

Nwaiwu O
Oyelade OB

Traditional herbal medicines used in neonates and infants less than six months old in Lagos Nigeria

DOI:<http://dx.doi.org/10.4314/njp.v43i1.8>

Accepted: 10th November 2015

Nwaiwu O (✉)
Oyelade OB
Department of Pharmacology,
Therapeutics and Toxicology,
Faculty of Basic Medical Science,
College of Medicine of the University
of Lagos, Lagos Nigeria.
Email: obiyo_nwaiwu@yahoo.com,
onwaiwu@unilag.edu.ng

Abstract: *Background:* Herbal medicine use in children, adults and other groups have been documented but little information is known about the use of herbal medicine mixtures in neonates and infants less than six months old. This is important because pharmacokinetics and pharmacodynamics changes between infants and adults may result in age-related differences in drug metabolism. This study was carried out to document the herbal medicines used for common ailments in neonates and infants less than six months in Lagos, Nigeria. *Methods:* With the aid of questionnaires and personal interviews during field trips to herbal medicine markets and infant welfare clinics a survey was undertaken to collect information on herbal medicine use by neonates and infants less than six months from traditional healers and nursing mothers during July and September 2014. Demographic information and types of herbal medicines used by the respondents, indications for their use and adverse effects of the herbal medicines they used were obtained.

Results: Medicinal plant species used for the treatment of common ailments including diarrhea, abdominal cramps, skin rashes, Fever (malaria), jaundice, convulsions, Insomnia and weight loss in neonates and infants less than 6 months were documented.

A high percentage of the mothers (72%) agreed they used herbal medicines in neonates and infants, although 96% of them did not notice any adverse effect while 100% of the mothers perceived the herbs to be efficacious. Herbal medicines are administered as a polyherbal compound, containing 4-6 plants

Conclusion: The use of herbal medicines is common amongst neonates and infants less than six months old. Further studies on the efficacy and safety of these medicines which are administered as polyherbal mixtures is recommended.

Keywords: Herbal medicine sellers, Nursing mothers, Herbal medicines, Neonates, Infants less than 6 months, Ethno botanical survey.

Introduction

Many complementary and alternative therapies, such as herbal remedies, are used in many parts of the world¹. Plants constitute good therapeutic agents for human diseases² and are available without prescription or prescribed by herbal practitioners. With increasing challenges of drug resistance, affordability and availability of good quality, safe and effective medicines, herbal medicines have become very important in our health care system as an option.³ Use of herbal medicine globally and amongst Nigerians is well documented. Studies have documented herbal medicine use in adults⁴, cancer patients⁵, presurgical patients or day case anaesthesia⁶, asthma patients⁷, hypertensive and diabetic patients^{8,9}, pregnant

women¹⁰, breastfeeding children¹¹, children with chronic health conditions¹², the paediatric age group in general,^{13,14} medical inpatients, outpatients, HIV patients,¹⁵ and the general population^{16,17,18}.

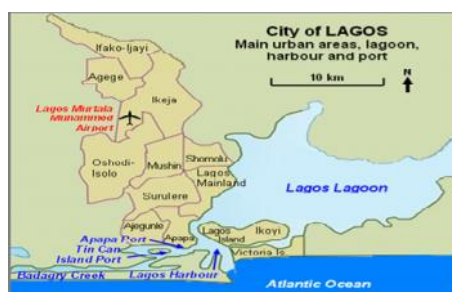
However, no studies have focused on the use of herbal medicine among the neonates and infants less than 6 months. These patients are specially affected because they are also exposed if their mothers take herbs. Like conventional medicines the circulating constituents of herbal medicines in the maternal blood stream are transferred into human breast milk.¹⁹ Anatomical, physiological and biochemical changes that occur from birth affect pharmacokinetics/pharmacodynamics and therefore the bioavailability of drugs. Immaturity of glomerular filtration, renal tubular secretion and tubular reabsorption at birth and their

maturation determine the different excretion of drugs in the neonate.¹⁹ Identification of the types of herbal medicines used in this age group and their indications is important as it adds to existing knowledge and is a useful database for future scientific studies on the scientific basis for the use of herbal medicines in the very young infant. The objective of this study is to document the use of herbal medicines in neonates and infants less than six months old in Lagos Nigeria.

