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HERBAL RECIPES USED FOR THE TRADITIONAL MANAGEMENT OF INFANTILE DERMATITIS IN ODEDA, SOUTHWESTERN NIGERIA

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Abstract

Background: The period of infancy, spanning through the neonatal stage to two years, is characterized by a series of health challenges for the affected child and concerned parents. This study conducted in Odeda Local Government Area of Ogun State, Nigeria was aimed at investigating the plants used in the traditional management of infantile dermatitis and other neonatal skin infections with emphasis on the role of **SPICES**.
Methods: Structured questionnaires (and personal interview) were administered to 36 nursing mothers (age range, 15 – 50) and 30 herbsellers (age range, 21 – 60) in the LGA. The herbsellers prescribed recipes used in the management of general skin diseases including abscess, chicken pox, eczema, flaky skin spots, measles, rashes, ringworm, and small pox.
Results: The survey yielded 69 plants belonging to 38 families and forming 25 polyherbal and mono-recipes. Fabaceae, Rutaceae, Euphorbiaceae, Annonaceae, Poaceae, Meliaceae, and Amaryllidaceae had high species representation. Trees (40.58%) were the most frequently used plant habit while leaves (40.58%) formed the most frequently used plant part. Decoction and infusion using pure water were the methods of preparation suggested. Administration ranged from drinking extracts (2-3 teaspoonfuls) three times daily, to bathing with warm extracts of the plants and the use of coconut oil as cream. Traditional black soap and Shea butter also featured in the herbal remedy for bath and as cream respectively. Local sponge was preferred for bathing.
Conclusion: This study has documented the alternative medical approach in the management of infantile skin diseases. The cultural relevance of plants calls for sustainable use of plant resources. This research finds application in primary health care, microbiology, and in cosmetic industries for the development of new or improved baby skin care products. Further research should be conducted to confirm the claimed ethnomedicinal values as well as evaluate possible harm of crude plant extracts to skin structures of infants.

Key words: Infants, Skin infections, Spices, Nigeria.

Introduction

The period of infancy, spanning through the neonatal stage to two years, is characterized by a series of health challenges for the affected child and concerned parents. For neonates, these health issues may be due in part to the not-strongly-developed immune system or immaturity of skin structures. However, other factors such as income of parents, hygiene level, environmental conditions, and cultural belief may also contribute to disease incidence and severity. Of all paediatric ailments, skin rashes are extremely common in newborns and present a great concern to parents (O'Connor, 2008). Some of these skin diseases are transient and less harmful as they surface during the first four weeks of landing a baby. Infants therefore should be closely monitored to prevent or manage the incidence of dermatitis. In conventional medicine, erythema toxicum neonatorum, acne neonatorum, transient neonatal pustular melanosis, seborrheic/atopic dermatitis, milia, and miliaria have been clinically diagnosed and characterized. Bacteria, fungi, and viruses are implicated as the causal organisms (O'Connor, 2008). All these technical terms are known as skin rashes by the unlettered nursing mothers in rural and semi-urban areas or as skin inflammations manifesting as swelling, redness, itching, heat, and pain (Ikeda et al., 2008). These skin infections may occur on the scalp, face, ears, neck or around the diaper area. Conventional drugs used in the management of these skin infections are available in pharmacy stores. However, low-income parents still subscribe to herbal medicine. The use of herbal products by parents to manage skin infections is influenced by interplay of environmental conditions, a system of customs, habits, and superstitious belief (Gupta and Gupta 2001).

The relative cheapness of herbal medicines, their acclaimed potency and cultural relevance, and the cost of conventional drugs have led to the acceptance of traditional treatment of common ailments. The use of plants by the rural and semi-urban populations has encouraged a series of ethnobotanical surveys. These surveys are documented and ethnomedicinal information disseminated to a wider audience. In Nigeria, ethnobotanical surveys have been carried out and reported by Bhat et al. (1990), Aiyeloja and Bello (2006), Soladoye et al. (2010 a,b), Erinoso and Aworinde (2012), Fasola et al. (2014), Gbadamosi and Egunyomi (2014), Mustafa et al. (2014), Shosan et al. (2014), Soladoye et al. (2014) and Aworinde and Erinoso (2015).

Spice plants have played major roles in culinary and food preparations of traditional delicacies. The use of spices in herbal medicine is a necessary advance. Billing and Sherman (1998) submitted that if spices disguise the taste and smell of bad food and inhibit or kill bacteria and fungi that spoil food or harm humans, then spices should be especially potent against local pathogens. In addition to the basic food uses of spices (and herbs) for flavouring, colouring, pungency, masking and use in alcoholic beverages, the antioxidant, insect repellent and antimicrobial activities of spices have also been established (Tanabe et al., 2002, Grangland et al., 2003). For example, history has it that Louis Pasteur discovered antibacterial properties of garlic and hence the plant was used in the battlefield to treat bacteria and to prevent gangrene in the 1800s (Block, 1986).

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This study forms part of an intensive project on the documentation of traditional medical practices in rural and semi-urban areas of Southwestern Nigeria and reports the recipes, method of preparation and administration of plants used in the management infantile skin infections.

Methods

Study Site

The survey was conducted in Odeda Local Government Area of Ogun State, Southwestern Nigeria (Fig. 1). The local government has a land area of 1547.29km^2 with a population of 109, 449 (NBS 2006). The headquarters of the LGA is at Odeda on the A5 highway 7º13'00N, 3º31'00E. The climate favours the cultivation of a wide range of food crops such as rice, maize, cassava, yam, cocoyam, oil palm, vegetables, and fruit trees. Residents are mainly farmers and traders with a few government workers attached to the state primary and secondary schools, local government secretariat and the state hospital.

