

Research Journal of
Medicinal
Plant

ISSN 1819-3455



Academic
Journals Inc.

www.academicjournals.com



Research Article

Medicinal Plants Used in the Treatment of Gastric Ulcer in Southwestern and North Central Nigeria

¹Abolanle Abideen Azeez Kayode, ²Bilqis Abiola Lawal, ²Abdulrasheed Ajao Abdullahi, ³Mubo Adeola Sonibare and ³Jones Olanrewaju Moody

¹Phytomedicine Research, Drug Discovery and Development Laboratory, Department of Biochemistry, Benjamin S. Carson (Snr) School of Medicine, Babcock University, Ilishan-Remo, Ogun State Nigeria

²Department of Pharmacognosy and Drug Development, Faculty of Pharmaceutical Sciences, University of Ilorin, Nigeria

³Department of Pharmacognosy, Faculty of Pharmacy, University of Ibadan, Ibadan, Nigeria

Abstract

Background and Objective: Despite the number of literature on ethnopharmacological studies in Nigeria, there seems to be no published works on the antiulcer plants used among the people of Ogun and Kwara States of Nigeria. This study was aimed at presenting results of ethnopharmacological survey of the plants used in the treatment of gastric ulcer in Ado-Odo/Ota local government area, Ogun State, Southwestern Nigeria and Ilorin-West and Irepodun local government areas, Kwara State, North central Nigeria. **Materials and Methods:** Sixty-three respondents, including the old, those who grows and sell herbs and the herb hawkers were interacted with using semi-structured questionnaires. The interviewees were 40 males and 23 females and their ages ranged from 28-70 years. The use-mentions index was calculated for each plant. **Results:** In total, 62 plant species from 40 families were identified. Famous among these plant families were Compositae, Euphorbiaceae and Leguminosae having 5 and 4 species, respectively. The most used plant species for the treatment of peptic ulcer were: *Carica papaya* L. (40%) (Caricaceae), *Zingiber officinale* Roscoe (27%) (Zingiberaceae), *Musa paradisiaca* L. (40%) (Musaceae) and *Allium sativum* L. (20%) (Amaryllidaceae). Infusion, decoction and concoction were ways of preparing these mixtures, which were to be taken orally, at least 3 times every day for a specified period. **Conclusion:** Herbalists have used the plants in this survey several times to treat their peptic ulcer patients and according to them were very effective.

Key words: Ethnopharmacology, gastric ulcer, medicinal plants, traditional medicine, ethnobotany, anti-inflammatory drugs, herbal medicine

Citation: Abolanle Abideen Azeez Kayode, Bilqis Abiola Lawal, Abdulrasheed Ajao Abdullahi, Mubo Adeola Sonibare and Jones Olanrewaju Moody, 2019. Medicinal plants used in the treatment of gastric ulcer in Southwestern and North central Nigeria. Res. J. Med. Plants, 13: 119-128.

Corresponding Author: Abolanle Abideen Azeez Kayode, Phytomedicine Research, Drug Discovery and Development Laboratory, Department of Biochemistry, Benjamin S. Carson (Snr) School of Medicine, Babcock University, Ilishan-Remo, Ogun State Nigeria

Copyright: © 2019 Abolanle Abideen Azeez Kayode *et al.* This is an open access article distributed under the terms of the creative commons attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

Competing Interest: The authors have declared that no competing interest exists.

Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

The medicinal use of plants for treating diseases is an ancient practice¹. Medicines derived from plants are largely used because they are, relatively safer, easily available and cheaper than the synthetic alternatives². Plants provide a rich source of raw materials for traditional medicine in Africa and other developing parts of the world. Many Africans still depend on traditional medicine practitioners and the use of medicinal plants for the maintenance of their health and health-related problems³. Factors that have been implicated in the development of ulcer are stress, smoking, caffeine, alcohol, *Helicobacter pylori*, nutritional deficiencies and frequent ingestion of nonsteroidal-anti-inflammatory drugs (NSAIDs)^{4,5}. Gastric ulcer develops from continuous erosions and injury of the stomach wall which may worsen and results into bleeding⁶. There is increase in research studies on the treatment of ulcer and the use of drugs from natural product^{7,8}.

Many medicinal plants are known to exhibit antiulcer activity and are found useful in the treatment of peptic ulcer⁹. Some of these medicinal plants have been confirmed scientifically to possess gastro protective and antiulcer property¹⁰⁻¹³. Peptic ulcer disease (PUD) which includes gastric and duodenal ulcer is the most prevalent gastrointestinal disorder¹⁴. Ethnopharmacological surveys of this type have been conducted by many scientist in Nigeria^{3,15-21}. However, this study focused on peptic ulcer disease because many researches do not usually consider this area probably due to less priority given to this disease in this part of the world.

This paper presents the results of an ethno pharmacological survey on the plants used in the treatment of ulcer in the Ado-Odo/Ota Local Government Area (LGA) of Ogun State, Southwestern Nigeria and Ilorin-West and Irepodun Local Government Areas, Kwara State, North central Nigeria. These locations were chosen because of the observation that more than half of the population in these areas patronizes traditional healers. In addition, significant portions of the major markets in these areas are devoted to the sales of herbs.

