Ethno-Pharmacological Survey of Therapeutic Plants Used in The Treatment of Paediatric Diseases in Two Local Governments in Ogun State, Nigeria

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***Abstract*— Herbal therapy deals with the use of plant-based products for therapeutic purposes and is still a popular and effective treatment choice for a variety of illnesses. The study's objective was to conduct an ethno-pharmacological survey of common therapeutic plants used in managing diseases in infants and children in Abeokuta North and Yewa South Local Government Areas (LGAs) of Ogun State, Nigeria. The respondents to the study completed one hundred and twenty (120) well-structured questionnaires. The results from the survey showed that thirty-seven (37) therapeutic plants are used for the treatment of twelve (12) paediatric diseases (malaria, typhoid fever, abdominal pains, pile, measles, jaundice, anaemia, colds, skin rashes, cough, worm infestation and infantile seborrheic dermatitis). The therapeutic plant forms are majorly trees (42%) and shrubs (36%) while the plant parts used are largely leaves (60%), major methods of preparation are decoction (39%) and cooking (32%) using water as the chief solvent. A good percentage of the plants (46%) are used for the treatment of malaria (31%) and typhoid fever (15%) respectively. Myriads amount of the plants are mono-therapeutic while few are known as poly-therapeutic. The dosage of the herbal remedy is not exact but largely with the use of medium size cup and discretional determination of little dose. Herbal therapy is still an important source of therapy in the LGAs and there is a need to correlate herbal therapy with scientific knowledge to obtain accurate dosage formulation and conduct toxicological examinations. Our study has therefore, contributed to the documentation of therapeutic plants used for treating paediatric diseases in the LGAs.**

***Keywords*— Abeokuta north, children, disease, herbal, infants, paediatric, therapeutic plant, Yewa south.**

I. INTRODUCTION

Since the advent of medicine, people have employed plants to maintain their health [1]. They have served as the cornerstone for maintaining and treating health since they are the richest bioresources for both traditional and modern medications [2]. Traditional medicine which is the use of herbs, shrubs and plant based products, for therapeutic purposes has been in existence before the invention of modern medication and are still a common and effective used treatment option for a wide range of diseases [3]. Medicinal use of plants ranges from the administration of the roots, barks, stems, leaves and seeds to the use of extracts and decoctions from the plants [4]. Presently, a good number of drugs are developed from plants which are active against quite a number of diseases and the majority of these involve the isolation of the active compound found in a particular medicinal plant and its subsequent modification [5]. According to World Health Organization (W.H.O) about 21,000 plant species have potentials of being used as medicinal plants, whereas more than 30% of the entire plant species are

already in use [5,6]. While the usage of therapeutic plants is well known among the indigenous people in rural parts of many underdeveloped countries, an estimated 25% of medical medications in developed countries are based on plants and their derivatives [7]. Studies has shown that majority of people living in developing countries are still dependent on traditional medicine like herbal plants [8]. The established facts on medicinal uses of plants became the foundation for ethnobotanical studies. For this reason, plants are identified as primary source of natural products in curing diseases [9]. The importance of medicinal plants, and the contribution of phytomedicine to the well-being of a significant number of the world's population, has attracted interest from a variety of disciplines [7]. An estimated seven (7) million children below the ages of five dies annually from diseases that are treatable and preventable most especially malaria and diarrhea. Interestingly, the mortality rate would have been averted or reduced if adequate and affordable intervention are readily available [10]. The occurrence of paediatric diseases is of a major concern due to their miniature health nature and the ability to be seriously threatened [11]. In very low income areas, characterized with expensive orthodox medication, inadequate healthcare facilities, underfunded and mismanaged available healthcare facilities. Guidance and parents resort to the utilization of herbal therapy compared to the orthodox medicine for treatment of paediatric diseases [12].

