Medicinal Plants Used for Wound Healing by the Kani Tribe of Kanniyakumari District, Tamil Nadu

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Abstract

Wounds are physical injuries that result in an opening or break of the skin. Present paper deals with the herbal remedies used for wound healing among Kani tribes in Kanniyakumari district, Tamil Nadu. The paper is based on the outcome of ethnobotanical survey carried out among the Kani tribe of Kanniyakumari district, Tamil Nadu. As a result of survey trips 33 plant species were collected which are widely used for wound healing. The documented medicinal plants are used for wound healings either single or in combination with other drugs. The plants recorded from the study area are arranged alphabetically by botanical name, family, voucher specimen no., Unani name, local name, part used and mode of application. Pharmacological activities of plants from published literature have also been given. Scientific validation of such folk drug plants species is suggested that may form the basis for their use as alternative treatment.

Key words: Ethnobotany, Kani tribals, Wound healing, Kanniyakumari, Tamil Nadu.

Introduction

Ethnobotany envisages to study the relationship between human and plants in nature. Ethnic people are highly knowledgeable about the plants and their medicinal values and this knowledge is passed through oral communication from generation to generation, who live in remote villages and forests. Traditional folk medicines are mostly undocumented which have been handed from one generation to another. Large section of the Indian population still relay on traditional herbal medicines. Today, a substantial number of drugs are developed from plants which are active against a number of diseases. The majority of these plants involve the isolation of the active ingredients (chemical compounds) found in a particular medicinal plant.

Research on wound healing agents is one of the developing areas in modern biomedical sciences and many traditional practitioners across the world particularly in countries like India and China have valuable information of many lesser-known, hitherto, unknown wild plants for treating wounds and burns (Kumar *et al*., 2007). Traditional forms of medicine practiced for centuries in Africa and Asia are being scientifically investigated for their potential in the treatment of wounds related disorders (Krishnan, 2006).

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Some of the commonly available drugs used in the healing of wounds are ibuprofen (non-steroidal anti-inflammatory drug), colchicines, corticosteroids, antiplatelets (aspirin), anticoagulants (heparin), warfarin and vasoconstrictors eg., nicotine, cocaine and adrenaline (Grey and Harding, 2006). Although ethnobotanical studies have been accomplished in and around Kanniyakumari forest among the tribal people by the researchers (Jeeva *et al*., 2006; Kingston *et al.,* 2006, Venkatesan *et al.,* 2009, 2010). However, no systematic studies have been undertaken to assess the management of wounds among tribals of the area. The present study was, therefore, undertaken with the aim to develop an inventory of plants used by folk healers in Kanniyakumari forests to document the folk therapies practiced for various wounds and related injuries among the tribals of the area. Information on pharmacological activities of such wound healing plants have also been included based on published literature.

Methodology

Study area and ethnic people

The study was conducted during 2008 and 2011. It was aimed to collect information about medicinal plants used by folk healers in the Southern - Western Ghats of Kanniyakumati district, Tamil Nadu. The district lies between 77°15' and 77°36' eastern longitudes and 8°03' and 8°35' northern latitudes.

The ethnomedicinal information was gathered from the indigenous people of the study area called Kani or Kanikaran, one of the oldest groups of the ethnic people in South India. They reside in remote and inaccessible forest areas and practice indigenous phytotherapy to treat common ailments. During the course of field exploration folk information on plants were gathered from the healers inhabiting the forest areas and have sound knowledge of herbal remedies.

In Kanniyakumari, the Kani tribals are inhabited in the villages of : Konjanr, Kodayar, Kodithurai or Kani kudiruppu, Keeripari, Ulakkaiaruvi, Veerapuli and Maramalai. The knowledge about medicinal plants is rather specialized and is limited to a few members in the community who are recognized as 'Vaidhyar' (also known as medicine men, informant and traditional healer). Traditional healers commonly begin their training as children or teenagers working as assistants to their mothers, fathers and to other relatives who are recognized healers. After having trained for a number of years, the apprentice will be ceremonially granted the authority to use a given treatment. This individual will be recognized by others in their culture as having mystical power to heal, as well as having the power to train others.