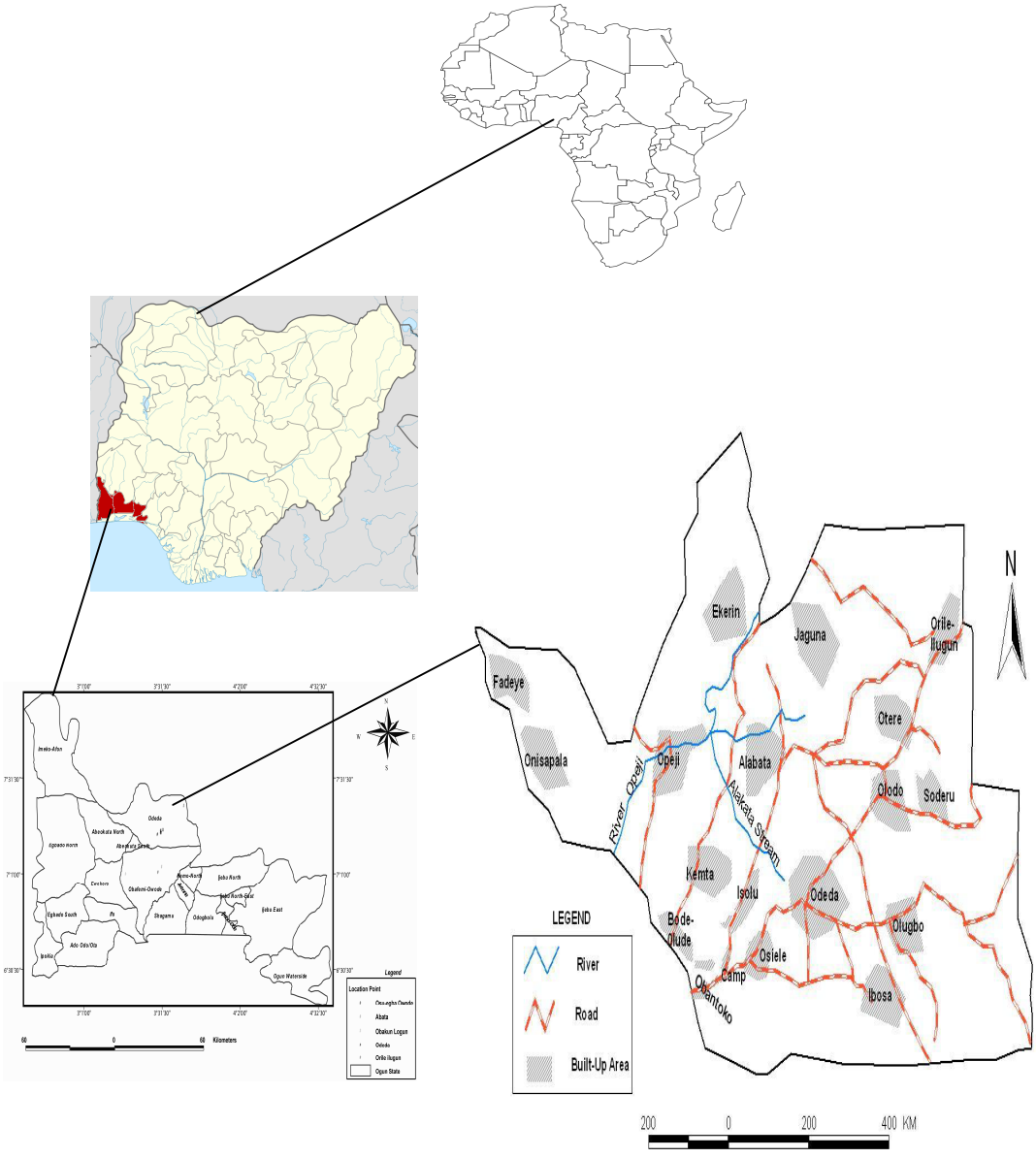

Figure 1: Study area (Odeda Local Government Area of Ogun State, Southwestern Nigeria)

Ethical Consideration

The purpose of the study was explained to the participants in the local language and informed consent was obtained from each of the respondents.

Administration of Questionnaire and Ethnobotanical Survey

This study was conducted between June and December 2014. Semi-structured questionnaires were administered to 30 herbsellers and 36 nursing mothers. Interviews were conducted in the local language and responses filled into the questionnaire. Respondents were re-examined and information validated by consistent response (Tongco, 2007). Out of the 30 herbsellers identified in the LGA only 10 showed willingness to share ethnomedicinal information. Plants mentioned in the survey were collected, pressed, mounted and identified in accordance with taxonomic practice. The preserved specimens were identified and authenticated at the Forestry Research Herbarium Ibadan (FHI) using their local names and standard texts (Gbile, 1989; Akobundu and Agyakwa, 1998).

Data Analysis

Descriptive statistics was used to present the data (IBM SPSS Statistics Version 20). Priority index followed the ranking proposed by Njoroge (2010).

