

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

Akpevwoghene Agbatutu^{1,2}, Francis Nosakhare Imade^{2,*}, Efosa A. Ogie-Odia²,
Mary Oromioshemime Ifedele³, Funmilola Modinat Abdulrasaq³, Daniel Eseigbe²

¹Department of Biological Sciences, Kwararafa University Wukari, Taraba State, Nigeria.

²Plant Science and Biotechnology Department, Faculty of Life Sciences, Ambrose Alli University, Ekpoma, Edo State, Nigeria.

³Department of Botany, University of Ibadan, Ibadan, Oyo State, Nigeria.

Corresponding author*

imadefrancis@gmail.com

Manuscript received: 26 May, 2022. Revision accepted: 28 July, 2022. Published: 03 August, 2022.

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 (Malfertheiner *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, amoxicillin) 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,

Sonnenberg, 2013). 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.

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

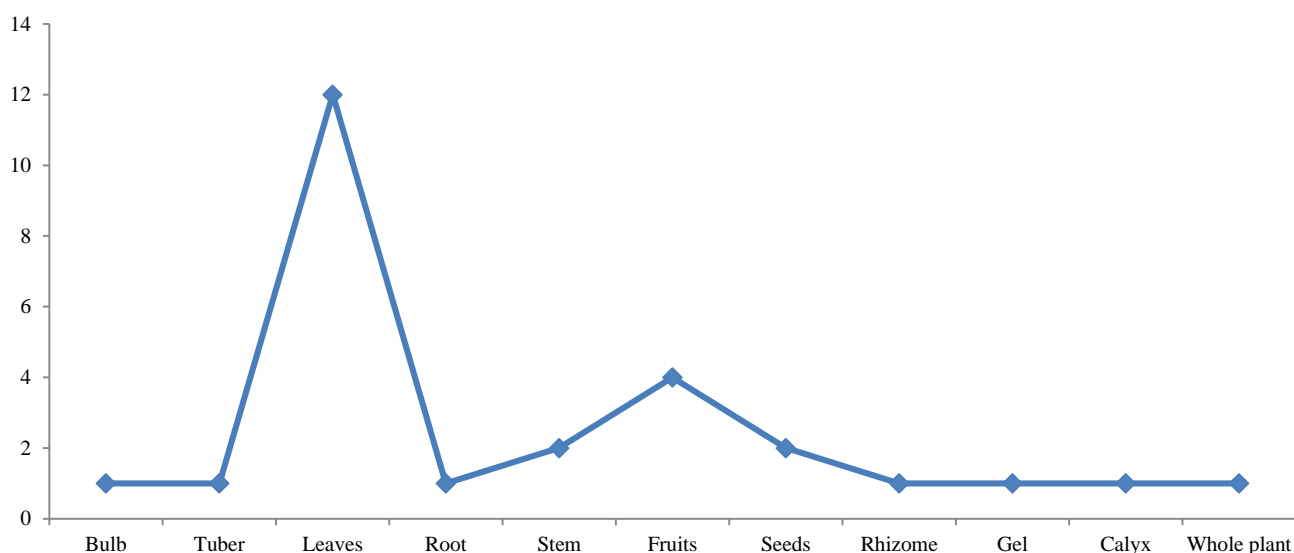
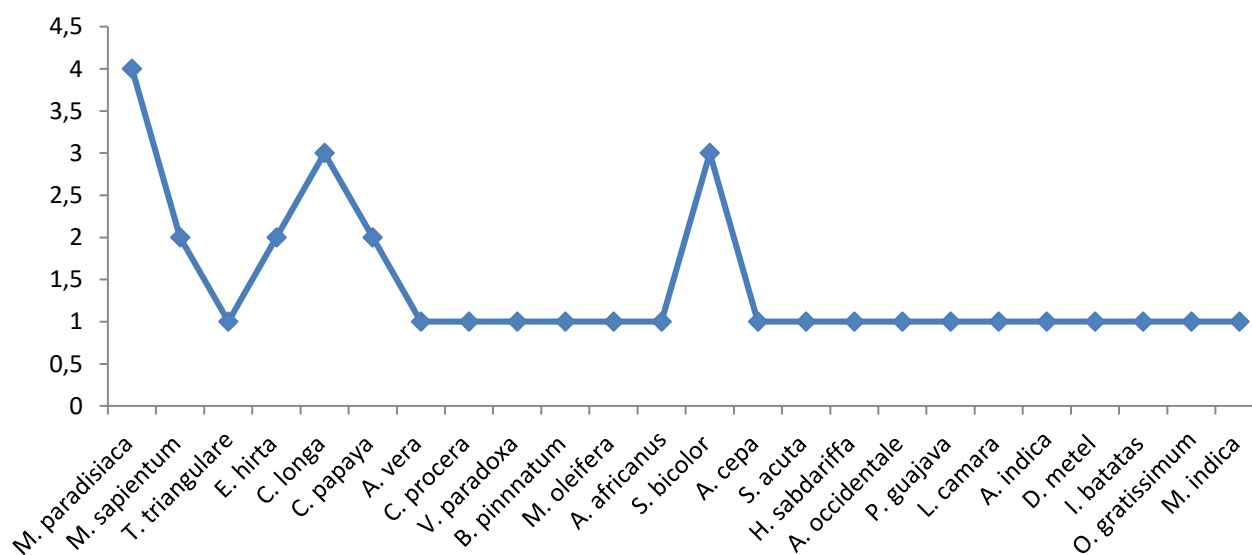
**Figure 3.** Frequency of plant parts used in management of PUD in Wukari metropolis