Data collection

The ethnomedicinal information was collected through interviewing traditional healers and for the purpose questionnaires were used to gather and record their knowledge. Details of medicinal plants used, mode of treatment, methods of preparation and types of administration were documented by interacting with them as well as through direct observations. The information got from the tribals was recorded in field notebooks and compared with the previous reports (Jain, 1991; Viswanathan, 2004; Venkatesan *et al.,* 2009). The collected plants were identified by the local people with their vernacular names, photographs and identified for the preparation of herbarium. The voucher specimens were deposited in the herbarium of Regional Research Institute of Unani Medicine, Chennai, for future reference and study.

Results

Leaves are the main part of the folk plants used for the treatment of diseases. The reasons why leaves are used mostly is that they are easily accessible and are active in production of secondary metabolites (Ghorbani, 2005). The methods of preparation fall in two categories, viz. plant parts apply as paste, juice extracted from the fresh parts of the plant, plant parts used to prepare extract in the combination of water and powder made from dried material. Majority of the remedies reported in the present study for wound healing were applied externally.

Kanniyakumari forests have a variety of medicinal plants which are used by the Kani tribals in their primary healthcare. The present study identified 33 species of plants used by folk healers to treat wounds and related injuries such as cuts, burns, bruises, boils, sores, abscess, etc,. Medicinal uses of these plants species have been presented in table- 1.The pharmacological action of the plant/part on wound healing have been shown in Table 2.

Discussion

The study of ethnomedical systems and herbal medicines as therapeutic agents is of a paramount importance in addressing health problems of traditional communities and third world countries as well as industrialized societies. Previous reports on the ethnobotany of kanniyakumari district and adjoining areas are an evidence for the presence of numerous ethnomedicinal plants used by the Kani tribals (Henry and Swaminathan, 1981; Jeeva *et al.,* 2006; Kingston, 2006; Venkatesan e*t al.,* 2009 & 2010). Present study

revealed that wounds are one of the major problems among the Kani people, due to their life in the forest. While entering into the forests they get injured. The traditional healers residing among them treat such wounds. In Indian traditional medicine, the species of the following genera are commonly used to treat wound and related injuries include *Abutilon, Achyranthes, Acorus, Aegle, Aerva, Aloe, Azadirachta, Bambusa, Boerhaavia, Butea, Caesalpinia, Calotropis, Carissa, Cassia, Curcuma, Cynodon, Datura, Dodonaea, Eclipta, Euphorbia, Ficus, Leucas, Morinda, Ocimum, Opuntia, Pergularia, Plumbago, Pongamia, Sida, Smilax, Terminalia, Tridax, Vitex* and *Zizyph*us (Jain, 1991). Kumar *et al*. (2007) and Biswas and Mukherjee (2003) reported that about 163 species of plants were used as wound healing plants in Indian Systems of Medicine (ISM) such as Ayurveda, Siddha, Unani, and folk medicine. Kani tribals in Kanniyakumari forest are also frequently using the leaves of *Ficus racemosa,* root of *Mirbilis jalapa* and stem latex of *Tylophora indica* in the treatment of wounds. According to various traditional medicinal practices throughout the world, wounds have been treated mostly topically with different medicinal herbs or with their extracts solely or in combination with some other plant parts. Kani tribals also prepare medicines in combination of several plant parts and they believe that combination of different plant parts cures diseases rapidly. Faced with increasing burden on health care, wound healers are examining all possible resources. The plants such as *Calotropis procera* (Rasik *et al*., 1999), *Heliotropium indicum*, *Plumbago zeylanicia* and *Acalypha indica* (Suresh Reddy *et al*., 2002), *Cassia fistula* (Senthil Kumar *et al*., 2006), *Cissus quadrangularis*, *Guiera senegalensis* and *Butyrospermum parkii* (Inngjerdingen *et al*., 2004), *Napoleona imperialis, Ocimum gratissimum* and *Ageratum conyzoides* (Chah *et al*., 2006) have long been used both orally and topically for healing of wounds and burns in the folk medicine by the tribal communities of various countries. Of the 33 plant species reported by Kani tribals for wound healing, the plants such as *Acalypha indica, Adhatoda zeylanica, Aloe vera, Aristolochia indica, Calotropis gigantea, Datura fastuosa*, *Euphorbia hirta*, *Ocimum tenuiflorum*, *Pongamia pinnata, and Terminalia arjuna* were investigated experimentally by various researchers in wounded animals (Reddy *et al.,* 2002; Subhashini *et al.,* 2010; Choi *et al.,* 2001; Shirwaikar *et al*., 2003; Pathak and Argal, 2007; Vimal *et al*., 2009; Sharma and Sikarwar, 2008; Shetty *et al.,* 2008; Srinivasan *et al.*, 2001; Chaudhari and Mengi, 2006.). These studies showed significant wound healing activity (Table- 2).