Results

Demography and Responses of Participants

The demographic profile of the herbsellers and nursing mothers interviewed is presented in Table 1. 30 herbsellers (age range, 21 – 60) and 36 nursing mothers (age range, 15 – 50) were interviewed. Of the 30 herbsellers, 6.7% were singles, 86.7% married and 6.7% widow. Majority (73%) of the herbsellers were high school certificate holders and practised Islam. 55% of the nursing mothers were Christians, 22 (61%) of which are high school certificate holders and 12 (33%) graduates. The younger nursing mothers were either primary school certificate holders or high school dropouts. 20 herbsellers claimed they treat infantile dermatitis regularly, and mentioned that the duration of treatment lasted till signs of infection disappear. 73% of the herbsellers declared that they inherited the ethnomedicinal knowledge while 27% admitted they acquired the knowledge through training. The herbsellers stated no accompanying side effects to the use of the herbal recipes. They also mentioned that no verbal instructions/incantations are required. Although the nursing mothers understood the transient nature of rashes around diaper area, yet they exhibited serious concern as to how to manage the skin infections. The herbsellers interviewed prescribed workable recipes for general skin diseases including abscess, chicken pox, eczema, flaky skin spots, measles, rashes, ringworm, and small pox.

Medicinal Plant Use, Parts and Life Forms

Sixty-nine (69) medicinal plants belonging to 38 families and forming 25 polyherbal and mono-recipes are reported to be effective in the treatment of neonatal skin infections (Tables 2, 3 and 4). *Xylopia aethiopica* (Dunal) A. Rich, *Tetrapleura tetraptera* (Schum. & Thonn.) Taub., *Allium ascalonicum* L., *Senna alata* (L.) Roxb., *Nauclea latifolia* Sm., *Khaya ivorensis* A. Chev., *Cymbopogon citratus* (DC.) Stapf. and *Euphorbia laterifolia* Schum. & Thonn. were the most cited while Fabaceae, Rutaceae, Euphorbiaceae, Annonaceae, Poaceae, Meliaceae, and Amaryllidaceae had high species representation. The percentage frequency of plant parts and plant life forms are presented in Figs. 2 and 3. Trees (40.58%) were the most frequently used plant habit while leaves (40.58%) formed the most frequently used plant part. Spices featured in all the prescriptions.

Herbal Preparation and Administration

Decoction and infusion using pure water are the methods of preparation suggested. Administration ranged from drinking extracts (2-3 teaspoonfuls three times daily), to bathing with warm extracts of the plants and to the use of coconut oil as cream. Traditional black soap and Shea butter also featured in the herbal remedy for bath and as cream respectively. Local sponge was preferred for bathing.

Table 1: Demographic profile of respondents on plants used in the traditional management of infantile dermatitis

Parameter	Specification	Category	
		Herbsellers	Nursing Mothers
Age	15 - 20	-	1
	21 - 30	6	15
	31 - 40	8	18
	41 - 50	15	2
	51 - 60	1	-
Gender	Male	-	-
	Female	30	36
Marital Status	Single	2	-

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	Married	26	36
	Others	2	-
Religion	Christianity	3	20
	Islam	20	16
	Traditional	7	-
Educational level	Primary School Cert.	8	2
	High School Cert.	22	22
	Graduate	-	12

Table 2: Plants used in the traditional management of infantile dermatitis in Odeda, Southwestern Nigeria

