominated by Zingiberaceae, with leaves (55%) and rhizomes (25%) the most used parts (Sari et al., 2025). The prominence of Zingiberaceae parallels its importance in Javanese *jamu* (Elfahmi et al., 2014), suggesting a shared regional pharmacopoeia expressed through distinct local preparations. The design and main findings of these inventories are summarised in Table 1.

3.5 Named preparation forms and therapeutic genres

Karo herbal knowledge is organised less by individual species than by named therapeutic genres, each with characteristic ingredients, preparation techniques, and indications (Table 2). Nasution et al. (2022) identify four core forms: *param* (also called *kuning*), *tawar*, *minyak Karo*, and *oukup*. A survey of preparations sold in the Berastagi and Kabanjahe markets recorded 20 types of traditional medicine divided into *param*, *tawar*, and massage oils (*minyak urut*), with each trader offering between 12 and 18 preparations; most were used for curative rather than preventive purposes (Silalahi, 2016).

Table 2. Principal therapeutic genres of Karo herbal medicine

Genre	Form and preparation	Main reported uses	Key sources
<i>Param / kuning</i>	Paste of rhizomes, spices, and other plant material applied externally	Fatigue, aches, postpartum recovery	Nasution et al. (2022); Silalahi (2016)
<i>Tawar</i>	Multi-ingredient preparation taken internally	Curative use against illness and weakness	Nasution et al. (2022); Silalahi (2016)
<i>Minyak Karo</i> (Karo oil)	Roots, stems, rhizomes, seeds, tubers, and leaves heated in coconut oil for 5–8 h until dark; several named variants, including one prepared with monitor lizard	Topical use for massage and injuries such as sprains and bruises	K. B. Ginting (2023); Aritonang et al. (2024); Sari et al. (2025)
<i>Minak pengalun</i>	Medicinal oil whose preparation is accompanied by prescribed ritual speech	Not specified in the linguistic source	Tarigan (2025)
<i>Oukup</i>	Herbal steam bath; 59–69 species recorded; <i>Zingiber officinale</i> , <i>Gaultheria leucocarpa</i> , and <i>Cinnamomum porrectum</i> prominent	Postpartum care; aches; described by users in terms of warming and aroma	Batubara et al. (2017); Silalahi & Nisyawati (2019)

Genre	Form and preparation	Main reported uses	Key sources
<i>Kem-kem</i>	Citrus-based remedies; 8 <i>Citrus</i> species known by 15 local names	Nine health conditions; <i>Citrus</i> × <i>junos</i> (<i>rimo kejaren</i>) the most versatile	Rahayu et al. (2024)
<i>Terites</i>	Partly digested stomach contents of slaughtered cattle cooked with vegetables and herbs; 29 plant species in 17 families	Digestive complaints (food as medicine)	Purba et al. (2018)

Note. Uses are summarised as reported in the cited sources; they are not evidence of clinical efficacy. Species counts for *oukup* derive from different study sites and designs and are not directly comparable.

Param or *kuning* is a paste of rhizomes, spices, and other ingredients applied externally to the body, particularly for fatigue, aches, and postpartum recovery. *Tawar* is a preparation taken internally, often described locally as a "neutraliser" against illness and weakness (Nasution et al., 2022; Silalahi, 2016).

Minyak Karo (Karo oil) is the most commercially visible Karo remedy. It is produced by prolonged heating of many plant parts, including roots, stems, rhizomes, seeds, tubers, and leaves, in coconut oil; one village-level study reported cooking times of five to eight hours, until the mixture turns dark brown or black (K. B. Ginting, 2023). Several named variants exist, including an oil prepared with monitor lizard, indicating that the Karo materia medica is not exclusively botanical (K. B. Ginting, 2023). The oil is applied topically, chiefly for massage and for bodily injuries such as sprains and bruises, and its ethnopharmacology has been examined in detail in Berastagi (Aritonang et al., 2024; Sari et al., 2025). The ritual speech accompanying the preparation of related oils (Tarigan, 2025) shows that even a product now sold in bottles retains a performative dimension for its makers.

Oukup is a herbal steam bath. Batubara et al. (2017) recorded 69 plant species used in *oukup* in Berastagi, with *Zingiber officinale* showing the highest species use value. Silalahi and Nisyawati (2019) interviewed traders, midwives, and mothers in Kabanjahe, Berastagi, and two villages and recorded 59 species in 25 families; *Gaultheria leucocarpa* and *Cinnamomum porrectum* were particularly valued for their aroma and analgesic effects. Steam bathing is used especially after childbirth, and informants describe its benefits in terms that correspond to thermotherapy and aromatherapy (Silalahi & Nisyawati, 2019). Anthropologically, *oukup* condenses several features of Karo medicine: it addresses the vulnerable postpartum body, it is organised largely by women, and its ingredients circulate through the same markets that supply other Karo remedies.

