Ethnobotanical Survey of Plants Used in The Management of Peptic Ulcer Diseases in Wukari Metropolis

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Abstract

Peptic ulcer diseases (PUD) are sores formed in soft tissues present in the lining of the digestive tract as a result of excessive stomach acid or inability of the alimentary tract or stomach to protect itself. The increasing surge for plant based drugs in the management of PUD has increased scientific investigation of herbs and recipes from traditional medicinal practitioners (TMP) to ascertain their efficacy through pharmacological studies. Ethnobotanical survey of plants and recipes from TMP used in the management of PUD in Wukari metropolis, Taraba State, Northeastern Nigeria were documented. A total of twenty (20) TMP located in ten (10) different area of the town were interviewed using a semi structured questioner. Twenty-four (24) plant species from twenty (20) different families and sixteen (16) recipes were documented from the survey. It was observed that plant leaves were mostly used while C. longa (Zingiberaceae), M. paradisiaca (Musaceae) had the highest frequency of occurrence in recipes formulation. Therefore, due to the proven efficacy of these herbal recipes as reported from correspondents, there is need for proper documentation, conservation, cultivation and use of these medicinal plants in the management of PUD to avoid them being endangered or going into extinction.

Keywords: Peptic ulcer; Wukari; Plant; Taraba.

INTRODUCTION

Peptic ulcer disease (PUD) is a common gastrointestinal disorder which occurs on inflamed break in the skin or mucus membrane lining the alimentary tract. It is the most predominant chronic and recurrent gastrointestinal diseases and a global health problem leading to morbidity and mortality worldwide (Sen et al., 2009). PUD manifest in different unit of the alimentary tract like the stomach (gastric ulcer), duodenum (duodenal ulcer), esophagus (esophageal ulcer) resulting in different types of peptic ulcer. The specific cause of PUD remains unclear over the years though studies report that the lack of equilibrium between the mucosal defensive factors (secretion of bicarbonate, prostaglandins, innate resistance of the mucosal cell) and gastric aggressive factors (acid, pepsin, H. pylori infection) are possible causes of PUD (Roy et al., 2013; Dashputre et al., 2011; Roberts, 2003). Presently H. pylori, non-steroidal anti-inflammatory drugs (NSAIDs) and Zollinger-Ellison syndrome (a dramatic hypersecretion of acid) are three primary factors in peptic ulcer disease though, environmental factors (smoking, excessive alcohol intake), genetic, dietary and physiologic stress also increases gastric acid secretion, weakens mucosal barrier leading to PUD (Malferttheiner et al., 2009; Wu and Fassihi, 2005). The pathophysiology of PUD injury mechanism in gastric and duodenal ulcer differs distinctively such that duodenal ulcer is essentially an H. pylori related disease while gastric ulcer is commonly associated with NSAID ingestion but in both conditions inflammatory symptoms is observed at the onset leading to an imbalance between protective and aggressive factors (Chan and Leung, 2002).

Orthodox drugs used in the treatment of PUD are histamine-receptor blockers (ranitidine, cimetidine), proton pump inhibitors (omeprazole, pantoprazole) and antibiotics (metronidazole, amoxycillin) which are sometimes combined to achieve better result. They are often directed at reduction of aggressive factors with some reported side effects such as dizziness, headache, constipation, impotence or breast enlargement in men and the use of antacids leads to stomach distention, belching, constipation (Gulmez et al., 2007, Sarkar et al., 2008, Reilly, 1999, Franco and Richter, 1998).

Previous studies reveal that about 5–10% of world population suffer from PUD though with a recent decrease in the incidence, rates of hospital admissions and mortality (Lanas and Chan, 2007, Lanas et al., 2011,
The prevalence of *H. pylori*, a major cause of PUD is higher in developing countries present in Africa, Central America, Central Asia and Eastern Europe where the bacteria is mostly acquired during childhood in an unhygienic environment especially in communities with lower socioeconomic status (Kuna et al., 2019; Hooi et al., 2017). Most people in these developing countries live below poverty level, do not have access to standard healthcare facilities, rely on NSAIDs and painkiller drugs to subside pains resulting from stress, are unable to afford balanced diet therefore consume food substances which tend to increase gastric acid production and these factors creates an imbalance between aggressive and defensive factors in gastrointestinal tract. These classes of people who constitute about 80% of the world’s population rely on herbs from plants as alternative medication in management of sickness and diseases. Traditional healers have used and relied on plants materials as main source of natural therapeutic medicines from time immemorial in the treatment and management of various infectious diseases (Akinwumi and Sonibare, 2019; Beverly and Sudarsanam, 2011; Dike et al., 2012). Scientific studies have established that medicinal plants used by traditional healers have displayed proven pharmacological, antioxidant and therapeutic activity against degenerative diseases. Many herbs and plant products have been found to play a role in protecting or helping to heal stomach and peptic ulcers with the presence of important secondary metabolites like flavonoids and tannins reported as the active principle responsible for their anti-ulcer activity (Nihar et al., 2017).