S/N	Botanical Name	Family	Vernacular/Local Name (Yoruba)	Habit	Part(s) Used	Freq. N (%)
1	*Abrus precatorius* L.	Fabaceae	Omisinmisin	climber	leaf	1 (0.97)
2	*Acacia nilotica* (L.) Willd. ex Delile	Fabaceae	Booni	tree	fruit	1 (0.97)
3	*Acalypha wilkesiana* Müll. Arg.	Euphorbiaceae	Jiwinni	herb	leaf	1 (0.97)
4	*Acanthus montanus* (Nees) T. Anderson	Acanthaceae	Ahon ekun	shrub	leaf	1 (0.97)
5	*Aframomum melegueta* K. Schum.	Zingiberaceae	Ata ire	herb	leaf	2 (1.94)
6	*Ageratum conyzoides* L.	Asteraceae	Imi esu	herb	leaf	1 (0.97)
7	*Allium ascalonicum* L.	Amaryllidaceae	Alubosa elewe	herb	leaf	**4 (3.88)**
8	*Allium sativum* L.	Amaryllidaceae	Ayuu	herb	bulb	1 (0.97)
9	*Aloe vera* (L.) Burm. f.	Xanthorrhoeaceae	Aloe	herb	leaf	1 (0.97)
10	*Anacardium occidentalis* L.	Anacardiaceae	Kaju	tree	stem bark	1 (0.97)
11	*Argemone Mexicana* L.	Papaveraceae	Ahon ekun/Orisa ode	herb	leaf	1 (0.97)
12	*Aristolochia ringens* Mill.	Aristolochiaceae	Ako-igun	herb	root	1 (0.97)
13	*Bambusa vulgaris* Schrad. ex J.C. Wendl.	Poaceae	Oparun	shrub (clump)	leaf	1 (0.97)
14	*Bridelia ferruginea* Benth.	Euphorbiaceae	Ira	tree	stem bark	1 (0.97)
15	*Brophyllum pinnatum* (Lam.) Oken	Crassulaceae	Abamoda/Odundun	herb	leaf	1 (0.97)
16	*Butyrospermum paradoxum* (C.F. Gaertn.) Hepper	Sapotaceae	Emi gidi	tree	fruit	2 (1.94)
17	*Cajanus cajan* (L.) Millsp.	Fabaceae	Otili	shrub	leaf	2 (1.94)
18	*Capsicum frutescens* L.	Solanaceae	Ata were	herb	leaf	1 (0.97)
19	*Cissus quandrangularis* L.	Vitaceae	Kumori	climber	vine	1 (0.97)
20	*Citrus aurantifolia* Swingle	Rutaceae	Oronbo wewe	tree	fruit	2 (1.94)
21	*Clausena anisata* (Wild.) Hook. f. ex Benth	Rutaceae	Atari-obuko	shrub	root, leaf	1 (0.97)
22	*Cocos nucifera* L.	Arecaceae	Agbon	tree	oil	2 (1.94)
23	*Combretum sordidum* Exel.	Combretaceae	Apoka pupa/funfun	tree	root	1 (0.97)
24	*Combretum tomentosum* G. Don	Combretaceae	Ayoka	tree	root	1 (0.97)
25	*Crinum jagus* (J. Thomps) Dandy	Amaryllidaceae	Ogede odo	herb	leaf	1 (0.97)
26	*Croton zambesicus* Müll. Arg.	Euphorbiaceae	Ajekofole	shrub	leaf	1 (0.97)
27	*Cymbopogon citratus* (DC.) Stapf.	Poaceae	Ewe tea	herb	leaf	**3 (2.91)**
28	*Dennettia tripetala* G. Baker	Annonaceae	Igberi	tree	seed	1 (0.97)
29	*Dioclea reflexa* Hook. f.	Fabaceae	Agbanrin pelebe	herb	seed	1 (0.97)
30	*Enantia chlorantha* L.	Annonaceae	Oso-pupa	tree	leaf	1 (0.97)
31	*Erythrophleum suavolens* (Guill. & Perr.) Brenan	Fabaceae	Obo	tree	stem bark	1 (0.97)
32	*Euphorbia hirta* L.	Euphorbiaceae	Emi-ile	herb	leaf	1 (0.97)
33	*Euphorbia laterifolia* Schum. & Thonn.	Euphorbiaceae	Enu-opiri	herb	stem	**3 (2.91)**
34	*Ficus exasperata* Vahl.	Moraceae	Ipin	tree	leaf	1 (0.97)
35	*Glyphae brevis* (Spreng.) Moench.	Malvaceae	Atori	shrub	leaf	1 (0.97)
36	*Grewia mollis* Juss.	Malvaceae	Ora-igbo	shrub	seed	1 (0.97)
37	*Griffonia simplicifolia* (M. Vahl ex Dc) Baill.		Tapara	climber	root	1 (0.97)
38	*Harrisonia abyssinica* Oliv.	Rutaceae	Arujeran	shrub	root	1 (0.97)
39	*Hoslundia opposita* Vahl.	Lamiaceae	Efinrin oso	shrub	leaf	1 (0.97)
40	*Icacina trichanta* Oliv.	Icacinaceae	Gbegbe	shrub	tuber	1 (0.97)
41	*Jatropha gossipifolia* L.	Euphorbiaceae	Botuje pupa	shrub	leaf	2 (1.94)

42	*Khaya grandifoliola* A. Juss	Meliaceae	Oganwo	tree	stem bark	1 (0.97)
43	*Khaya ivorensis* A. Chev.	Melicaceae	Gedu/Oganwo	tree	stem bark	**3 (2.91)**
44	*Lantana camara* L.	Verbenaceae	Ewon agogo	shrub	twig	1 (0.97)
45	*Lecaniodiscus cupaniodes* Planch ex Bth	Sapindaceae	Aaka	tree	stem bark	1 (0.97)
46	*Monodora myristica* (Gaertn.) Dunal	Annonaceae	Abo-ikose	tree	fruit	1 (0.97)
47	*Musa paradisiaca* L.	Musaceae	Ogede agbagba	herb	stem	1 (0.97)
48	*Nauclea latifolia* Sm.	Rubiaceae	Egbesi	tree	root	**3 (2.91)**
49	*Newbouldia laevis* (p. Beauv.) Seem.	Bignoniaceae	Igi akoko	tree	leaf	1 (0.97)
50	*Nicotiana tabacum* L.	Solanaceae	Ewe taba	herb	leaf	1 (0.97)
51	*Ocimum gratissimum* L.	Lamiaceae	Efinrin	herb	leaf	1 (0.97)
52	*Olax subscorpioidea* Oliv.	Olacaceae	Ifon	tree	seed	1 (0.97)
53	*Opuntia* sp.	Cactaceae	Oro-agogo	herb	stem	1 (0.97)
54	*Parinari excelsa* Sabine	Chrysobalanaceae	Yinrinyinrin	tree	leaf	1 (0.97)
55	*Parkia biglobosa* (Jacq.) R. Br. ex G. Don	Fabaceae	Lasangba/Iru	tree	fruit	1 (0.97)
56	*Paullinia pinnata* L.	Sapindaceae	Kakansela	climber/ creeper	root	1 (0.97)
57	*Petivera alliaceae* L.	Phytolacaceae	Awogba	herb	leaf	2 (1.94)
58	*Picralima nitida* (Stapf.) T. Durand & H. Durand	Apocynaceae	Erin	tree	seed	2 (1.94)
59	*Piper guineense* L.	Piperaceae	Iyere	climber	fruit	2 (1.94)
60	*Prosopis africana* (Guill. & Perr.) Taub.	Fabaceae	Ayan	tree	fruit	1 (0.97)
61	*Pseudocedrela kotschyi* (Schweinf.) Harms	Meliaceae	Emi-gbegiri	tree	stem bark	2 (1.94)
62	*Schrebera arborea* A. Chev.	Oleaceae	Opele	tree	seed	1 (0.97)
63	*Senna alata* (L.) Roxb.	Fabaceae	Asunwon	shrub	leaf	**4 (3.88)**
64	*Smilax kraussiana* Meisn.	Smilacraceae	Kaasan	shrub	root	2 (1.94)
65	*Sorghum bicolor* (L.) Moench.	Poaceae	Oka baba	herb	seed	1 (0.97)
66	*Syzygium aromaticum* (L.) Merr. & L.M. Perry	Myrtaceae	Kanafuru	tree	fruit	1 (0.97)
67	*Tetrapleura tetraptera* (Schum. & Thonn.) Taub.	Fabaceae	Aidan	tree	fruit	**4 (3.88)**
68	*Xylopia aethiopica* (Dunal) A. Rich	Annonaceae	Eru-alamo	tree	fruit	**8 (7.77)**
69	*Zingiber officinale* Roscoe	Zingiberaceae	Ata-ile/Atale	herb	leaf	2 (1.94)

