Journal of Medicinal Plants for Economic Development
ISSN: (Online) 2616-4809, (Print) 2519-559X

Plants used for the management of paediatric ailments in Zimbabwe: A narrative review

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Dates:
Received: 25 May 2024
Accepted: 15 July 2024
Published: 14 Aug. 2024

How to cite this article:
Maroyi, A., 2024, 'Plants used for the management of paediatric ailments in Zimbabwe: A narrative review', *Journal of Medicinal Plants for Economic Development* 8(1), a264. https://doi.org/10.4102/jomped.v8i1.264

Background: Children are susceptible to various types of infections and diseases because of their low and weakened immune system. In various communities throughout the world, medicinal plants have historically been used to treat and manage paediatric diseases and ailments.

Aim: The current study was aimed at identifying and analysing medicinal plants used traditionally to treat and manage paediatric diseases in Zimbabwe.

Setting: This review provides an overview of medicinal plants used to manage paediatric ailments in Zimbabwe.

Method: Ethnobotanical information on medicinal plants used to treat and manage paediatric diseases in Zimbabwe was obtained using online databases such as Scopus, JSTOR, PubMed, Google Scholar and Science Direct.

Results: A total of 178 taxa belonging to 64 families have been documented as traditional medicines for paediatric diseases and ailments in Zimbabwe. *Cryptolepis oblongifolia*, *Asparagus* spp., *Dichrostachys cinerea, Fadogia ancylantha, Inula glomerata, Lannea edulis* and *Strychnos spinosa* are the most popular medicinal plants with four to five use reports each. Medicinal plants are used to treat and manage 41 childhood medical conditions in Zimbabwe.

Conclusion: Baseline data provided in this study can be used for future ethnopharmacological research focusing on chemical, pharmacological and toxicological evaluations of the documented species.

Contribution: This study contributes to the existing literature about medicinal plants used to treat and manage paediatric diseases, and such data can be used to develop new health-promoting products for children and also pharmaceutical products that can be used to reduce child or infant mortality rate.

Keywords: indigenous pharmacopeia; medicinal plants; paediatric diseases; traditional medicine; tropical Africa; Zimbabwe.

Introduction

Children are susceptible to various types of infections and diseases because of their low and weakened immune system. Research showed that many diseases such as eye infections, gastro-intestinal problems, dental anomalies, respiratory infections, liver and kidney disorders and urinary problems are common in children throughout the world (Shaheen et al. 2017). While child mortality is decreasing globally by at least 50% (Wright, Power & Shivak 2022), mortality burden is still a major challenge in developing countries in sub-Saharan Africa and South Asia (Patton et al. 2016). In developing countries, non-fatal outcomes and disabilities because of long-term consequences of congenital conditions, malnutrition, complications of infections, injury and non-communicable diseases are common (Wright et al. 2022). Moreover, children's diseases present a notable health concern as child mortality is regarded as an important measure of a population's health status (Mbunge et al. 2024). In 2019, about 5.2 million children died before reaching the age of 5 years in sub-Saharan Africa and south Asia (Sharrow et al. 2022). The major causes of these deaths are preterm birth complications, intrapartum-related events, lower respiratory infections, diarrhoea, malaria, injury, meningitis, measles and congenital abnormalities (Perin et al. 2022). Zimbabwe is one of the countries still facing a high child or infant mortality rate with 54 deaths per 1000 live births recorded in 2020 (Mbunge et al. 2024), which is higher than the United Nations 2030 Sustainable Development Goal target of 12 deaths per 1000 live births (Raina et al. 2023). Despite concerted global efforts to enhance children's health care through conventional medicines, the influence of traditional health practices persists in many countries in

sub-Saharan Africa, including Zimbabwe (James et al. 2023; Ngere et al. 2022). Although the use of medicinal plants against children's diseases in Zimbabwe dates back to the onset of human civilisation through human–plant interactions, this traditional knowledge is often neglected or not given priority. However, in developing countries, the use of medicinal plants to treat and manage children diseases is regarded as an important alternative. Traditional and complementary medicine is within the reach of millions of people who are unable to access modern health care facilities that are expensive and inaccessible (Hailu et al. 2020; Kasilo et al. 2019; Khalid & Ahmed 2023; Liheluka et al. 2023; Mokhesi & Modjadji 2022; Tugume & Nyakoojo 2019). Therefore, this review explores the indigenous knowledge of plants used for paediatric diseases in Zimbabwe to establish the knowledge gaps and areas for further research.

Methods

Ethnobotanical information on medicinal plants used to treat and manage paediatric diseases in Zimbabwe was obtained using online databases such as Scopus, JSTOR, PubMed, Google Scholar and Science Direct, and these data are summarised in Table 1. Additional information on medicinal plants used to treat and manage paediatric diseases in Zimbabwe was also obtained by a systematic search of various resources that are not covered by electronic databases, and these included journal papers, books, dissertations, book chapters, theses and other scientific articles obtained from the university library. All published studies related to the use of plants for managing paediatric diseases in Zimbabwe were included in this narrative review (Table 1). The ethnobotanical surveys listed in Table 1 were conducted in all floristic regions of the country. Zimbabwe is divided into five floristic divisions, that is, the central region, eastern, northern, southern and western region (Pope & Pope 1998). The relevant literature covered the period 1959–2022, that is, more than 60 years, a very long period to capture all the relevant work on the subject.

Review findings

The list of plant species used as sources of traditional medicines against paediatric diseases in Zimbabwe is presented in Table 2. A total of 178 taxa are listed. These taxa are distributed among 64 families and 149 genera. Sixteen (9.0%) of these taxa are exotic to Zimbabwe (Table 1). These species include *Agave americana* L., *Asparagus asiaticus* L., *Bidens biternata* (Lour.) Merr. & Sherff, *B. pilosa* L., *Carica papaya* L., *Citrus limon* (L.) Osbeck, *Dysphania ambrosioides* (L.) Mosyakin & Clemants, *Jatropha curcas* L., *Lantana camara* L., *Melia azedarach* L., *Mentha spicata* L., *Moringa oleifera* Lam., *Musa* spp., *Ricinus communis* L., *Zea mays* L. and *Zingiber officinale* Roscoe. These exotic species are now an important component of the indigenous or traditional pharmacopoeia in Zimbabwe (Maroyi 2018). Similarly, these exotic species are also included in the official indigenous or traditional pharmacopoeias in South Africa with species such as *A. americana, B. biternata, B. pilosa, C. papaya, C. limon, J. curcas, L. camara, M. azedarach, M. spicata, M. oleifera, R. communis* and *Z. officinale* traded in informal herbal medicine markets or shops as sources of traditional medicines (Williams et al. 2021). Moreover, exotic species such as *C. papaya, C. limon, M. spicata, R. communis, Z. mays* and *Z. officinale* are well-known sources of traditional medicines, and these species are included in the book entitled 'Medicinal plants of the world' written by Van Wyk and Wink (2015), emphasising their therapeutic uses, phytochemistry and pharmacological properties.

Twenty species, namely, *Acalypha petiolaris* Hochst., *Ansellia africana* Lindl., *Asparagus* spp., *C. sericeum* G. Don, *Convolvulus sagittatus* Thunb., *Cryptolepis oblongifolia* (Meisn.) Schltr., *Dichrostachys cinerea* (L.) Wight & Arn., *Fadogia ancylantha* Schweinf., *Ficus sur* Forssk., *Flacourtia indica* (Burm.f.) Merr., *Grewia flavescens* Juss., *Gymnosporia senegalensis* (Lam.) Loes., *Hoslundia opposita* Vahl, *Inula glomerata* Oliv. & Hiern, *Lannea edulis* (Sond.) Engl., *Lippia javanica* (Burm.f.) Spreng., *Ormocarpum trichocarpum*

TABLE 1: Overview of literature sources documenting paediatric diseases in Zimbabwe.