MATERIALS AND METHODS

Study areas: This study was conducted between October, 2012 and December, 2016. The first study area Ado-Odo/Ota Local Government Area (LGA) comprises of 8 locations, namely: Sango- Ota, Ota, Ota Market, Igbesa, Lusada Market, Igboloye, Iju and Atan (Fig. 1). The Ado -Odo/Ota LGA is 1 of the 20 LGAs of Ogun State. It is the most industrialized portion of the state. It also borders the state with metropolitan Lagos

State and the Republic of Benin. The capital of the LGA is Ota at 6°41' 00" N 3°41'00" to the North of the area. Other towns and cities include Ado-Odo, Igbesa, Agbara, Sango-Ota and Itele. It has an area of 878 km² and a population of 526,565 by the 2006 census. The second phase was conducted in 2 major Local Government Areas of Kwara State, namely, Ilorin-West and Irepodun local government areas (Fig. 2). Ilorin-West Local Government area of Kwara State is in the transitional zone between Northern and Southern parts of Nigeria. It has an area of 105 km² and a population of 364,666 at the 2006 census with its headquarters in the town of Oja-Oba. Irepodun is a local government area in Kwara State, Nigeria with its headquarters in the town of Omu-Aran. It has an area of 732 km² and a population of 148,610 at the 2006 census. It has very significant Yoruba cultural and historical significance. Irepodun LGA shares boundary with Ifelodun LGA to the north, Osun state to the South, Ekiti and Offa Local Government to the East and West respectively. It is endowed with Savannah and Rain forest vegetation on a plain terrain with patches of Rivers and Streams.

These areas still have many villages with a large segment of the population without access to modern health care services and relying mostly on herbal medicine and traditional medicine practitioners (TMP) for solutions for their health challenges.

Informed consent: Several people interviewed included Traditional Medicine Practitioner (TMP) (those who practiced traditional medicine popularly known as herbalist, Herb Sellers (those who sell herbs in shops or stalls, Herb Hawkers (those who hawk herbs and already prepared herbal mixture for dispensing) and the elderly who had knowledge of medicinal plant use. Informed consent was obtained verbally from all participants being interviewed. These informants were selected based on their vast knowledge of medicinal plants, many years of experience in treating diseases (gastric ulcer disease inclusive) using medicinal plants found in and around their areas.

Administration of questionnaire: Semi-structured questionnaires and oral interview were adopted to obtain the relevant ethno medicinal data and three of the investigators administered these.

A sample of the semi- structured questionnaire is given in Appendix 1. The interviewees were 40 males and 23 females and their ages ranged from 28-70 years. Furthermore, the use-mentions index was calculated for all plants²². The use-mentions index (-UMi-) was taken as the number of uses mentioned for a particular plant divided by the total number of informants interviewed.

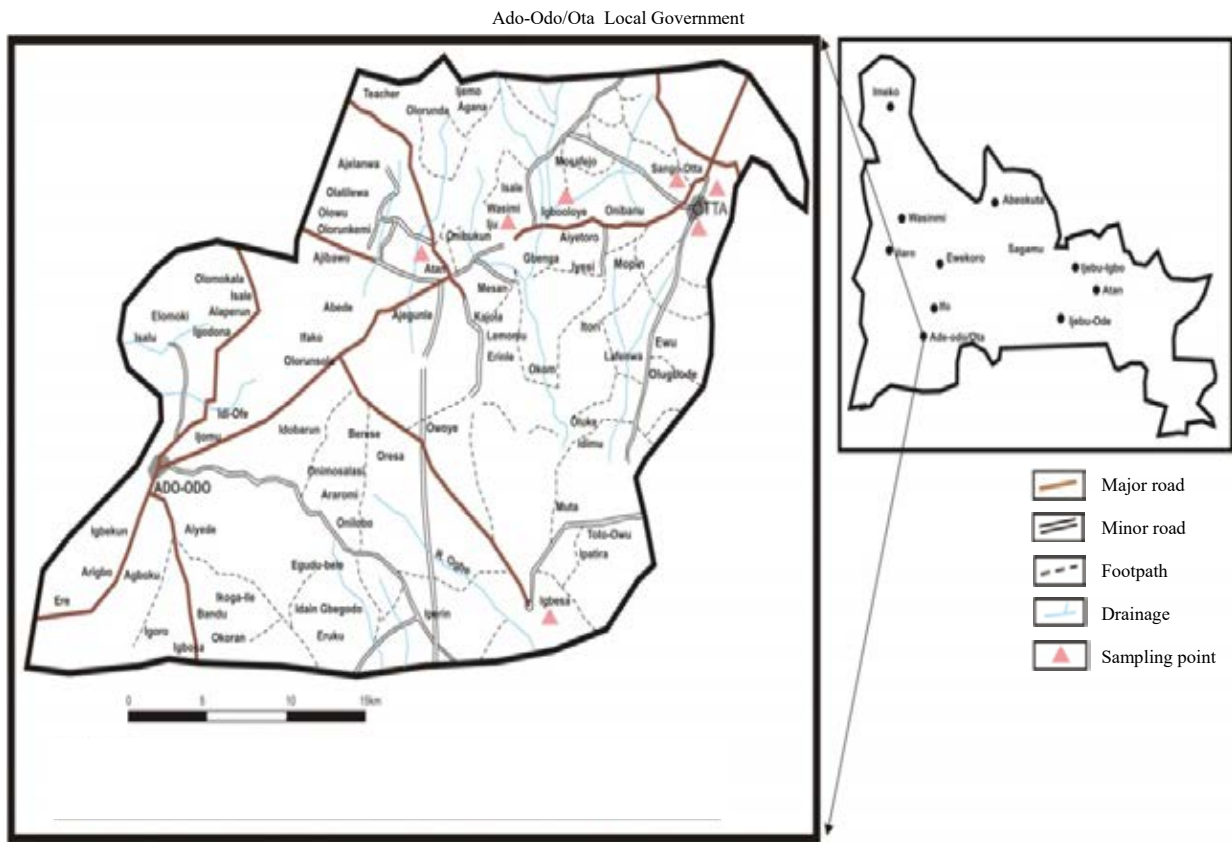


Fig. 1: Map of Ogun State showing study area (Phase 1)

