



Blood purification practices; Some ethnopharmacological insight from a rural community in KwaZulu-Natal, South Africa

N.S. Zwane¹¹, H. De Wet^a, S.F. Van Vuuren^{b1*}

^a Department of Botany, University of Zululand, Private Bag 1001, KwaDlangezwa, 3886, South Africa
^b Department of Pharmacy and Pharmacology, Faculty of Health Sciences, University of Witwatersrand, 7 York Road, Parktown, 2193, South Africa

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ABSTRACT

Edmopharmacological relevance: Blood purification practices, also referred to as blood cleansing or detoxification, is an ancient concept which is widespread within African traditional medicine. There is, however, limited consolidated information about the selection of plant species, the purpose of use and how the preparation is made. An in-depth examination of how regional communities use medicinal plants for blood purification is needed to better understand this ethnopharmacological practice.

Aim of the Study: To gather knowledge on the traditional use of medicinal plants used for the purpose of blood purification by laypersons in northern Maputaland, KwaZulu-Natal, South Africa.

Methods: An ethnobotanical survey was conducted on medicinal plants used in the rural areas of northern Maputaland for blood purification. Interviews were conducted in 55 homesteads, where the most knowledgeable participant per household was interviewed using structured questionnaires. Information collected included knowledge of the concept of blood purification, purpose for medicating, plant selection, and mode of preparation. The most important species and families were identified through indices.

Results: Sixty-four plant species from 35 families were recorded as blood purifiers for the treatment of ailments linked to the need for blood purification. *Tenninalia smecia* Burch. ex DC. was the most used plant species (mentioned by 39% of the people interviewed). The conditions that were mostly associated with blood purification were skin complaints, gastro-intestinal disorders, and overall improvement of general health. Blood purification is also commonly used for non-medical purposes such as granting good luck or as a love charm. Six new plant species and five new Zulu vernacular names had not previously been documented for blood purification.

Conclusion: The frequently mentioned use of medicinal plants for blood purification by the rural community of northern Maputaland clearly emphasises the importance of this cultural practice. There is no doubt that when examining African traditional medicine, holistic terms such as ‘blood cleansing’ cannot be ignored. Future studies may provide a better understanding of this often misunderstood and undocumented practice.

1. Introduction

A blood purifier is defined as a substance that removes toxins from the bloodstream via a process known as detoxification. Blood purification is a practice that has been carried out traditionally for centuries. Blood impurities are toxins that are accumulated in the body through improper diet, irregular bowel movements, pollution, obesity, and lack of physical activity. Traditional use confers that toxins in the stomach could be transported to other organs of the body through blood circulation and cause impurities in the blood and thus cause several varied infections (Akter et al., 2012). The concept of blood purification is

complex and often difficult to understand due to multifactorial aspects that are implicated in diagnosis. Nonetheless, blood cleansing is widespread both in Western and in traditional medicine all over the world (Akter et al., 2012; Clement et al., 2017; Khalid et al., 2017; Sureshkumar et al., 2017). It implies that the blood is contaminated with undesirable elements that may cause illness. In Western medicine, blood purification involves sophisticated medical procedures which may include; haemoadsorption, haemodialysis, haemofiltration, haemo-perfusion and plasma exchange amongst other techniques (Zhou et al., 2007).

In traditional medicine, the concept of blood purification is widely

* Corresponding author.

E-mail address: sandy.vanvuuren@wits.ac.za (S.F. Van Vuuren).

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practiced. This have been reported widely, where some studies included medicinal plants (*Cassia absus* L., *Cynodon dactylon* (L.) Pers. and *Ziziphium nymularia* (Burm.f.) Wight & Arn) as blood purification remedies from India (Sureshkumar et al., 2017). In Pakistan in the Karamar valley, *Bauhinia vatiegata* LIM., *Chenopodium album* L., *Cuscuta rejllexa* Roxb., *Fagonia arabica* L. and *Fumatia parviflora* L were documented (Khrdid et al., 2017), and in Iran, south of Kerman *Berberis integmima* Bunge, *Cichoriwn pumilwn* Jacq., *Sageretia thea* (Osbeck) M.C.Johnst. and *Trifoliumpretense* L were recorded (Sadat-Hosseini et al., 2017).

In South Africa, previous studies have shown that blood contamination is often linked to medical conditions where the origin is not easily identifiable, such as internal infections and/or spiritual connection (Vai Vuuren and Frank, 2020). Several ethnobotanical surveys have recorded plant species used for blood purification. A study on medicinal plants used by women in northern KwaZulu-Natal documented 14 plants used as blood purifiers, and these were the most popular treatments documented (De Wet and Ngubane, 2014). Earlier records (Hutchings et al., 1996) on medicinal plants used in the Zulu culture documented 73 plants for blood purification. Furthermore, our earlier review on South African medicinal plants used as blood purifiers defined the African concept of blood purification and documented 159 plant species that are associated with blood cleansing (Van Vuuren and Frank, 2020). Within this review, recommendations were made to get a better understanding of why specific plant species are used for blood purification. This study explores the plants used as blood purifiers and their curative purpose in rural communities within Northern Maputaland, KwaZulu-Natal.

2. Material and methods

2.1. Study area

The study took place in three rural communities (Mbazwana, Mseleni and Ntshogwe) in northern Maputaland in KwaZulu-Natal (South Africa) (fig. 1). These communities are part of Umhlabyalingana Local Municipality, which falls under Umkhanyakude District Municipality. The homesteads visited during the survey were found between 32°21' and 32°41' latitudes and 27°2'X and 27°6'CY longitudes with a surface area of

3621 km². The population estimates for the municipality is approximately 168 763 for the year 2021. The number of households recorded as of 2016, was 39 614, with an average household size of 4.3 people per household (Umhlabyalingana Local Municipality IDP, 2022/23).

The primary topsoil type prevalent in Umhlabyalingana local municipality is sandy. This region also features expansive wetlands, characterized by the presence of wetland vegetation such as various species of *Juncus*. These wetlands offer numerous benefits to the area, with a significant focus on supplying grass for crafting and household purposes, as well as aiding in flood control. The prevailing vegetation in the area is referred to as Maputaland Coastal Thicket, with a predominant presence of grassland (Umhlabyalingana Local Municipality IDP, 2022/23). The area is 99% classed as rural, yet according to the Umhlabyalingana Local Municipality, 72% of the population has access to schools, and 91.6% of households have access to healthcare services and schools. According to Sanders and Bradshaw (2010), many residents in these areas live in unclean, overcrowded, and poorly ventilated dwellings, which increase their risk of contracting infectious diseases. The local economy relies heavily on agriculture, tourism, and informal businesses as its key economic driving forces.

The region has a subtropical climate, characterized by an average yearly temperature of 21.5 °C. Summers are warm to hot, while winters tend to be cool to mild. Annual precipitation varies, with the western rural areas receiving between 600 and 700 mm, and the coastal sea belt on the eastern side receiving between 1201 and 1250 mm of rainfall (Umhlabyalingana Local Municipality IDP, 2022/23).