Source	Floristic regions	Data-collection methods	Percentage
Wild and Gelfand 1959	Central and northern	Interviews and fieldwork	16.0
Harvey and Armitage 1961	Western	Interviews with 21 traditional healers (THs) and fieldwork	11.0
Wild, Mavi and Biegel 1972	All floristic regions of the country	Not specified	1.0
Chinemana et al. 1985	Central, eastern and northern	Semi-structured questionnaire and fieldwork	4.0
Gelfand et al. 1985	Not specified	Interviews with 161 THs	75.0
Mavi 1996	Not specified	Interviews with 248 THs	2.0
Chigora, Masocha and Mutenheri 2007	Southern	Structured interviews	2.0
Gundidza et al. 2009	Central	Structured interviews and field work	1.0
Maroyi 2011	Central	Participatory rapid appraisal (PRA) and open-ended interviews with 9 THs and fieldwork	1.0
Takawira-Nyenya and Stedje 2011	All floristic regions of the country	PRA, open-ended and semi-structured interviews with selected participants and fieldwork	1.0
Viol et al. 2013	Eastern and western	Structured interviews and fieldwork	1.0
Matowa et al. 2020	All floristic regions of the country	Structured questionnaire with 20 and field work	3.0
Shava et al. 2021	Eastern	In-depth interviews with THs and questionnaire-based interviews with participants and fieldwork	3.0
Shopo, Mapaya and Maroyi 2022	Central	Interviews with 12 THs, semi-structured questionnaires, focus group discussions with selected participants, field observations and fieldwork	4.0

TABLE 2: Medicinal plants used for the treatment and management of paediatric diseases in Zimbabwe.

Species and family	Local names+	Habit	Plant parts	Disease or ailment*
Acalypha allenii Hutch., Euphorbiaceae	Chimunamato (S)	Herb	Roots	Diarrhoea[1]
A. caperonoides Baill., Euphorbiaceae	Chimunamato (S)	Herb	Leaves	Fatten infants[1]
A. petiolaris Hochst., Euphorbiaceae	Acalypha (E)	Herb	Roots	Abdominal pains, depressed fontanelle and fatten infants[1]
Adansonia digitata L., Malvaceae	Muuyu (S)	Tree	Bark, fruits	Fatten infants[1]
Adenia gummifera (Harv.) Harms, Passifloraceae	Muboori (S)	Climber	Leaves, stems	Kwashiorkor[2]
Afzelia quanzensis Welw., Fabaceae	Ihlene (N)	Tree	Bark	Depressed fontanelle[1]
**Agave americana* L., Asparagaceae	Isikutsha (N)	Shrub	Fibre	Dilate veins around umbilicus[3]
Albizia antunesiana Harms, Fabaceae	Muriranyenze (S)	Tree	Roots	Depressed fontanelle and fatten infants[1]
Allophylus rubifolius (Hochst. ex A. Rich.) Engl., Sapindaceae	-	Shrub	Leaves, roots	Depressed fontanelle[1]
Aloe excelsa A. Berger, Asphodelaceae	Chigiakia (H)	Tree	Leaves	Depressed fontanelle[1]
Annona stenophylla Engl. & Diels, Annonaceae	Muroro (S)	Shrub	Roots	Dilate veins around umbilicus[1]
Ansellia africana Lindl., Orchidaceae	Chaunga (S)	Epiphyte	Whole plant	Antiemetic, depressed fontanelle and diarrhoea[1,4]
Aristolochia heppii Merxm., Aristolochiaceae	Chividze (S)	Climber	Roots	Depressed fontanelle[1]
Asparagus africanus Lam., Asparagaceae	Rukato (S)	Climber	Roots	Depressed fontanelle and prevent illness[1,5]
**A. asiaticus* L., Asparagaceae	Asparagus (E)	Climber	Roots	Constipation[6]
Asparagus spp., Asparagaceae	Ingotsha (N)	Climber	Roots	Depressed fontanelle, dehydration, dilate veins around umbilicus and prevent illness[3,7]
Aspilia pluriseta Schweinf. ex Engl., Asteraceae	Ruhwati (S)	Herb	Roots	Dilate veins around umbilicus[1]
Astripomoea malvacea (Klotzsch) A. Meeuse, Convolvulaceae	Star-creeper (E)	Climber	Roots	Abdominal pains[1,6]
Babiana bainesii Baker, Iridaceae	Hwena (S)	Herb	Bulb	Depressed fontanelle[1]
Bauhinia petersiana Bolle, Fabaceae,	Mubondo (S)	Tree	Roots	Depressed fontanelle[8]
**Bidens biternata* (Lour.) Merr. & Sherff, Asteraceae	Guza (S)	Herb	Whole plant	Depressed fontanelle and wounds[1]
**B. pilosa* L., Asteraceae	Guza (S)	Herb	Leaves	Wounds[1]
Biophytum umbraculum Welw., Oxalidaceae	Karora (S)	Herb	Leaves	Depressed fontanelle[1]
Bobgunnia madagascariensis (Desv.) J.H. Kirkbr. & Wiersema, Fabaceae	Mucherekese (S)	Tree	Roots	Convulsions[6]
Boscia integrifolia J.St.-Hil., Capparaceae	Inkinza (N)	Tree	Roots	Constipation[1]
**Carica papaya* L., Caricaceae	Mupopo (S)	Tree	Roots	Depressed fontanelle[1]
Carissa spinarum L., Apocynaceae	Muruguru (S)	Tree	Roots	Tonic[1]
Catunaregam taylorii (S. Moore) Bridson, Rubiaceae	Chizhuzhu (S)	Shrub	Roots	Depressed fontanelle[1]
Cissampelos mucronata A. Rich., Menispermaceae	Nyakuta (S)	Climber	Roots	Depressed fontanelle and dilate veins around umbilicus[1]
Cissus cornifolia (Baker) Planch., Vitaceae	Muzambiringa (S)	Shrub	Roots	Colic and diarrhoea[3]
**Citrus limon* (L.) Osbeck, Rutaceae	Muremani (S)	Tree	Roots	Depressed fontanelle[1]
Clematis brachiata Thunb., Ranunculaceae	Mokoka (S)	Climber	Leaves	Diarrhoea[1]
Coleus livingstonei A.J. Paton, Lamiaceae	Bunganyunyu (S)	Shrub	Leaves	Abdominal pains[1]
Combretum molle R. Br. ex G. Don, Combretaceae	Mubondo (S)	Tree	Roots	Depressed fontanelle and fatten infants[1]
C. sericeum G. Don, Combretaceae	Bepu (S)	Shrub	Roots	Antiemetic, diarrhoea and dilate veins around umbilicus[1,6]
Commelina spp., Commelinaceae	Gezi (S)	Herb	Leaves	Depressed fontanelle and tonic[1]
Convolvulus sagittatus Thunb., Convolvulaceae	Karuzoka (S)	Herb	Whole plant	Constipation, depressed fontanelle and inflammation of navel cord[1]
Crossopteryx febrifuga (Afzel. ex G. Don) Benth., Rubiaceae	Muteyo (S)	Shrub	Not specified	Colic[9]
Cryptolepis oblongifolia (Meisn.) Schltr., Apocynaceae	Mubvamukaka (S)	Shrub	Leaves, roots	Antiemetic, depressed fontanelle, diarrhoea and strengthen infants[1]
Cussonia arborea Hochst. ex A. Rich., Araliaceae	Mufenje (S)	Tree	Wood	Prevent illness[1]
Cussonia spicata Thunb., Araliaceae	Mufenje (S)	Tree	Roots	Prevent illness[1]
Cynanchum viminale (L.) L., Apocynaceae	Chifure (S)	Climber	Roots	Abdominal pains[1]
Cyperus angolensis Boeckeler, Cyperaceae	Chityorabadza (S)	Sedge	Roots	Constipation[6]
Cyphostemma buchananii (Planch.) Desc. ex Wild & R.B. Drumm., Vitaceae	Mukononozina (T)	Climber	Roots	Abdominal pains[1]
C. junceum (Webb) Desc. ex Wild & R.B. Drumm., Vitaceae	Zandakubaya (S)	Herb	Roots	Diarrhoea and fatten infants[1,6]
C. rhodesiae (Gilg & M. Brandt) Desc. ex Wild & R.B. Drumm., Vitaceae	Gano (S)	Herb	Roots	Fatten infants[1,6]
Dichrostachys cinerea (L.) Wight & Arn., Fabaceae	Mupangara (S)	Tree	Roots	Abdominal pains, colic, depressed fontanelle, diarrhoea and fatten infants[1,3]
Dicoma anomala L., Asteraceae	Chifumuro (S)	Herb	Roots	Antiemetic and nightmares[1,8]
Diospyros lycioides Desf., Ebenaceae	Musumadombo (S)	Shrub	Roots	Antiemetic[1]
Dracaena aethiopica (Thunb.) Byng & Christenh., Asparagaceae	Isikutsha (N)	Herb	Leaves	Dehydration[10]
D. hyacinthoides (L.) Mabb., Asparagaceae	Isikutsha (N)	Herb	Leaves	Colic and dehydration[10]
**Dysphania ambrosioides* (L.) Mosyakin & Clemants, Amaranthaceae	Imbanje (N)	Herb	Whole plant	Fatten infants[1]
Ehretia coerulea Gürke, Boraginaceae	Stamberwood (E)	Shrub	Leaves	Teething pains[1]

Table 2 continues on the next page →

TABLE 2 (Continues...): Medicinal plants used for the treatment and management of paediatric diseases in Zimbabwe.