Kem-kem remedies use citrus fruits. Rahayu et al. (2024) recorded eight *Citrus* species, known by 15 local names, used for nine health conditions, with *Citrus* × *junos* (*rimo kejaren*) regarded as the most versatile. Karo informants distinguished citrus varieties by fruit characteristics finer than those recognised in botanical taxonomy, an instance of local classification that carries therapeutic meaning.

Finally, *terites*, a dish prepared from the partly digested stomach contents of slaughtered cattle mixed with vegetables and herbs, blurs the line between food and medicine. Purba et al. (2018) recorded 29 plant species from 17 families used in its preparation and found that Karo people valued it chiefly for its perceived benefits against digestive complaints. *Terites* illustrates a broader feature of Karo medicine: therapeutic value is often located in everyday foods and meals rather than in a separate category of "drugs".

3.6 Markets, commercialisation, and gender

Karo medicine is not a closed village tradition. Kabanjahe and Berastagi markets connect highland collectors and producers with urban consumers and tourists, and the diversity of material they carry is extraordinary (Silalahi et al., 2015). Commercialisation has encouraged standardised, portable products, most notably bottled *minyak Karo*, and prepared mixtures of *param* and *tawar* sold by market traders (Silalahi, 2016). This transformation plausibly brings economic benefits to producers and traders, many of them women, and has helped make Karo remedies known beyond the region.

From a medical anthropology perspective, commodification also changes what a remedy is. A preparation that was once made for a specific patient, accompanied by speech and ritual and embedded in kin relations, becomes an anonymous product whose value is expressed through labels, brands, and price. Knowledge that was transmitted within families becomes, at least potentially, a trade secret or a claim to intellectual property. Questions about who benefits from the market success of Karo remedies, and how the knowledge of women producers and traders is recognised, have not yet been examined empirically.

Gender runs through the literature, though it is rarely analysed directly. Women dominate the preparation of household remedies, postpartum care, and market trading (Silalahi et al., 2015; Silalahi & Nisyawati, 2019), while Steedly (1993) documented both women and men as spirit mediums. A gender-sensitive analysis of who holds which kinds of knowledge, how it is transmitted, and how it is valued would considerably strengthen understanding of Karo medicine.

3.7 Medical pluralism and health-seeking behaviour

Karo patients do not choose between "traditional" and "modern" medicine as mutually exclusive systems. As Leslie (1976) argued for Asian medical systems more broadly, several traditions coexist and patients move among them according to the nature of the complaint, its duration, cost, access, and the explanations that make sense to them. Kleinman's (1980) sector model captures this movement: self-treatment in the household is usually the first response, followed by consultation with folk practitioners or biomedical services, and frequently with both.

The limited empirical evidence supports this picture. Karo patients with diabetic foot ulcers combined hospital treatment with herbal remedies and traditional ceremonies, and their choices were shaped by beliefs about supernatural causation (Suza et al., 2020). Practitioners in Karo Regency continue to provide mainly massage and herbal care to a regular clientele (Sembiring et al., 2020). National data show that use of traditional medicine in Indonesia is associated with older age, poorer self-rated health, chronic conditions, and strong social support (Pengpid & Peltzer, 2018), all of which are likely to be relevant in the Karo highlands, although Karo-specific utilisation data are lacking.

Religious change adds a further layer. For Christian and Muslim Karo, herbal remedies are generally regarded as acceptable, while spirit mediumship and rituals involving ancestors are more contested (Kipp, 1993; Sebayang et al., 2022). Patients may therefore use herbs openly while keeping ritual consultations private. Biomedical providers who are unaware of these patterns may underestimate concurrent traditional treatment, which has implications for safety and for the therapeutic relationship. Suza et al. (2020) accordingly called for cultural competence among nurses caring for Karo patients.