Role of plant compounds in wound healing

The process of wound healing is promoted by several natural products which are composed of active principles like triterpenoids, alkaloids, flavonoids and

biomolecules (Sumitra *et al.,* 2005). Asiaticoside from *Centella asiatica* (Shukla *et al*., 1999), β-sitosterol (Krishnan, 2006) and glycoprotein (Choi *et al*., 2001) from the gel of *Aloe vera*, oleanolic acid from *Anredra diffusa* (Letts *et. al*., 2006), quercetin, isorhamnetin and kaempferol from *Hippophae rhamnoides* (Fu *et al*., 2005), curcumin from *Curcuma longa* (Jagetia and Rajanikant, 2004), proanthocyanidins and reseveratrol from *Vitis vinifera* (Khanna *et al*., 2002), acylated iridoid glycosides from *Scrophularia nodosa* (Stevenson *et al*., 2002), phenolic acids from *Chromolaena odorata* (Phan *et al*., 2001), (+)-epi-α-bisabolol from *Peperomia galioides* (Villegas *et al*., 2001), fukinolic acid and cimicifugic acids from *Cimicifuga sps*. (Kusano *et al*., 2001) and Xyloglucan from *Tamarindus indicus* (Burgalassi *et al*., 2000) are some of the important plant derived wound healing compounds which were tested in animal models. Diallo *et al*. (2002) stated that polysaccharides are also partly responsible for the process of wound healing; for example, arabinogalactans from the root of *Angelica acutiloba*, acidic heteroglycans from the leaves of *Panax ginseng*, acemannan from the gel of *Aloe vera* and general polysaccharides from the leaves of *Plantago major* are reported to have wound healing activity. Many traditional remedies are based on systematic observations and methodologies and have been time-tested but for many of them, scientific evidence is lacking and there are only few prospective randomized controlled trials that have proved the clinical efficacy of these traditional wound healing agents (Khalil *et al*., 2007). Kumar *et al*. (2007) stated that the major problem with pharmacological validation of the wound healing plants was that the exact mechanism of the healing process of wound was not clearly understood; hence most of the researchers restricted the screening of plants to simple healing of wounds and did not go into details. The validation by scientific method of the usefulness of plants species reported in the present study may be undertaken that may form the basis for their possible use as alternative treatment.

Table 1: Medicinal plants used for wound healing among Kani tribals in Kanniyakumari district.

S. No.	Botanical Name/Family Name/Voucher Specimen Number	Unani Name	Local Name	Part used and Mode of Application
1	*Acalypha indica* L./ Euphorbiaceae/ RRIUM CH-9904	Kuppi	Kuppaimani	Leaves made into paste with turmeric powder applied on wound.