Table 3. PUD Herbal Recipes from TMP in Wukari, Taraba State.

S/N	Method of Preparation
1.	Dry the half ripe <i>M. paradisiaca</i> and <i>M. sapientum</i> peels and grind into powder, mix one teaspoon of the powder with honey.
2.	Squeeze the fresh leaves of <i>T. triangulare</i> , <i>E. hirta</i> in clean water, add edible salt (NaCl), then sieve the extract, take a glass cup twice daily
3.	Dried rhizome of <i>C. longa</i> is chewed with leaves of <i>E. hirta</i> in an oily juice (Palm oil, olive oil).
4.	Dried half ripe peels of <i>M. paradisiaca</i> and <i>M. sapientum</i> is powdered, a powdered teaspoon is mixed with honey and taken daily for two months.
5.	Cut two whole fruits of <i>C. papaya</i> 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 <i>A. vera</i> 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 <i>C. procera</i> are crushed and mixed with <i>V. paradoxa</i> and swallowed twice daily.
8.	Gentle heat is applied to the leaves of <i>B. pinnatum</i> 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 <i>M. oleifera</i> in water, is taken twice daily.
10.	Unripe <i>M. paradisiaca</i> and <i>C. papaya</i> fruits are sliced to cubes, soaked in water for three days and taken daily.
11.	Powdered leaves and rhizome of <i>A. africanus</i> , <i>C. longa</i> is mixed with <i>S. bicolor</i> paste and consumed morning and evening daily.
12.	Bulbs of <i>A. cepa</i> and leaves of <i>S. acuta</i> are crushed, mixed with <i>S. bicolor</i> paste and natural honey.
13.	Decoction of the calyx of <i>H. sabdariffa</i> is mixed with powdered leaves of <i>A. occidentale</i> and <i>P. guajava</i> and taken twice daily.
14.	A tea spoon of powdered <i>M. paradisiaca</i> fruit in mixed in a maceration of <i>A. indica</i> leaves and <i>L. camara</i> whole plant for seven days be taken twice daily for two months.
15.	Paste of boiled <i>C. longa</i> mixed with a pinch powdered leaves of <i>D. metel</i> leaves be eaten with boiled tuber of <i>I. batatas</i> should be taken early morning daily.
16.	Decoction of fresh leaves of <i>O. gratissimum</i> , <i>M. indica</i> mixed with <i>S. bicolor</i> paste and natural honey

**Figure 4.** Frequency of plants used in PUD herbal recipes in Wukari metropolis.

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 mode of activity or mechanism of action against the reported major causes of PUD such as *H. pylori* a bacteria, NSAIDs related drugs, Zollinger-Ellison syndrome and environmental stress (Iqbal *et al.*, 2018, Gupta *et al.*, 2015, Arciniegas *et al.*, 2016, Malfertheiner *et al.*, 2009). The therapeutic activity of these herbal recipes as reported from respondents and their customers suggest that these herbal products contain numerous bioactive constituents that are a part of the physiological functions of living flora and hence they are believed to have better compatibility with human body (Kamboj, 2000).