3.8 Between ethnopharmacology and anthropology: evidence and safety

Ethnobotanical studies of Karo medicine frequently conclude that recorded plants are promising sources of new drugs. The pharmacological evidence for most Karo-specific preparations is, however, limited. A few of the most frequently used species do have a substantial literature. *Kaempferia galanga*, ranked highest in cultural significance in Langkat (Gani et al., 2024), has documented anti-inflammatory and analgesic activity, and ethyl *p*-methoxycinnamate has been identified as one of its principal bioactive constituents (Wang et al., 2021). *Gaultheria* species, which are prized in *oukup*, contain volatile oils dominated by methyl salicylate, and gaultherin-rich fractions have shown analgesic and anti-inflammatory activity in animal models (Liu et al., 2013). These findings offer a plausible pharmacological basis for the use of such plants in pain, bruising, and postpartum aches, but they do not validate the complex, multi-ingredient Karo preparations in which the plants are actually used.

Safety deserves equal attention. Methyl salicylate is itself a salicylate, so concentrated oils applied repeatedly over large areas, or ingested, warrant caution. *Cinnamomum porrectum*, another valued *oukup* ingredient (Silalahi & Nisyawati, 2019), is a source of safrole, a compound listed as reasonably anticipated to be a human carcinogen on the basis of liver tumours in experimental animals (National Toxicology Program, 2021). Whether inhalation during steam bathing results in meaningful exposure is unknown. Animal-derived ingredients, such as those in some variants of *minyak Karo* (K. B. Ginting, 2023), and uncharacterised market preparations also raise questions of quality, contamination, and species conservation.

Closing these gaps requires pharmacological research that reflects how remedies are actually made and used. Studies should document botanical identity with voucher specimens, reproduce traditional preparation methods, and characterise extracts chemically according to current best-practice guidance (Heinrich et al., 2022). Medical anthropology has a complementary contribution to make: it can specify what counts as "efficacy" for Karo users, which often includes restored strength, warmth, sleep, or social reintegration rather than a single biomarker, and it can identify the contexts of use that pharmacological models should mimic. The Indonesian classification of herbal products into *jamu*, standardised herbal medicine, and

phytopharmaceuticals (Elfahmi et al., 2014) provides a regulatory pathway for product development, but that pathway is designed for single products and has little to say about ritual or relational healing.

3.9 Policy, rights, and the continuity of knowledge

Indonesian law recognises traditional health care. Government Regulation No. 103 of 2014 sets out the categories, registration, and supervision of traditional health services, including empirical and complementary modalities (Government of the Republic of Indonesia, 2014). The Health Law of 2023 (Law No. 17 of 2023) replaced the earlier Health Law of 2009 and retains traditional health services within the national health system (Government of the Republic of Indonesia, 2023). Internationally, the WHO Global Traditional Medicine Strategy 2025–2034 calls on member states to strengthen the evidence base, regulate for safety, and integrate appropriate traditional, complementary, and integrative medicine into health systems (World Health Organization, 2025).

These frameworks are oriented primarily toward safety, licensing, and evidence of efficacy. Few Karo practitioners hold permits (Sembiring et al., 2020), and J. B. Ginting et al. (2026) argue that Indonesian health law has subordinated indigenous healing to biomedical validation, leaving no space for healing ontologies such as *Pemena* in which health is defined relationally. A policy approach informed by medical anthropology would distinguish between herbal products, which can reasonably be subject to quality and safety standards, and ritual and relational practices, which call for recognition and respect rather than clinical licensing.

The rights of knowledge holders are a related concern. Karo medicinal knowledge has commercial value, as the market for *minyak Karo* shows. The Nagoya Protocol on access to genetic resources and the fair and equitable sharing of benefits provides a framework for prior informed consent and benefit sharing when genetic resources and associated traditional knowledge are used in research and development (Secretariat of the Convention on Biological Diversity, 2011). Research partnerships with Karo communities should apply these principles from the outset, and should return findings to communities in accessible forms.

Continuity of knowledge is uncertain. The ageing practitioner population, reliance on inheritance, religious ambivalence toward ritual healing, and the substitution of market products for household preparation all threaten intergenerational transmission (Gani et al., 2024; Sembiring et al., 2020). Documentation by outside researchers can help, but it is not a substitute for conditions that allow knowledge to remain in use within Karo communities.

3.10 Research gaps and agenda

The review identified several gaps. First, the literature is dominated by ethnobotanical inventories; ethnographic studies of illness experience, healer–patient interaction, and decision-making are few, and the most detailed ethnography of Karo mediumship dates from the early 1990s (Steadly, 1993). Second, there are no Karo-specific data on the prevalence and patterns of traditional medicine use, or on concurrent use with biomedicine. Third, pharmacological studies rarely reproduce traditional multi-ingredient preparations and seldom address toxicity. Fourth, the gendered and economic dimensions of Karo medicine, including the effects of commercialisation and tourism, remain largely unexamined. Fifth, much of the local literature is published in Indonesian-language journals with limited international visibility, which slows comparative work.