Species and family	Local names+	Habit	Plant parts	Disease or ailment*
Endostemon obtusifolius (E. Mey.) N.E. Br., Lamiaceae	-	Shrub	Roots	Strengthen infants and tonic[1,6]
Entada goetzei (Harms) S.A. O'Donnell & G.P. Lewis, Fabaceae	Intolwane (N)	Shrub	Roots	Depressed fontanelle and wasting[1,11]
Eriosema englerianum Harms, Fabaceae	Blue bush (E)	Shrub	Tuber	Depressed fontanelle and wasting[1]
Eriosema rhynchosioides Bak., Fabaceae	Gwera (S)	Shrub	Roots	Tonic[1]
Eriospermum abyssinicum Baker, Asparagaceae	-	Herb	Roots	Depressed fontanelle[1,4]
Erythrina abyssinica Lam., Fabaceae	Mutiti (S)	Tree	Roots	Wasting[1]
Euclea divinorum Hiern, Ebenaceae	Mubhubhunu (S)	Shrub	Roots	Depressed fontanelle and diarrhoea[1,6,12]
Evolvulus alsinoides (L.) L., Convolvulaceae	Morning-glory (E)	Herb	Roots	Depressed fontanelle[1]
Fadogia ancylantha Schweinf., Rubiaceae	Mundaswa (S)	Shrub	Roots	Abdominal pains, antiemetic, depressed fontanelle and umbilical cord removal[1,6]
Ficus sur Forssk., Moraceae	Muonde (S)	Tree	Bark, fibres, roots	Depressed fontanelle, diarrhoea and oedema[1,9]
F. sycomorus L., Moraceae	Muonde (S)	Tree	Roots	Depressed fontanelle[9]
F. thonningii Blume, Moraceae	Muonde (S)	Tree	Roots	Depressed fontanelle and dilate veins around umbilicus[1]
Flacourtia indica (Burm.f.) Merr., Salicaceae	Munhunguru (S)	Tree	Bark	Abdominal pains, diarrhoea and teething pains[1,6]
Flueggea virosa (Roxb. ex Willd.) Royle, Phyllanthaceae	Changaome (H)	Shrub	Roots	Depressed fontanelle and diarrhoea[1]
Gardenia resiniflua Hiern, Rubiaceae	Chigonondo (T)	Tree	Roots	Depressed fontanelle[8]
G. ternifolia Schumach. & Thonn., Rubiaceae	Mutarara (S)	Shrub	Roots	Kwashiorkor[8]
Geigeria spp., Asteraceae	-	Herb	Roots	Depressed fontanelle[1]
Gerbera ambigua (Cass.) Schultz Bip., Swynnerton, Asteraceae	Yellow gerbera (E)	Herb	Roots	Abdominal pains[1]
Gomphocarpus glaucophyllus Schltr., Apocynaceae	Gwendere (S)	Herb	Roots	Antiemetic[1]
Grewia flavescens Juss., Malvaceae	Mubhubhunu (S)	Shrub	Roots	Depressed fontanelle, diarrhoea and inflammation of navel cord[1]
G. herbacea Hierm, Malvaceae	Chidzungu (S)	Shrub	Roots	Depressed fontanelle[1]
Grona barbata (L.) H. Ohashi & K. Ohashi, Fabaceae	Zanzi (S)	Herb	Roots	Dilate veins around umbilicus and wasting[1]
Gymnanthemum glaberrimum (Welm. ex O. Hoffm.) H. Rob., Asteraceae	Nyakashwa (S)	Shrub	Roots	Rash on umbilicus[1]
Gymnosporia senegalensis (Lam.) Loes., Celastraceae	Chizhuzhu (S)		Roots	Dilate veins around umbilicus, inflammation of umbilical cord and intestinal worms[1,3]
Helichrysum caespititium (DC.) Sond., Asteraceae	-	Herb	Whole plant	Depressed fontanelle[1]
Hemionitis calomelanos (Sw.) Christenh., Pteridaceae	Kabovora (S)	Fern	Whole plant	Depressed fontanelle[1]
Hermannia boraginiflora Hook., Malvaceae	Isinama (N)	Shrub	Roots	Abdominal pains and colic[3]
Heteromorpha arborescens (Spreng.) Cham. & Schltdl., Apiaceae	Umbandecha (N)	Tree	Leaves	Abdominal pains[1]
Heteropyxis dehniae Suess., Myrtaceae	Chisurudza (S)	Tree	Leaves	Depressed fontanelle[1,8]
Hibiscus cannabinus L., Malvaceae	Decan hemp (E)	Herb	Roots	Dilate veins around umbilicus[1]
**Hibiscus sabdariffa* L., Malvaceae	Sosoori (S)	Herb	Calyces	Malnutrition[13]
Hoslundia opposita Vahl, Lamiaceae	Amalilibhobo (N)	Herb	Roots	Abdominal pains, diarrhoea and gastro-enteritis[1,3]
Hyparrhenia filipendula (Hochst.) Stapf, Poaceae	Dangaruswa (S)	Grass	Roots	Depressed fontanelle[1]
Hypoestes aristata (Vahl) Sol. ex Roem. & Schult., Acanthaceae	Ribbon bush (S)	Herb	Roots	Constipation[6]
Hypoestes forskaolii (Vahl) R. Br., Acanthaceae	Ribbon bush (E)	Herb	Roots	Constipation[1]
Indigofera vicioides Jaub. & Spach., Fabaceae	-	Shrub	Roots	Depressed fontanelle[1]
Inula glomerata Oliv. & Hiern, Asteraceae	Zheveratsuro (S)	Herb	Roots	Abdominal pains, constipation, strengthen infants and tonic[6]
Ipomoea verbascoidea Choisy, Convolvulaceae	Dombwe (S)	Climber	Tubers	Fatten infants and stomach problems[1,3]
Jamesbrittenia burkeana (Benth.) Hilliard, Scrophulariaceae	Mutunya (S)	Herb	Roots	Inflammation of navel cord and rash[6]
**Jatropha curcas* L., Euphorbiaceae	Mupfuta (S)	Shrub	Roots	Tonic[1]
Justicia elegantula S. Moore, Acanthaceae	Spring posy (E)	Herb	Roots	Inflammation of navel cord[1]
Kigelia africana (Lam.) Benth., Bignoniaceae	Mubvene (S)	Tree	Fruits	Fatten infants and malnutrition[1,13]
Kirkia acuminata Oliv., Kirkiaceae	Mubvimira (S)	Tree	Roots	Fatten infants[1]
Lactuca inermis Forssk., Asteraceae	Wild lettuce (E)	Herb	Roots	Depressed fontanelle[1]
Laggera alata (D. Don) Sch.Bip. ex Oliv., Asteraceae	Rutapatsikidzi (S)	Herb	Roots	Fatten infants[1]
Lannea edulis (Sond.) Engl., Anacardiaceae	Intakubomvu (N)	Shrub	Roots	Bilharzia, depressed fontanelle, fatten infants and inflammation of umbilical cord[1,2,9]
**Lantana camara* L., Verbenaceae	Lantana (E)	Shrub	Fruits	Malnutrition[13]
Lasiosiphon kraussianus (Meisn.) Meisn., Thymelaeaceae	Chitupatupa (S)	Herb	Tuber	Depressed fontanelle[1]
Ledebouria spp., Asparagaceae	-	Herb	Bulb	Depressed fontanelle[1]
Leptactina benguelensis (Welw. ex Benth. & Hook.f.) R.D. Good, Rubiaceae	Ivory carpet (E)	Herb	Roots	Depressed fontanelle[1]
Leucas martinicensis (Jacq.) R. Br., Lamiaceae	Bisikavana (S)	Herb	Fruits	Depressed fontanelle[1]
L. milanjiana Gürke, Lamiaceae	-	Herb	Whole plant	Walking difficulties[1]
L. nyassae Gürke, Lamiaceae	-	Herb	Leaves	Walking difficulties[6]

Table 2 continues on the next page →

TABLE 2 (Continues...): Medicinal plants used for the treatment and management of paediatric diseases in Zimbabwe.