N=103; 3-4 citations = moderate priority species; 7 or more citations = high priority species.

Table 3: Distribution of plants (according to family) used in the traditional management of infantile dermatitis in Odeda, Southwestern Nigeria

$^{S}/_{N}$	**Family**	**Number of Species**
1	Acanthaceae	1
2	Amaryllidaceae	**3**
3	Anacardiaceae	1
4	Annonaceae	**4**
5	Apocynaceae	1
6	Arecaceae	2
7	Aristolochiaceae	1
8	Asteraceae	1
9	Bignoniaceae	1
10	Cactaceae	1
11	Chrysobalanaceae	1
12	Combretaceae	2
13	Crassulaceae	1
14	Euphorbiaceae	**6**
15	Fabaceae	**13**
16	Icacinaceae	1
17	Lamiaceae	2
18	Malvaceae	2
19	Meliaceae	**3**
20	Moraceae	1
21	Musaceae	1
22	Myrtaceae	1

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23	Olacaceae	1
24	Oleaceae	1
25	Papaveraceae	1
26	Phytolacaceae	1
27	Piperaceae	1
28	Poaceae	**3**
29	Rubiaceae	1
30	Rutaceae	**4**
31	Sapindaceae	2
32	Sapotaceae	1
33	Simulacraceae	1
34	Solanaceae	2
35	Verbenaceae	1
36	Vitaceae	1
37	Xanthorrhoeaceae	1
38	Zingiberaceae	2

Table 4: Enumeration of recipes used in the traditional management of infantile dermatitis in Odeda, Southwestern Nigeria

S/N	Prescription, method of preparation and administration
1	*Allium ascalonicum* leaf, *Syzygium aromaticum* fruit, *Picralima nitida* seed, *Smilax kraussiana* root, and *Griffonia simplicifolia* root. Decoction with pure water. Drinking (2-3 teaspoonfuls) 3x daily and for bath.
2	*Dioclea reflexa* seed, *Xylopia aethiopica* fruit, *Smilax kraussiana* root, *Nauclea latifolia* root, *Tetrapleura tetraptera* fruit. Decoction with pure water. Drinking (2-3 teaspoonfuls) 3x daily.
3	*Euphorbia hirta* leaf, *Tetrapleura tetraptera* fruit, *Cymbopogon citratus* leaf, *Dennettia tripetala* seed, and *Lantana camara* twig. Decoction with pure water. **For bath only.**
4	*Aloe vera* leaf, *Euphorbia laterifolia* stem, *Xylopia aethiopica* fruit, *Tetrapleura tetraptera* fruit, *Senna alata* leaf, and traditional black soap. The plants are ground, and worked into the black soap. **For bath**. Coconut oil is used as cream to massage the affected area.
5	*Aristolochia ringens* root, *Harrisonia abyssinica* root, *Nauclea latifolia* root, and *Xylopia aethiopica* fruit. Infusion with pure water. Drinking (2-3 teaspoonfuls) 3x daily.
6	*Allium ascalonicum* leaf, *Euphorbia laterifolia* stem, *Khaya ivorensis* stem bark, *Opuntia* sp., and *Picralima nitida* seed. Infusion with pure water. Drinking (2-3 teaspoonfuls) 3x daily.
7	*Abrus precatorius* leaf, *Acacia nilotica* fruit, *Pseudrocedrela kotschyi* stem bark, and *Xylopia aethiopica* fruit. Infusion with pure water. Drinking (2-3 teaspoonfuls) 3x daily.
8	*Allium sativum* bulb, *Piper guineense* fruit, *Parkia biglobosa*, *Euphorbia laterifolia* leaf, and *Tetrapleura tetraptera* fruit. Decoction with pure water. **For bath only.**
9	*Aframomum melegueta* leaf, *Cajanus cajan* leaf, and *Zingiber officinale* leaf. The plants are ground, and worked into Shea butter, and used as cream to massage the affected area.
10	*Cissus quandrangularis* vine, *Cymbopogon citratus* leaf, *Petivera alliaceae* leaf, *Hoslundia opposita* leaf, *Acacia nilotica* fruit, and *Monodora myristica* fruit. Infusion with pure water. Drinking (2-3 teaspoonfuls) 3x daily.
11	*Croton zambesicus* leaf, *Jatropha gossipifolia* leaf, *Senna alata*, *Glyphae brevis* leaf, and *Xylopia aethiopica* fruit. Decoction with pure water. Drinking (2-3 teaspoonfuls) 3x daily.
12	*Anacardium occidentalis* stem bark, *Enantia chlorantha* leaf, *Nicotiana tabacum* leaf, *Allium ascalonicum* bulb, *Butyrospermum paradoxum* fruit, *Capsicum frutescens* leaf, and traditional black soap. The plants are ground, and worked into the black soap. **For bath**.
13	*Bridellia ferruginea* stem bark, *Piper guineense* fruit, *Petivera alliaceae*, *Schrebera arborea* seed, and *Grewia mollis* seed. Decoction with pure water. Drinking (2-3 teaspoonfuls) 3x daily.
14	*Cymbopogon citratus* leaf, *Citrus aurantifolia* fruit, and *Khaya grandifoliola* stem bark. Decoction with pure water. Drinking (2-3 teaspoonfuls) 3x daily. Coconut oil is used as cream to massage the affected area.
15	*Acanthus montanus* leaf, *Jatropha gossipifolia* leaf, *Aframomum melegueta* leaf, *Sorghum bicolor* seed, *Olax subscorpioidea* seed, and traditional black soap. The plants are ground and worked into the black soap. **For bath.**
16	*Bambusa vulgaris* leaf, *Prosopis africana* fruit, *Newbouldia laevis* leaf, *Ficus exasperata* leaf, *Icacina trichanta* tuber, and *Pseudrocedrela kotschyi* stem bark. Decoction with pure water. Drinking (2-3 teaspoonfuls) 3x daily, and for bath.
17	*Khaya ivorensis* stem bark, *Nauclea latifolia* stem bark, *Parinari excelsa* leaf, and *Paullina pinnata* root. Decoction with pure water. Drinking (2-3 teaspoonfuls) 3x daily, and for bath.
18	*Ageratum conyzoides* leaf, *Acalypha wilkesiana* leaf, *Argemone mexicana*, *Butyrospermum paradoxum* stem bark, *Lecaniodiscus cupanioides* stem bark, and *Xylopia aethiopica* fruit. Decoction with pure water. Drinking (2-3 teaspoonfuls) 3x daily, and for bath.
19	*Combretum sordidum* root, *Combretum tomentosum* root, and *Clausena anisata* root. Decoction with pure water. Drinking (2-3 teaspoonfuls) 3x daily, and for bath.
20	*Allium ascalonicum* leaf, *Bryophillum pinnatum* leaf, *Crinum jagus* leaf, *Senna alata* leaf, and *Xylopia aethiopica* fruit
21	*Cajanus cajan* seed: grind seed into powder and dust the affected area with the powder.
22	*Cocos nucifera* oil: cream the affected area with the oil.
23	*Citrus aurantifolia* fruit: cream the affected area with the juice of the lime.
24	*Musa paradisiaca* stem: cut the stem into pieces and pound to squeeze out the juice, and then apply juice to affected area.
25	*Senna alata* leaf: squeeze the leaf to extract juice and apply juice to affected area.