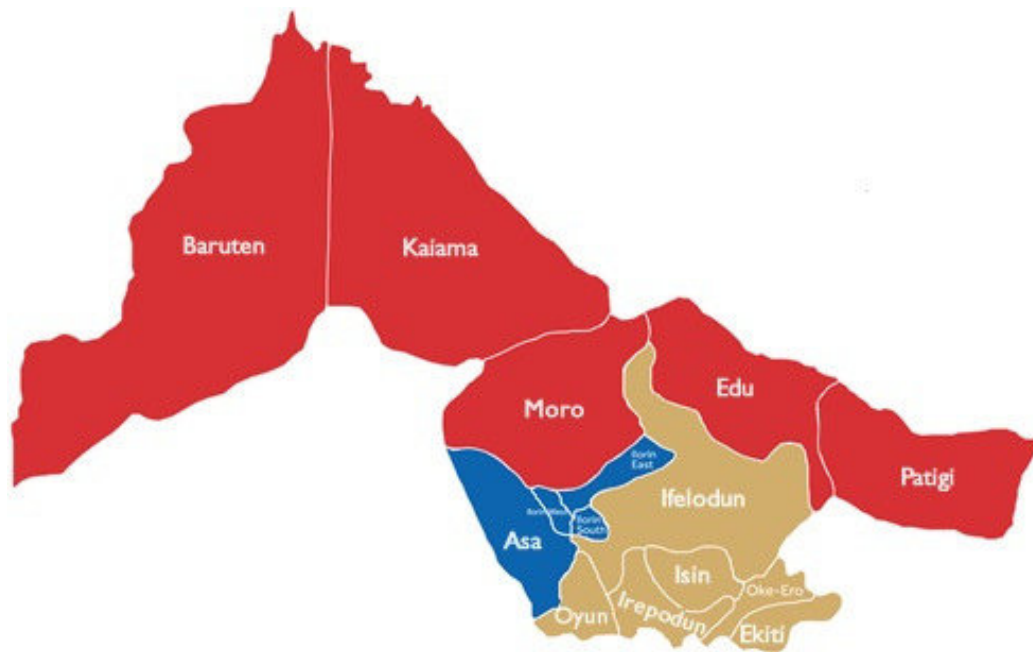


Fig. 2: Map of Kwara State showing study area (Phase 2)

Appendix 1: Semi-structured questionnaire

Demographic Information

- Name (Optional)
- Age
- Sex
- Religion
- Date
- Village/Local government area
- Tribe
- Nationality
- Occupation/Function/Specialty
- How long have you been in this business?
- Training
- Education
- Number of Staff

Treatment of gastric ulcers, plants and recipes used for treatment

- Where do you get medicinal plants from?
- Why do people come to buy medicinal plant from you?
- Do you have herbs for ulcers?
- Is it a single plant or mixture?
- Please give the name(s) of the plant(s)
- Which part of the plant do you use?
- Methods of preparation
- (a) Do you have ulcer patients? (b) How many?
- Frequency of treatment
- (a) Duration of treatment (b) Dosage
- Mode of Administration
- Any accompanied side effects
- Any accompanied verbal instructions
- Sources of knowledge of treatment (e.g. Ancestral, Training)
- Any other technique used?
- Prevalence of ulcer in your area: High, moderate, low
- Do you know/have plants that prevent ulcer?
- Results/Response from your patients after treatment
- Any other information you wish to give
- Comments (by interviewer)

Plant identification and authentication: The curator of the Botanical Garden, University of Ibadan, Ibadan, Nigeria identified the medicinal plants. Botanical names were established by comparing specimens with those at the Department of Pharmacognosy Herbarium, University of Ibadan (DPHUI) and vouchers specimens deposited.

RESULTS

A total of 62 plant species (Table 1) belonging to 40 families were identified. Table 1 shows the list of identified plant species, families, local names and plant parts used. The most prominent among these plant families were the compositae, euphorbiaceae and leguminosae with 5 and 4 species, respectively. Other plant families include Malvaceae 3), Meliaceae (3), Asclepiadaceae, Bignoniaceae, Cucurbitaceae, Piperaceae, Musaceae and Zingiberaceae with 2 species each among others. The most frequently mentioned species were *Carica papaya* (0.400) and *Musa paradisiaca* (0.400) each of which were mentioned 12 times while *Zingiber officinale* (0.267) and *Allium sativum* (0.200) were mentioned 8 and 6 times respectively, by the respondents. The species distribution according to the ethnobotanical survey with use mention index is also given in Table 1. The species distributions according to families of plant used for the treatment of gastric ulcer are illustrated in Fig. 2. Percentage occurrence of plant parts used is shown in Fig. 3. The most common plant parts used were the leaves. Some of the herbs

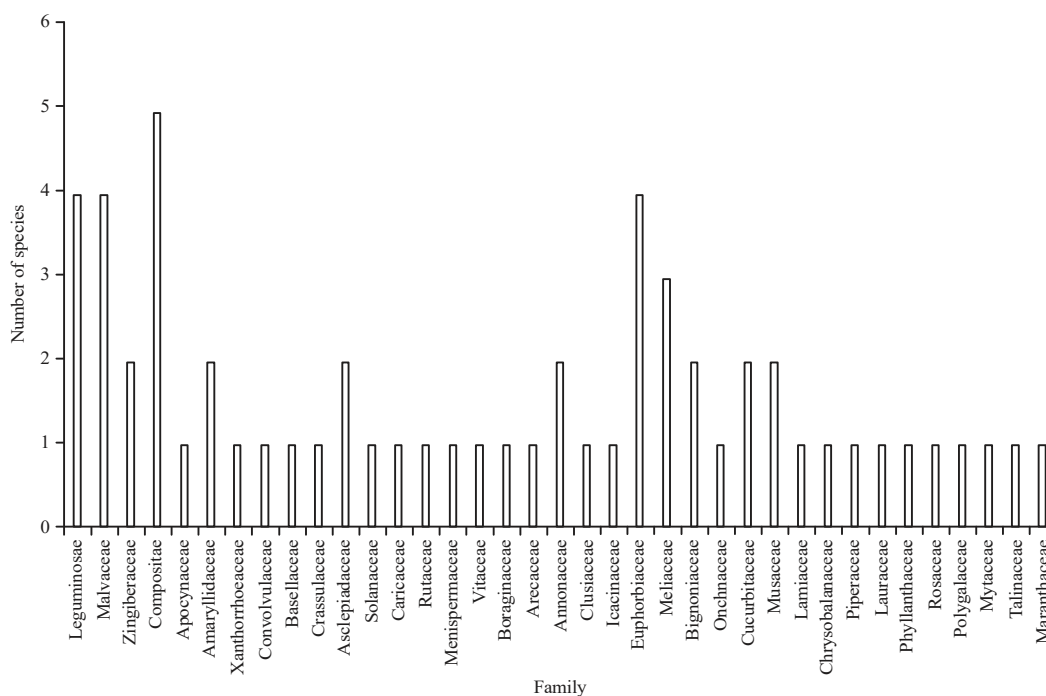


Fig. 3: Percentage occurrence of plant parts used in the treatment of gastric ulcer