Researches have shown that plants can be used to treat a variety of diseases and afflictions. For instance, in a study by Adeniyi *et al.* [13], thirty-one (31) species of plants belonging to sixteen (16) families were reported as being used to treat disease, including the treatment of malaria with *Afraegle paniculata, Chromolaena odorata, Jatropha gossypifolia* and *Azadirachta indica, Lantana camara* is used to treat upper respiratory infections, *Momordica charantia* to treat diabetes and stomach aches, *Vernonia cinerea* to treat cancer and inflammatory diseases, and *Zanthoxylum zanthoxyloides* to treat elephantiasis, toothaches, sexual impotence, gonorrhoea, malaria, dysmenorrhea, and abdominal pain. Another study by Ampitan [14] reported that twenty-seven (27) plant species from twenty-four (24) families were identified as medicinal plants use for the treatment of various diseases in the Biu local government area of Borno state, Nigeria. Some of these plants are *Adansonia digitate* for treating asthma and Cough, *Allium sativum* for treating hypertension, boil and eye pain, *Carica papaya* for treating stomach pain and asthma, *Guiera senegalensis* for treating diarrhoea, *Jatropha curcas* for treating of wound and ring worm, *Parkia biglobosa* for treating high blood pressure, yellow fever, constipation and *Vernonia amygdalina* for treating stomach pain.

A study by Bhattarai and Khadka [15] reported a total of one hundred and two (102) plant species used for treatment of a minimum of fifty-six (56) ailments, some of which are *Cassia fistula* for treating diarrhoea and vomiting, *Nephrolepis auriculata* for treating stomach problems and worms' infestation, *Phyllanthus emblica for* blood purification and stomach ache. Mangali *et al.* [16] reported twelve (12) plants used for the treatments of diseases such as *Anonan muricata* for treating urinary tract infection, *Vitex negundo* for treating cough and flu, *Synedrella nodiflora* for the treatment of burns, *Crossocephalum crepidiodos* for iodine supplement, *Stachytarpheta jamaicensis* for treating wounds and *Hyptis capitates* for treating stomach pain and diarrhea. A good number of studies has been reported in Nigeria e.g. Shosan *et al.* [7]; Adeniyi *et al.* [13] and Ampitan [14], but there are still gaps in our knowledge about therapeutic plants used in treating diseases in infants and children in Abeokuta North and Yewa South Local Government Areas of Ogun State. Therefore, the need for this study.

II. METHODOLOGY

A. Study Area

The research survey was conducted in Ogun State, South-West, Nigeria which borders Lagos, Oyo, Ondo State and Benue Republic to the south, north, east and west respectively. Abeokuta is the capital and largest of all the cities in the state. Two Local Government Areas (Abeokuta North and Yewa South) were used for the study, **Figure 1.**

Figure 1: Ogun State map showing the study areas; denoted with stars (*Image adopted from Wikipedia*)

B. Research Design & Data Collection

The study adopted a survey research design; by this method the researcher used structured questionnaires to obtain data from a sample of the population in order to make a generalization for the purpose of the study. Source of data collection are primary source which include a set of questionnaires. The source of data requires the administration of a questions to respondent in order to support the findings of the research.

C. Administration of Questionnaires

A total of one hundred and twenty (120) questionnaires were randomly administered to respondents to obtain information about therapeutic plants used in treating diseases in infants and children in the surveyed local government areas. The questionnaire was divided into two sections. Section A: Demographic information such as gender, age group, religion, educational level and profession. Section B: List of therapeutic plants used in treatment of different ailments; which is divided into botanical and common name of plant, local name (Yoruba), parts used, plant form, mode of preparation of plant material, solvent used disease and dosage.

D. Data Analysis

Collected data were analyzed in frequency distribution and percentage tables while Microsoft excel 2013 was used to generate graphical representation.