Species and family	Local names+	Habit	Plant parts	Disease or ailment*
Lippia javanica (Burm.f.) Spreng., Verbenaceae	Zumbani (S)	Shrub	Leaves, roots	Bronchitis, malnutrition and prevent illness[1,3]
**Melia azedarach* L., Meliaceae	Musiringa (S)	Tree	Leaves	Depressed fontanelle[1]
**Mentha spicata* L., Lamiaceae	Mint (E)	Herb	Leaves	Inflammation of umbilical cord[1]
Mondia whitei (Hook.f.) Skeels, Apocynaceae	Mungurauwe (S)	Climber	Bark	Paediatric asthma[14]
**Moringa oleifera* Lam., Moringaceae	Moringa (S)	Tree	Leaves, fruits, seeds	Malnutrition[13]
**Musa* spp., Musaceae	Banana (E)	Shrub	Roots	Depressed fontanelle[1]
Neocussonia umbellifera (Sond.) Hutch., Araliaceae	Muchaka (S)	Tree	Roots	Inflammation of navel cord[1]
Nymphaea nouchali Burm.f., Nymphaeaceae	Hapa (S)	Herb	Roots	Colic and diarrhoea[1,9]
Ochna pulchra Hook., Ochnaceae	Iminyelenyele (N)	Tree	Roots	Dysentery and dehydration[3]
Ocimum obovatum E. Mey. ex Benth., Lamiaceae	Chikomatadza (S)	Herb	Leaves	Abdominal pains[1]
Ormocarpum kirkii S. Moore, Fabaceae	Munyadza (S)	Tree	Leaf	Depressed fontanelle[6]
O. trichocarpum (Taub.) Engl., Fabaceae	Kapurupuru (S)	Shrub	Leaves, roots	Allergy, depressed fontanelle and stomach problems[1,3]
Ozoroa insignis Delile, Anacardiaceae	Isafice (N)	Tree	Roots	Inflammation of umbilical cord[1]
O. paniculosa (Sond.) R. Fern. & A. Fern., Anacardiaceae	Isifice (N)	Tree	Roots	Abdominal pains and colic[3]
Parinari curatellifolia Planch. ex Benth., Chrysobalanaceae	Muhacha (S)	Tree	Fruits	Kwashiorkor[8]
Pavetta schumanniana F. Hoffm. ex K. Schum., Rubiaceae	Chinama (S)	Shrub	Leaves	Chest pains[1]
Pelargonium luridum (Andrews) Sweet, Geraniaceae	Nyamaropa (S)	Herb	Roots	Abdominal pains[1]
Pericopsis angolensis (Baker) Meeuwen, Fabaceae	Muvanga (S)	Tree	Roots	Antiemetic[1]
Phytolacca dodecandra L'Hér., Phytolaccaceae	Inkberry (E)	Climber	Leaves	Wasting[1]
Pleurostylia africana Loes., Celastraceae	Mulamandebele (T)	Shrub	Roots	Fatten infants[1]
Pogonarthria squarrosa (Licht.) Pilg., Poaceae	Nyakatswatswa (S)	Grass	Roots	Depressed fontanelle[1]
Pouzolzia mixta Solms, Urticaceae	Isikhukhukhu (N)	Shrub	Roots	Depressed fontanelle[1]
Pseudarthria hookeri Wight & Arn., Fabaceae	Mutapatsikidzi (S)	Herb	Roots	Diarrhoea[1]
Pseudolachnostylis maprouneifolia Pax, Phyllanthaceae	Mukuvazviyo (S)	Tree	Leaves	Convulsions[6]
Psydrax lividus (Hiern) Bridson., Rubiaceae	Muvengahonye (S)	Shrub	Roots	Bilharzia[1,3]
Pterocarpus angolensis DC., Fabaceae	Mubvamaropa (S)	Tree	Bark, roots	Depressed fontanelle and kwashiorkor[1,4,7,8]
Pterolobium stellatum (Forssk.) Brenan, Fabaceae	Rukato (S)	Climber	Roots	Depressed fontanelle[7]
Rhynchosia insignis (O. Hoffm.) R. E.Fr., Fabaceae	Dapanyuchi (S)	Herb	Roots	Depressed fontanelle[1]
Rhynchosia spp., Fabaceae	Dapanyuchi (S)	Herb	Roots	Cool infants with high temperature[6]
**Ricinus communis* L., Euphorbiaceae	Mupfuta (S)	Shrub	Seeds	Depressed fontanelle[1,7]
Rumex sagittatus Thunb., Polygonaceae	Scrambling dock	Climber	Roots	Abdominal pains[1]
Schotia brachypetala Sond., Fabaceae	Mutondosvi (S)	Tree	Bark	Depressed fontanelle[7]
Securidaca longepedunculata Fresen., Polygalaceae	Chipfufanana (S)	Shrub	Roots	Convulsions and tonic[1,6]
Senecio coronatus (Thunb.) Harv., Asteraceae	Chipapari (S)	Herb	Roots	Depressed fontanelle[1]
S. latifolius DC., Asteraceae	Indlebevundhla (N)	Herb	Roots	Maintain health and tonic[1,3]
Senegalia ataxacantha (DC.) Kyal. & Boatwr., Fabaceae	Rukato (S)	Shrub	Roots	Prevent illness[1]
S. chariessa (Milne-Redh.) Kyal. & Boatwr., Fabaceae	Itatawe (N)	Shrub	Roots	Blood purifier and prevent illness[1,3]
Senna italica Mill., Fabaceae	Isizambane (N)	Shrub	Roots	Diarrhoea[1]
S. petersiana (Bolle) Lock, Fabaceae	Muremberembe (S)	Tree	Roots	Depressed fontanelle[1]
S. singueana (Delile) Lock, Fabaceae	Munzungu (S)	Shrub	Roots	Abdominal pains, constipation and umbilical cord removal[1,6]
Sesbania spp., Fabaceae	Sesbania (E)	Shrub	Seeds	Fever[6]
Solanum campylacanthum Hochst. ex A. Rich., Solanaceae	Intume (N)	Shrub	Fruits, leaves, roots	Depressed fontanelle, scabies and wasting[1,2,5]
S. incanum L., Solanaceae	Munhundurwa (S)	Shrub	Leaves, roots	Depressed fontanelle and wasting[1]
Solanum spp., Solanaceae	Nthume (N)	Shrub	Roots	Dehydration and gastro-enteritis[3]
Spermacoce dibrachiata Oliv., Rubiaceae	-	Herb	Roots	Depressed fontanelle[1]
Sphenostylis erecta (Baker f.) Hutch. ex Baker f., Fabaceae	Chitupatupa (S)	Shrub	Roots	Wasting[1]
Sphedamnocarpus angolensis (A. Juss.) Planch. ex Oliv., Malpighiaceae	Hazviere (S)	Shrub	Roots	Abdominal pains[3]
Sporobolus pyramidalis P. Beauv., Poaceae	Catstail dropseed	Grass	Roots	Depressed fontanelle and inflammation of navel cord[1,4]
Strychnos spinosa Lam., Loganiaceae	Mutamba (S)	Shrub	Roots	Abdominal pains, chest pains, colic and sore throat[3]
Syzygium cordatum Hochst. ex Krauss, Myrtaceae	Mukute (S)	Tree	Bark	Depressed fontanelle[7]
Tabernaemontana elegans Stapf, Apocynaceae	Muchanga (S)	Tree	Fruits	Depressed fontanelle[1]
Terminalia sericea Burch. ex DC., Combretaceae	Mususu (S)	Tree	Roots	Depressed fontanelle and prolapsed rectum[1,3]
Thesium spp., Santalaceae	-	Herb	Roots	Abdominal pains[1]
Thespesia garckeana F. Hoffm., Malvaceae	Mutohwe (S)	Tree	Bark	Chest pains[6]
Thunbergia oblongifolia Oliv., Acanthaceae	Mufurambudzi (S)	Herb	Roots	Depressed fontanelle and fatten infants[1,6]

Table 2 continues on the next page →

TABLE 2 (Continues...): Medicinal plants used for the treatment and management of paediatric diseases in Zimbabwe.