Methods

The study was done in Lagos metropolis. Lagos is located in South West Nigeria. Lagos has a tropical wet and dry climate and experiences two rainy seasons, with the heaviest rains falling from April to July and a weaker rainy season in October and November.^{20,21}

Fig 1: City of Lagos^{20,21}



Ethnobotanical survey, sampling technique and data collection

Data was collected from July 2014-September 2014. Herb sellers (aka "ELEWE OMO" by Yoruba) from Itire, Aguda, Mushin and Oyingbo markets in Lagos Metropolis were randomly selected by convenient sampling and visited. A total of 30 questionnaires were administered to the herbal medicine sellers. A second survey involved nursing mothers with neonates and infants less than 6 months old attending mother and child care clinic in Massey Street children Hospital and Randle General Hospital in Lagos state. One hundred nursing mothers were selected randomly and interviewed. Demographic data (educational levels and age of children), common illnesses among infants less than 6 months and neonates for which herbs are prescribed, types of herbal plants, duration of treatment, perception of efficacy, perception of safety and occurrence of adverse events were discussed and documented. Discussions were held in English and local Yoruba language. Voucher specimens were collected from the herbal sellers and identified at the Department of Botany University of Lagos.

Ethical considerations

The proposal was submitted to the research and ethic committee of Lagos University Teaching Hospital and an exemption from review was obtained. Informed consent was also obtained from the herb sellers and nursing mothers before administration of the question-

naire. Permission to visit hospitals was obtained from the Lagos State Health Service Commission.

Data analysis

Data is presented as frequency tables and a bar chart.

Results

A total of 30 questionnaires were administered to the herbal sellers in the markets: Itire, Mushin, Oyingbo and Aguda in Lagos metropolis. Herb sellers were knowledgeable about local morbidity patterns in neonates and infants and the herbal medicines used in the treatment of such ailments. Questionnaires were distributed to 100 nursing mothers but only 78 of them responded. Majority of the herb sellers and nursing mothers had secondary education (Tables 1&2). Children of twelve percent (9) of the nursing mothers were neonates. (Fig 2) The herbal medicines are administered as a polyherbal compound, containing 4-6 plants

Table 1: Educational levels of the herbs sellers

Level of Education of herbal sellers	Number	Percentage
No education	4	13.3
Primary	7	23
Secondary	16	53.3
Tertiary	3	10
Total	30	100

Table 2: Educational levels of the nursing mothers

Level of Education of herbal sellers	Number	Percentage
No education	20	26
Primary	10	13
Secondary	28	35
Tertiary	20	26
Total	78	100

Fig 2: Age of children of nursing mothers

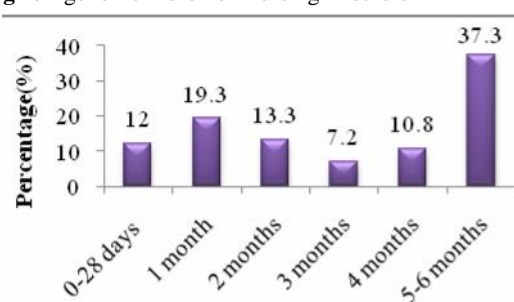


Table 3 shows herbal Remedies used in infants and neonates. The list shows a list of plant species used as herbal mixtures in the Lagos area, presented by family and genera and parts of the plant used.

Table 3: Herbal plant mixtures used in neonates and infants less than 6 months old.