III. RESULTS AND DISCUSSION

A. *Demographic Information of Respondents*

Demography of the respondents presented in Table 1, indicates that the majority of the respondents for the survey were females accounting for 80% of the total respondents, this in agreement with the studies of Borokini *et al.* [15] and Shosan *et al.* [7] who reported higher percentage of female respondents in a survey from Oyo state (58.1%) and Abeokuta South, Ogun state (80%) respectively. The respondents were all adults while the majority (83.5%) of the respondents religious believes were Christianity (47.5%) and Islamic (34.2%), this shows that therapeutic plants are widely used by individual of various religious beliefs. A very good level of literacy (88.9%) among the respondents (27.5% primary, 41.7% secondary and 19.2% tertiary) was observed in the survey. This obviously rule out the perception of therapeutic plant usage as a result of ignorance and lack of education. The majority of the respondents were herb seller (35%) followed by people utilizing therapeutic plant (27.5%), this also is in agreement the work of Shosan *et al.* [7] who also reported majority of the respondents in a study in Abeokuta South were herb sellers

B. *Therapeutic Plant Used for The Treatment of Paediatric Diseases*

Table 2, showed the list of therapeutic plants used in treating diseases in infants and children from the surveyed local government areas. A total of thirty-seven (37) therapeutic plants used for the treatment of twelve (12) paediatric aliments which can be classified into four (4) categories such as parasitic and bacterial infections (malaria, typhoid fever & worm infestation), skin infection (skin rashes, measles & infantile seborrheic dermatitis), gastro-intestinal disorder (abdominal pains & pile) and others (cold, jaundice, cough & anaemia) were recorded in the survey. The study showed that wide range of plant parts such as the leaves, stem bark, bulb, husk, seed and fruit have been found to be essential in the treatment of various diseases in infants and children. Therefore, from the survey the plant part used were largely leaves (60%) and roots (17%) **Figure 2**. More so, the therapeutic plants mentioned span across a wide forms of plants, the most widely used are trees (42%) and shrubs (36%) **Figure 3**. The common use of leaves from plants are mostly due to their availability during both the rainy and dry seasons while trees and shrubs could be due to their year-round availability. Leaves are also used due to their rapid generativity, potency and because they are the primary organ of photosynthesis and serving as storage for photosynthates which are of therapeutic potency [18]. The report from the study is similar to that of other studies (Ampitan [14]; Kipkore *et al.,* [19]; Tugume and Nyakoojo, [18]) who also reported that leaves are the major plant part used for herbal preparation in Borno state, Nigeria; Marakwet community, Kenya and Rukungiri District, Uganda respectively. The frequent mode of preparation was decoction (39%) and cooking (32%) **Figure 4.** Decoctions are commonly employed since it is believed that hot water removes more plant components. This is consistent with the findings of Moshi *et al.* [20] and Abdillahi and Van Staden [21] in a study from Kagera region, Tanzania and South Africa respectively who reported that herbal remedies are primarily prepared as decoctions. Water (88%) serves as the most widely used solvent for preparation of the therapeutic plants materials followed by pap-water (9%) **Figure 5.** This is grossly in acceptance with other studies involving preparation of herbal preparation use for therapeutic purposes (Ampitan [14]; Shosan *et al.,* [7]; Tugume and Nyakoojo [12]). Water is a universal solvent with the ability of extracting wide range of compounds from plant materials, it is also a suitable for ingestion by infants and

children since it is naturally pivotal for human physiology. Majority of the therapeutic plants are mono-therapeutic (single plant for single ailment) while few are poly-therapeutic (single plant for multiple ailments) such as bitter gourd (*Mormodica charantia*) use for the treatment of measles, skin rashes and worm infestation; Cotton (*Gossypium barbadense*) use for the treatment of typhoid fever and anaemia. High percentage of the reported therapeutic plants are used for the treatment of malaria disease (31%) following by typhoid fever (15%) **Figure 6**. The prevalence of malaria in the study area is traceable to the presence of stagnant water and bushes around homes and dwellings which promotes mosquito breeding while that of typhoid fever could be linked to improper sanitation which enhances the occurrence and distribution of causative pathogens [12]. The dosage form of the herbal preparations ranged from the use of medium size cup and discretional determination of little dose without proper formulation. This is given to the infants and children once, twice and thrice daily as the case may be until the ailment is perceived to be cured using sign and symptoms as bio-indicator. The modes of administrating the herbal preparations are majorly through oral (ingestion) while some are dermal (skin) via rubbing and bathing of the baby/children. This is in agreement with the study of Tugume and Nyakoojo [12] who reported oral as the major and convenient route of herbal administration to babies.