Ethnobotanical studies or survey are recognized as the most viable method of identifying novel medicinal plants or refocusing on those earlier reported for bioactive constituents (Alebiosu et al., 2005). There is little or no documentation of medicinal plants used for the treatment of PUD in Wukari metropolis, Northeastern Nigeria, Taraba state therefore this documentation will serve as reference to scientific researchers in the development of potent drugs and recipes from natural plants in treatment and management of PUD with fewer or no side effects. This present study aims to document medicinal plants used in the management of PUD in Wukari, Taraba state.

**METHODOLOGY**

**Study area**

This survey was conducted in Wukari metropolis the headquarters of Wukari Local Government Area of Taraba State, Nigeria. It has an area of 4,308km² and a population of 238,283 at the 2006 census which is located in the south of the Benue river basin (NBS, 2006). The town is located in the Southern Taraba with its coordinates between latitude 7° 51’N to 7° 85’N and longitude 9°47’E to 9°78’E which is about 200km from Jalingo the state capital. The city has a tropical continental climate characterized by a marked distinctive wet and dry season, an annual rainfall between 1000-1500mm, temperatures range between 20-40°C with a lengthy wet season (7 months) throughout the course of the year (Oyatayo et al., 2017). Wukari is mainly an agrarian town that lies within the savannah zone and has mainly grassland vegetation and scattered trees and shrubs in the southern part of the State. Its inhabitants are the Jukuns, who are predominantly traditionalists though some of them are Christians and Muslims. The survey was conducted in sampled areas that are close to farms and garden in the extended city areas of Wukari, with the aim to capture both rural and urban populace and locate the elderly people with the knowledge of traditional medicine.

![Figure 1. Map of Nigeria showing Taraba State.](image-url)
Data collection
The main data sources consisted of a series of semi-structured and open-ended questionnaires as well as informal interviews administered on local herb sellers, herbalists, aged and other groups of people rich in traditional medicine knowledge. The survey was conducted within the span of eight (8) months from January 2019 to August 2019 with repeated visits to the respondents. Questionnaires were administered and Hausa language was used to obtained the information from the respondents. Such information includes the local plant names, useful plant parts and methods of preparation. Local names of plants mentioned were validated using literatures and proper taxa nomenclature was validated in the plant list database at www.plantlist.org.

Demographic data
A total of twenty respondents were interviewed consisting of twelve males (60%) and eight females (40%) in Wukari metropolis. The respondents include traditional healers (30%), herbalist (20%), herb sellers (40%) and the aged people (10%) all of which are Nigerians from the Jukun ethnic group comprising of (40%) Christians, (20%) Muslims and (40%) practicing traditionalists. Their ages were within 31-70 years with the age bracket of 51-60 (45%) with no formal education (60%) being the highest among them (Table 1).

RESULTS
A total of twenty-four (24) plant species belonging to twenty (20) families were identified as plants used in treatment of PUD in Wukari metropolis (Table 2). The plant families, local names, part used and frequency of occurrence were documented. The Anarcardiaceae, Alliaceae, Malvaceae and Musaceae had two plants each among the twenty-four plant species while the leaves were mostly used in preparation of various herbal recipes. Some of the plants were reported to be harvested from the forest while others from home garden and environs. The respondents claimed that their medicinal knowledge was inherited, few trained and some believed to be divine.

| Demography        | Frequency (n=20) | Percentage (%) |
|-------------------|------------------|----------------|
| Traditional healers | 6                | 30.0           |
| Herbalist         | 4                | 20.0           |
| Herb seller       | 8                | 40.0           |
| Aged              | 2                | 10.0           |

| Gender            |                |
|-------------------|----------------|
| Male              | 12              |
| Female            | 8               |

| Age range         | Frequency (n=20) | Percentage (%) |
|-------------------|------------------|----------------|
| Below 30          | 0                | 0.0            |
| 31-40             | 2                | 10.0           |
| 41-50             | 7                | 35.0           |
| 51-60             | 9                | 45.0           |
| 60 and above      | 2                | 10.0           |

| Religion          | Frequency (n=20) | Percentage (%) |
|-------------------|------------------|----------------|
| Christianity      | 8.0              | 40.0           |
| Islam             | 4.0              | 20.0           |
| Traditional religion | 8.0            | 40.0           |

| Education         | Frequency (n=20) | Percentage (%) |
|-------------------|------------------|----------------|
| No formal         | 12               | 60.00          |
| Primary           | 4                | 20.00          |
| Secondary         | 4                | 20.00          |
| Diploma           | 0                | 00.00          |
| Degree            | 0                | 00.00          |
### Table 2. List of Plants Used in Management of PUD in Wukari, Taraba State.