Abdominal spasms (spasmolytic herbal plant mixtures)				
Botanical name	Family	Common name	Local name	Part used
<i>Aristolochia albidula</i>	Aristolochiaceae	Dutchman's pipe	Paranfunfun	stem, root
<i>Cryptolepis sanguinolenta</i>	Apocynaceae	Nibima	Paran pupa	stem, root
<i>Aliumascalonicum</i>	Liliaceae	Spring onion	Alubosaelewe	Leaves, Bulb
<i>Calliandra haematocephala</i>	Leguminosae	Corpse awakener	Tude	Leaves, Twigs, Roots
<i>Eugenia aromatic</i>	Myrtaceae	Clove	Kanafuru	Flower

Anti convulsant herbal plant mixtures

Botanical name	Family	Common name	Local name	Part used
<i>Crinum glaucum</i>	Amaryllidaceae	Crinum lily	Isumeri	Bulb, Flower stalk
<i>Oxalyscorpoides</i>	Olacaceae		Egboifon	Roots, stem, bark
<i>Aliumascalonicum</i>	Liliaceae	Spring onion	Alubosaelewe	Leaves, Bulb
<i>Tetrapleura tetrapteris</i>	Leguminosae	Aidan	Aridan	Bark, Pod
<i>Croton lobatus</i>	Euphorbiaceae	Cascarilla	Eru	Root, Bark, Leaves

Antidiarrhoea herbal plant mixtures

Botanical name	Family	Common name	Local name	Part used
<i>Senna fistula</i>	Leguminosae	Indian laburnum	Aidantoro	Pods, Leaves
<i>Gongronema latifolium</i>	Asclepiadaceae	Amaranth globe	Madumaro, Utazi	leaves
<i>Cryptolepis sanguinolenta</i>	Asclepiadaceae	Jamaican climbing fern	Paran pupa	stem, Root
<i>Aristolochia albidula</i>	Aristolochiaceae	Dutchman's pipe	Paranfunfun	stem, root
<i>Bidens pilosa</i>	Compositae	Spanish needle	Abeere	Flowers, leaves
<i>Eugenia aromatic</i>	Myrtaceae	Clove	Kanafuru	Flower
<i>Rauwolfia vomitoria</i>	Apocynaceae	Jamaican dogwood	Epoorira	Bark
<i>Aristolochia ringens</i>	Aristolochiaceae	Dutchman's pipe	Akogun	Stem, root
<i>Aliumascalonicum</i>	Liliaceae	Spring onion	Alubosaelewe	Leaves, Bulb
<i>Pteleiopsis suberosa</i>	Combretaceae		Epookuku	Bark
<i>Pseudocedrela kotschyi</i>	Meliaceae	Dry cedar	Emi gbe-giri	Leaves
<i>Senna fistula</i>	Leguminosae	Indian laburnum	Aidantoro	Leaves
<i>Anthocleista djallonensis</i>	Loganiaceae	cabbage tree	Egbosapo	Bark, leaves
<i>Alstonia boonei</i>	Apocynaceae	Stool wool	Ahun	Bark

Herbal plant mixtures for skin diseases

Botanical name	Family	Common name	Local name	Part used
<i>Khayaivorensis</i>	Meliaceae	Red mahogany	oganwo	Bark
<i>Daniellia</i>	Leguminosae	African balsam	Iya	Leaves
<i>Khayaivorensis</i>	Meliaceae	Mahogany	Mahogany	Stem, root, bark
<i>Echinops longifolius</i>	Compositae		Iregbe	Root
<i>Detarium microcarpum</i>	Leguminosae	Sweet detar	Ogbogbo	Bark

Herbal plant mixtures for hotness of the body; (anti malaria)

Botanical name	Family	Common name	Local name	Part used
<i>Alstonia boonei</i>	Apocynaceae	Stool wool	Ahun	Bark
<i>Alium cepa</i>	Liliaceae	White onion	Alubosa funfun	Bulb, leaves
<i>Enanthia chlorantha</i>	Annonaceae	African yellow wood	Awopa	Bark
<i>Curcuma longa</i>	Zingiberaceae	Turmeric	Atale pupa	Rhizome
<i>Citrus aurantiifolia</i>	Rutaceae	Lime	Osanwe	Leaves, stem, fruit
<i>Khayaivorensis</i>	Meliaceae	Red mahogany	Epoooganwo	Bark
<i>Nuclea latifolia</i>	Rubiaceae	African peach tree	Egboegbesi	Bark, stem, root
<i>Ananas cosmos</i>	Bromeliaceae	Pineapple	Pineapple	Fruit
<i>Citrus paradise</i>	---	---	Grape	Fruit
<i>Axonopus compressus</i>	Poaceae	Tropical carpet grass	Idi	Leaves