This review proposes a research agenda with four strands: (1) mixed-methods studies that combine ethnographic fieldwork with population surveys of health-seeking behaviour among Karo households; (2) collaborative ethnopharmacology in which Karo practitioners help define preparations, indications, and outcomes, and in which extracts are chemically characterised and tested for safety as well as efficacy; (3) studies of markets, producers, and gender relations in the Karo herbal economy; and (4) policy research on how Indonesian regulation can accommodate indigenous healing without reducing it to biomedical categories. In all strands, research should follow principles of prior informed consent, benefit sharing, and community ownership of knowledge.

3.11 Limitations

This review has limitations. As a narrative review, it did not follow a pre-registered protocol, used no formal quality appraisal, and may be affected by selection bias. Some Indonesian-language and grey literature may have been missed. Several included sources are descriptive studies in local journals, and quantitative findings

from individual communities cannot be generalised to all Karo. Finally, the interpretation of Karo concepts offered here depends on the published ethnographic record, which is uneven in time and coverage.

4. Conclusion

Karo herbal medicine is a living medical system rather than a static inventory of plants. It rests on a relational understanding of health in which the condition of the soul, kin relations, ancestors, spirits, and the landscape all matter; it is carried by a diverse set of healers, household caregivers, and traders; it is organised into recognisable therapeutic genres such as *param*, *tawar*, *minyak Karo*, *oukup*, and *kem-kem*; and it coexists with biomedicine within a pluralistic health-seeking environment. The botanical documentation is extensive, but evidence on illness experience, patterns of use, pharmacology, and safety remains limited. A medical anthropology perspective shows why Karo people continue to value these remedies and what is at stake when they are commercialised, regulated, or validated. Research that joins ethnography with rigorous and ethically grounded pharmacology offers the best route to improving both the safety of Karo remedies and the recognition of the communities that hold this knowledge.

Acknowledgements

The author thanks Institut Kesehatan Helvetia for providing facilities during the preparation of this review.

Conflict of Interest

The author declares no conflict of interest.

References

- Aritonang, A. C. Y., Lubis, M. F., & Sujarwo, W. (2024). Ethnopharmacology of Karo oil as traditional medicine by Karo ethnic group in Berastagi, North Sumatra, Indonesia. *Ethnobotany Research and Applications*, 27, 1–43. <https://doi.org/10.32859/era.27.17.1-43>
- Baethge, C., Goldbeck-Wood, S., & Mertens, S. (2019). SANRA—a scale for the quality assessment of narrative review articles. *Research Integrity and Peer Review*, 4, Article 5. <https://doi.org/10.1186/s41073-019-0064-8>
- Batubara, R. P., Zuhud, E. A. M., Hermawan, R., & Tumanggor, R. (2017). Nilai guna spesies tumbuhan dalam oukup (mandi uap) masyarakat Batak Karo [Use value of plant species for steam bath oukup, Karo]. *Media Konservasi*, 22(1), 79–86. <https://doi.org/10.29244/medkon.22.1.79-86>
- Elfahmi, Woerdenbag, H. J., & Kayser, O. (2014). Jamu: Indonesian traditional herbal medicine towards rational phytopharmacological use. *Journal of Herbal Medicine*, 4(2), 51–73. <https://doi.org/10.1016/j.hermed.2014.01.002>
- Foster, G. M. (1976). Disease etiologies in non-Western medical systems. *American Anthropologist*, 78(4), 773–782. <https://doi.org/10.1525/aa.1976.78.4.02a00030>
- Gani, A. R. F., Hastuti, U. S., Sulisetijono, S., & Setiowati, F. K. (2024). Ethnobotanical study of medicinal plants among the Karo tribe in Kuala Sub-district, Langkat District, North Sumatra, Indonesia. *Biodiversitas Journal of Biological Diversity*, 25(7), 2960–2968. <https://doi.org/10.13057/biodiv/d250717>
- Ginting, J. B., Suci, T., Ginting, C. N., & Indriyanto, K. (2026). Pemena: Toward a relational ecophilosophy of health among the Karo people of North Sumatra. *Studia Ecologiae et Bioethicae*, 24(3), 5–16. <https://doi.org/10.21697/seb.5876>
- Ginting, K. B. (2023). Analisis komposisi minyak Karo di Desa Naman Kecamatan Naman Teran [Analysis of the composition of Karo oil in Naman Village, Naman Teran Sub-district]. *Hijaz: Jurnal Ilmu-Ilmu Keislaman*, 2(2), 57–61. <https://doi.org/10.57251/hij.v2i2.826>
- Government of the Republic of Indonesia. (2014). *Peraturan Pemerintah Republik Indonesia Nomor 103 Tahun 2014 tentang Pelayanan Kesehatan Tradisional* [Government Regulation No. 103 of 2014 on Traditional Health Services]. <https://peraturan.bpk.go.id/Details/5557/pp-no-103-tahun-2014>
- Government of the Republic of Indonesia. (2023). *Undang-Undang Republik Indonesia Nomor 17 Tahun 2023 tentang Kesehatan* [Law No. 17 of 2023 on Health]. <https://peraturan.bpk.go.id/details/258028/uu-no-17-tahun-2023>