| S/N | Plant Name                        | Family          | Part used   | Common name | Hausa name   | Frequency of occurrence |
|-----|-----------------------------------|-----------------|-------------|-------------|--------------|------------------------|
| 1   | Azadirachta indica (A.) Juss.    | Maliaceae       | Leaves      | Neem        | Doogon yaaroo | 1                      |
| 2   | Psidium guajava Linn.            | Myrtaceae       | Leaves      | Guava       | Gweebaa        | 1                      |
| 3   | Anarcardium occidentale Linn.    | Anarcardiaceae  | Roots, stems| Cashew      | Jambe          | 1                      |
| 4   | Carica papaya Linn.              | Caricaceae      | Fruits, seeds | Pawpaw   | Gwandar masar   | 1                      |
| 5   | Ocimum gratissimum Linn.         | Lamiaceae       | Leaves      | Scent leaf  | Tagida, daddooya | 1                      |
| 6   | Musa sapientum Linn.             | Musaceae        | Unripe fruits | Banana    | Ayama         | 2                      |
| 7   | Talinum triangulare (Jacq.) Wild.| Portulacaceae   | Leaves      | Water leaf  | Alenyruwa      | 1                      |
| 8   | Curcuma longa Linn.              | Zingiberaceae   | Rhizome     | Tumeric     | Zabibi        | 4                      |
| 9   | Musa paradisiaca Linn.           | Musaceae        | Fruit       | Plantain    | Agada         | 4                      |
| 10  | Aloe vera (L.) Burm. F           | Alliaceae       | Gel         | Aloe        | Hantsar giwaa | 1                      |
| 11  | Mangifera indica Linn.           | Anarcardiaceae  | Leaves      | Mango       | Mangoro       | 1                      |
| 12  | Hibiscus sabdariffa Linn.        | Malvaceae       | Calyx       | Roselle     | Saboroto      | 1                      |
| 13  | Sida acuta Burm.f.               | Malvaceae       | Leaves      | Wire weed   | Tsadar lamarudu | 1                      |
| 14  | Lantana camara Linn.             | Verbenaceae     | Stem, whole plant | Red sage | Kimbana halba | 1                      |
| 15  | Euphorbia hirta Linn.            | Euphorbiaceae   | Leaves      | Garden spurge | Noonon kuriyaa | 2                      |
| 16  | Ipomoea batatas Linn.            | Convolvulaceae  | Tubers      | Sweet potato | Ba fadamee    | 1                      |
| 17  | Moringa oleifera Lam.            | Moringaceae     | Leaves      | Drumstick   | Zogelle       | 1                      |
| 18  | Bryophyllum pinnatum Lam.        | Crussalaceae    | Leaves      | Life plant  | Harifi        | 1                      |
| 19  | Calotropis procera (Ait.) Ait.f. | Asclepidiaceae  | Leaves      | Sodom Apple | Baabaa ambele | 1                      |
| 20  | Allium cepa Linn.                | Alliaceae       | Bulb        | Onion       | Albasa        | 1                      |
| 21  | Datura metel Linn.               | Solanaceae      | Leaves      | Devil trumpet | Zakami       | 1                      |
| 22  | Vitellaria paradoxa Gaertn.f.    | Sapotaceae      | Leaves and fruit | Shea butter | Kadde        | 1                      |
| 23  | Sorghum bicolor (L.) Moench     | Poaceae         | Seed        | Guinea corn | Mazakuwa     | 2                      |
| 24  | Ampelocissus africanaus (Lour.) Merr. | Vitaceae     | Leaves      | Simple-leaved wild grape | Siling siame | 1                      |

*Figure 3.* Frequency of plant parts used in management of PUD in Wukari metropolis
Table 3. PUD Herbal Recipes from TMP in Wukari, Taraba State.