Akinwumi and Sonibare (2019) stated that cultivation and proper documentation of medicinal plants from ethnobotanical 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. Abdurasaq 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.

REFERENCES

- Ajibola ES, Adeleye OE, Okediran BS and Rahman SA (2010). Effect of Intragastric Administration of Crude Aqueous Leaf Extract of *Anacardium occidentale* on Gastric Acid Secretion in Rats. *Nig. J. Physiol. Sci.* 25: 59 – 62.
- Akinwumi IA and Sonibare MA (2019). Use of medicinal plants for the treatment of gastric ulcer in some parts of Southwestern Nigeria. *African Journal of Pharmacy and Pharmacology* Vol. 13(15), pp. 223-235
- Alebiosu CO, Ugwa OM, Ugwah-Oguejiofor CJ and Njan AA (2012). Ethnobotanical studies of medicinal plants used in the management of peptic ulcer disease in Sokoto State, North Western Nigeria. *International Research Journal of Pharmacy and Pharmacology*, 29(9): 225-230.
- Amadi EN, Njoku OO, Okereke CN, Ndubuisi JL and Oguoma O (2014). Pharmacological Use of *Ocimum gratissimum* in Peptic Ulcer Diseases (Pud) Treatment. *International Journal of Engineering & Science Research* 4(6): 450-455.
- Arciniegas A, Perez-Castorena, AL, Antonio, N, Kita, Y and Romo de Vivar A (2016). Antihyperglycemic, antioxidant and anti-inflammatory activities of extracts and metabolites from *sida acuta* and *sida rhombifolia* quim nova vol (10) pp 1-6.
- Beverly CD and Sudarsanam G (2011). Ethnomedicinal plant knowledge and practice of people of Javadhu hills in Tamilnadu. *Asian Pacific Journal of Tropical Biomedicine* 1(1):79-81.
- Burkill HM (1995). The Useful Plants of West Tropical Africa. 2nd Edition, Volume 1, Families A–D. Royal Botanic Gardens, Kew, Richmond, United Kingdom. pp. 21-25.
- Chan KL and Leung, WK (2002). Peptic-ulcer disease *Lancet* 360: 933–41.
- Dashputre NL and Naikwade NS (2011). Evaluation of Anti-Ulcer Activity of Methanolic Extract of *Abutilon indicum* Linn Leaves in Experimental Rats. *International Journal of Pharmaceutical Sciences and Drug Research*; 3(2): 97-100.
- Dike IP, Obembe OO and Adebisi FE (2012). Ethnobotanical survey for potential anti-malarial plants in south Western Nigeria. *Journal of Ethnopharmacology*, 144(3): 618-26.
- Franco TG and Richter JE (1998). Proton pump inhibitors for gastric accelerated disease. *Cleave. Clin. J. Med.* 65: 27-34.
- Gulmez SE, Holm A, Frederiksen H, Jensen TG and Pedersen C (2007). Use of proton pump inhibitors and the risk of community-acquired pneumonia: A Population-Based Case-Control Study. *Arch. Intern. Med.* 167: 950-955.
- Gupta A, Surabhi M and Rajendra S (2015). Evaluation of antimicrobial activity of curcuma longa rhizome extract against *Staphylococcus aureus*. *Biotechnol Rep.* 73: 1-5.
- Hooi JKY, Lai, WY, Ng WK, Suen MMY, Underwood FE, Tanyingoh D, Malfertheiner P, Graham DY, Wong VWS and Wu JCY (2017). Global prevalence of *Helicobacter pylori* infection: Systematic review and meta-analysis. *Gastroenterology*, 153, 420–429.