Herbal plant mixtures for treatment of yellowness of skin and eyes (neonatal jaundice)

Botanical name	Family	Common name	Local name	Part used
<i>Carica Papaya</i>	Caricaceae	Pawpaw	Ibepe	Fruit
<i>Alium cepa</i>	Liliaceae	White Onion	Alubosa funfun	Bulb
<i>Alstonia boonei</i>	Apocynaceae	Stool Wool	Ahun	Root, Bark, Leaves

Amongst the Nursing mothers, a high percentage of the mothers (72%) agreed they used herbal medicines in neonates and infants, while 100% of the mothers perceived the herbs to be efficacious. Most of the women (96%) did not report any adverse outcomes with herbal medicines on their neonates and infants while 4% of them reported vomiting as a common adverse outcome.

Table 4 shows the indications for herbal medicines and duration of treatment.

Table 4: Herbal medicine sellers indications and duration of treatment for herbal medicines in neonates and infants less than 6 months

Indications for herbal medicines	No of herbal sellers who sell herbal medicines for the indications	Percentage (%)	Duration of treatment
Anti Diarrhea	30	100	1 week
Abdominal cramps	26	87	1 week
Skin rashes	20	67	>2 weeks
Malaria (Fever)	7	23	1-3 days
Jaundice	6	20	2 weeks
Spasms / convulsions	5	17	>2 weeks
Insomnia	3	10	1-3 days
Weight gain	3	10	>2 weeks

Discussion

The present study shows that there is acceptance and use of traditional medicine in neonates and infants less than 6 months old. Information was

obtained from both herb sellers and nursing mothers. This is important because traditional herbalists in Nigeria use various herbal preparations to treat various types of ailments, including diarrhea, cough, convulsions, skin diseases and others²² and women are major caregivers and their knowledge of herbal medicine has been shown to have positive effects on child health outcomes²³⁻²⁷.

In this study, both herb sellers and participating nursing mothers had different levels of education. A large number of the participants had secondary and tertiary education. Previous studies had shown that there was no statistically significant effect of respondents' levels of education on their use of herbal medicines¹⁸.

The morbidity and mortality pattern in children vary with age. In this study, the indications for which herbal medicines were prescribed are similar to the published morbidity patterns in neonates and very young infants. In infants and children malaria presenting as fever is an important cause of morbidity and mortality. Bacterial infections, in particular pneumonia, gastroenteritis, meningitis and tuberculosis, respiratory tract infection, diarrhoeal disease skin rash, are also important diseases. Amongst neonates the major indications for admission include infections, sepsis, jaundice, low birth weight, tetanus, birth asphyxia and prematurity²⁸⁻³⁷.

Herbal medicines have been used either alone or in combination with conventional medicines and other herbal medicines. Polyherbal mixtures locally called 'Agbojedi-jedi', 'agbo-iba', have been used and documented in our setting¹⁸. The data on herbal medicines obtained in this study contain herbs already identified in previous documentations, as useful herbal remedies in Nigeria³⁸⁻⁴⁶.

The efficacy of some of these plants have been confirmed. For example the anti malarial activity of aqueous extract of stem bark of *Enantiachlorantha* has been investigated in *Plasmodium Berghi* infected mice. It has potent antimalarial activities comparable to that of chloroquine⁴⁷ and the stem bark of *E. chlorantha* consist of preponderant alkaloids such as 9-methoxycanthin -6-one and phenolics, could be responsible for the pharmacologic activity of the extract⁴⁸. The antimalarial activity may be due to the antioxidant effect of its alkaloids. It has been postu-

lated that its antioxidant components might inhibit nitric oxide (NO) production in macrophages which will lead to increased degradation of tryptophan and thereby starve the parasite of an essential amino acid leading to its death^{49,50}. Different extracts of *enanthiachlorantha* have also been reported to exert antimicrobial activities including antibacterial^{51,52}.