2.2. Ethnobotanical surveys

Ethnobotanical surveys were conducted from October 2018 to January 2019 after receiving ethical clearance (UZREC 171110-030 PGM, 2018/609) from the University of Zululand Research Ethics Committee. Structured questionnaires were used to conduct interviews. The 55 homesteads visited were sampled by the convenience sampling method (EtJkan et al., 2016). The homesteads were approached if there was a sign of someone within the homestead. Participants of the study were sampled by availability and willingness to participate in the

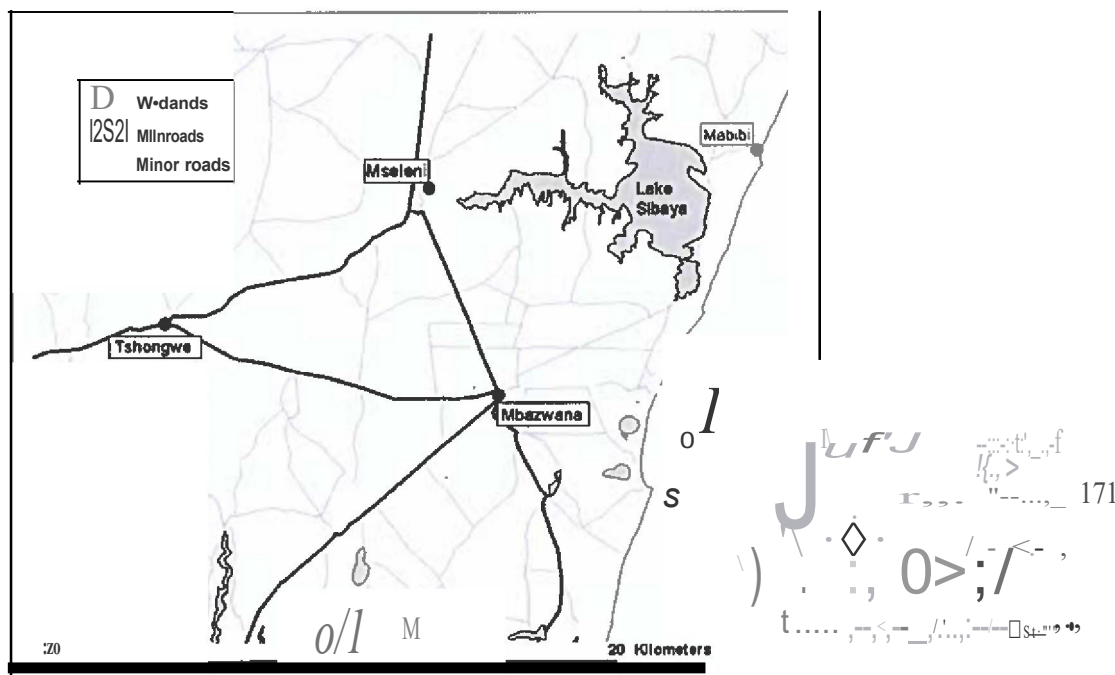


Fig. 1. Area of the study, showing the three communities involved in the study in the northern Maputaland KwaZulu-Natal, South Africa.

survey. In the case where there were two or more consenting adults in a homestead, the most knowledgeable person would be questioned.

Fifty-five participants were interviewed. The 55 participants consisted of 50 females and five males. All participants were well acquainted with plants used for blood purification. The survey had participants from different age groups, of which one participant was a child, 11% comprised of young people, 65% adults (25–64 years) and 22% elders (265 years). The survey was conducted during the time of the day when males and most young people were not around the homesteads. The males were reported to be herding cattle, seeking jobs or out for leisure, whereas young people were reported to be at school.

Thirty-one percent of participants were illiterate, while 34% had only primary education, 33% had accomplished secondary education (with three teenagers interviewed still at school) and one participant had a tertiary education. None of the participants were formally employed. The living income was either from the South Africa Social Security Agency pension (SASSA) (18%), government social grants (33%), self-employment (7%), self-employment and SASSA pension (16%), self-employment and government social grant (20%) or government child support grant (6%). Self-employment referred to any income generating endeavour which included amongst others, selling medicinal plants to muthi markets, street vendors, home farming and some in construction.

Global Positioning System (GPS) was used to mark the specific location of each homestead visited. The aim and objectives of the study were explained to the participants and a consent form was signed before the interview. The elderly and illiterate participants were allowed to sign by the cross-signature method. The interviews were conducted in IsiZulu (local language). In most interviews, the researcher read the questions and wrote the answers verbally given by the interviewee, since some of the participants could not read or write. Plant species mentioned were identified by the participants and collected *in situ* for voucher specimens. One voucher specimen that had leaves, flowers and fruits was collected for scientific identification. In the absence of vegetative and reproduction parts, the plant was searched by the common name and the resulting images were confirmed by the informants. Where there was ambiguity with respect to the common name, voucher specimens were cross referenced with our previous collections in the same geographical area (De Wet et al., 2010; York et al., 2011; De Wet et al., 2012; De Wet et al., 2013; De Wet and Ngubane, 2014; De Wet et al., 2016). Plant names were authenticated by Dr. T.H.C. Mostert from the Department of Botany (University of Zululand) and deposited in the University of Zululand herbarium (ZULU).

2.3. Data C111alysis

The demographic data of the informants was initially analyzed. Thereafter, quantitative parameters, where applicable, were measured to validate the traditional use of medicinal plants for blood purification (Leonti, 2022). The relative frequency of citation (RFC) was calculated to determine the correlation between the number of times a species was mentioned by an informant in relation to the number of times mentioned in total.

3. Results

3.1. Socio-demographic ill/on11nation

An observation was made from the study that males and females had different reasons to use blood purifier plants. Males in the study predominantly use blood purification for non-medical purposes like seeking employment (good luck) or courting (love channs), while women reportedly use the plant species for medically related conditions associated with the female anatomy. Both genders reportedly use plants for infection related conditions.

The study area is a developing region with easily accessible clinics, hospitals, and schools for basic education, however, the participants

voiced preferred plants growing in and around their homesteads for their primary healthcare. More than 50% of the participants from each age group could at least name three plant species and provide detailed information on the preparation and administration of the remedy. In this study, a teenage girl in grade 12 (final year of secondary school education) was more interested and informative about blood purifier plants than her mother. The interest of this young girl in medicinal plants came from her aspiration of becoming a medical doctor, with the dream of promoting a relationship between traditional medicine and Western medicine.

3.2. Concept of blood purification

The participants from northern Maputaland used the word "*izihlazi*" to refer to blood purifier plants, which is a direct translation from the word 'cleanser'. The participants described blood purification as a method for improving the function of the body and preventing and treating infections. "Blood impurities" were then referred to as any "dirt" accumulated by the blood and body to cause illnesses and discomfort. Examples of given impurities were toxins, pathogenic organisms, evil spirits and magical evil cast through "witchcraft". In addition, blood purification procedures can also be applied for a spiritual connection, and body cleansing before participating in a spiritual event like fasting to connect to ancestors or during ancestral ceremonies. Blood purification plants were reportedly also used against "hateful thoughts", or "bad blood". Magical uses were ascribed to casting good luck and love charms. Several ailments were reported to be associated with the need for blood purification (fig. 2). According to the participants, blood purification improves the functioning of a weak body (possibly referring to a weak immune system). Blood purification is applied when Jay people show visible signs of weakness, breath and urine odour, sores on children, regular boils, acne, red eyes, bladder, and kidney complaints, burning of parts of the body and bad luck. The study revealed that the participants associated most skin and urinary tract infections as well as infertility with blood impurity. Participants also associated blood cleansing with various fungal and bacterial infections as well as cultural and spiritual beliefs. The interviewed people believed that tapeworms develop in your intestine because of irregular cleansing and accumulation of blood toxins in the digestive system.

3.3. Medicinal plant species used for blood purification

A total of 64 plant species within 35 families were recorded for blood purification. The participants believe that the red colour of the bark or roots of selected plants, like *Sclerocarya birrea* (A. Rich.) Hochst. and *Rhoicissus digitata* (L.f.) Gilg & M. Brandt show that the plant could be used for blood-related ailments. The whiteness of some bark or roots (*Ekebergia capensis* Sparrm., *Gardenia volkensii* K.Schum. and *Vangueria infa11sta* Burch.) was affiliated to cleanliness.