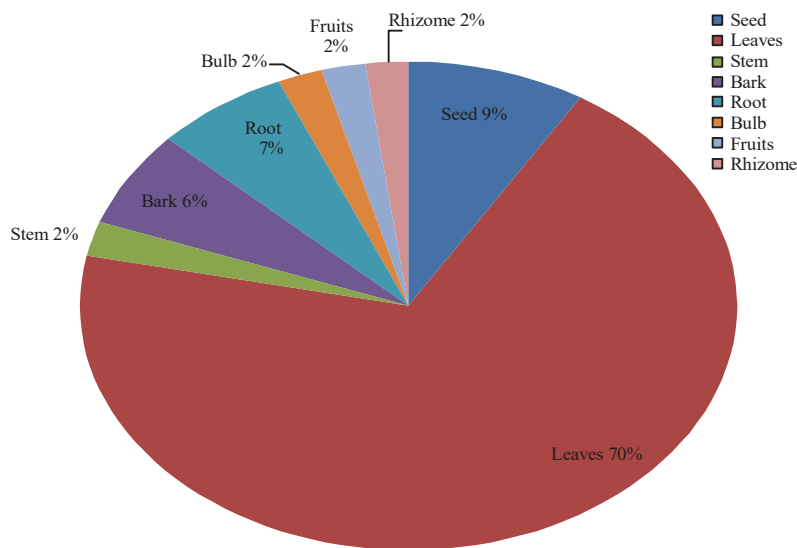


Fig. 4: Percentage occurrence of plant parts used in the treatment of gastric ulcer



Fig. 5: Some of the plants used in the treatment of gastric ulcer in the Southwestern and North central regions of Nigeria, (a) *Ageratum conyzoides* (Compositae), (b) *Carica papaya* (Caricaceae), (c) *Corchorus olitorius* (Tiliaceae), (d) *Momordica charantia* (Cucurbitaceae), (e) *Musa paradisiaca* (Musaceae), (f) *Ocimum gratissimum* (Lamiaceae), (g) *Parquetina nigrescens* (Apocynaceae) and (h) *Persea Americana* (Lauraceae)

were prepared in combination with other herbs. Figure 5 shows some of these plants used in the treatment of gastric ulcer in southwestern and north central Nigeria. During the interactions with the respondents, some claimed that use of single plants was sufficient to cure the disease (e. g *Musa paradisiaca*, *Talinum triangulare* (Jacq.) Willd., *Momordica charantia* L etc.) while others insisted that, only a mixture of certain plants (e. g *Garcinia kola* Heckel, *Carica papaya* and *Plukenetia conophora* Mull. Arg.) would be efficacious.

Method of preparation: Herbal remedies could either be prepared from dry plants purchased from the markets or from freshly collected samples around homes or gardens. However, respondents affirmed that both sources of plant materials were efficient in herbal preparation except in some cases where freshly collected samples were preferred. The main methods of preparations were decoction (boiling in water) and juice extraction. Others were mashing and roasting, infusion (extracted in hot water) and concoction (mixing of