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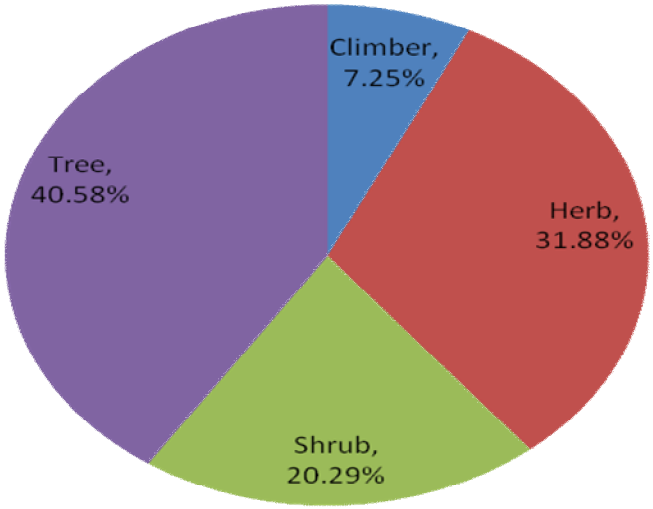

Figure 2: Plant life form and percentage frequency of plants used in the traditional management of infantile dermatitis in Odeda, Southwestern Nigeria

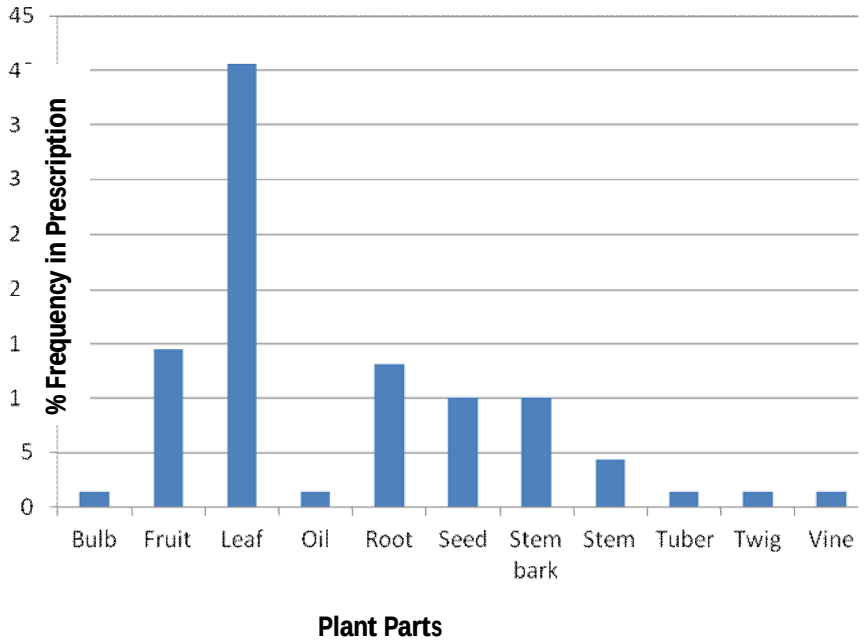

Figure 3: Percentage frequency of plant parts used in the traditional management of infantile dermatitis in Odeda, Southwestern Nigeria

Discussion

The sex of the herbsellers supports gender inclination to the trade of medicinal plants. The religion of nursing mothers did not influence their subscription to herbal products or traditional medical practices. The subscription to herbal medicinal products showed the importance of plant resources to the people of Odeda. Such acceptance may be due in part to the relative cheapness of herbal medicinal products, their ethnomedicinal values and cultural significance.