2	*Achyranthes aspera* L./ Amranthaceace/ RRIUM CH-8979	Atkumah	Nayuruvi	Leaf paste mixed with calcium externally applied on wound.
3	*Adhatoda zeylanica* Medic./ Acantaceae/ RRIUM CH-8982	Arusa	Adathoda	Paste of tender leaves applied on wound.
4	*Aloe vera* (L.) Burm.f./Liliaceae/ RRIUM CH-9942	Gheekwar	Karthali	Leaves gel externally apply on wound.
5	*Alstonia scholaris* (L.) R.Br./ Apocynaceae/ RRIUM CH-9968	Kashim	Elilaipalai	Latex externally applies on chronic wound.
6	*Andrographis paniculata* Burn.f/ Acanthaceae/ RRIUM CH-8931	Kalmegh	Nila vembu	Leaf extract externally applied on skin rashes.
7	*Aristolochia indica* L./ Aristolochiaceae/ RRIUM CH- 9037	Isharmul	Karuda kodi	Leaves are made in to paste applied on scabies wound.
8	*Azadiracta indica* A.Juss./ Meliaceae/ RRIUM CH-10098	Neem	Vambu	Leaves made in to paste with turmeric powder applied on cut injuries.
9	*Calotropis gigantea* R.Br./ Euphorbiaceae/ RRIUM CH-8883	Madar	Erruku	Latex applied on Dog bite (rabies) wound to cure.
10	*Cassia tora* L./ Caesalpiniaceae/ RRIUM CH-8930	Panwad	Usaithakarai	Powder of fruits mixed with 'neem oil' externally applied on diabetic wound.
11	*Catunaregam spinosa* (Thunb.) Tirvengadam./ Rubiaceae/ RRIUM CH- 8879	Mayeenphal	Karai	Fruit past applied on wounds.
12	*Cissus quadrangularis* L./ Vitaceae/RRIUM CH-9067	Hadjoda	Pirandai	Plant extract externally applied on burning injury.

13	*Coccinia grandis* (L.) J. Voigt/ Cucurbitaceae/ RRIUM CH-9949	Kunduri	Kovai	Leaf paste externally applied on wounds and cut injuries.
14	*Croton tiglium* L./ Euphorbiaceae/ RRIUM CH- 8946	Salateen	Nervalam	Seed oil externally applied on wounds.
15	*Cuscuta reflexa* Roxb./ Cuscutaceae/ RRIUM CH-8973/	Kasoos	Ottuchedi	Plant extract applied on burn injuries.
16	*Datura fastusa* L./Solanaceae/ RRIUM CH-9942	Dhatura Siyah	Karuoomathai	Roasted leaves bandaged on wound as tincture.
17	*Eclipta prostrata* L./Asteraceae/ RRIUM CH- 8989	Bhangra	Karisalnkanni	Plant extract applied on wounds as tincture.
18	*Euphorbia hirta* L./ Euphorbiaceae/ RRIUM CH-8947	Dudhi Kalan	Amman pachiarasi	Latex and leaf paste externally applied on cut injuries.
19	*Ficus racemosa* L./Moraceae/ RRIUM CH-10131	Gular, Jamiz	Atthi	Aqueous extract of bark applied on wounds.
20	*Leucas aspera* (Wild.) Link/ Lamiaceae/ RRIUM CH- 8992	Thumba, Chota halkusa	Thumbai	Leaves are made into paste with calcium and externally applied on wounds.
21	*Mimosa pudica* L./Mimosaceae/ RRIUM CH-9091	Lajwanti	Thottal vadi	Leaves are made into paste and externally applied on cut injuries.
22	*Mirabilis jalapa* L./ Nyctraginaceae/ RRIUM CH- 8894	Gul-e-Abbas	Anthimalli	Root past externally applied on cut injuries.
23	*Moringa pterygosperma* Gaertn../ Moringaceae/ RRIUM CH-10021	Sahajana	Murungai	Root paste used as bandaged medicine for wound.
24	*Ocimum tenuiflorum* L. ./Lamiaceae/ RRIUM CH-10039	Raihan	Neelathulasi	Leaf extract applied on wound.