- Iqbal Z, Sshehzad K, Nawaz S and Zahid M (2018). antimicrobial activity of essential oil of allium cepa world *Jourml of Pharmaceutical Research* 7(2): 575-580.
- Kuna L, Jakab J, Smolic R, Raguz-Lucic N, Vcev A and Smolic M (2019). Peptic Ulcer Disease: A Brief Review of Conventional Therapy and Herbal Treatment Options *J. Clin. Med.* 8: 179: 1-19.
- Lanas A and Chan, FKL (2017). Peptic ulcer disease. *Lancet*, 390: 613–624.
- Lanas A, García-Rodríguez LA, Polo-Tomás M, Ponce M, Quintero E, Perez-Aisa MA, Gisbert JP, Bujanda L, Castro M, Muñoz M et al. (2011). The changing face of hospitalisation due to gastrointestinal bleeding and perforation. *Aliment. Pharmacol. Ther.*, 33: 585–591.
- Malfertheiner P, Chan FKL. and McColl, KEL (2009). Peptic ulcer disease. *The Lancet*. 347: 1449-1461.
- National Bureau of Statistics (NBS). (2006) Population Census. Available at <http://www.nigerianstat.gov.ng>. Accessed 15 April 2020.
- Neelima N, Sudhakar M, Mrityunjaya B, Patil BVS and. Lakshmi (2012). Anti-ulcer Activity and HPTLC Analysis of *Mangifera indica* L. Leaves *Int. J. Pharm. Phytopharmacol. Res.* 1(4): 146-155.
- Nihar RK, Shreechandani P, Priyadarshini P and Sampad SS (2017). Herbal Drugs in Treatment of Peptic Ulcer, *J. Bio. Innov.* 6 (3): 499-508.
- Okewumi TA and oyeyemi AW (2012). Gastro-protective activity of aqueous Carica papaya seed extract on ethanol induced gastric ulcer in male rats. *African Journal of Biotechnology*, 11(34): 8612-8615.
- Onwurah N, Ifeanyi GE and Aruh AO (2013). Antiulcer Properties of Aqueous Extract of *Talinum triangulare* Leaves in Experimentally Induced Gastric Ulceration in Mice. *Asian J. Pharm. Biol. Res.*, 3(1): 4-7.
- Oyatayo KT, John BA, Ademola JS, Abuh OP and Ndabula C (2017). Farmers perception and local agricultural adaptation practices to climate change in Wukari town, Wukari LGA Yaraba state Nigeria *Journal of the General Studies Unit, Federal University Wukari.* p28
- Prabha P, Karpagam T, Varalakshmi B, Chandra S and Packiavathy A (2011). Indigenous anti-ulcer activity of *Musa sapientum* on peptic ulcer. *Phcog Res* 3: 232-8.
- Rao M, Ahmad BA, Khamsah SM and Thant Z (2016). Antiulcer Activity of *Musa paradisiaca* (banana) Tepal and Skin Extracts in Ulcer Induced Albino Mice. *Malaysian Journal of Analytical Sciences*, Vol 20 No 5: 1203 – 1216.
- Reilly JP (1999). Safety profile of the proton pump inhibitors *AM. J. Health. Syst. Pharm.* 56(23): S11-S17.
- Roberts S (2003). In: Burger's Medicinal Chemistry and Drug Discovery, 6th edn. Abraham DJ. editor. New Jersey: John Wiley. Pp.86-121.
- Roy SD, Chakraborty J, Shil D, Das S and Begum N (2013). Herbs used in peptic ulcer: A review. *Int. J. Pharm. Res. Allied Sci.* 2:9-23.
- Sarkar M, Hennessy S and Yang, YX (2008). Proton-pump inhibitor use and the risk for community-acquired pneumonia. *Ann. Intern. Med.* 149: 391-398.
- Sen S, Chakraborty R, De B and Mazumder J (2009). Plants and phytochemicals for peptic ulcer: An overview. *Pharmacogn. Rev.*; 3: 270.
- Sonnenberg A (2013). Historic changes of helicobacter pylori-associated diseases. *Aliment. Pharmacol. Ther.*, 38, 329–342.
- Subramanian S, Kumor DS, Aruisevan P, Senthilkumar GP and Rao M (2007). Evaluation of antiulcerogenic potential of *Aloe vera* leaf gel extract studied in experimental rats. *Journal of Pharmacology and Toxicology* 2(1):85-97.
- Wu Y and Fassihi R (2005). Stability of metronidazole, tetracycline HCl and famotidine alone and in combination. *Int. J. Pharm.* 290: 1-13.

THIS PAGE INTENTIONALLY LEFT BLANK