In TRble 1, the plant species mentioned for blood purification were recorded along with ailments that participants had linked to blood infection, the mode of preparation and administration was also mentioned. Five of these plant species were not available for collection in the homestead area or if the plant was available, it was reported that the roots were used but no above-ground vegetative part was available for identification. These plants were tentatively identified by their Zulu vernacular names. The most frequently mentioned plant species (Table 1) used as blood purifiers by the participants was *Tennillia sericea* Burch. ex DC. (mentioned 25 times), *Bridelia cathanica* Bertol. (18 times), *Cymbopogon marginatus* (Steud.) Stapf ex Burt•Davy (15 times), *Catunaregam obovata* (12 times), *Sclerocarya birrea* (A.Rich.) Hochst. {10 times} and *Senecio serraruloides* DC. {10 times}. Six plant species in this study, viz., *Can11laregam obovata*, *Dichapetal11m cymos111m* (Hook.) Engl., *Hyphaene natalensis* Kuntze, *Sola1111m pandurifonne* E. Mey., *Synaptolepis kirkii* Oliv and *TabernaemontC111a elegans* Stapf had not been previously mentioned in the literature for blood purification. The Zulu vernacular

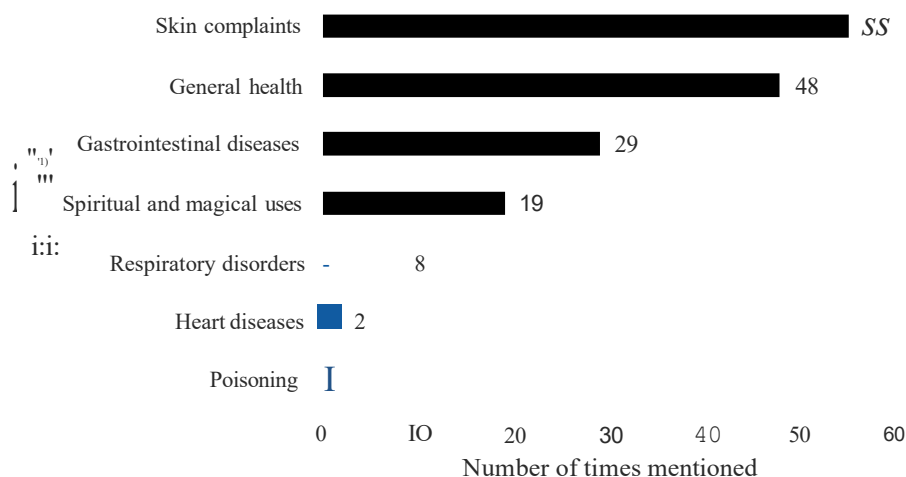


Fig. 2. Plant uses reported in northern Maputaland that are associated with the need for blood purification.

plant names mentioned for the first time according to literature were; isikwakwane (*Cattmaregam obovata* (Hochst.) A.E.Gon.); upata (*Grewia caffra* Meisn.); umhlakuva (*Ricinus communis* L.); umbungwa (*Landolphia kirkii* Dyer) and uvemvane (*Waldtena indica* L.).

Roots (41) were the most commonly used plant part followed by leaves (17%) then bark (16%). The other plant parts mentioned for blood cleansing included bulbs, fruits, seeds, tubers, connes, shoots, and twigs. For some plant species, i.e., *Cymbopogon natus* (a grass) a whole plant was reported for use. During the survey, *C. natus* was not available for collection during this survey due to goats and cattle grazing in and around the homesteads, but when available, the plant was frequently utilized for blood purifying purposes.

3.4. Preparation and administration of blood purifier plants

The predominant way to prepare the remedies used for blood purification was by decoction (52%), then infusion (35%) and burning of plant parts (4%). Most of the remedies were administered orally, whereby large quantities (5 L) of a weak, lukewarm herbal infusion was consumed to induce vomiting. The participants reported that this was done to ensure that the remedy can flush the system from impurities that may have accumulated. Poultices were used on boils and bums or as a bandage to cover them. In some cases plant material was simply sliced and rubbed on affected areas. The preparation involved softly pounding leaves to make a paste and then packing on an affected area.

While many of the plant preparations were simple decoctions, one preparation stood out which was that for *Pyrethanthus scandens*. For this plant species, the participant mentioned the additional use of "white.. (silver) coins to enhance good luck. This can be compared to tossing coins into fountains and wells to wish for good luck. Forty percent of the remedies were taken orally, 18% of the remedies were administered as enemas, 15% by steaming, 12% through bathing, 11% by rubbing on the skin and 4% by inhaling the aromatic smoke. The dried fruits or bark was burned; fleshy shoots or leaves were crushed between the fingers and the aroma they release is inhaled. This type of inhalation was reported to be used for treating headaches. Steaming was reported to be purposively done by adults to open pores and allow the remedy to be absorbed by the skin for skin ailments (mostly for acne). In addition to steaming, people also reported using decoctions for bathing to wash sweat and "dirt" secreted from the skin. Ninety percent of the time participants reported that the plants they use for good luck or love charms were prepared as baths and for steaming. The use of an enema was reported to "flush diseases from the body" and cleanse the "stomach". Participants reported that when a remedy is bitter or poisonous if

taken orally, the rectal route is preferred, and was less likely to have adverse effects. This mode is commonly used for infants and children. Enemas were administered in different dosages depending on the age of the person treated. Infants and children of 1-3 years took low dosages with a bulbed apparatus to inject an enema, whereby volumes of 30-300 ml were rectally inserted. Older children take enemas of 1-2 L and adults administered a dose of 5 L of a lukewarm decoction. The use of an enema was also mentioned for also relieving constipation.

The participants emphasized the correct use of, as well as low dosages when using certain blood purifier plants, particularly when some blood purification plants are known to be poisonous. However, these poisonous plants species seemed to be the preferred plants since participants believed that inducing vomiting or any other type of purging promoted good health which was the main blood purification purpose. Some of the reported plants like *Abrus precatorius* L. and *Ricinus communis* were known to be toxic, however, they were reported as useful for inducing vomiting or acting as a laxative for removing "excess bile". Some taxa such as *Cattmaregam obovata*, *Catharanthus roseus* and *Trichilia emetica* were used and participants all claimed that they had no known adverse reaction when used in small dosages. Ninety percent of the participants who mentioned *Catharanthus roseus* and *Trichilia emetica* emphasized that pregnant women should not resort to using these medicinal plants as they could induce abortion. The participants claimed that plant parts that have a bitter stinging taste are more likely to be poisonous and should be used cautiously. Other species that are known or suspected to be poisonous were not reported to be used internally but rather used as baths for sores and other skin ailments.

3.5. Plant combinations; mentioned as blood purifiers

A total of 26 combinations were mentioned for blood purification (Table 1). These combinations were made up of mostly two plants but sometimes three or four plants were combined. The availability of different plant species in the area allowed participants to formulate their own combinations when trying to increase the efficacy of remedies. Each combination was mentioned once. However, it was noted that some combinations had one plant difference. For example, one participant mentioned a combination of *Combretum molle* and *Terminalia sericea* and the other participant mentioned the same combination with the addition of *Ziziphus mucronata*. These combinations were prepared by boiling (92%) or soaking overnight (8%). *Vangueria infausta*, *Sclerocarya birrea*, *Strychnos spinosa* and *Terminalia sericea* were the most frequently used plant species prepared in combinations.

From the 64 plant species used for blood purification, the RFC were

Table 1
Medicinal plants used (single and combination) by the participants for blood purification.