25	*Plumbago zeylanica* L./ Plumbaginaceae/ RRIUM CH- 8977	Sheetraj hindi	Kodiveli	Leaves made into paste with neem oil externally applied on diabetic wound.
26	*Pongamia pinnata* (L.) Pierre./ Papilonaceae/ RRIUM CH- 9075	Karanj	Pongan	Seed oil applied on chronic wounds.
27	*Ricinus communis* L./ Euphorbiaceae/ RRIUM CH-9018	Arand, Bedanjeer	Amanakku	Paste of tender leaves externally applied on wounds.
28	*Rubia manjesta* Roxb.ex Fleming/ *Rubiaceae*/ RRIUM CH- 9023	Majeeth	Manjeti	Crushed flower paste applies on wound.
29	*Terminalia arjuna (Roxb.ex DC.) W&S.*/ Combretaceae/ RRIUM CH-9083	Arjun	Arjuna	Leaves are made into paste with coconut oil and used as banded medicine for chronic wounds.
30	*Tinospora cordifolia* (Willd.) Hook/ Minispermaceae/ RRIUM CH-9099	Gilo	Senthil	Leaf paste externally applied on wounds.
31	*Tribulus terrestris* L./ Zygophyllaceae/ RRIUM CH-9951	Khar-e-Khasak	Nerunji	Leaves are made in to paste with neem oil and externally applied on wounds.
32	*Tylophora indica* (Burm.f) Merr./ Asclepiadaceae/ RRIUM CH-9909	Anantamul	Velaipalai	Latex externally applied on cut injuries.
33	*Wrightia tinctoria* R.Br./ Apocynaceae/ RRIUM CH-8880	Inderjo shirin	Veppalai	1. Leaves are soaked in coconut oil for one month and applied on chronic wounds. 2. The latex externally applied for delivery wounds.

Table 2: Pharmacological action of the plants/parts on wounds healing.

S. No.	Botanical Name	Wound & related therapies practiced in folk medicine	Plant part, extracts and animal models used	Studied wound healing/ related activity
1	*Acalypha indica* L.	Skin diseases and Wound healing	Alcoholic extract of whole plant in excision and incision rat models.	Wound healing activity (Suresh Reddy *et al.,* 2002).
2	*Adhatoda zeylanica* Medic.	Wound healing properties and Asthma	Phytochemical activities of leaves wound healing in Swiss albino mice	Wound healing activity (Subhashini *et al.,* 2010).
3	*Aloe vera* (L.) Burm.f.	Skin diseases and Wound healing	Crude extract of Plant in rates	The wound-healing effect of a glycoprotein (Choi *et al.,* 2001).
4	*Aristolochia indica* L.	Wound healing and skin diseases	The ethanol extract of the shade-dried leaves wound healing in rats	Wound healing activity (Shirwaikar *et al*., 2003).
5	*Calotropis gigantean* (L.) R. Br.	Earache, Wound healing toothache and headache, sprain, stiff joints and pains	Ethanolic extract of the flowers in acetic acid induced writhing and hot plate test in mice.	Analgesic activity (Pathak and Argal, 2007).
6	*Datura fastuosa* L.	Wound healing and asthma	Ethanolic extract of aerial parts of on Wistar albino rats	Wound healing activity (Vimal *et al*., 2009).
7	*Euphorbia hirta* L.	Wound healing activity	Ethanolic extract of leaves in rats.	Wound healing activity (Sharma and Sikarwar, 2008).
8	*Ocimum tenuiflorum* L.	Wound healing and cough	Alcoholic and aqueous extract of leaves in rates	Wound healing activity (Shetty *et al.,* 2008).
9	*Pongamia pinnata* (L.) Pierre.	Wounds, inflammations, piles, ulcers and rheumatism	Ethanolic extract of leaves in acute, subacute and chronic models of inflammation in rats.	Anti-inflammatory and ulcerogenic effect (Srinivasan *et al.*, 2001).
10	*Terminalia arjuna* (Roxb. ex DC.) W&A.	Wound healing and teeth ache	Photochemical constituents for wound healing	Wound healing activities (Chaudhari and Mengi, 2006).

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