| S/N | Method of Preparation |
|-----|-----------------------|
| 1.  | Dry the half ripe *M. paradisiaca* and *M. sapientum* peels and grind into powder, mix one teaspoon of the powder with honey. |
| 2.  | Squeeze the fresh leaves of *T. triangulare*, *E. hirta* in clean water, add edible salt (NaCl), then sieve the extract, take a glass cup twice daily. |
| 3.  | Dried rhizome of *C. longa* is chewed with leaves of *E. hirta* in an oily juice (Palm oil, olive oil). |
| 4.  | Dried half ripe peels of *M. paradisiaca* and *M. sapientum* is powdered, a powdered teaspoon is mixed with honey and taken daily for two months. |
| 5.  | Cut two whole fruits of *C. papaya* pieces including the peel, soak in six liters of water, sieve to remove the cubes and add 750ml of honey into the extract, and drink a glass cup twice a day. |
| 6.  | Blend four matured leaves of *A. vera* with 750ml of pure honey and 750ml of clean water respectively, filter the syrup and keep in a container to be taken twice daily. |
| 7.  | Dry leaves of *C. procera* are crushed and mixed with *V. paraoxa* and swallowed twice daily. |
| 8.  | Gentle heat is applied to the leaves of *B. pinnumatim* until it brings out oil which is then crushed to paste and mixed with honey before consumption twice daily. |
| 9.  | Boiled or crushed leaves of *M. oleifera* in water, is taken twice daily. |
| 10. | Unripe *M. paradisiaca* and *C. papaya* fruits are sliced to cubes, soaked in water for three days and taken daily. |
| 11. | Powdered leaves and rhizome of *A. africamus*, *C. longa* is mixed with *S. bicolor* paste and consumed morning and evening daily. |
| 12. | Bulbs of *A. cepa* and leaves of *S. acuta* are crushed, mixed with *S. bicolor* paste and natural honey. |
| 13. | Decoction of the calyx of *H. sabdariffa* is mixed with powdered leaves of *A. occidentale* and *P. guajava* and taken twice daily. |
| 14. | A tea spoon of powdered *M. paradisiaca* fruit in mixed in a maceration of *A. indica* leaves and *L. camara* whole plant for seven days be taken twice daily for two months. |
| 15. | Paste of boiled *C. longa* mixed with a pinch powdered leaves of *D. metel* leaves be eaten with boiled tuber of *I. batatas* should be taken early morning daily. |
| 16. | Decoction of fresh leaves of *O. gratissimum*, *M. indica* mixed with *S. bicolor* paste and natural honey. |

**DISCUSSION**

The importance of plant based drugs from traditionalists and herb sellers in the management of PUD remains vital in the search of novel active compounds with little or no side effects. A total of twenty-four (24) plant species from twenty (20) families with sixteen (16) recipes were recorded from twenty (20) traditional medical practitioners present in Wukari metropolis. (Figure 2 to 4, Tables 1 to 2). The plants *C. longa*, *M. paradisiaca* recorded the highest frequency of occurrence while various plant parts such as leaves, stem, fruit bark, rhizome and bulb were frequently used in the prescribed recipes. These formulations were either mixed or prepared with pap, water and honey as major vehicle suggested during preparation, administration and consumption of prepared recipes. There are reports on the scientific investigation on PUD and gastro-protective
potentials of some of these plants such as *C. longa* (Savaringal and Sanalkumar, 2018), *A. vera* (Subramanian et al., 2007), *A. occidentale* (Ajibola et al., 2010), *C. papaya* (Okewumi and Oyeyemi, 2012), *O. gratissimum* (Amadi et al., 2014), *M. paradisiaca* (Rao et al., 2016), *M. indica* (Neelima et al., 2012), *T. triangulare* (Onwurah et al., 2013) and *M. sapientum* (Prabha et al., 2011) have been evaluated using different models on experimental animals. Some of these plants have been reported to display strong antimicrobial (*A. cepa, C. longa*), anti-inflammatory (*S. acuta*), relaxant (*O. gratissimum, M. oleifera*) and acid reflux (*M. sapientum, A. vera*) activity which could confirm their medicinal plants. Evaluation of Anti-S. acuta and acid reflux (*H. pylori*). These herbal have better compatibility with human body (Kamboj, et al., 2018).

Akinwumi and Sonibare (2019) stated that cultivation and proper documentation of medicinal plants from ethnomedicinal survey is essential to prevent them from being endangered and going into extinction. This confirms and addresses the worries from respondents who reported the scarce availability of some plants in their natural habitats due to their increasing demands for food and medicine. Therefore, the increasing dependence of these plant based herbal drugs mainly in developing countries for primary health care could be properly harnessed and managed only if there are measures to ensure sustainable cultivation that will have a considerable long term effect on the environment, health care and economy.

**CONCLUSION**

Twenty-four (24) plant species with sixteen (16) recipes from traditional medicinal practitioners and herb sellers were documented and reordered for the treatment and management of PUD. The major essence of this survey is to harness and document the rich knowledge of the traditional medicinal practitioners on the use of medicinal plants in the treatment of PUD which could pave the way for detailed scientific research in the discovery of novel compounds with better activity, new mechanism of action and less toxic side effects.

**Authors’ Contributions:** Agbatutu designed the study. Agbatutu carried out the laboratory work. Ifedele and Imade analyzed the data. Agbatutu and Imade wrote the manuscript. Abdulrasaq and Ogie Odia review the manuscript All authors read and approved the final version of the manuscript

**Competing Interests:** The authors declare that there are no competing interests.

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