Species and family	Local names+	Habit	Plant parts	Disease or ailment*
Tinnea zambesiaca Baker, Lamiaceae	-	Shrub	Roots	Convulsions[6]
Tragia okanyua Pax, Euphorbiaceae	Gwenyakwenya (S)	Climber	Roots	Walking difficulties[1,6]
Trichodesma ambacense Welw., Boraginaceae	Gwiramwaka (S)	Herb	Tuber	Depressed fontanelle and fatten infants[1]
Tricliceras longepedunculatum (Mast.) R. Fern., Passifloraceae	Pimpernel (E)	Herb	Roots	Inflammation of umbilical cord[1]
Triumfetta welwitschii Mast., Malvaceae	Pompons (E)	Herb	Tuber	Depressed fontanelle[1]
Turraea nilotica Kotschy & Peyr., Meliaceae	Chipindura (S)	Shrub	Roots	Constipation, depressed fontanelle and inflammation of navel cord[1,6]
Vangueria infausta Burch., Rubiaceae	Munzviru (S)	Shrub	Roots	Diarrhoea and inflammation of navel cord[1,6]
Vigna unguiculata (L.) Walp., Fabaceae	Nyemba (S)	Herb	Roots	Constipation[1]
Wahlenbergia denticulata (Burch.) A.DC., Campanulaceae	-	Shrub	Leaves	Fever[6]
Waltheria indica L., Malvaceae	Chiriridzi (S)	Shrub	Roots	Depressed fontanelle[1]
Xenostegia tridentata (L.) D.F. Austin & Staples, Convolvulaceae	Nkunzano (T)	Climber	Leaves	Inflammation of umbilical cord[1]
Ximenia americana L., Olacaceae	Iholotshane (N)	Shrub	Roots	Abdominal pains and diarrhoea[6]
X. caffra Sond., Olacaceae	Munhengeni (S)	Shrub	Fruits	Malnutrition[13]
Zanthoxylum chalybeum Engl., Rutaceae	Kudyanyoka (S)	Tree	Bark	Depressed fontanelle[8]
**Zea mays* L., Poaceae	Chibage (S)	Grass	Cob	Mumps[2]
**Zingiber officinale* Roscoe, Zingiberaceae	Tsangamidzi (S)	Herb	Rhizome	Depressed fontanelle[1]
Ziziphus mucronata Willd., Rhamnaceae	Mpala (N)	Tree	Bark, roots	Dehydration and depressed fontanelle[1,3,7]

Local names+: E = English, T = Tonga, H = Hlengwe, N = Ndebele and S = Shona; *Literature sources: [1]Gelfand et al. 1985; [2]Chigora et al. 2007; [3]Harvey and Armitage 1961; [4]Mavi 1996; [5]Wild et al. 1972; [6]Wild & Gelfand 1959; [7]Chinemana et al. 1985; [8]Shopo et al. 2022; [9]Shava et al. 2021; [10]Takawira-Nyenya & Stedje 2011; [11]Viol et al. 2013; [12]Maroyi 2011; [13]Matowa et al. 2020; [14]Gundidza et al. 2009.

(Taub.) Engl., *Senna singueana* (Delile) Lock, *Solanum campylacanthum* Hochst. ex A. ich., *Strychnos spinosa* Lam. and *Turraea nilotica* Kotschy & Peyr. have the highest number of medicinal uses against paediatric diseases in Zimbabwe (Figure 1). Species documented in at least three independent ethnobotanical surveys include *Euclea divinorum* Hiern, *L. edulis*, *Pterocarpus angolensis* DC., *S. campylacanthum* and *Ziziphus mucronata* Willd. (Table 2; Figure 1). Notably, this study also identified medicinal plants that had been previously documented by Van Wyk (2015, 2017) who categorised such species as commercially important in sub-Saharan Africa as the species are regularly traded on local, national and international markets as medicinal plants, dietary supplements or functional foods. Such species include *Adansonia digitata* L., *Carissa spinarum* L., *D. cinerea*, *Dicoma anomala* L., *D. ambrosioides*, *Heteromorpha arborescens* (Spreng.) Cham. & Schltdl., *Hibiscus sabdariffa* L., *Kigelia africana* (Lam.) Benth., *L. javanica, Mondia whitei* (Hook.f.) Skeels, *Phytolacca dodecandra* L'Hér., *Senna italica* Mill., *S. campylacanthum*, *Syzygium cordatum* Hochst. ex Krauss, *Terminalia sericea* Burch. ex DC., *Ximenia americana* L. and *Z. mucronata* (Table 2). Such similarities in terms of species uses and values highlight the importance of recording indigenous and local knowledge about medicinal plants from different cultures and geographical regions. The insights that can be generated from such ethnomedicinal applications and cross-cultural comparisons offer promising avenues for further ethnopharmacological exploration.

About three quarters (71.0%) of the taxa listed in Table 2 are from 17 families (Figure 2), namely, Fabaceae, Asteraceae, Rubiaceae, Lamiaceae, Malvaceae, Asparagaceae, Apocynaceae, Euphorbiaceae, Convolvulaceae, Poaceae, Acanthaceae, Vitaceae, Araliaceae, Anacardiaceae, Combretaceae, Moraceae and Solanaceae. The rest of the families is represented by one to three taxa each (Table 2). These research findings highlight the dominance of medicinal plants belonging to Fabaceae

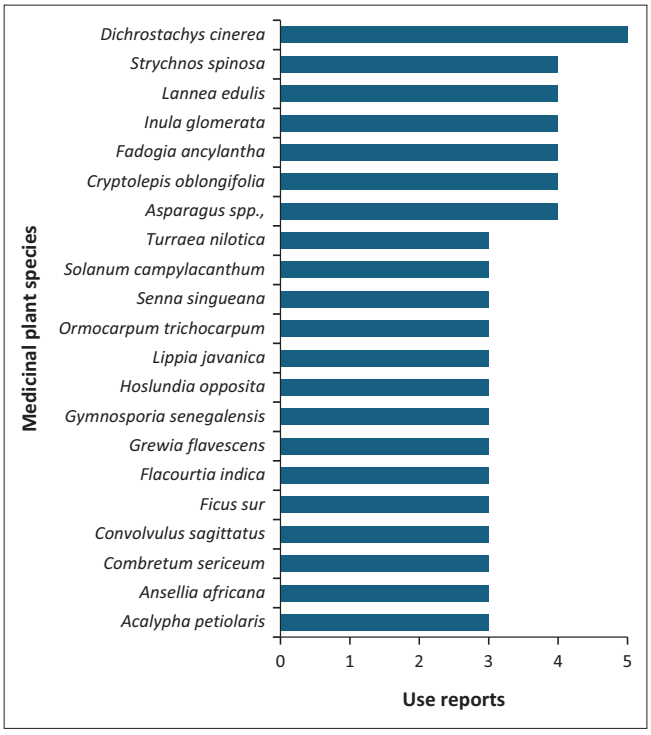

FIGURE 1: Popular medicinal plants used against paediatric diseases with 3–5 use reports.

and Asteraceae families and therefore, corroborating earlier findings that indicated that the majority of medicinal plants used to treat and manage paediatric diseases in South Africa (Ndhlovu et al. 2023) and Uganda (Nalumansi, Kamatenesi-Mugisha and Godwin 2014) belong to Fabaceae and Asteraceae families. Apart from being large families characterised by more than 19000 species each (Christenhusz & Byng 2016), families Fabaceae and Asteraceae are the most widespread taxa worldwide (Koekemoer, Steyn & Bester 2014) and have diverse ethnopharmacological applications (Garcia-Oliveira et al. 2021; Panda et al. 2019; Rolnik & Olas 2021; Van Wyk 2019). The genera with the highest

number of taxa are *Acalypha, Asparagus, Cyphostemma, Ficus, Leucas, Senna and Solanum, with three species each (Table 2).* These genera are represented by two species each: *Bidens, Combretum, Cussonia, Dracaena, Eriosperma, Gardenia, Grewia, Hypostes, Ormocarpum, Ozoroa, Rhynchosia, Senecio and Senegalia* (Table 2).