- Heinrich, M., Jalil, B., Abdel-Tawab, M., Echeverria, J., Kulić, Ž., McGaw, L. J., Pezzuto, J. M., Potterat, O., & Wang, J.-B. (2022). Best practice in the chemical characterisation of extracts used in pharmacological and toxicological research—The ConPhyMP—Guidelines. *Frontiers in Pharmacology*, 13, Article 953205. <https://doi.org/10.3389/fphar.2022.953205>
- Kipp, R. S. (1993). *Dissociated identities: Ethnicity, religion, and class in an Indonesian society*. University of Michigan Press. <https://doi.org/10.3998/mpub.13370>
- Kleinman, A. (1978). Concepts and a model for the comparison of medical systems as cultural systems. *Social Science & Medicine. Part B: Medical Anthropology*, 12, 85–93. [https://doi.org/10.1016/0160-7987\(78\)90014-5](https://doi.org/10.1016/0160-7987(78)90014-5)
- Kleinman, A. (1980). *Patients and healers in the context of culture: An exploration of the borderland between anthropology, medicine, and psychiatry*. University of California Press.
- Leslie, C. (Ed.). (1976). *Asian medical systems: A comparative study*. University of California Press.
- Liu, W.-R., Qiao, W.-L., Liu, Z.-Z., Wang, X.-H., Jiang, R., Li, S.-Y., Shi, R.-B., & She, G.-M. (2013). *Gaultheria*: Phytochemical and pharmacological characteristics. *Molecules*, 18(10), 12071–12108. <https://doi.org/10.3390/molecules181012071>
- Nasution, J., Amrul, H. M. Z. N., & Dasopang, E. S. (2022). Etnomedisin Karo di Sumatera Utara [Karo ethnomedicine in North Sumatra]. *Jurnal Biologi Papua*, 14(1), 72–77. <https://doi.org/10.31957/jbp.1879>
- National Toxicology Program. (2021). *Report on carcinogens* (15th ed.): *Safrole*. U.S. Department of Health and Human Services, Public Health Service. <https://ntp.niehs.nih.gov/sites/default/files/ntp/roc/content/profiles/safrole.pdf>
- Pengpid, S., & Peltzer, K. (2018). Utilization of traditional and complementary medicine in Indonesia: Results of a national survey in 2014–15. *Complementary Therapies in Clinical Practice*, 33, 156–163. <https://doi.org/10.1016/j.ctcp.2018.10.006>
- Purba, E. C., Silalahi, M., & Nisyawati. (2018). Gastronomic ethnobiology of "terites"—a traditional Batak Karo medicinal food: A ruminant's stomach content as a human food resource. *Journal of Ethnic Foods*, 5(2), 114–120. <https://doi.org/10.1016/j.jef.2018.06.002>
- Rahayu, M., Kalima, T., Martgrita, M. M., Sembiring, C., Simangunsong, L., Elisabeth, S., Munawaroh, E., Astuti, I. P., Susiarti, S., Oryzanti, P., Sihotang, V. B. L., Purwanto, Y., & Nikmatullah, M. (2024). Ethnobotany and diversity of *Citrus* spp. (Rutaceae) as a source of "Kem-kem" traditional medicine used among the Karo sub-ethnic in North Sumatra, Indonesia. *Heliyon*, 10(9), Article e29721. <https://doi.org/10.1016/j.heliyon.2024.e29721>
- Sari, W. D. P., Sanimah, Suriani, C., & Nasution, A. (2025). Ethnobotanical study of medicinal plants in traditional medicine of the Karo tribe based on local wisdom. *Jurnal Penelitian Pendidikan IPA*, 11(9). <https://doi.org/10.29303/jppipa.v11i9.12291>
- Sebayang, V. A., Surbakti, A., & Naiborhu, T. (2022). Erpangir ku lau ritual: Between religion and identity. *International Journal of Interreligious and Intercultural Studies*, 5(1), 53–58. <https://doi.org/10.32795/ijiis.vol5.iss1.2022.2849>
- Secretariat of the Convention on Biological Diversity. (2011). *Nagoya Protocol on access to genetic resources and the fair and equitable sharing of benefits arising from their utilization to the Convention on Biological Diversity*. United Nations Environment Programme.
- Sembiring, S. A., Harahap, R. H., & Amir, A. (2020). Traditional healthcare and patient response services in Karo Regency. *Indonesian Journal of Medical Anthropology*, 1(1), 26–30. <https://doi.org/10.32734/ijma.v1i1.4551>
- Silalahi, M. (2016). Ramuan obat tradisional sub-etnis Batak Karo yang diperjualbelikan di pasar Berastagi dan Kabanjahe Sumatera Utara [Traditional medicinal preparations of the Batak Karo sub-ethnic group traded in Berastagi and Kabanjahe markets, North Sumatra]. *Jurnal Ilmiah Kesehatan Keperawatan*, 15(2). <https://doi.org/10.26753/jikk.v15i2.293>
- Silalahi, M., & Nisyawati. (2018). The ethnobotanical study of edible and medicinal plants in the home garden of Batak Karo sub-ethnic in North Sumatra, Indonesia. *Biodiversitas Journal of Biological Diversity*, 19(1), 229–238. <https://doi.org/10.13057/biodiv/d190131>