Botanical name (Voucher number); Family name	Vernacular name in Zulu	Plant parts used	Number or times mentioned (RFC)	Preparation, dose, administration and ailments associated with blood cleansing	Previous studies relating to associated use that may link to blood purification
<i>Abrus precatorius</i> L. (ns.zwan 02); Fabaceae	Umsinsi	Roots	Two (0.04)	(i) The roots are ground and boiled in water for 30 min (min) after which they are allowed to cool down. A mug (250 ml) is taken daily for blood cleansing and prevention or treatment for boils, sores, rashes, ringworm or as a tonic. (ii) The roots are mixed with those of <i>Iliridilio</i> , <i>cardiatica</i> and boiled in water. The decoction is taken in the morning occasionally as a blood cleanser.	Worms (Tugume et al., 2016)
<i>Acanthopanax glaberrimum</i> (DC.) Wild (ns.zwan 42); Asteraceae	Isinama	Whole plant	Three (0.05)	Ground plant is immersed in warm water and given to children as an enema for internal cleansing , to boost the immune system, treat strong fever, fatigue and cool down extreme body heat.	Fever (York et al., 2011)
<i>Alburtisia dilaegensis</i> (N.E. Br.) Forman (ns.zwan 34); Menispermaceae	Ungangingandi	Roots	Three (0.05)	(i) Ground roots are boiled in water and taken orally by children for blood cleansing and tapeworm. (ii) The roots are ground and immersed in water overnight. Half a mug (125 ml) is taken orally in the mornings for cleansing blood. (iii) Ground roots are mixed with the root tuber of <i>Pyrracantha kauraba</i> , <i>sana</i> and boiled in 2 L of water. A quarter or a cup is taken orally for sores.	Digestive system disorders and infections (De Wet and Van Wyk 2008)
<i>Aloe marlothii</i> A. Berger (TYORK 19); Aloaceae	Inhlaba	Leaves	Two (0.04)	Add a few drops of leaf sap in half a glass of water to drink in the morning for blood cleansing. This is also used for heart diseases and high blood pressure.	Sores (De Wet et al., 2012)
<i>Bidens pilosa</i> L. (ns.zwan 48); Asteraceae	Uqadolo	Roots	One (0.02)	A handful of ground roots are boiled in 2 L of water and strained. Drink half a glass every morning for internal cleansing and skin complaints.	Blood purification (Bryant, 1966; Mabogo, 1990; Von Koenen, 2001); ringworm (De Wet et al., 2013)
<i>Brachylaena dioica</i> DC. (ns.zwan 43); Asteraceae	Iphahla	Leaves	Three (0.05)	The ground leaves are boiled in water, strained and allowed to cool down. The decoction is taken as an enema for internal cleansing and strengthening of the body.	Blood cleansing (Githens, 1949; Watt and Breycr-Brandwijk, 1962; Mabogo, 1990); fever (Corrigan et al., 2011)
<i>Bridelia cathartica</i> Bertol. (ns.zwan 01); Euphorbiaceae	Umkhawulangazi/ungazini	Leaves, roots	Seventeen (0.31)	(i) A handful of fresh leaves or roots is lightly ground and boiled in 1 L of water for 30 min. A quarter or a cup (63 ml) is administered orally 30 min before breakfast for blood purification. This could also be used to treat menstrual pains. (ii) The leaves or roots are ground, boiled in water, strained, and allowed to cool down. The decoction is taken prior to breakfast, as an emetic. The decoction could also be used as an enema for relief. (iii) The ground roots are mixed with the roots of <i>Rhoicissus digitata</i> and allowed to boil in 2 L of water. Hair a mug (125 ml) or the remedy is administered orally in the mornings as a tonic or cleanser. This can also improve fertility. (iv) It is used in combination with <i>Abrus precatorius</i> as previously described for cleansing blood.	Blood clearing and menstrual pain (Wall and Ilirij) (Ct-Brandwijk, 1962)
<i>Carica papaya</i> L. (NZ-21); Caricaceae	Upopo	Leaf stalk	One (0.02)	The milky sap or the stalk is applied topically on warts or ringworm or taken orally for internal sores (where skin integrity has been compromised), and used for cleansing.	Skin infections (Atkinson et al., 2011)
<i>Canchium immitis</i> (L.) Kuntze (ru.zwan 07); Rubiaceae	Umvuthwamini	Roots	Two (0.04)	(i) The steam produced from boiling the ground roots in water is used to treat acne and cleansing through the pores. (ii) The ground roots are mixed with the roots of <i>Schinus molle</i> and immersed in warm or cold water for bathing. This	Stomach complaints (Ilirij) (L 1966)

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Table 1 (continued)

Bou,nkal IU1111e (Voucher number); family name	Vernacular name In Zulu	Plant parts used	Number of times mentioned (RFC)	Preparation, dosage and administration and ailments associated with blood cleansing	Previous studies peruininz associated use that may link to blood purification
<i>Carharandw ro.sew</i> (L.) Cl. Don (ns.zwan 45); Apocynaceae	Imball	Rooll	Three (0.05)	was reported to be done for good luck and as a love charm. The roots are ground and immersed in warm water to prepare enemas for internal cleansing. It is used for strengthening the body, stomach-ache and IRpewonn.	Used extensively but not for any blood cleansing (Kl ¹ , IIIA ¹ , I ¹ = - - 2021)
<i>Carunarqun obovata</i> (Hochst.) A.E.Gon . (ns. zwan S2); Rubiaceae	Jsikwakwane	fruits	Ten (0.18)	Mature fruits are cut and immersed in warm water and the next morning the infusion is carefully strained and taken orally to induce vomiting for blood cleansing.	None mentioned In IltrltuH
<i>ewan,,,los hirta</i> "Klowch (ns.zwan 37); Menispermaceae	Umenyokane	Roots	One (0.02)	Ground roots are mixed with the ground roots of <i>Gymnosporia senegalmru</i> and a handful of <i>Landolphia krrlcii</i> and boiled in 2 L of water. Adults drink half a mug (125 ml) and children 1-2 tablespoons (15 ml) three times a day to cleanse and strengthen the body, Md to l'eat diarThoea.	Diarrhoea ("i. "ti ..., III 2010)
Cl<uJflla omsata (Willd > Hook f ex Bendt. (ns.zwan 47); Rutaceae	Umwashampunzi/ umsanga/isifudu/ umnukambiba	Leaves	Five (0.09)	Ground leaves are boiled in water, strained, and allowed to cool down. This is administered as an enema for body cleansing, internal sores and external sores. The decoction is also used as a wash for external sores	Treats body pains;md gives Slength (Phl ndl?r 2011)
<i>Combnrummolle</i> • R.Br. ex G. Don (ns.zwan 16); Combretaceae	Imbond	Leaves, roots	Six (0.11)	(i) Ground leaves or roots are soaked in 5 L of water overnight. The infusion is strained and taken orally before breakfast as an emetic. This is done regularly to maintain a healthy immune system and for sl'length, (ii) A handful of roots are ground and mixed with the roots of <i>Taminalia</i> eo and infused in water. In the mornings this infusion is taken orally to induce vomiting. This is also used as an antidote for snake poison. (iii) Mix the roots with the roots of <i>Tmminali</i> • <i>saiua</i> and <i>Ziziphw mnrcronara</i> and soak them in warm water for a brief time and use R<an enema for internal body cleansing and fatigue.	Snake bite antidote (Pon,'t7, 1998)
Cmbopogan m("linalw• (Steud.) Engl. (ns.zwan 20); Davy; Poaceae	Is	Whole plant	Fifteen (0.27)	(l) Ground fresh or dried plants are soaked in water for balhng , for love charms, for good luck, and for skin problems. (ii) Mix the plant with the roots of <i>Prosopi, cinbaria</i> and <i>Sapium int,genimum</i> and boil in water. The steam is used for blood cleansing. Steaming is also used to treat acne and as a good luck charm. (iii) The plant could also be used in combination with <i>Schotia brachypttala</i> bark to steIU11 for pimples.	Blood purification (Wan and Breyer-Brandw1,k, 1962' Philander, 2011)
<i>Dichapetalum cyrnoswn</i> • (Hook.) Engl. (ns.zwan 20); Dichapetalaceae	Ubangalala	Roots	One (0.01)	Roots are ground with roots of <i>Eudeo natalmsiJ</i> and soaked in cold water overnight. In the morning the infusion is taken orally to induce vomiting. It is also used in baths as a love charm and for good luck.	None mentioned in Ilrt<aun
<i>Ekebergia capm,i,s</i> Spamn. (ns.zwan 50); Meliaceae	Umnymathi	Bark	One (0.02)	(i) Bark boiled in water is taken as an emetic for blood cleansing. (ii) Steam released from boiling the bark in water is used to treat acne and as a love or good luck charm.	Emetic, pimples (Mabogo, 1990)
<i>Elk.JhM1011hifa duJ)hamna</i> (Burch.) Skeels (S. Neikl 12); Leguminosae	Intolwanetumdabu	Roots	Two (0.00)	The roots are ground and boiled in water to be administered as an enema to improve blood circulation and strength.	Blood purification (Bryant, 1966; Ocl(and el al., 1985; Von Koenen, 2001)
<i>Eud,a natalmsis</i> • A.DC. (ns. zwan 19); Ebenaceae	Udelunina/ idungamuz,	Bark, roots	Two (0.04)	(i) It is used in combination with <i>Dichap,talwn cymoswn</i> as previously described. (ii) A handful of bark or roots are mixed with a handful of <i>Stlerocarya bin-ea</i> bark Md boiled to steam for cleansing blood treating acne and getting rid of bad luck	Blood purification (Gerstner, 1 38; U. Wei and Ngubane, 2014)