However, the use of these herbs in the very young are of major concern. Major challenges include undetermined dosage regimens, immaturity of metabolic and excretory functions, content, preparation, quality of mixtures and duration of treatment (prolonged systemic exposure). Adverse reactions due to herbal medicines occur when used alone²⁷ or concurrently with conventional or orthodox medicines^{15,18}. In this study most of the women (96%) did not report any adverse reactions with herbal medicines on their neonates and infants suggesting good tolerability while 4% of them reported vomiting after herbal medicine intake. There are very few clinical data on safety, kinetics and efficacy. Further research is recommended on the use of these herbal medicines. Randomized clinical trials are needed to evaluate and validate the pharmacological properties of medicinal plants before they can be recommended for use in neonates and very young infants.

Conclusions

The use of herbal medicines is common amongst neonates and infants less than six months. Health care workers who care for children should be aware that neonates and infants less than six months also receive herbal medicines. Further studies to evaluate efficacy, safety, potential adverse effects and drug herb interactions are needed.

Acknowledgements

We are grateful to all the herbal sellers from Itire, Aguda, Mushin and Oyingbo markets in Lagos metropolis and nursing mothers with infants less than 6 months including neonates attending mother and child care clinic in Massey Street children Hospital and Randle General Hospital in Lagos for giving us information.

Conflict of interest: None

Funding: None

References

1. Kathi JK, Sunita V, Richard W. The Task Force on Complementary and Alternative Medicine, the Provisional Section on Complementary, Holistic, and Integrative Medicine The Use of Complementary and Alternative Medicine in Pediatrics, *Pediatrics* 2008 ;122, (6), 1374-1386.
2. Reza S-N, Ghorbani A ,Bagheri FV and Rakhshandeh H. Chronic Administration of a Combination of Six Herbs Inhibits the Progression of Hyperglycemia and Decreases Serum Lipids and Aspartate Amino Transferase Activity in Diabetic Rats. *Advances Pharmacological Sciences*.2012,
3. Wilcox ML, Bodekar G. Traditional herbal medicines for malaria. *BMJ* 2004.329:31-34.
4. Eisenberg DM, Kessler RC, Foster C, Norlock FE, Calkins DR, Delbanco TL. Unconventional medicine in the United States: prevalence, costs, and patterns of use. *N Engl J Med*. 1993;328(4):246-252