Growth habit and parts used

Herbs (32.0%), shrubs (30.0%) and trees (24.0%) are the primary sources of medicinal plants used to treat and manage paediatric diseases in Zimbabwe (Figure 3A). The plant parts used to prepare these traditional medicines include calyses, cobs, rhizomes, stems, wood, bulbs, fibres, seeds, whole plants, fruits, bark, leaves and roots (Figure 3B). Roots are the main plant parts used to prepare the remedies used to treat and manage paediatric diseases (Figure 3B). Similarly, Ndhlovu et al. (2023) reported the predominance of the roots and rhizomes (40.0%), leaves (23.0%) and whole plants (20.0%) in the preparation of remedies against childhood diseases in the North West Province of South Africa. Traditional healers and other users of traditional medicines believe that underground plant parts such as roots, bulbs, rhizomes, corms and tubers contain higher concentration of active ingredients or phytochemical compounds (Barata et al. 2016; Chebii, Muthee & Kiemo 2023; Flores & Flores 1997) and therefore, likely to be more effective than the aerial plant parts such as branches, twigs, flowers, leaves, seeds and fruits. Research by Asigbaase et al. (2023) showed that harvesting pressure on medicinal plants is determined by the frequency of harvesting, quantity and plant parts being harvested, method of harvesting, plant species being harvested and its population size.

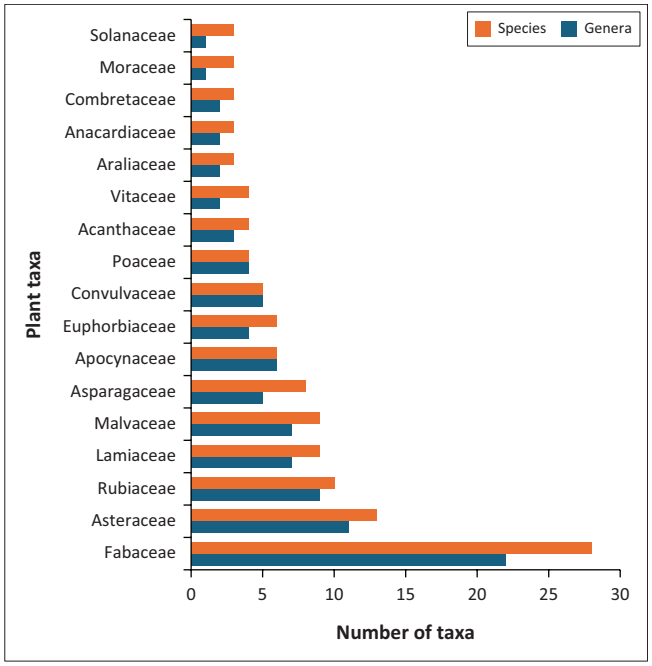

FIGURE 2: Frequency of major plant families, genera and species used to manage and treat paediatric diseases in Zimbabwe.

Disease categories

This study showed that medicinal plants are used to treat and manage 41 childhood medical conditions in Zimbabwe (Table 2). Maximum use is for depressed fontanelle (74 use reports), followed by abdominal pains (22 use reports), diarrhoea (19 use reports), fattening infants (17 use reports) and inflammation of umbilical cord (14 use reports) (Table 3). Results of this study corroborate previous findings by Towns, Eyi and Van Andel (2014), which revealed that fontanelle is a common paediatric ailment managed through the use of traditional medicines in tropical Africa. Literature search showed that traditional medicines are widely used against depressed fontanelle in Benin (Towns et al. 2014), Botswana (Teichler 1971), Gabon (Towns et al. 2014), Ghana (Ani-Amponsah et al. 2023) and South Africa (Khoza et al. 2023; Mashile, Tshisikhawe & Masevhe 2019). Similarly, Chandra and Wanda (2017) argued that traditional medicine is effective in managing diarrhoea in children in Indonesia. The general role and value of medicinal plants in childhood well-being is highlighted through utilisation of

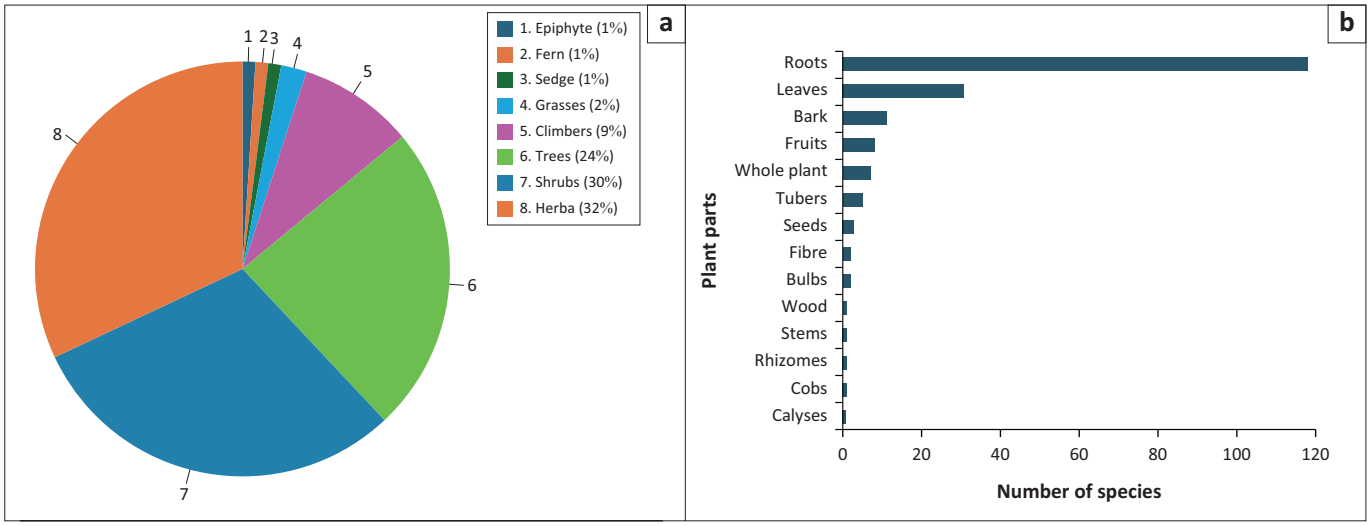

FIGURE 3: Characteristics of medicinal plants used against paediatric diseases in Zimbabwe. (a) Growth habit represented in pie diagram and (b) Plant parts used represented in a bar chart.

TABLE 3: Major categories of paediatric diseases or conditions treated or managed with medicinal plants in Zimbabwe.

Disease category	Use records	Percentage
Depressed fontanelle	74	42.0
Abdominal pains	22	12.0
Diarrhoea	19	11.0
Fatten infants	17	10.0
Inflammation of navel cord	14	8.0
Dilate veins around umbilicus	10	6.0
Constipation	10	6.0
Antiemetic	8	4.0
Colic	8	4.0
Wasting	8	4.0
Prevent illness	7	4.0
Tonic	7	4.0
Dehydration	6	3.0
Malnutrition	6	3.0

various plants in the management of malnutrition, kwashiorkor, growth of infants, wasting and prevention of illnesses (see Tables 2 and 3). Therefore, local communities in Zimbabwe have developed knowledge and skills necessary to exploit medicinal plants collected from the surrounding environment to treat and manage paediatric ailments and diseases.

Conclusion

The current study explored medicinal plants that are used to treat and manage paediatric diseases and ailments in Zimbabwe. The study also explored the traditional knowledge associated with utilisation of medicinal plants to manage such diseases in children. This study revealed that children are prone to several ailments, and there is need for systematic documentation of medicinal plants used for the treatment and management of paediatric diseases. Results of this study, therefore, provide baseline data that can be used for future ethnopharmacological research focusing on chemical, pharmacological and toxicological evaluations of the documented species.