Table 1: Medicinal plants used in the treatment of gastric ulcer

Botanical name	Family	Voucher/specimen No.	Local name (language/dialect)	Parts used	Number of times mentioned	Use mention index (UMI)
<i>Acacia nilotica</i> (Guill. and Perr.) Kuntze	Leguminosae	AAAK 1	Boni-booni	Seeds, leaves	1	0.033
<i>Adansonia digitata</i> L.	Malvaceae	AAAK 16	Ose	Leaf	1	0.033
<i>Aframomun melegueta</i> (Roscoe) K. Schum.	Zingiberaceae	AAAK 3	Atare	Seed, pods	10	0.159
<i>Ageratum conyzoides</i> L.	Compositae	DPHUI 1080	Imi-esu	Leaves	7	0.111
<i>Alafia barteri</i> Oliv.	Apocynaceae	DPHUI1129	Agbarietu	Stem, leaves	1	0.033
<i>Allium sativum</i> L.	Amaryllidaceae	DPHUI 1116	Ayuu	Bulb	6	0.200
<i>Aloe vera</i> (L.) Burm. f.	Xanthorrhoeaceae	AAAK 6	Etieerinoyinbo	Leaves	2	0.067
<i>Argyrea nervosa</i> (Burm.f.) Bojer	Convolvulaceae	AAAK 17	Rerinkomi	Leaves	1	0.033
<i>Aspilia africana</i> (Pers.) C.D. Adams	Compositae	DPHUI 1083	Yunriyun	Leaves	1	0.033
<i>Basella alba</i> L.	Basellaceae	AAAK 4	Amunu tutu	Leaves	6	0.095
<i>Bryophyllum pinnatum</i> (Lam.) Oken	Crassulaceae	AAAK 18	Odundun	Leaves	3	0.091
<i>Calotropisprocera</i> (Aiton) W.T.Aiton	Asclepiadaceae	AAAK 19	Bomubomu	Leaves	1	0.033
<i>Capsicum frutescens</i> L.	Solanaceae	AAAK 20	Ata ijosi	Fruits	1	0.033
<i>Carica papaya</i> L.	Caricaceae	DPHUI 1175	Ibepe	Leaves, bark, fruit	12	0.400
Citrus aurantifolia (Christm.) Swingle	Rutaceae	AAAK 21	Osanwewe	Peel	1	0.033
<i>Cissampelosowariensis</i> P. Beauv. Ex DC.	Menispermaceae	AAAK 9	Ewejokoje	Leaves	1	0.033
<i>Cissus populnea</i> Guill. And Perr.	Vitaceae	AAAK 10	Ogbolo	Root	1	0.033
<i>Corchorus olitorius</i> L.	Malvaceae	DPHUI 1068	Ewedu	Leaves	2	0.067
<i>Crassocephalum crepidioides</i> (Benth.) S. Moore	Compositae	AAAK 7	Efoebolo	Leaves	3	0.100
<i>Crinum jagus</i> (J. Thomps.) Dandy	Amaryllidaceae	AAAK 22	Ogedeodo	Leaves	1	0.033
<i>Ehretia cymosa</i> Thonn.	Boraginaceae	AAAK 11	Jaoke	Leaves	1	0.033
<i>Elaeis guineensis</i> Jacq.	Arecaceae	AAAK 23	Imo ope	Flower	2	0.067
<i>Enantia chlorantha</i> Oliv.	Annonaceae	DPHUI 0306	Awopa	Bark	2	0.067
<i>Garcinia kola</i> Heckel	Clusiaceae	DPHUI 1128	Orogbo	Seed	4	0.133
<i>Gongronema latifolium</i> Benth et. Hook	Asclepiadiaceae	AAAK 23	Madumaro	Leaves	1	0.033
<i>Icacina trichantha</i> Oliv.	Icacinaceae	DPHUI 0679	Gbegbe	Leaves	1	0.033
<i>Jatropha curcas</i> L.	Euphorbiaceae	DPHUI 0901	Botuje	Leaves	3	0.100
<i>Jatropha gossypifolia</i> L.	Euphorbiaceae	DPHUI 1001	Botuje pupa	Leaves	3	0.100
<i>Khaya senegalensis</i> (Desr.) A. Juss.	Meliaceae	DPHUI 0717	Ogano	Leaves	1	0.033
<i>Kigelia africana</i> (Lam.) Benth.	Bignoniaceae	AAAK 24	Pandoro	Fruit	1	0.033
<i>Lophira alata</i> Banks ex. Gaertn.	Onchnaceae	AAAK 25	Ponhan	Leaves	1	0.033
<i>Luffa cylindrica</i> (L.) M. Roem.	Cucurbitaceae	DPHUI 1074	Kankan ayaba	Leaves	1	0.033
<i>Manihot esculenta</i> Crantz.	Euphorbiaceae	DPHUI 0608	Paki	Leaves	2	0.067
<i>Momordica charantia</i> L.	Cucurbitaceae	DPHUI 1066	Ejirin	Leaves	2	0.067
<i>Musa paradisiaca</i> L.	Musaceae	AAAK 2	Ogede agbagba	leaves	12	0.400
<i>Musa sapientum</i> L.	Musaceae	DPHUI 1110	Ogede	Leaves	1	0.033
<i>Newbouldia laevis</i> (P. Beauv.) Seem.	Bignoniaceae	AAAK 26	Akoko	Root	1	0.033
<i>Ocimum gratissimum</i> L.	Lamiaceae	DPHUI 1052	Efinrin	Leaves	2	0.067
<i>Parinari laxiflora</i> Ducke	Chrysobalanaceae	AAAK 14	Abere	Seed	1	0.033
<i>Peperomia pellucida</i> (L.) Kunth.	Piperaceae	AAAK 27	Rinrin	Leaves	1	0.033
<i>Persea americana</i> Mill.	Lauraceae	DPHUI 1382	Piya	Leaves	1	0.033
<i>Phyllanthu samarus</i> Schumach. and Thonn.	Phyllanthaceae	DPHUI 1064	Iyin olobe	Root, leaves	1	0.033
<i>Piper guineense</i> Schumach. and Thonn.	Piperaceae	AAAK 28	Iyere	Seed	1	0.033

Table 1: Continue

Botanical name	Family	Voucher/specimen No.	Local name (language /dialect)	Parts used	Number of times mentioned	Use mention index (UMI)
<i>Plukenetia conophora</i> Mull. Arg.	Euphorbiaceae	AAAK 13	Awusa	Root	4	0.133
<i>Pseudocedrela kotschyi</i> (Schweinf.) Harms.	Meliaceae	DPHUI 0056	Emi-gbegiri	Leaves	1	0.033
<i>Pterocarpus osun</i> Craib	Leguminosae	AAAK 29	Osun	Seed		
<i>Pyrus communis</i> L.	Rosaceae	AAAK 15	Pear	Leaves, fruits	1	0.033
<i>Securidaca longepedunculata</i> Fresen.	Polygalaceae	DPHUI 1131	Ipeta	Leaves, bark	1	0.033
<i>Senna podocarpa</i> (Guill. and Perr.) Lock	Leguminosae	DPHUI 0079	Asunrin	Leaves	1	0.133
<i>Sida carpinifolia</i> L. f.	Malvaceae	AAAK 8	Oso kotu	Leaves	1	0.133
<i>Syzygium guineense</i> (Willd.) DC.	Myrtaceae	AAAK 12	Ewe ori	Leaves	1	0.033
<i>Talinum triangulare</i> (Jacq.) Willd.	Talinaceae	AAAK 5	Gbure	Leaves	4	0.133
<i>Tetrapluera tetraptera</i> (Schum. and Thonn) Taub.	Leguminosae	AAAK 30	Aidan	Pod	1	0.033
<i>Thaumatococcus danielli</i> (Benn.) Benth	Maranthaceae	AAAK 31	Eeran	Leaf	1	0.033
<i>Trichilia monadelpha</i> (Thonn.) J. J. de Wilde	Meliaceae	AAAK 32	Rere	Leaf	1	0.033
<i>Tridax procumbens</i> L.	Compositae	DPHUI 1056	Igbalode	Leaves	1	0.033
<i>Urena</i> L.	Malvaceae	DPHUI 1130	Esinsinagborin	Leaves	2	0.067
<i>Vernonia amygdalina</i> Delile	Compositae	DPHUI 0669	Ewuro	Leaves	12	0.400
<i>Xylopiya aethiopica</i> (Dunnal) A. Rich	Annonaceae	AAAK 33	Eeru	Root	1	0.033
<i>Zingibe rofficinale</i> Roscoe	Zingiberaceae	DPHUI 0374	Atale	Rhizome	8	0.267

different plants). Decoction was the most preferred method. The time required for boiling was variable and dependent on nature of plant material. In all cases, the preparation was to be taken orally.