IV. CONCLUSIONS AND RECOMMENDATION

Overall, our study has shown that a variety of medicinal plants are used by the residents and people of Abeokuta North and Yewa South Local Government Areas of Ogun state, Nigeria to treat illnesses in infants and children. It has also advanced our knowledge and encouraged the documentation of medicinal herbs in use. Therefore, phytochemical, toxicological, and pharmacological studies are required to evaluate the medicinal claims of these plants. Additionally, a precise dosage formulation must be done to guarantee that each plant component is effective enough.

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TABLE 1

DEMOGRAPHY OF THE RESPONDENTS

Parameter	Frequency	Percentage
Gender		
Male	24	20
Female	96	80
Total	**120**	**100**
Age Group		
18-40	42	35
41-59	57	47.5
Above 60	21	17.5
Total	**120**	**100**
Religion		
Christianity	57	47.5
Islam	41	34.2
Traditional	22	18.3
Atheist	-	-
Total	**120**	**100**
Educational Level		
No formal education	14	11.7
Primary	33	27.5
Secondary	50	41.7
Tertiary	23	19.2
Total	**120**	**100**
Profession		
Herb seller	42	35
Traditional Practitioner	25	20.8
People utilizing therapeutic plant	33	27.5
Herbalist	20	16.7
Total	**120**	**100**

TABLE 2

THERAPEUTIC PLANTS USED IN THE TREATMENT OF DISEASES IN INFANTS AND CHILDREN

S/N	Botanical Name	Common Name	Local Name (Yoruba)	Parts used	Plant Form	Mode of preparation	Solvent used	Diseases/Ailment	Usage/Dosage
1.	*Aframomum melegueta* (K Schum)	Alligator pepper	Atare	Leaf/ Seed	Herb	Decoction/ Soak	Water	Malaria / Cough	Give little quantity thrice daily
2.	*Ageratum conyzoides* L.	Goat weed	Imi-esu	Leaf	Herb	Decoction	Water	Skin rashes	Bath babies regularly
3.	*Allium cepa*	Onion	Alubosa	Bulb	Underground stem	Soak	7up drink	Malaria	Give every morning before meal
4.	*Allium sativum L.*	Garlic	Aayu	Bulb	Underground stem	Decoction	Water	Abdominal pain	Give little quantity when during attack
5.	*Anacardium occidentale* L.	Cashew	Kasu	Leaf	Tree	Decoction	Water	Infantile Seborrheic Dermatitis	Give little quantity morning and night
6.	*Azadirachta indica* (A. Juss.)	Neem	Dongoyaro	Leaf, bark	Tree	Decoction, Cook	Water	Malaria, Typhoid	Give medium cup size quantity once daily
7.	*Bambusa vulgaris* L.	Bamboo	Oparun	Leaf	Shrub	Decoction/ Cook	Water/ Pap-water	Malaria	Give small cup size quantity thrice daily
8.	*Calotropis procera* R. Br	Milk weed	Bomubomu	Leaf	Shrub	Decoction	Water	Jaundice	Give medium cup size quantity daily
9.	*Carica papaya* (Linn.)	Pawpaw	Ibepe	Leaf	Tree	Decoction	Water	Malaria	Give little quantity morning and night
10.	*Chromolaena odorata* (Linn.)	Siam weed	Akintola	Leaf	Shrub	Decoction	Water	Jaundice	Give little quantity thrice daily
11.	*Cissia fistula* L.	Golden shower	Aidantoro	Root	Tree	Cook	Water	Malaria	Give little quantity thrice daily
12.	*Citrus aurantifolia* (Christm. & Panzer)	Lime	Osan wewe	Fruit	Tree	Juice	-	Abdominal pain	Give two (2) tea spoonful on attack
13.	*Citrus sinensis* (Linn.)	Orange	Osan	Fruit	Tree	Decoction	Water	Typhoid	Give little quantity thrice daily
14.	*Cocos nucifera*	Coconut	Agbon	Husk	Tree	Decoction	Water	Typhoid	Give little quantity morning and night
15.	*Corchorus olitorius*	Jute mellow	Ewedu	Stem	Shrub	Cook	Water	Malaria	Give little quantity morning and night
16.	*Cryptolepsi sanguinolenta*	Quinine	Paran pupa	Root	Shrub	Soak	Water	Worm Infestation	Give little quantity in the morning