Acknowledgements

Competing interests

The author declares that they have no financial or personal relationship(s) that may have inappropriately influenced him in writing this article.

Author's contribution

A.M. declares that they are the sole author of this review article.

Ethical considerations

This article followed all ethical standards for research without direct contact with human or animal subjects.

Funding information

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

Data availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Disclaimer

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References

Ani-Amponsah, M., Richter, S., Adam, M.A.H., Osei, E.A., Mustapha, M. & Oti-Boadi, E., 2023, 'Hot fomentation of newborn fontanelles as an indigenous practice in Ghana: Implications for policy and integrated community-based health care in Covid-19 pandemic and beyond', *International Journal of Equity Health* 22, 37. https://doi.org/10.1186/s12939-023-01852-3

Asigbaase, M., Adusu, D., Anaba, L., Abugre, S., Kang-Milung, S., Acheamfour, S.A. et al., 2023, 'Conservation and economic benefits of medicinal plants: Insights from forest-fringe communities of Southwestern Ghana', *Trees, Forests and People* 14, 100462. https://doi.org/10.1016/j.tfp.2023.100462

Barata, A.M., Rocha, F., Lopes, V. & Carvalho, A.M., 2016, 'Conservation and sustainable uses of medicinal and aromatic plants genetic resources on the worldwide for human welfare', *Industrial Crops and Products* 88, 8–11. https://doi.org/10.1016/j.indcrop.2016.02.035

Chandra, K.A. & Wanda, D., 2017, 'Traditional method of initial diarrhea treatment in children', *Comprehensive Child and Adolescent Nursing* 40(Suppl. 1), 128–136. https://doi.org/10.1080/24694193.2017.1386980

Chebii, W.K., Muthee, J.K. & Kiemo, K., 2023, 'Sociocultural conservation strategies of prioritized medicinal plants, their historical context and space for integration', *African Journal of History and Culture* 15(1), 11–21. https://doi.org/10.5897/AJHC2022.0546

Chigora, P., Masocha, R. & Mutenheri, F., 2007, 'The role of indigenous medicinal knowledge (IMK) in the treatment of ailments in rural Zimbabwe: The case of Mutirikwi communal lands', *Journal of Sustainable Development in Africa* 9, 26–43, viewed 22 March 2024, from https://jsd-africa.com/Jsda/V9N2-Summer2007/ARC_RoleIndigenousMedKnoledge_IMK.pdf.

Chinemana, F., Drummond, R.B., Mavi, S. & De Zoysa, I., 1985, 'Indigenous plant remedies in Zimbabwe', *Journal of Ethnopharmacology* 14(2–3), 159–172. https://doi.org/10.1016/0378-8741(85)90084-4

Christenhusz, M.J. & Byng, J.W., 2016, 'The number of known plants species in the world and its annual increase', *Phytotaxa* 261, 201–217. https://doi.org/10.11646/phytotaxa.261.3.1

Flores, H.E. & Flores, T., 1997, 'Biology and biochemistry of underground plant storage organs', in T. Johns & J.T. Romeo (eds.), *Functionality of food phytochemicals. Recent advances in phytochemistry*, vol. 31, pp. 113–132, Springer, Boston MA.

Garcia-Oliveira, P., Barral, M., Carpena, M., Gullón, P., Fraga-Corral, M., Otero, P. et al., 2021, 'Traditional plants from Asteraceae family as potential candidates for functional food industry', *Food and Function* 12, 2850–2873. https://doi.org/10.1039/D0FO03433A

Gelfand, M., Mavi, S., Drummond, R.B. & Ndemera, B., 1985, *The traditional medical practitioner in Zimbabwe: His principles of practice and pharmacopeia*, Mambo Press, Gweru.

Gundidza, G.M., Mmbengwa, V.M., Magwa, M.L., Ramalivhana, N.J., Mukwevho, N.T., Ndaradzi, W. et al., 2009, 'Aphrodisiac properties of some Zimbabwean medicinal plants formulations', *African Journal of Biotechnology* 8(22), 6402–6407. https://doi.org/10.5897/AJB09.430

Hailu, F., Cherie, A., Gebreyohannis, T. & Hailu, R., 2020, 'Determinants of traditional medicine utilization for children: A parental level study in Tole District, Oromia, Ethiopia', *BMC Complementary Medicine and Therapies* 20(1), 125. https://doi.org/10.1186/s12906-020-02928-1

Harvey, T.E.C. & Armitage, F.B., 1961, 'Some herbal remedies and observations on the Nyanga of Matabeleland', *The Central African Journal of Medicine* 7(6), 193–207, viewed 22 March 2024, from https://journals.co.za/doi/pdf/10.10520/AJA00089176_7289.

James, P.B., Gyasi, R.M., Kasilo, O.M.J., Wardle, J., Bah, A.J., Yendewa, G.A. et al., 2023, 'The use of traditional medicine practitioner services for childhood illnesses Among childbearing women: A multilevel analysis of demographic and health surveys in 32 sub-Saharan African countries', *BMC Complementary Medicine and Therapies* 23, 137. https://doi.org/10.1186/s12906-023-03972-3

Kasilo, O.M.J., Wambebe, C., Nikiema, J.-B. & Nabyonga-Orem, J., 2019, 'Towards universal health coverage: Advancing the development and use of traditional medicines in Africa', *BMJ Global Health* 4(9), e001517. https://doi.org/10.1136/bmjgh-2019-001517

Khalid, T. & Ahmed, A., 2023, 'Medicinal plants adopted to treat children's diseases by traditional pediatrics "women healers" in the Souss Massa Region (Agadir Idaoutanan, Inzegane Ait Meloul and Chtouka Ait Baha) Morocco', *Pharmacognosy Journal* 14(6s), 880–886. https://doi.org/10.5530/pj.2022.14.183

Khoza, N., Dukhan, S., Ramalepe, P. & Risenga, I., 2023, 'Medicinal plants used to treat maternal and paediatric health related ailments in the Nkomazi Local Municipality, Mpumalanga province, South Africa', *Ethnobotany Research and Applications* 26, 74. https://doi.org/10.32859/era.26.74.1-16

Koekemoer, M., Steyn, H.M. & Bester, S.P., 2014, *Guide to plant families of southern Africa*, Strelitzia 31, South African National Biodiversity Institute, Pretoria.

Liheluka, E., Gibore, N.S., Lusingu, J.P.A., Gesase, S., Minja, D.T.R., Lamshöft, M. et al., 2023, 'Medicinal plants for treatment of diarrhoeal diseases among under-five children: Experience from traditional healers in North-eastern Tanzania', *BMC Complementary Medicine and Therapies* 23, 379. https://doi.org/10.1186/s12906-023-04216-0

Maroyi, A., 2011, 'Ethnobotanical study of medicinal plants used by people in Nhema communal area, Zimbabwe', *Journal of Ethnopharmacology* 136(2), 347–354. https://doi.org/10.1016/j.jep.2011.05.003

Maroyi, A., 2018, 'Ethnomedicinal uses of exotic plant species in south-central Zimbabwe', *Indian Journal of Traditional Knowledge* 17, 71–77, viewed 25 March 2024, from http://nopr.niscpr.res.in/handle/123456789/43148

Mashile, S.P., Tshisikhawe, M.P. & Masevhe, N.A., 2019, 'Medicinal plants used in the treatment of maternal health-related problems by the Mapulana of Ehlanzeni District, Mpumalanga province, South Africa', *Journal of Applied Pharmaceutical Science* 9(12), 21–29. https://doi.org/10.7324/JAPS.2019.91204

Matowa, P.R., Gundidza, M., Gwanzura, L. & Nhachi, C.F.B., 2020, 'A survey of ethnomedicinal plants used to treat cancer by traditional medicine practitioners in Zimbabwe', *BMC Complementary Medicine and Therapies* 20, 278. https://doi.org/10.1186/s12906-020-03046-8

Mavi, S., 1996, 'Medicinal plants and their uses in Zimbabwe', in H. Norman, I. Snyman & M. Cohen (eds.), *Indigenous knowledge and its uses in southern Africa*, pp. 67–73, Human Sciences Research Council, Pretoria.