Enumeration of recipes:

- The dried leaves of *Alafia barteri* Oliv., *Pseudocedrela kotschyi* (Schweinf.) Harms. and the bark of *Securidaca longepedunculata* Fresen. are boiled together in water and made into a decoction. A cupful is to be taken 3 times daily
- Barks of *Garcinia kola*, *Carica papaya* and *Plukenetia conophora* are mashed and roasted. The mixture is taken with cold pap, once or twice daily for four weeks
- The leaves of *Manihot esculenta* Crantz., *Jatropha curcas* L., *Jatropha gossypifolia* L. and *Syzygium guineense* (Willd.) DC. are boiled in water and decoction taken twice daily for 1 month or until symptoms disappear
- The barks of *Plukenetia conophora*, *Garcinia kola* and *Carica papaya* are soaked in alcohol and the infusion taken twice daily
- The fresh leaves of *Ocimum gratissimum* L. and *Vernonia amygdalina* Delile are squeezed to extract the juice which is taken 3 times daily after meals
- Unripe *Musa sapientum* L is boiled in water. The infusion is taken three times daily. Bark of unripe *Musa paradisiaca* is mashed and roasted. This is taken with water or cold pap, 3 times daily after meals
- Fresh leaves of *Talinum triangulare* are squeezed to extract the juice which is taken 3 times daily after meals
- Fresh leaves of *Talinum triangulare* are squeezed to extract the juice which is taken with honey 3 times daily after meals
- Fresh leaves of *Ehretia cymosa* Thonn. are squeezed to extract the juice and taken 3 times daily after meals
- Fresh leaves of *Urena* sp. are squeezed to extract the juice which is taken 3 times daily after meals
- Fresh leaves of *Momordica charantia* are squeezed to extract the juice. The extracted juice is mixed with red palm oil and saccharin. The mixture is taken 3 times daily
- A mixture of the fruits of *Carica papaya* and *Aframomun melegueta* (Roscoe) K. Schum. is to be taken with cold pap daily
- Fresh leaves of *Carica papaya* is boiled in water. The decoction is taken regularly. Leaves of *Jatropha gossypifolia* are washed and soaked in alcohol. The infusion is taken twice daily
- The seeds of *Acacia nilotica* (Guill. and Perr.) Kuntze is mashed and roasted and mixed with honey or palm oil. The mixture is taken regularly

DISCUSSION

The plant families with the highest number of species used in the treatment of peptic ulcer includes Compositae, Leguminosae and the Euphorbiaceae with 5 and 4 species, respectively followed by Malvaceae (3 species), Zingiberaceae, Cucurbitaceae, Meliaceae and Musaceae with 2 species each which is indicative of their importance in the treatment of peptic ulcer in these regions. Although, Apocynaceae, Amaryllidaceae, Lamiaceae, Clusiaceae, Phyllanthaceae, Xanthorrhoeaceae were only represented by one species there is also a need to explore them scientifically for antiulcer drug development. Results also revealed that quite a number of plants parts especially the leaves, roots, rhizomes, fruits, seeds and very rarely the whole plants have been found efficient in the treatment of gastric ulcer by the respondents. The most prominent plant species in the medicinal recipes according to the use-mentions index were *Carica papaya* (Caricaceae), *Zingiber officinale* (Zingiberaceae), *Musa paradisiaca* (Musaceae) and *Allium sativum* (Amaryllidaceae) suggesting that they may possess important anti-ulcer properties.

Investigations on the plant parts used and the mode of preparation and administration indicated that irrespective of the plant part(s) or combinations used, water was the main medium for all the medicinal preparations. In addition to pure herbal preparations, in some cases the drug was administered along with honey, sugar, cold pap or palm oil. These ingredients may be used to enhance the effect of the herbal preparations by serving as vehicle for some chemical compounds or are simply added to make the preparations palatable.

Many researchers have reported antiulcer activity of some of the plants species mentioned in this survey (*Aspilia africana* (Pers.) C.D. Adams, *Parquetina nigrescens*, *Excoecaria agallocha* and *Cassia nigricans*) or other species of the same families identified in this survey (Compositae, Apocynaceae, Euphorbiaceae and Leguminosae)^{8,11,13,23,24}. Also, *Aspilia africana*, *Carica papaya*, *Musa paradisiaca*, *Persea Americana* Mill., *Musa sapientum*, *Mormodica charantia*, *Ocimum gratissimum*, *Zingiber officinale* and *Talinum triangulare* are among the plants identified as the medicinal plants used as antiulcer in some parts of southwestern and northwestern Nigeria^{25,26}.

Some species of the family Compositae are used in wound healing, wound cleansing, anti-inflammatory and for curing stomach aches, pains²⁷ and this to an extent may explain while some of the plants identified in this survey belong to the family Compositae. Plants of the family Lamiaceae is used for

treating stomach pain and as relaxant, which may be connected to stomach ulcer²⁸. Ekpendu reported the antiulcer property of the following plant families: Leguminosae, Xanthorrhoeaceae, Malvaceae and Myrtaceae among others as antiulcer plants used in the Benue area of Nigeria²⁹. Some of these plant families have also been identified in this present work as part of plant families used by the people of southwestern and north central regions of Nigeria.