S/N	Botanical Name	Common Name	Local Name (Yoruba)	Parts used	Plant Form	Mode of preparation	Solvent used	Diseases/Ailment	Usage/Dosage
17.	*Cymbopogon citratus*	Lemon grass	Koriko-Oba/ewe tea	Leaf	Grass	Decoction	Water/ Pap-water	Malaria/ Typhoid	Give little quantity morning and night
18.	*Ficus cyathistipula*	African Fig tree	Opoto	Bark	Tree	Cook	Water	Infantile Seborrheic Dermatitis	Bath baby regularly
19.	*Gossypium barbadense* L.	Cotton	Owu-Akese	Root/Leaf	Shrub	Cook	Water	Typhoid/Anaemia	Give little quantity morning and night
20.	*Hippocratea indica* (Hutch. & M. B. Moss)	Bitter sweet	Ponjuowiwi	Root	Shrub	Cook	Water	Malaria	Give little quantity morning and night
21.	*Jatropha curcas*	Physic/ Barbados nut	Botuje/ Lapalapa	Leaf	Shrub	Cook	Water	Infantile Seborrheic Dermatitis	Give little quantity thrice daily
22.	*Kigelia africana* (Lam.) Benth.	Sausage Tree	Pandoro	Seed	Tree	Decoction/Soak	Water/ Pap water	Malaria/ Typhoid	Give little quantity morning and night
23.	*Mangifera indica L.*	Mango	Mongoro	Leaf, Bark	Tree	Decoction, Cook	Water	Typhoid	Give a medium cup size quantity in thrice daily
24.	*Manihot esculentum* Crantz	Cassava	Paki	Leaf	Shrub	Cook	Water	Measles	Mixed with local soap for bathing baby
25.	*Mentha spicata*	Mint leaf	Ewe minti	Leaf	Herb	Cook	Water	Malaria	Give little quantity morning and night
26.	*Morinda lucida* Benth	Brimstone Tree	Oruwo	Leaf	Tree	Squeezed extract	-	Malaria	Give every morning and night
27.	*Moringa oleifera* Lam.	Moringa	Ewe-ile	Leaf	Tree	Decoction	Water	Malaria	Give medium size cup quantity morning, afternoon and night
28.	*Mormodica charantia* Descourt.	Bitter /hill gourd	Ejinrin	Leaf/Root	Creeper	Squeezed extract/soak	-	Measles, Skin rashes/ Worm Infestation	Rub on baby skin/ give to drink before morning meal
29.	*Ocimum gratissimum*	Basil	Efinrin	Leaf	Shrub	Squeezed extract	-	Jaundice, Pile, Measles	Give little quantity morning and night/ Rub on baby skin
30.	*Parquetina nigrescens*	African parquetina	Ogbo	Leaf	Woody climber	Squeezed extract	-	Malaria/ Anaemia	Give little quantity morning and night
31.	*Persea americana (Miller)*	Avocado pear	Apoka	Leaf	Tree	Decoction	Water	Malaria	Give little quantity thrice daily
32.	*Prunus dulcis*	Tropical Almond	Fruitu	Leaf	Tree	Cook	Water	Infantile Seborrheic Dermatitis	Give little quantity morning and night
33.	*Psidium guajava* L	Guava	Gurofa	Leaf	Tree	Decoction	Water	Pile	Give little quantity in the morning