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Table 1 (continued)

Botanical name (Voucher number); Family name	Vernacular name in Zulu	Plant parts used	Number of times mentioned (RFC)	Preparation, dosage and administration and all mentions associated with blood cleansing	Previous studies pertaining to associated use that may link to blood purification
<i>Euphorbia inaequalis</i> E.Mey. ex Boiss.; Euphorbiaceae	Umhlehle	Leaves	Two (0.04)	The leaves are cul, and the milky sap is applied topically to cleanse blood or rubbed on warts.	Blood purification (Cnlttn, 19:111)
<i>Garcinia livingstonei</i> T. Anderson (ns.zwan 23); Clusiaceae	Ugobandlovu/Umphimbi	Bark	Three (0.05)	(i) The ground bark is soaked in water and strained after a few min. The infusion is given to children as an enema for weakness and fatigue. (ii) The bark is mixed with that of <i>Scltrocarya bin'ea</i> and boiled. After straining, it is taken orally to treat diarrhoea. (iii) The roots are mixed with the roots of <i>Oclma natalitia</i> and <i>Vangueria infawta</i> then soaked in cold water overnight. The infusion is used in a bath for seven consecutive days for body cleansing to prevent bad luck.	Blood purification (De Wet and Ngubane, 2014)
<i>Gardenia elkensis</i> K.Schum. (ns.zwan 28); Rubiaceae	Umvalasangweni	Roots	One (0.02)	(i) A handful of roots are boiled and used to steam acne and soothe sore eyes. (ii) The ground roots are boiled in water, strained, and taken orally to cleanse the body and for intestinal worms and sores.	Sore eyes (Marx et al., 2010)
<i>Grewia caffra</i> Meisn. (ns.zwan 44); Tiliaceae	Upata	Roots	Two (0.04)	The ground roots are soaked in cold/warm water. A quarter of a mug is taken often orally to strengthen the body and prevent diseases as a form of blood cleansing.	Blood purification (Furber, 19:111)
<i>Gymnosporia natalensis</i> (Lam.) Loes. (ns.zwan 22); Celastraceae	Ubuhlangwe/ isihlangwane	Leaves, roots	Four (0.05)	(i) The roots or leaves are ground and mixed with sulphur powder and boiled in water for 30 min. The strained decoction is taken orally in the mornings (half glass) for blood cleansing. (ii) The ground roots are mixed with those of <i>Cissampelos hirta</i> and <i>Lardolphia kirkii</i> and allowed to boil. Adults drink half a mug and children 1-2 spoons (15 ml) three times a day to cleanse the body and strengthen it.	Blood purification (Lindenberg et al., 2011)
<i>Hippobromus ucyflorus</i> Radlk. (ns.zwan 29); Sapindaceae	Iqhume/umfazi othethayo	Twigs, roots	One (0.02)	(i) The ground twigs are soaked in warm water and administered as an enema to cleanse the body internally and for fatigue. (ii) Twigs or roots are used to steam for love charms.	Love charm (Lindenberg et al., 2009)
<i>Hydnora abyssinica</i> A.Br. (ns.zwan 39); Hydnoraceae	Umvumbuka	Rhizome	Two (0.04)	Dry rhizome is ground, and a handful is boiled in 5 L of water for steaming and bathing. This is for cleansing the body and skin, good luck charms and pimples.	Stomach diseases, gastric ulcers and cancer (Al-fuom, et al., 2018)
<i>Hyphaene natalensis</i> Kuntze (ns.zwan 32); Arecaceae	Ilala	Stem	One (0.02)	The chopped stem is mixed with the ground roots of <i>Rhoicissow digi101a</i> and boiled in 1 L of water. The decoction is taken orally in the morning for body cleansing and to relieve menstrual pains.	None mentioned in literature
<i>Hypoxis hemerocallidea</i> Fisch., C.A.Mey. & Avenell (SC Ngubane 15); Hypoxidaceae	Inkomfe	Corm	One (0.02)	(i) Fresh corm is chopped and boiled in 1-2 L of water. Half a glass is taken regularly to cleanse blood. (ii) The corm is chopped and mixed with the crushed shoots of <i>Senedo strobiluloides</i> and boiled in 2 L of water for 30 min. Half a glass for children is taken orally twice a day to cleanse blood, treat rashes and sores. (iii) A handful of freshly ground corm is mixed with <i>Scadaxus pwucw</i> ground bulb, <i>Ruellia lunulw</i> mulifidw shoots, ground roots of <i>Ximenia caffra</i> and brimstone (sulphur) and boiled in 5 L of water. Take half a glass orally three times a day to drain vaginal discharge, get rid of smell in urine, dirt in the blood, and pimples.	Blood purification (Rustner, 2011)
<i>Kigelia africana</i> (Lam.) Benl. (ns.zwan 30); Bignoniaceae	Umvongothi	Bark	Five (0.09)	The ground bark is boiled in 1 L of water. Infants are given 1 teaspoon (5 ml) twice a	Blood purification (Rustner, 1938; Von Koenen 2001; Corrigan et al., 2011)

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Table 1 (continued)

Botanical name (Voucher number); Family name	Vernacular name in Zulu	Plant parts used	Number or times mentioned (RFC)	Preparation, dosage and administration and ailments associated with blood cleansing	Previous studies pertaining to associated use that may link to blood purification
<i>Knollmola mosambicensis</i> Pax Holtt. (ns.zwan 14); Caryophyllaceae	Ikhambl	Shoots	Five (0.09)	day to cleanse the internal system and treat boils and sores. (i) Crush one handful or the plant and soak it in 1 L of warm water. After straining, use the infusion as an enema to cleanse the body and for fatigue. (ii) The leaves are mixed with those of <i>Psidium guajava</i> and <i>Melia litoralis</i> and boiled in water to be administered orally in the mornings for blood purification.	Skin and stomach complaints (De Wet et al. 2010; York et al. 2011)
<i>Landolphia kirki</i> , Dyer; Apocynaceae	Umbungwa	Roots	One (0.02)	The ground roots are mixed with those of <i>Cissampelos hirta</i> and <i>Gymnosporia senegalensis</i> and boiled in water. The decoction is taken orally three times a day (half a mug for adults and 1-2 teaspoons for children) for blood purification.	Magic medicine (Magwede et al. 2019)
<i>Lippia javanica</i> (Burm.f.) Spreng. (ns.zwan 06); Verbenaceae	Umsuzwane	Leaves and shoots	Two (0.04)	(i) The leaves or shoots are boiled in water and taken orally to improve blood circulation, strengthen the body and for fever. (ii) The leaves or shoots are allowed to boil in water for steaming to treat fever or used as a bath to get rid of evil spirits.	Blood purification (Mabogu, 1990; Pooley, 1991)
<i>Momordica balsamilla</i> L. (ns.zwan 35); Cucurbitaceae	Umkaka	Leaves	Three (0.05)	(i) The crushed leaves are boiled in water and administered orally for blood cleansing. Paste is made from leaves and applied on ringworm and sores.	Blood purification (Vogel, 2001)
<i>Ochna neriifolia</i> (Meisn.) Walp. (ns.zwan 03); Ochnaceae	Isizemane	Roots	Two (0.04)	(i) A handful or cut or ground roots (sometimes mixed with <i>Iliridelia cathartica</i>) is boiled in 2 L of water. One cup is diluted in 5 L of water and used as an emetic every morning for blood cleansing. (ii) It is used in combination with <i>Garcinia livingstonei</i> and <i>Vernonia cinerea</i> as described previously to cleanse the body and prevent bad luck.	Blood purification (Ngunjiri, 2014)
<i>Ochna serrulata</i> Walp. (ns.zwan 41); Ochnaceae	Umgengsanyoni	Roots	Three (0.05)	The roots are cut and boiled in 2 L of water for 30 min. The decoction is taken orally three times a day for blood and womb cleansing. The decoction is also taken for infertility and menstrual pains.	Skin infections (Oluwalanle, 1994)
<i>Oreocarya nana</i> R.F. & M. A. Fem. (ns.zwan 46); Anacardiaceae	Islice	Roots	One (0.02)	A handful of roots is ground and soaked in warm water for 15 min. The infusion is taken as an enema for internal cleansing as well as fever.	Blood purification (De Wet and Ngunjiri, 2014)
<i>Pumila mucronata</i> Mill. (ns.zwan 27); Lauraceae	Ukotapheya	Seed	One (0.02)	Cut seed is soaked in warm water and taken orally on mornings for cleansing the body and for kidney complaints.	Cleanser (Asowata-Ayodele et al., 2016)
<i>Prosopis cineraria</i> (L.) Druce (ns.zwan 08); Leguminosae	Ushashane	Roots	Four (0.07)	(i) The roots are boiled in water and strained. A decoction is used as a mouthwash for toothache. (ii) It is used in combination with <i>Cymbopogon marginatus</i> and <i>Sapium integrifolium</i> , described previously to treat pimples and cleanse blood. (iii) Mix with the roots of <i>Strychnos spinosa</i> and <i>Vangueria infausta</i> and boil in 2 L of water. Take two plastic hot water caps (10 ml) twice a day to cleanse blood and ease menstrual pain.	Various ailments (Choudhary et al., 2018)
<i>Psidium guajava</i> L. (ns.zwan 49); Myrtaceae	Amagwava/ugwava	Leaves	One (0.02)	The leaves are combined with those of <i>Kramolan mosambicensis</i> and <i>Melaleuca</i> , boiled in water and taken orally in the mornings for blood cleansing.	The leaves are used to treat poisoning, stomach-ache and diarrhoea (Mongalo and Malchaire, 2018)
<i>Pongamia pinnata</i> (L.) Baill. (ns.zwan 38); Leguminosae	Inzimu	Root tuber	Two (0.04)	(i) A handful or ground dried root tuber is soaked in 2 L of cold water. The infusion is taken orally in the mornings for the cleansing of blood. (ii) The powder of the root tuber is placed on sores and wounds.	Genital warts (De Wei et al., 2012)