5. Ezeome ER, Anarado AN: Use of complementary and alternative medicine by cancer patients at the University of Nigeria Teaching Hospital, Enugu, Nigeria. *BMC Complement Altern Med*. 2007, 7:28.
6. Onyeka TC, Ezike HA, Nwoke OM, Onyia E A, Onuorah EC, Anya SU and Nnacheta TE. Herbal medicine: a survey of use in Nigerian presurgical patients booked for ambulatory anaesthesia *BMC Complement Altern Med* 2012, 12:130
7. Adeyeye OO, Onadeko BO, Ogunleye O, Bamisile RT, Olubusi A: The use of complementary and alternative medicine by asthma patients receiving care in an urban tertiary centre in Nigeria. *Int J Biol Med Res*. 2011, 2:1026–1030.
8. Nwako SO, Fakeye TO: Evaluation of use of herbal medicines among ambulatory hypertensive patients attending a secondary health care facility in Nigeria. *Int J Pharm Practice* 2009, 17:101–105.
9. Olayemi SO, Nwaiwu O, Fasanmade O, Aro AO, Ibrahim A. Clinical outcomes in hypertensive or diabetes, patients who concomitantly use complementary medicines in Lagos Nigeria. *East Afr Med J* 2014, 91; 11: 1-6
10. Fakeye TO, Adisa R, Musa IE: Attitude and use of herbal medicines among pregnant women in Nigeria. *BMC Complement Altern Med*. 2009, 9:53.
11. Sim TF, Sherriff J, Hattingh HL, Parsons R and Tee LBG The use of herbal medicines during breastfeeding: a population-based survey in Western Australia. *BMC Complement Altern Med* 2013, 13:317
12. Oshikoya KA, Senbanjo IO, Njokanma OF, Soipe A: Use of complementary and alternative medicines for children with chronic health conditions in Lagos Nigeria. *BMC Complement Altern Med*. 2008, 8:66.
13. Towns AM, Eyi S M, Andel TV. Traditional Medicine and Child-care in Western Africa: Mothers' Knowledge, Folk Illnesses, and Patterns of Healthcare-Seeking Behavior. *Plos one*. 2014;9 (8) 8 ;e105972
14. Kemper K J, Vohra S, Walls R. The Task Force on Complementary and Alternative Medicine, the Provisional Section on Complementary, Holistic, and Integrative The Use of Complementary and Alternative Medicine in Pediatrics. *Pediatrics* 2008; 122, (6)1375
15. Langlois-Klassen D, Kipp W, Jhangri GS, Rubaale T: use of traditional herbal medicines by AIDS patients in kaharole district, western Uganda. *Am J Trop Med Hyg*. 2007; 77(4) :757-763.
16. Fakeye TO, Tijani A, Adebisi O: A survey of the use of herbs among patients attending secondary-level health care facilities in Southwestern Nigeria. *J Herb Pharmacother*. 2007, 7:213–227.
17. Yusuff KB, Tayo F: Frequency, types and severity of medication use-related problems among medical outpatients in Nigeria. *Int J Clin Pharm* 2011, 33:558–564.
18. Oreagba IA, Oshikoya KA and Amachree M. Herbal medicine use among urban residents in Lagos, Nigeria. *BMC Complement Altern Med* 2011, 11:117
19. Dambisya YM and Tindimwebwa G. traditional remedies in children around eastern cape, South Africa. *East Afr Med J* 2003. 80:8
20. "The Lagos pressure group on the environment". Limge Online. Retrieved 4 April 2015. "Weather BBC Weather Lagos Nigeria". BBC. Retrieved 15 May 2015.
21. Panghal M, Arya V, Yadav S, Kumar S, Yadav JP: Indigenous knowledge of medicinal plants used by Saperas community of Khetawas, Jhajjar District, Haryana, India. *J Ethnobiology Ethnomedicine* 2010.
22. Miller EM. Maternal health and knowledge and infant health outcomes in the Ariaal people of northern Kenya. *Soc Sci Med*.
23. Tanner S, Chuquimia-Choque ME, Huanca T, McDade TW, Leonard WR, et al. (2011) The effects of local medicinal knowledge and hygiene on helminth infections in an Amazonian society. *Soc Sci Med* 72(5):701–709.
24. Vandebroek I. Intercultural health and ethnobotany: How to improve healthcare for underserved and minority communities? *J Ethnopharmacol*. 2013;148(3): 746–754.
25. McDade TW, Reyes-García V, Blackinton P, Tanner S, Huanca T, et al. Ethnobotanical knowledge is associated with indices of child health in the Bolivian Amazon. *Proc Natl Acad Sci* 2007; 104(15): 6134–6139.
26. Black RE, Cousens S, Johnson HL, Lawn JE, Rudan I, et al. Global, regional, and national causes of child mortality in 2008: a systematic analysis. *Lancet*. 2010;375(9730): 1969–1987.
27. Oshikoya KA, Njokanma OF, Chukwura HA, Ojo OI: Adverse drug reactions in Nigerian children. *Paediatric Perinatal Drug Therapy* 2007, 8:81-88.
28. Udo JJ¹, Anah MU, Ochigbo SO, Etuk IS, Ekanem AD. Neonatal morbidity and mortality in Calabar, Nigeria: a hospital-based study. *Niger J Clin Pract*. 2008;11(3):285–9.
29. Owa JA, Osinaike AI. Neonatal morbidity and mortality in Nigeria. *Indian J Pediatrics*. 1998. 65; 3: 441-449
30. Petit PL, van Ginneken JK. Analysis of hospital records in four African countries, 1975-1990, with emphasis on infectious diseases. *J Trop Med Hyg*. 1995;98(4):217-27
31. Osinusi K¹, Oyejide CO. Morbidity pattern among Nigerian children from a poor urban community. *Afr J Med Med Sci*. 1989 ;18(1):43-7.
32. Olamijulo JA¹, Olalaye O. Perinatal mortality in Lagos University Teaching Hospital: a five year review. *Niger Q J Hosp Med*. 2011 ;21(4):255-61.
33. Tapsoba H, Deschamps JP: Use of medicinal plants for the treatment of oral diseases in Burkina Faso. *J Ethnopharmacology* 2006, 104:68-78.
34. Saikia AP, Ryakala VK, Sharma P, Goswami P, Bora U: Ethnobotany of medicinal plants used by Assamese people for various skin ailments and cosmetics. *J Ethnopharmacology* 2006, 106:149-157.
35. Fawole OA, Finnie JF, Van Staden J: Antimicrobial activity and mutagenic effects of twelve traditional medicinal plants used to treat ailments related to the gastrointestinal tract in South Africa. *South Afr J Botany* 2009, 75:356-362.
36. Sofowora A. Medicinal plants and traditional medicine in Africa. Chichester: Wiley, 1982. 256 p. Adeleye IA, Opiah L. Antimicrobial activity of extracts of local cough mixtures on upper respiratory tract bacterial pathogens. *West Indian Med J* 2003; 52:188-90.
37. Odugbemi T. Outlines and pictures of medicinal plants from Nigeria; University of Lagos press. Revised edition 2008.
38. Adisa R, Fakeye TO. Assessment of Knowledge of community pharmacists regarding common phytopharmaceuticals sold in Southwestern Nigeria. *Trop J Pharm Res*, 2006; 5(2):619-625.