S/N	Botanical Name	Common Name	Local Name (Yoruba)	Parts used	Plant Form	Mode of preparation	Solvent used	Diseases/Ailment	Usage/Dosage
34.	*Sida acuta* Burn F.	Common wire weed	Isekotu	Leaf	Shrub	Cook	Water	Measles	Give little quantity twice daily
35.	*Sorghum bicolor* (L.) Moench	Sorghum	Poporo	Leaf, Root	Grass	Cook, Soak	Water	Anaemia	Give twice daily
36.	*Telfaria occidentalis Hook. F.*	Fluted Pumpkin	Ugwu	Leaf	Shrub	Soak	Water	Anaemia	Give before breakfast
37.	*Vernonia amygdalina* Delile	Bitter leaf	Ewuro	Leaf	Shrub	Squeezed extract	-	Jaundice, Cold	Give little quantity morning and night

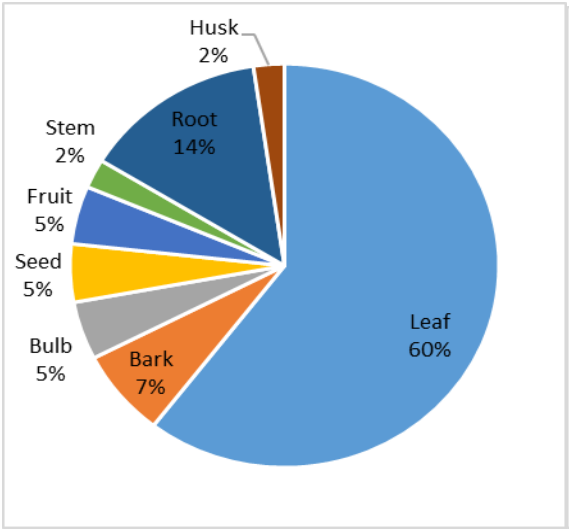

Figure 2: Parts of plants used

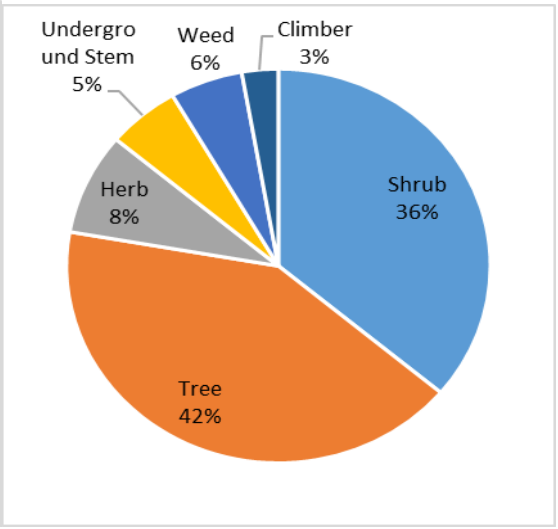