Moreover, a number of the plants identified in this survey have been reported to have other medicinal uses traditionally in similar studies carried out in Nigeria. These include: Anticancer (*Alafia barteri*, *Vernonia amygdalina*, *Garcinia kola*, *Allium sativum*, *Securidaca longepedunculata* among others³⁰, Antimalaria (*Zingiber officinale*, *Garcinia kola*, *Ocimum gratissimum*, *Phyllanthus amarus*, *carica papaya*, *Mormodica charantia*, *Persea Americana* among others^{18,31}. Mustafa and other researchers identified *Ageratum conyzoides*, *Parquetina nigrescens*, *Jatropha gossypifolia*, *Musa paradisiaca* and *Ocimum gratissimum* as some of the plants used in the treatment of diabetes in Irepodun local government area of Osun State, southwest, Nigeria³². These plants were also documented in this study. This suggests that the constituents of these plants may have the cure for various non-communicable diseases and should be investigated scientifically. In the ethnobotanical survey of medicinal plants in Biu local government area of Borno State, Nigeria carried out by Ampitan³³, certain plant species identified in our work were also reported to be useful in the treatment of some other ailments such as hypertension and eye pain (*Allium sativum*), stomach pain (*Carica papaya* and *Vernonia amygdalina*) and wound healing (*Jatropha curcus*).

The results of this survey showed that the majority of the herb sellers, traditional medicine practitioners (TMPs)/herbalists claimed no occurrence of side effects following patients' use of herbal preparations for the treatment of peptic ulcer. However, some of the traditional healers said they usually advice their patients to avoid eating spicy food or irregular eating habit, alcohol and sweetened substances. They were also encouraged to take milk but not in excess.

With this basic information on the local uses of these medicinal plants, further investigation aimed at isolation of the biologically active compounds from these plants may be carried out. The isolation, identification and purification of the bioactive compounds will certainly form the basis for future drug discovery and design from these indigenous medicinal plants. This study also illustrates the need for conservation of traditional knowledge and medicinal plants. In this context, more detailed studies about the antiulcer property of some

selected plants among these medicinal plants identified in this research work were carried out at University of Ibadan Pharmacognosy research laboratory¹³ and the biological activity of the most promising plants were further investigated, evaluated and elucidated.

CONCLUSION

This documentation provided the basis for further research in developing new, effective, safe and affordable plant-derived antiulcer drugs from our rich resources of indigenous medicinal plants. The study also plays a part in documenting and conserving traditional knowledge of antiulcer plants for future use.

SIGNIFICANCE STATEMENT

This study discovered that many medicinal plants, which, are being used in the locations visited, can be beneficial for the development of new antiulcer drugs for the treatment of peptic ulcer. This study will inspire scientific investigations into the biological activity of these medicinal plants in the management and cure for ulcer.

ACKNOWLEDGMENT

The authors are grateful to the curators of the Botanical Garden and the Department of Pharmacognosy Herbarium, University of Ibadan, (DPHUI), Ibadan, Nigeria for assisting with the identification of the plants collected during the survey. We deeply appreciate the efforts and suggestions of Dr Omowumi Kayode (Landmark University, Omu Aran, Kwara State and Mr. Olufemi Oladipo (Resident of Ado/Odo Ota LGA, Ogun State) in identifying and locating informants for this work and many thanks to all the informants in Ogun and Kwara States, Nigeria, contacted in the course of the survey for their cooperation and readiness to give cogent information on their uses of traditional antiulcer plants.

Authors also thankful to the Research Journal of Medicinal Plants for publishing this article FREE of cost and to Karim Foundation for bearing the cost of article production, hosting as well as liaison with abstracting and indexing services and customer services.

REFERENCES

1. Sofowora, A., 1982. Medicinal Plants and Traditional Medicine in Africa. John Wiley and Sons Ltd., New York, USA, ISBN-13: 9780471103677, pp: 64-79.
2. Iwu, M.M., A.R. Duncan and C.O. Okunji, 1999. New Antimicrobials of Plant Origin. In: Perspectives on New Crops and New Uses, Janick, J. (Ed.). ASHS Press, Alexandria, VA., USA., ISBN-13: 9780961502706, pp: 457-462.
3. Sonibare, M.A. and Z.O. Gbile, 2008. Ethnobotanical survey of anti-asthmatic plants in South Western Nigeria. Afr. J. Tradit. Complement. Altern. Med., 5: 340-345.
4. Belaiche, J., A. Burette, M. de Vos, E. Louis, M. Huybrechts, M. Deltenre and Belgian Study Group of NSAID-GI Complications, 2002. Observational survey of NSAID-related upper gastro-intestinal adverse events in Belgium. Acta Gastroenterol. Belgica, 65: 65-73.
5. University of Maryland Medical Center, 2008. Digestive disorders: Stomach and duodenal ulcers (peptic ulcers). The University of Maryland Medical Center, Baltimore, MD., USA.
6. Wallace, J.L., 2008. Prostaglandins, NSAIDs and gastric mucosal protection: Why doesn't the stomach digest itself? Physiol. Rev., 88: 1547-1565.
7. Ukwé, C.V., C.M. Ubaka, M.O. Adibe, C.J. Okonkwo and P.A. Akah, 2010. Antiulcer activity of roots of *Zapoteca portoricensis* (Fam. Fabiaceae). J. Basic Clin. Pharm., 1: 183-186.
8. Ubaka, M.C., V.C. Ukwé, C.T. Okoye and O.M. Adibe, 2010. Investigation into the anti-ulcer activity of the aqueous leaf extract of *Aspilia africana* C.D. Adams. Asian J. Med. Sci., 2: 40-43.
9. Kumar, M.R., K.M. Niyas, T.T. Mani, O.M.F. Rahiman and B.S. Kumar, 2011. A review on medicinal plants for peptic ulcer. Der Pharmacia Lettre, 3: 180-186.
10. Singh, R., J. Madan and H.S. Rao, 2008. Antiulcer activity of black pepper against absolute ethanol induced gastric mucosal damage in mice. Pharmacogn. Mag., 4: 232-235.
11. Kayode, A.A.A., O.T. Kayode and A.A. Odetola, 2009. Anti-ulcerogenic activity of two extracts of *Parquetina nigrescens* and their effects on mucosal antioxidants defence system on ethanol-induced ulcer in rats. Res. J. Med. Plants, 3: 102-108.
12. Farombi, E.O. and O. Owoeye, 2011. Antioxidative and chemopreventive properties of *Vernonia amygdalina* and *Garcinia biflavonoid*. Int. J. Environ. Res. Public Health, 8: 2533-2555.
13. Kayode, A.A.A., M.A. Sonibare and J.O. Moody, 2015. Antiulcer activities of *Securidaca longepedunculata* Fres. (Polygalaceae) and *Luffa cylindrica* Linn. (Cucurbitaceae) in Wistar rats. Niger. J. Nat. Prod. Med., 19: 85-91.
14. Del Valle, J., 2005. Peptic Ulcer Diseases and Related Disorders. In: Harrison's Principles of Internal Medicine, Braunwald, A.S., A.S. Fauci, S.L. Kasper, S.L. Hauser, D.L. Longo and J.L. Jameson (Eds.). 16th Edn., McGraw-Hill, New York, USA., pp: 1746-1762.
15. Aiyelaja, A.A. and O.A. Bello, 2006. Ethnobotanical potentials of common herbs in Nigeria: A case study of enugu state. Educ. Res. Rev., 1: 16-22.