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Table 1 (continued)

Botanical name (Voucher number); Family name	Vernacular name in Zulu	Plant parts used	Number of times mentioned (RFC)	Preparation, dosage and administration and ailments associated with blood cleansing	Previous studies pertaining to associated use that may link to blood purification
<i>Lyrtia. antha scandru</i> Planch ex Harv. (ns zwan 40); Icacinaceae	Unginakile/ umakkhothwane/ ungangingandi/inhlanhla emhlophe	Twigs	Four (0.07)	(iii) It is used in combination with <i>Albertia delagoensis</i> as described previously to cleanse the blood and the body. (i) Soak a handful of twigs in 5 L of cold water overnight. Strain 1 L of the infusion in the morning and drink to induce vomiting. This is done to cleanse the body. (ii) Soak a mug of ground stem in 5 L of cold water overnight with silver money coins. Use the mixture to bathe at dawn (without using soap for cleansing) for good luck and as love charms.	An anti-abortion (Brammer, 1991)
<i>Ranunculus multifidus</i> Forssk. (S. Nkiki 23), Ranunculaceae	Ixhaphozi	Shoots	Three (0.05)	(i) A handful of shoots is mixed with a handful of <i>Senecio raietloids</i> shoots and crushed, then boiled in 2 L of water. The decoction is strained and poured in a sealable bottle. It is drunk daily in the morning for skin cleansing, menstrual pain, and pimples. (ii) Ground shoots are mixed with the corm of <i>Hypoxis hemerocallida</i> , bulb of <i>Scadoxus pumilus</i> , <i>Ximbia caffra</i> roots and sulphur as described previously. 10 drain vaginal discharge, get rid of smell in urine, dirt in the blood, and for pimples.	Blood purification (Mofokeng, 2001)
<i>Rhoicissus digitata</i> (L.O. Güg & M. Brandt (ns.zwan 04), Vitaceae	Izizwa	Roots	Two (0.04)	(i) Roots are chopped and boiled in 1 L of water. It is taken orally in the morning before eating to cleanse the blood and treat menstrual pain. (ii) Ground roots are mixed with the ground stem of <i>Hyphaene natalensis</i> and boiled in 2 L of water. It is taken orally in the morning before eating for blood cleansing and kidney complaints.	Blood purification (Brammer, 1991)
<i>Ricinus communis</i> L. (ns.zwan 21); Euphorbiaceae	Umlhakuvu /umpono	Leaves	Three (0.05)	(i) The leaves of the plant are boiled in water, strained, allowed to cool and taken orally for blood cleansing and sores. (ii) Leaves are soaked in worm water. The infusion is taken orally to cleanse the bladder and kidneys.	Blood purification (Von Koenen, 2000)
<i>Sclerolobos integrifolius</i> (Hochst.) J. Leonard. (ns. zwan 11); Euphorbiaceae	Igowane /umgaqampunzi	Bark	One (0.02)	(i) The bark is infused in cold water and used for bathing to treat skin ailments. The bark is also used to steam for blood cleansing. (ii) Ground roots are mixed with the bark of <i>Strychnos spinosa</i> to steam for blood cleansing and as a love charm. (iii) It is used in combination with <i>Cymbopogon martinii</i> as described previously to treat pimples, as a charm and to cleanse the blood.	Menstrual and dysmenorrhoea (De Wei and Nguane, 2014)
<i>Scadoxus pumilus</i> (CL.) Friis & Nardal (ns.zwan 09); Amaryllidaceae	Idumbe lehlalhi	Bulb	One (0.02)	The ground material is mixed with a handful of freshly ground corms of <i>Hypoxis hemerocallida</i> , <i>Ranunculus multifidus</i> shoots, <i>Ximbia caffra</i> roots and brimstone (sulphur) as described previously to drain vaginal discharge, get rid of smell in the urine, dirt in the blood, and for pimples.	Blood purification (Mhlomo and Van Wyk, 2019)
<i>Scholia brachylopha</i> Sond. (ns.zwan 17); Leguminosae	Umgxa.mujuvovovo	Bark roots	Four (0.07)	(i) The bark and roots are ground and boiled in water for steaming to cleanse the body and purify the blood. (ii) It is used in combination with <i>Cymbopogon martinii</i> as described previously to treat pimples and for body cleansing.	Blood purification, acne (Mhlomo and Van Wyk, 2019)
<i>Sclerocarya birrea</i> (A.Rich.) Hochst. (ns.zwan 10); Anacardiaceae	Uthlathu	Bark	Ten (0.18)	(i) A handful of fresh bark is mixed with bark or roots of <i>Euclea natalensis</i> , boiled in water and used for steaming to decontaminate the blood, get rid of pimples and against bad luck.	Blood purification (Gerstner (1938); Pujol (1990); Von Koenen (2001)

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Table 1 (continued)