The anatomy and physiology of skin structures vary at different sites of the body but neonates' skins are generally delicate especially in the first few weeks of landing. Most skin and soft tissue infections in children are caused by bacteria, fungi, and viruses (Templer and Brito, 2009). The risk factors of these methicilin- and multi-drug resistant organisms include a breakdown of the epidermis, poor personal hygiene, crowding, co-morbidities, and close contact with an infected person (Templer and Brito, 2009). Also, Vaseline and mineral oils are now known to be important causes of skin problems (van Hees and Naafs, 2001). Aqueous cream or emulsifying ointment from vegetable oils e.g. coconut oil are good alternatives to Vaseline for use as moisturiser (van Hees and Naafs, 2001).

This submission is in line with the traditional use of coconut oil as complementary treatment after drinking and bathing with decocted or infused extracts. However, in the application of these research findings, commercial production of plants of interest into baby skin care products may be presented in the form of ointments or cream especially for wet or delicate skin structures.

The use of plants and plant products by traditional societies has necessitated the conscious efforts of documentation and dissemination of ethnobotanical information. Some of the plants documented in this study have been reported in various ethnobotanical investigations for different ailments. This is an indication that majority of these plants have broad-spectrum activities as antimalarial, anticancer, anti-diabetic, anti-inflammatory etc. Plant parts and habits are also important aspects of herbal preparations. For instance, in the treatment of sexually transmitted infections Gbadamosi and Egunyomi (2014) found that trees were the most used plant habit and leaves the most prescribed plant part. These findings have conservation significance. Trees and leaves regenerate fast. However, caution must be exercised during collection especially prescriptions involving root and stem bark of plants. The families Fabaceae, Euphorbiaceae and Malvaceae have been cited more frequently in related studies (Gbadamosi and Egunyomi 2014, Soladoye et al., 2014).

Spices have been used in culinary preparations of pepper soup for pungency and the medicinal values. Of interest is the use of *Capsicum frutescens* leaf and *Zingiber officinale* leaf. The fruit and rhizome of these plants have been used in several medicinal preparations. It is believed that these parts are too strong for infants' skin tissues. Other herbal remedies involving spices have been scientifically investigated. The *in vitro* antimicrobial effect of *Aframomum melegueta* on *Staphylococcus aureus* has been assayed by Odetunde *et al*. (2015). Alo et al. (2012) reported the antibacterial activity of water, ethanol and methanol extracts of *Aframomum melegueta, Ocimum gratissimum* and *Vernonia amygdalina* and found that *A. melegueta* significantly inhibited the growth of *Staphylococcus typhi* and *Escherichia coli* with inhibition zones between 12 and 23mm. An *in vitro* screen of diterpenoids isolated from *A. melegueta* against strains of *Eschericia coli, Listeria monocytogenes* and *Staphylococcus aureus* has been reported by Ngwoke et al. (2014) with acceptable toxicity level. The authors recommended further optimization of the isolated and purified compounds. Partially purified extract of *Allium ascalonicum* showed antimycobacterial activity with a MIC value of 500µg/ml (Amin et al. 2009).

The medicinal values of *Allium sativum* as anti-infective agent have been confirmed against many bacteria, fungi and viruses by Adetunbi et al. (1986), Weber et al. (1992), Rees et al. (1993), and later by Amin and Kapadnis (2005) against 23 strains of bacteria and fungi. Johnson et al. (2013) found that the volatile oil blend from *Allium sativum* has antimicrobial activity against *S. aureus, E. coli* and *C. albicans*. Eja et al. (2011) evaluated the synergistic antimicrobial properties of *Allium sativum* and *Gongronema latifolium* on *E. coli* and *S. aureus*. The authors doubted the synergistic effects of the medicinal plants but confirmed the additive properties of garlic and conventional drugs such as ciprofloxacin and ampicillin. Information regarding the combination of plants to form recipes and hence their effectiveness is best sourced from knowledgeable individuals. In other words, information concerning a particular plant varies from one ethnic group to the other and depends on the indigenous peoples' perceived efficacy of plants and their usefulness as understood by the people of a particular ethnic group (Igoli et al. 2005). This may well explain the observed synergistic inactivity reported by Eja et al. (2011). Furthermore, Evans (2002) opined that whether an effect is truly synergistic, or merely additive, is rarely established and evidence to prove it conclusively is sparse. Nonetheless, herbalists and associated practitioners have insisted that better results are obtained with polyherbal recipes rather than single plant or isolated compounds.