Mbunge, E., Chemhaka, G., Dzinamarira, T., Moyo, E., Fashoto, S., Muchemwa, B. et al., 2024, 'Determinants of under-five mortality in Zimbabwe: Evidence from the 2015–2016 Zimbabwe demographic Health Survey data', *Women and Children Nursing* 2(1), 1–8. https://doi.org/10.1016/j.wcn.2024.02.001

Mokhesi, T. & Modjadji, P., 2022, 'Usage of traditional, complementary and alternative medicine and related factors among patients receiving healthcare in Lesotho', *The Open Public Health Journal* 15, 1–12. https://doi.org/10.2174/18749445-v15-e2202090

Nalumansi, P., Kamatenesi-Mugisha, M. & Godwin, A., 2014, 'Medicinal plants used in paediatric health care in Namungalwe Sub County, Iganga District, Uganda', *Nova Journal of Medical and Biological Sciences* 3(2), 1–8. https://doi.org/10.20286/nova-jmbs-030234

Ndhlovu, P.T., Asong, J.A., Omotayo, A.O., Otang-Mbeng, W. & Aremu, A.O., 2023, 'Ethnobotanical survey of medicinal plants used by indigenous knowledge holders to manage healthcare needs in children', *PLoS One* 18(3), e0282113. https://doi.org/10.1371/journal.pone.0282113

Ngere, S.H., Akelo, V., Ondeng'e, K., Ridzon, R., Otieno, P., Nyanjom, M. et al., 2022, 'Traditional medicine beliefs and practices among caregivers of children under five years-the child health and mortality prevention surveillance (CHAMPS), western Kenya: A qualitative study', *PLoS One* 17(11), e0276735. https://doi.org/10.1371/journal.pone.0276735

Panda, S.K., Da Silva, L.C.N., Sahal, D. & Leonti, M., 2019, 'Editorial: Ethnopharmacological studies for the development of drugs with special reference to Asteraceae', *Frontiers of Pharmacology* 10, 955. https://doi.org/10.3389/fphar.2019.00955

Patton, G.C., Sawyer, S.M., Santelli, J.S., Ross, D.A., Afifi, R., Allen, N.B. et al., 2016, 'Our future: A Lancet commission on adolescent health and wellbeing', *Lancet* 387(10036), 2423–2478. https://doi.org/10.1016/S0140-6736(16)00579-1

Perin, J., Mulick, A., Yeung, D., Villavicencio, F., Lopez, G., Strong, K.L. et al., 2022, 'Global, regional, and national causes of under-5 mortality in 2000–19: An updated systematic analysis with implications for the Sustainable Development Goals', *The Lancet Child and Adolescent Health* 6(2), 106–115. https://doi.org/10.1016/S2352-4642(21)00311-4

Pope, G.V. & Pope, D.G., 1998, *Flora Zambesiaca: Collecting localities in the Flora Zambesiaca area*, Royal Botanic Gardens, Kew, Richmond.

Raina, N., Khanna, R., Gupta, S., Jayathilaka, C.A., Mehta, R. & Behera, S., 2023, 'Progress in achieving SDG targets for mortality reduction among mothers, newborns, and children in the WHO South-East Asia Region', *The Lancet Regional Health Southeast Asia* 18, 100307. https://doi.org/10.1016/j.lansea.2023.100307

Rolnik, A. & Olas, B., 2021, 'The plants of the Asteraceae family as agents in the protection of human health', *International Journal of Molecular Science* 22, 3009. https://doi.org/10.3390/ijms22063009

Shaheen, S., Abbas, S., Hussain, J., Mabood, F., Umair, M., Ali, M. et al., 2017, 'Knowledge of medicinal plants for children diseases in the environs of district Bannu, Khyber Pakhtoonkhwa (KPK)', *Frontiers in Pharmacology* 8, 430. https://doi.org/10.3389/fphar.2017.00430

Sharrow, D., Hug, L., You, D., Alkema, L., Black, R., Cousens, S. et al., 2022, 'Global, regional, and national trends in under-5 mortality between 1990 and 2019 with scenario-based projections until 2030: A systematic analysis by the UN interagency group for child mortality estimation', *Lancet Global Health* 10(2), 195–206. https://doi.org/10.1016/S2214-109X(21)00515-5

Shava, S., Saurombe, T., Sibanda, M. & Matowanyika, J.Z.Z., 2021, 'Impact of cyclones and extreme floods on traditional medicines and indigenous knowledge systems in Chimanimani, Zimbabwe', in G. Nhamo & K. Dube (eds.), *Cyclones in southern Africa, volume 2: Foundational and fundamental topics*, pp. 169–178, Springer Nature, Cham.

Shopo, B., Mapaya, R.J. & Maroyi, A., 2022, 'Ethnobotanical study of medicinal plants traditionally used in Gokwe South District, Zimbabwe', *South African Journal of Botany* 149, 29–48. https://doi.org/10.1016/j.sajb.2022.05.052

Takawira-Nyenya, R. & Stedje, B., 2011, 'Ethnobotanical studies in the genus *Sansevieria* Thunb. (Asparagaceae) in Zimbabwe', *Ethnobotany Research and Applications* 9, 421–443. https://doi.org/10.17348/era.9.0.421-443

Teichler, G.H., 1971, 'Notes on the Botswana pharmacopoea', *Botswana Notes and Records* 3, 8–11, viewed 21 March 2024, from https://www.jstor.org/stable/40979269.

Towns, A.M., Eyi, S.M. & Van Andel, T., 2014, 'Traditional medicine and childcare in Western Africa: Mothers' knowledge, folk illnesses, and patterns of healthcare-seeking behavior', *PLoS One* 9(8), e105972. https://doi.org/10.1371/journal.pone.0105972

Tugume, P. & Nyakoojo, C., 2019, 'Ethno-pharmacological survey of herbal remedies used in the treatment of paediatric diseases in Buhunga parish, Rukungiri District, Uganda', *BMC Complementary and Alternative Medicine* 19, 353. https://doi.org/10.1186/s12906-019-2763-6

Van Wyk, B.-E., 2015, 'A review of commercially important African medicinal plants', *Journal of Ethnopharmacology* 176, 118–134. https://doi.org/10.1016/j.jep.2015.10.031

Van Wyk, B.-E., 2017, 'A review of African medicinal and aromatic plants', in M. Neffati, H. Najjaa & A. Máth (eds.), *Medicinal and aromatic plants of the world: Africa*, vol. 3, pp. 19–60, Springer, Dordrecht.

Van Wyk, B.-E., 2019, 'The diversity and multiple uses of southern African legumes', *Australian Systematic Botany* 32, 519–546. https://doi.org/10.1071/SB19028

Van Wyk, B.-E. & Wink, M., 2017, *Medicinal plants of the world*, Briza Publications, Pretoria.

Viol, D.I., Chagonda, L.S., Moyo, S.R. & Mericli, A.H., 2013, 'Antibacterial, antifungal and phytochemical activities of some medicinal plants from Zimbabwe', *Journal of Biologically Active Products from Nature* 3(4), 273–284. https://doi.org/10.1080/22311866.2013.782758

Wild, H. & Gelfand, M., 1959, 'Some native herbal remedies at present in use in Mashonaland', *The Central African Journal of Medicine* 5(6), 292–305, viewed 26 March 2024, from https://journals.co.za/doi/pdf/10.10520/AJA00089176_5619.

Wild, H., Mavi, S. & Biegel, S.M., 1972, *A southern Rhodesia botanical dictionary of native and English plant names*, Government Printer, Salisbury.

Williams, V.L., Burness, A., Wojtasik, E.M. & Byrne, M.J., 2021, 'Dataset, including a photo-guide, of alien plants sold in traditional medicine markets and healthcare outlets in three South African cities, specifically by traders of Indian, West African, East African, and Chinese origin', *Data in Brief* 38, 107395. https://doi.org/10.1016/j.dib.2021.107395

Wright, K.D., Power, H.A. & Shivak, S.M., 2022, 'Child health and illness', in G.J.G. Asmundson (ed.), *Comprehensive clinical psychology*, pp. 501–513, Elsevier, London.