Botanical name (Voucher number); Family	Vernacular name In Zulu	Plant parts used	Number of times mentioned (RFC)	Preparation, dosage and administration and ailments associated with blood cleansing	Previous studies pertaining to blood purification
				(ii) It is used in combination with <i>Garcinia</i> as described previously to treat diarrhoea .	
				(iii) The bark is mixed with the bark of <i>Vachdia sitibolia</i> boiled in water. It is used as an enema for internal deansi for a baby.	
<i>Senecio saratoloides</i> DC. (ns. zwan); Asteraceae	Un.sukumbh	Leaves , shoots, whole plant	Ten (0.18)	(i) A handful of crushed dried or fresh plant material is boiled in 1 L of water. Half a cup of the decoction is taken twice a day for adults and two teaspoons (10 ml) for children for blood cleansing and sores. (ii) It is used in combination with <i>Hypoxis hemuoca</i> as described previously for blood cleansing and to treat rash and sores. (iii) It is used in combination with <i>Ranunculus</i> as described previously to treat skin and dysmenorrhea.	Blood purification (Wall and Breyer-Brednjik, 1992; Pooley, 1998)
<i>Senecio atuleasun</i> Dunal; Solanaceae	Intuma enkulu/umthama omkhulu	Fruits	One (0.02)	(i) Fruits are burnt in a way that the smoke will reach the sore tooth for treating toothache. (ii) Fruits are cut open and applied topically on warts and other skin infections.	Sores and wounds (Mhlongo and V, Wyk, 2019)
<i>Solanum panduriforme</i> E. Mey. (S. Ntiki 38); Solon	Intuma/umthama	Fruits	Two (0.00)	(i) The fruit is used to treat warts and boils. It is cut open and applied topically on warts or boils. (ii) Dried fruit is burnt, and the smoke is directed to the sore tooth for toothache. (iii) The fruits are ground and soaked in warm water . The infusion is administered as an enema once strained and lukewarm to cleanse the internal system.	None mentioned in literature
<i>Strychnos spinosa</i> Lam. (ns. zwan 12); Loganiaceae	Umhhlathu/umhhlathi	Roots	Four (0.07)	(i) Eating fruits helps to get rid of the mucus that builds up in the chest to cleanse the body from internal dirt. (ii) It is used in combination with <i>Canthium</i> as described previously and used as a blood cleanser. (iii) It is used in combination with <i>Prosopis cineraria</i> and <i>Vernonia infausta</i> as described previously to treat dysmenorrhea and cleanse the blood. (iv) It is used in combination with <i>Sapum integerrimum</i> as described previously to cleanse blood.	Blood purification (Von Kotschy, 2009)
<i>Synaptolobos leirichii</i> Ohw.; Thymelaeaceae	Uvum omhlophe	Roots	Two (0.04)	(i) Two handfuls of ground roots are balled in water for steaming to cleanse the blood and body. (ii) The roots are ground, and the powder is snuffed to inhibit hemorrhage.	None mentioned in literature
<i>Syzygium cordatum</i> Hochst. ex Krauss (ns. zwan 11); Myrtaceae	Umdoni	Bark	Two (0.04)	The bark is mixed with the root or <i>Ternstroemia</i> and soaked in warm water overnight. The infusion is used as an emetic for body cleansing.	Skin conditions. medicinal magical purpose (Hutchings et al., 1996; Mhlongo and Van Wyk, 2019)
<i>Tabernaemontana elaeagnifolia</i> Stapf (ns. zwan 31); Apocynaceae	Umkhahla	Fruits	One (0.021)	A few fruits are ground and soaked in 2 L of warm or cold water. The infusion is occasionally taken orally in the mornings to induce vomit for internal cleansing and prevention of illnesses. It is also recommended for fever and fatigue.	None mentioned in literature
<i>Ternstroemia lycium</i> Burch. ex DC. (ns. zwan 18); Combretaceae	Ikono/umkonono	Bark, roots	Twenty-two (0.40)	(i) The ground roots are soaked in warm water. The liquid is strained in the morning; a cup of the infusion is drunk and then the patient waits a few minutes before drinking enough warm water to induce vomiting to cleanse the blood. (ii) It is used in combination with <i>Combretum molle</i> as described previously to cleanse blood.	Blood purification (Votaw, 2001)

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Table 1 (continued)

Botanical name (Voucher number); Family name	Vernacular name in Zulu	Plant parts used	Number of times mentioned (RFC)	Preparation, dosage and administration and ailments associated with blood cleansing	Previous studies pertaining to the use that may link to blood purification
<i>Trichilia tmeacea</i> Yahl (ns. zwan 25); Meliaceae	Umdlutshi	Bark, roots	four (0.07)	(iii) It is used in combination with <i>Combretum molle</i> and <i>Ziziphora mucronata</i> as described previously to cleanse the body. (iv) The bark is used in combination with <i>Syzygium cordatum</i> as previously described to cleanse the body. (i) The roots are ground, boiled in water and strained. The decoction is used as an enema to cleanse the womb and relieve constipation. (ii) The bark is ground and soaked in water for enemas, used occasionally for arthritis and cleansing the body. Make sure the decoction is weak.	Numerous medicinally related uses (Komane et al., 2011)
<i>Vachellia sirtbenandii</i> (DC.) Kyal & Boaiwa (ns. zwan 33); Leguminosae	Umlchay	Bark, root	Four (0.07)	(i) The ground roots of <i>Vachellia sieberiana</i> , <i>Vachellia irrorata</i> and <i>Ximelia caffra</i> are mixed and soaked in warm water. The infusion (25 ml, half a cup) is taken orally or as an enema once in a while for blood cleansing. (ii) It is used in combination with <i>Sclerocarya birrea</i> as described previously for internal cleansing of infants.	Blood purification (Hladik et al., 1996)
<i>Vachellia ranthophloea</i> Benl. (ns. zwan 26); Leguminosae	Umkhanyakude	Decoction	Two (0.04)	(i) The bark is ground and boiled in water, strained, and taken orally for blood cleansing or as an emetic. (ii) The bark is boiled in water and used to steam and bath for cleansing of blood and obtaining good luck and love charms. (iii) The bark is used in steaming or as a decoction for fever.	Blood purification (Hladik et al., 1996), good luck/love charms (Corrigan et al., 2011)
<i>Vachellia infamitii</i> Burch. (ns. zwan 15); Rubiaceae	Umvili/uvilapha	Root	Five (0.11)	(i) Cut or ground roots are boiled in water and taken orally for blood cleansing. (ii) A handful of ground bark is soaked in warm water overnight. One quarter of a mug (one tablespoon for children) of the infusion is taken orally in the morning prior to breakfast as a body cleanser. (iii) It is used in combination with <i>Vachellia sieberiana</i> and <i>Ximelia caffra</i> as described previously for blood cleansing. (iv) It is used in combination with <i>Garcinia livingstonii</i> and <i>Ochna narallida</i> as described previously to cleanse the body and prevent bad luck. (v) It is used in combination with <i>Prosopis juliflora</i> and <i>Strychnos spinosa</i> as described previously to treat dysmenorrhea and cleanse blood.	Blood purification (Hladik et al., 2001)
<i>Walltheria indica</i> L. (ns. zwan 36); Sterculiaceae	Uvemvane	Root	One (0.02)	(i) The roots are used for steaming for unblemished skin and cleansing. (ii) Ground roots are soaked in warm water and used as a wash for sores.	Sores (Von Koenen, 2001)
<i>Withania somnifera</i> (L.) Dunal (ns. zwan 24); Solanaceae	Ubuvimba/uvimba	Whole plant	Eight (0.15)	The roots or whole plant is ground and soaked in warm water, strained, and used as an enema to cleanse the body and to treat fever.	Cleanser (Von Koenen, 2001; Mollet and Kose, 2016)
<i>Ximelia caffra</i> Sond. (ns. zwan 13); Olacaceae	Amathunduluka/umthunduluka	Root	Five (0.07)	(i) The roots are ground and allowed to boil in water. The decoction is taken orally for blood purification and haemorrhoids. (ii) Ground roots are mixed with <i>Hypoxis hemerocallidoides</i> ground root, <i>Rammula multifida</i> ground root, <i>Scadoxus plicata</i> ground bulb and sulphur as described previously to drain vaginal discharge, get rid of the smell in urine, dirt in the blood, and for pimples. (iii) It is used in combination with <i>Vachellia sieberiana</i> and <i>Vanuaria infamita</i> as	Blood purification (Von Koenen, 2001)

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Table 1 (continues)

Botanical name (Voucher number); Family name	Vernacular name in Zulu	Plant parts used	Number of times mentioned (RFC)	Preparation, dosage and administration and ailments associated with blood cleansing	Previous Studies pertaining to associated use that may link to blood purification
<i>Ziziphus mucronata</i> Willd. (S. Nciki 32); Rhamnaceae	Umphafa	Roots	One (0.02)	described previously to cleanse the blood. It is used in combination with <i>Combretum</i> and <i>Teninalia sericea</i> as described previously to cleanse the body.	Body pains, skin conditions and as a tonic (Mhlomo and Van Wyk, 2019)

Bold - Plant species mentioned for the first time.

- plants used in combination.
- voucher unavailable due to seasonal plant collection.
- Zulu name recorded for the first time.

calculated. There is a very clear distinction of plant species demonstrating importance with the top three species in order of highest RFC obtained for *Teninalia sericea*, *Bridelia cathanica* and *Cymbopogon marginatus* respectively. Of the 39 families mentioned, Verbenaceae was the most frequently used.