16. Sonibare, M.A., J.O. Moody and E.O. Adesanya, 2009. Use of medicinal plants for the treatment of measles in Nigeria. *J. Ethnopharmacol.*, 122: 268-272.
17. Ogbole, O.O., A.A. Gbolade and E.O. Ajaiyeoba, 2010. Ethnobotanical survey of plants used in treatment of inflammatory diseases in Ogun State of Nigeria. *Eur. J. Scient. Res.*, 43: 183-191.
18. Idowu, O.A., O.T. Soniran, O. Ajana and D.O. Aworinde, 2010. Ethnobotanical survey of antimalarial plants used in Ogun State, Southwest Nigeria. *Afr. J. Pharm. Pharmacol.*, 4: 55-60.
19. Erinoso, S.M. and D.O. Aworinde, 2012. Ethnobotanical survey of some medicinal plants used in traditional health care in Abeokuta areas of Ogun State, Nigeria. *Afr. J. Pharm. Pharmacol.*, 6: 1352-1362.
20. Soladoye, M.O., E.C. Chukwuma and F.P. Owa, 2012. An 'Avalanche' of plant species for the traditional cure of *Diabetes mellitus* in South-Western Nigeria. *J. Nat. Prod. Plant Resour.*, 2: 60-72.
21. Elufioye, T.O., A.T. Oladele, C.M. Cyril-Olutayo, J.M. Agbedahunsi and S.A. Adesanya, 2012. Ethnomedicinal study and screening of plants used for memory enhancement and antiaging in Sagamu, Nigeria. *Eur. J. Med. Plants*, 2: 262-275.
22. Andrade-Cetto, A., 2009. Ethnobotanical study of the medicinal plants from Tlanchinol, Hidalgo, Mexico. *J. Ethnopharmacol.*, 122: 163-171.
23. Akah, P.A., O.E. Orisakwe, K.S. Gamaniel and A. Shittu, 1998. Evaluation of Nigerian traditional medicines: II. Effects of some Nigerian folk remedies on peptic ulcer. *J. Ethnopharmacol.*, 62: 123-127.
24. Thirunavukkarasu, P., L. Ramkumar and T. Ramanathan, 2009. Anti-ulcer activity of *Excoecaria agallocha* bark on NSAID-induced gastric ulcer in Albino rats. *Global J. Pharmacol.*, 3: 123-126.
25. Oluranti, A.C., U.O. Michael, U.O.C. Jane and N.A. Ayembe, 2012. Ethnobotanical studies of medicinal plants used in the management of Peptic ulcer disease in Sokoto State, North Western Nigeria. *Int. Res. J. Pharm. Pharmacol.*, 2: 225-230.
26. Akinlami, O.O., O.A. Obijole and H.O. Oloyede, 2014. Ethnobotanical survey of anti-ulcer plants in South Western Nigeria. *Int. J. Pharma Sci.*, 4: 431-433.
27. Heinrich, M., M. Robles, J.E. West, B.R.O. de Montellano and E. Rodriguez, 1998. Ethnopharmacology of Mexican asteraceae (Compositae). *Annu. Rev. Pharmacol. Toxicol.*, 38: 539-565.
28. De Santayana, M.P., E. Blanco and R. Morales, 2005. Plants known as *té* in Spain: An ethno-pharmaco-botanical review. *J. Ethnopharmacol.*, 98: 1-19.
29. Ekpendu, T.O.E., 2003. Nigerian ethnomedicine and medicinal plant flora: Anti-ulcer plants of the Benue area of Nigeria. *West Afr. J. Pharmacol. Drug Res.*, 19: 1-4.
30. Soladoye, M.O., M.O. Adetayo, E.C. Chukwuma and A.N. Adetunji, 2010. Ethnobotanical survey of plants used in the treatment of haemorrhoids in South-Western Nigeria. *Ann. Biol. Res.*, 73: 175-185.
31. Dike, I.P., O.O. Obembe and E.F. Adebisi, 2012. Ethnobotanical survey for potential anti-malarial plants in South-Western Nigeria. *J. Ethnopharmacol.*, 144: 618-626.
32. Mustafa, A.A., O.O. Fawibe, A.A. Ajiboye and D.A. Agboola, 2014. Ethnobotanical survey of medicinal plants used in the treatment of diabetes in Irepodun local government area of Osun State, Nigeria. *Greener J. Biol. Sci.*, 4: 59-68.
33. Ampitan, T.A., 2013. Ethnobotanical survey of medicinal plants in Biu local government area of Borno state, Nigeria. *Compr. J. Herbs Med. Plants*, 2: 7-11.