S. aureus, K. pneumoniae and *P. aeruginosa* were found to be susceptible to the methanol leaf extract of *Capsicum frutescens* L. var. *Longa* (Solanaceae) (Vinayaka et al., 2015). In the fight against multi-drug resistant Gram-positive bacteria strains, Soares et al. (2013) established that *Cymbopogon citratus* essential oil could have a potential application in the treatment and prevention of diseases caused by *Staphylococcus aureus* and *S. epidermidis*. Similar activity of the essential oil of *C. citratus* on pathogenic organisms has been reported by Naik et al. (2010) and Ewansiha et al. (2012). Steam-distilled leaf extract of *O. gratissimum* had inhibitory effect on *Staphylococcus aureus, E. coli., Salmonella typhi* and *S. typhimurium* (Adebolu and Oladimeji 2005). The ethanol extract of *O. gratisimum* and *Piper guineense* showed better antimicrobial effect against *E. coli* and *S. aureus* compared to the aqueous extract (Nwinyi et al. 2009). Leaf of *Parkia biglobosa*, a popular condiment in Southwestern Nigeria, exhibited a concentration-dependent antibacterial activity against standard strains of some Gram-positive bacteria (Ajaiyeoba, 2002). Hydroalcoholic extract of stem bark and leaf of *Parkia biglobosa* from Burkina Faso showed antimicrobial activity against *Staphylococcus aureus* (Millogo-Kone et al., 2009). The authors, however, submitted that *Parkia biglobosa* is most active if the time of collection falls in May. Evans (2002) provides a support for this submission that the season at which each drug is collected is usually a matter of considerable importance, as the amount, and sometimes the nature of the active constituents is not constant throughout the year. Moreover, Gberikon et al. (2015) discovered that the stem bark extract of *Tetraptera Tetrapleura* only was not enough to inhibit the growth of *Pseudomonas aeruginosa;* activity was higher when the stem bark extract was combined with the fruit extract. Nweze and Onyishi (2010) reported that *X. aethiopica* could be administered together with conventional antibiotics such as ofloxacin, gentamycin, fluconazole and ketoconazole.

Ethanolic leaf extract of *Piper guineense* showed antimicrobial activity against *S. aureus, C. albicans*, and *Sacccharomyces cerevisiae* (Anyanwu and Nwosu 2014; Okoye and Ebeledike 2013). Dosumu et al. (2012) found that methanol extract of *Prosopis africana* had high anti-fungal but low antibacterial activities. Ethanol and water extract of *Tetrapleura tetraptera* (pod) inhibited the growth of four human bacterial pathogens (Ekwenye and Okorie 2010). Crude and organic extracts of the rhizome of *Zingiber officinale* showed activity against some bacterial strains according to Kaushik and Goyal (2011). Gull et al. (2012) however reported that some well known Gram-positive and Gram-negative bacteria were not susceptible to an aqueous extract of ginger from Pakistan. Extraction solvent is an important factor in the determination of complete dissolution of bioactive compounds and hence the improvement in the kinetics of metabolites (Kratchnova et al., 2010). Another crucial factor is the location of a plant as well as the time of collection of the plant (Evans, 2002). Saad et al. (2014) reported that ginger rhizome had more antimicrobial activity than ginger leaves and that it can be used with conventional antibiotics to fight series of infections.

Spices are used in the preservation of food products against spoilage by micro-organisms. Dada et al. (2013) reported antifungal activity of *Xylopia aethiopica, Syzygium aromaticum*, and *Piper guineense* against *Aspergillus niger* and *A. flavus*, and *Monodora myristica* against *A. niger*. The seed of *M. myristica* is significantly rich in potassium and magnesium and serves as spice and food in local food preparations (Enabulele et al. 2014). *M. myristica* and *Zingiber officinale* inhibited the growth of fungi in sweet potato juice (Banso, 2009) and *Z. officinale* inhibited the growth of 24 isolates of food-borne pathogens (Islam, 2014). Aqueous, petroleum

ether, chloroform and ethanol extracts of *Syzygium aromaticum* inhibited the growth of Gram-positive (*Staphylococcus aureus, Streptococcus pneumoniae*) and Gram- negative (*Eschericihia coli, Klebsiella pneumoniae*) food borne pathogens (Pandey and Singh 2011; Kumari et al., 2013). The use of *Xylopia aethiopica* in preserving fresh orange juice has been proposed by Ogbona et al. (2013). Ogbona et al. (2013) further confirmed the inhibitory activity of *Aframomum melegueta, Piper guineense* and *Xylopia aethiopica* on 14 micro-organisms associated with food spoilage.

Scientific evaluation and application of the medicinal values of non-spice plants reported in this study have been carried out. For example, Al-Mehna and Kadhun (2011) treated *Streptococcus pyogenes*-infected mice with an ointment prepared from aqueous and alcoholic leaf extracts of *Lawsonia inermis* and reported the antimicrobial activity as well as an increase and organization of bands of collagen at the point of application. Ethanolic leaf extract of *Acanthus monthanus* had moderate antimicrobial activity against pathogenic microbes according to Osagwu and Onwuegbuchulam (2015).

Conclusion and Application of Results

The importance of plants and plant products to the people of Odeda has been showcased in this study. Some of the plants cited in this study have been reported to have antimicrobial activities. The active constituents of these plants have been isolated, characterized and identified. The recovery of traditional medical knowledge, documentation and diffusion of local botanical knowledge is a necessary effort towards the retention and dissemination of this information to a wider audience. The indigenous values of plants call for deliberate efforts in the sustainable use of plant resources. This research finds application in primary health care, microbiology and in cosmetic industries for the development of new or improved baby skin care products. Further research should be conducted to confirm the claimed ethnomedicinal values as well as evaluate possible harm of crude plant extracts to skin structures of infants.

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