4. Discussion

An observation was made from the study that males and females had different reasons to use blood purifier plants. Da Costa et al. (2021) reported that ethnobotanical knowledge is gender structured, and females have a connected sharing network that allows for a greater knowledge to be shared, whereas males are less likely to share knowledge. This could be the reason why the males in the study area knew fewer plants and did not know many of the ailments related to blood purification. Age had no effect on the participants' knowledge. A possible explanation for this is that the study focused on plants that intrigued young people. Furthermore, the use of blood purifiers held relevance to all age categories.

Plant species not previously documented for the use of blood purification does not mean that those plants had not been documented for other ailments. Since this is the first study in Northern Maputaland to focus specifically on documenting blood purifier plants in a region that is claimed to be a botanical biodiversity hotspot (Boon, 2010), there is always a higher possibility that new medicinal plant uses could be reported.

Asteraceae (6.25%), Euphorbiaceae (6.25%) and Leguminosae (7.81%) families had the highest number of species. Similar to this study, a review on blood purifier plants conducted by Van Vuuren and Frank (2020) stated that the people of San and Sotho cultures also use the doctrine of signatures principle and the colour red in the plants to associate the plant with blood-related infections. From the survey conducted it was noted that most plant species mentioned as blood purifiers were either red which according to the participants insinuated 'blood related' or white insinuating 'clean or cleanser' and therefore such a plant could be used as blood or body cleanser. The preferences for specific plant parts are often influenced by cultural, historical, and pharmacological factors. Roots, for instance, are frequently used because they may contain concentrated bio-active compounds. Leaves are also commonly used, as they can be harvested without harming the plant's survival, and they often contain valuable secondary metabolites.

According to the results of the study, the whole idea of cleansing depends on purging effects in order to remove the toxins in the body or blood. The lay people from this area believe that illnesses are caused by internal disruption or "uncleanliness" within the body. Therefore toxic plants can purify the body and blood through purging (Hutchings, 1989). Adverse reactions may induce vomiting or any other type of purging to promote good health (Clement et al., 2017). The two most frequently used plant species, *T. sericea* (cited 22 times) and *B. cathartica* (cited 17 times) were found to be non-toxic when tested in the brine shrimp lethality assay. Most of the recommended mixtures were also

found to be non-toxic (Zwane, 2022).

It is important to consider the relative importance of the most frequently used plant species in the context of general medicinal use within the same cultural group and geographical region (Heinrich et al., 2009). Taking this into consideration, the most cited plant species in the current study was comparatively evaluated with the most cited plant species from previous ethnobotanical studies within the same cultural group. When compared to other medicinal plant traditional uses, for example diarrhoea (De Wet et al., 2010), respiratory diseases (York et al., 2011), sexually transmitted infections (De Wet et al., 2012), skin disorders (De Wet and Ngubane, 2014), hypertension (De Wet and Ngubane, 2014) and gynecological complaints (De Wet and Ngubane, 2014), the most frequently used plant species (*Teninalia sericea*) for blood purification holds less importance than the most frequently cited plant species for other diseases studied. What is interesting is that all the species most frequently mentioned (*Bridelia cathanica*, *Hypoxis hemerocallidea*, *Momordica balsamina*, *Psidium guajava*, *Senecio senecioides*, and *Lippia jallanica*) in previous studies are also used for blood purification.

Kigen et al. (2017), documented the combination of plants in concoctions for blood cleansing. The use of plant combinations is common practice in this study area. Several ethnobotanical studies from northern Maputaland reported the use of combinations to treat diarrhoea (De Wet et al., 2010); respiratory diseases (York et al., 2011); sexually transmitted infections (De Wet et al., 2012); skin disorders (De Wet and Ngubane, 2014), hypertension (De Wet and Ngubane, 2014) and gynecological complaints (De Wet and Ngubane, 2014). Although some plant species were similar in the last-mentioned studies, only one combination was the same, namely *Hypoxis hemerocallidea* in combination with *Senecio serratuloides* which was reported by both the current study (treating rash and sores) and De Wet et al. (2012) to treat sores related to sexually transmitted diseases.

5. Conclusion

Within the traditional practices of using medicinal plants in Northern Maputaland, blood purification plays a significant role in holistic treatment. Plant species and their combinations were used for a number of medically related conditions, cultural and spiritual purposes but with the specific directive of cleansing the blood. While the use of blood purifiers remains a largely unexplored area, this study provides valuable information on traditional use and the participants' perception of why they need to purify or cleanse their blood. Most plants reported in this study were used with caution or in low dosages suggesting concern of toxicity or overdosing. There is no doubt that when examining African traditional medicine, holistic terms such as "blood cleansing" cannot be ignored and providing some scientific rationale may forge a link between western and African medical systems.

Ethics approval and consent to participate

Ethical clearance was received from the University of Zululand Research Ethical Committee for this project (UZREC 171110-030 PGM, 2018/609). All participants gave consent for publication.

CRediT authorship contribution statement

N.S. Zwane: Data curation, Formal analysis, Investigation, Methodology, Validation, Writing - original draft. H. De Wet: Conceptualization, Funding acquisition, Project administration, Resources, Supervision, Writing - review & editing. S.F. Van Vuuren: Conceptualization, Funding acquisition, Methodology, Project administration, Supervision, Writing - review & editing.

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.

Data availability

Data will be made available on request.

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Zwane, N.S., 2021. An Ethnobotanical and Ethnopharmacological Study of Plants Used for Blood Purification by Rural Communities in Northern Maputaland, South Africa. Master's Thesis, University of Zululand.



Saady van Vuurea (PhD) holds a personal professorship in the Department of Pharmacy and Pharmacology, University of Witwatersrand, where she has been employed for the past 37 years. She obtained a PhD undertaken on the antimicrobial properties of Saudi African medicinal plants.

Some of the most valuable research contributions made have been towards the field of ethnopharmacology and traditional use of medicinal plants in Southern Africa. Furthermore, a strong emphasis of her research is in validating the anti-infective role of medicinal plants in traditional healing and Africa. Investigations of the antimicrobial properties of essential oils and structure activity relationships have been a major component of her research, specifically on pathogens related to

relevant diseases. Another focus area, which brought both national and international recognition, is her scientific contribution towards combination studies where attention is given to interactions between African medicinal plants, essential oils and compounds, and conventional antimicrobials. She has authored 181 ISI accredited publications and over 262 conference contributions, many of which have been awarded prizes. She currently holds a 83 benchmark rating from the National Research Foundation of South Africa.



commercialization.

Nontobeko **Zwane** graduated with a Master's degree from the University of Zululand in 2021 with her thesis entitled "An ethnobotanical and ethnopharmacological study of plants used for blood purification by rural communities in northern Maputaland, South Africa." She has given two oral presentations at National conferences on the subject matter. She is currently a PhD candidate in the Botany department of the University of Zululand, KwaZulu-Natal. She also holds a BSc in Biochemistry and Botany (2016), and a BSc (Hons) in Botany (2017). Her previous research has focused on plant morphology and physiology, ethnobotany, and ethnopharmacology. Her current work focuses on propagating and enhancing Indigenous fruit trees for possible domestication and



Helene de Wei is a retired Professor from the University of Zululand (South Africa). She started her career as Senior Laboratory Assistant in the Department of Botany in 1990. She was appointed as a Lecturer in the same department in 1995. She registered for a PhD programme in 2001 and graduated in 2006 from the University of Johannesburg (South Africa). Her doctoral research covered a variety of fields such as ethnobotany, taxonomy and the chemical analysis of secondary plant products of the South African species family of the Menispermaceae. After her PhD she established herself as an expert in the field of ethnobotany. She is the first ethnobotanist to concentrate on Zulu people's medicinal plant knowledge in a region not previously explored by any other ethnobotanist,

namely Northern Maputaland. Her focus has been mostly on the plants that are grown in and on the periphery of people's homesteads. Many new medicinal plants and vernacular names used for a variety of infections and other ailments have been documented for the first time. Her ethnobotanical surveys also included medicinal plants used among people of Khoi-San and Cape Dutch descent in the eastern parts of the Karoo.