Figure 3: plants form

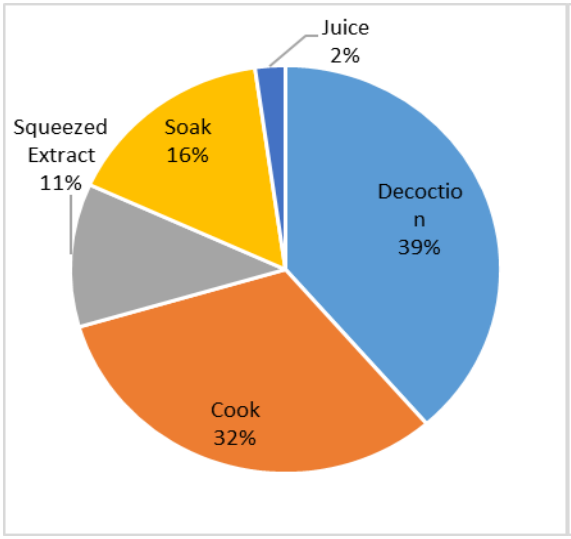

Figure 4: Mode of preparation

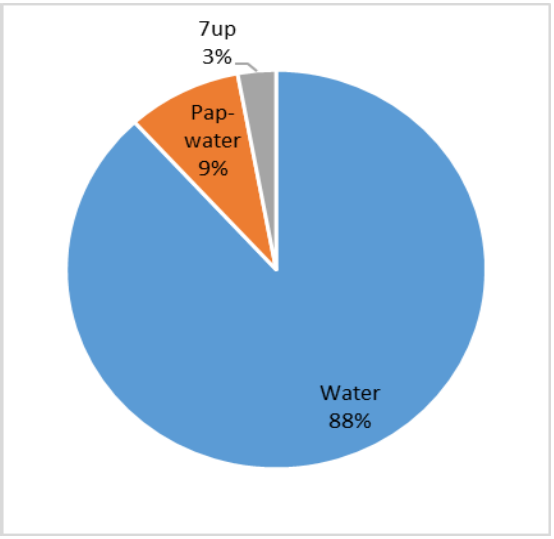

Figure 5: Solvents used for plant preparation

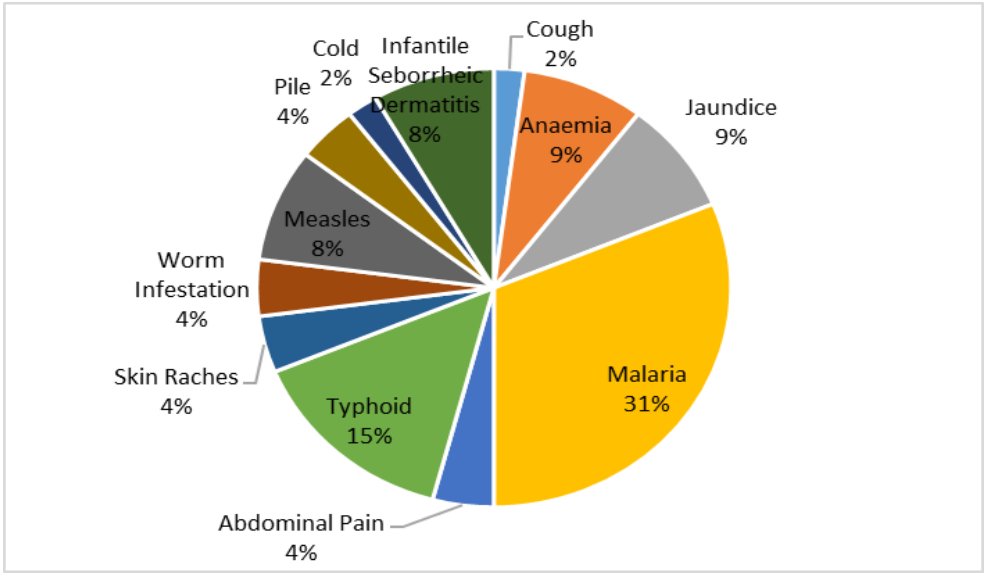

Figure 6: Percentage of therapeutic plants used for treating individual paediatric disease

Plate 1: Images of some therapeutic plants recorded from the survey:

a. Neem plant (*Azadirachta indica*) b. Orange plant (*Citrus sinensis*) c. Bitter leaf plant (*Vernonia amygdalina)* d. Lemon grass (*Cymbopogon citratus*) e. Pawpaw plant (*Carica papaya*) f. Mango plant (*Mangifera indica*) g. Basil plant (*Ocimum gratissimum*) h. Bamboo plant (*Bambusa vulgaris*) i. Cassava plant (*Manihot esculentum)*