- Silalahi, M., & Nisyawati. (2019). An ethnobotanical study of traditional steam-bathing by the Batak people of North Sumatra, Indonesia. *Pacific Conservation Biology*, 25(3), 266–282. <https://doi.org/10.1071/PC18038>
- Silalahi, M., Nisyawati, Walujo, E. B., Supriatna, J., & Mangunwardoyo, W. (2015). The local knowledge of medicinal plants trader and diversity of medicinal plants in the Kabanjahe traditional market, North Sumatra, Indonesia. *Journal of Ethnopharmacology*, 175, 432–443. <https://doi.org/10.1016/j.jep.2015.09.009>
- Silalahi, M., Nisyawati, & Wahyuningtyas, R. S. (2022). Kajian etnobotani tumbuhan obat oleh masyarakat lokal etnis Batak Mandailing di Desa Tanjung Julu, Kabupaten Mandailing Natal, Sumatra Utara [Ethnobotanical study of medicinal plants by the local Batak Mandailing community in Tanjung Julu Village, Mandailing Natal Regency, North Sumatra]. *Al-Kauniah: Jurnal Biologi*, 15(1), 107–120. <https://doi.org/10.15408/kauniah.v15i1.17958>
- Singarimbun, M. (1975). *Kinship, descent and alliance among the Karo Batak*. University of California Press. <https://doi.org/10.1525/9780520309838>
- Steadly, M. M. (1993). *Hanging without a rope: Narrative experience in colonial and postcolonial Karoland*. Princeton University Press.
- Suza, D. E., Eltrikanawati, T., Tarigan, R., Setiawan, & Gunawan, J. (2020). The lived experience of patients from an ethnic group in Indonesia undergoing diabetic foot ulcer treatment. *British Journal of Nursing*, 29(5), S20–S26. <https://doi.org/10.12968/bjon.2020.29.5.S20>
- Tarigan, K. E. (2025). Speaking herbs: The pragmatic roles of language in the creation of minak pengalun in Karo tradition. *Journal of Linguistics, Culture and Communication*, 3(1), 25–49. <https://doi.org/10.61320/jolcc.v3i1.25-49>
- Wang, S.-Y., Zhao, H., Xu, H.-T., Han, X.-D., Wu, Y.-S., Xu, F.-F., Yang, X.-B., Göransson, U., & Liu, B. (2021). *Kaempferia galanga* L.: Progresses in phytochemistry, pharmacology, toxicology and ethnomedicinal uses. *Frontiers in Pharmacology*, 12, Article 675350. <https://doi.org/10.3389/fphar.2021.675350>
- World Health Organization. (2025). *Global traditional medicine strategy 2025–2034*. <https://www.who.int/publications/i/item/9789240113176>