39. Astin JA .Why patients use alternative medicine? Results of a national study. *J Am Med Ass*, 1998;279:1548-53.
40. Eisenberg D, Davis R, Etners .Trends in alternative medicine use in the United States. *J Am Med Ass* 1998, 280:1569-75.
41. Ernst E. Herbal medicines put into context. *Brit Med J*. 2003; 327:881-2.
42. Fakeye T. O., Onyemadu O. Evaluation of knowledge base of hospital pharmacists and physicians on herbal medicines in Southwestern Nigeria. *Pharm. Pract.* 2008. 6, 88–92.
43. Furnham A. Why do people choose and use complementary therapies?In *Complementary medicine an objective Appraisal* Editedby: Ernst E. Oxford: Butterworth-Heinemann.1996.
44. World Health Organization. Traditional medicine.*Fact sheet* 2007:134 [<http://www.who.int/mediacentre/factsheets/fs134/en/>].
45. Rinne E: Water and Healing - Experiences from the Traditional Healers in Ile-Ife, Nigeria. *Nordic J African Studies* 2001, 10:41-65.
46. Ayoade AA, Musbau AA. Antimalarial Bioactivity of Enantiachlorantha stem bark .*Medicinal plants, Phytochemistry, Pharmacology therapeutics* 2010 ; (1): 441-447 .
47. Adesokun .A.A ., Akanji MA and Yakubu MT . Antibacterial potentials of aqueous extracts of Enantiachlorantia stem bark. *Afr.j. biotechnol* 2007; 6 (22) : 2502-2505 .
48. Daubenar , W. Interleukin -1 inhibit gamma interferon -induced bacteriostasis in human uroepithelial cells .*Infection and Immunity* , 1999 ;67 : 5615 -5620.
49. Mahmoud M.S., Gliani AH and Khwaja et al . The invitro effect of aqueous extract of `` Nigella sativa seeds on nitric oxide production .*Phytothr. Res*, 2003; 17: 921-924.
50. Agbaje ,EO and Onabanjo A.O .The effects of extracts of Enantiachlorantia in malaria . *Ann. Trop . Med. Parasitol* 1991, 85 (6) : 585-590.
51. Chan , K . Choo , C . Abdullah N.R and Ismail Z. Antiplasmodial studies of Eurycomalongifolia jack using the lactate dehydrogenase assay of plasmodium falciparum, *J. Ethnopharmacol*, 2004;92: 223-227.