



## Seasonal Variation of Gastro - Duodenal Perforation in University of Benin Teaching Hospital (UBTH) - A 5 Years Study

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### Abstract

**Aim:** To highlight the pattern of seasonal variation of gastro-duodenal perforations in University of Benin Teaching Hospital and some associated aetiological factors.

**Patients and Methods:** Consecutive records of all patients diagnosed and operated from January 2013 to December 2017, were studied using a pro forma, the medical records, operative notes, Pathology and Surgery departmental records of the University of Benin Teaching Hospital, Benin City, Nigeria. Information of all cases of gastro-duodenal perforation, confirmed at laparotomy, were extracted from the pro forma and analyzed considering socio-demography, seasonal pattern, associated aetiological factors and intra - operative findings, using Microsoft Excel 2016. Ethical approval was obtained from the departmental ethical committee, University of Benin Teaching Hospital.

**Results:** There were 112 intra - operatively confirmed cases of gastro - duodenal perforations during the study period, (constituting 64.3% of all gastrointestinal perforations seen during the study period). Records of 108 patients (96.4%) were adequate for analysis. In 4 patients the records were inaccurately entered in the spread sheet and were excluded, from the study. Overall crude incidence of gastroduodenal perforations in UBTH was 21.6 cases per year during the study period. Age range was 18 years - 79 years. Mean age  $47 \pm 16$  years. Bimodal cluster age distribution, 3<sup>rd</sup> to 4<sup>th</sup> decade (37%) and 6<sup>th</sup> to 7<sup>th</sup> decade (44.4%), Male: Female ratio =2:1. Peasant farmers and Farm produce loaders/haulers (49%) were most common. Clergy (2.1%) was the least. Non - Steroidal Anti - Inflammatory Drugs was the commonest culprit. Ratio of duodenal to gastric perforations is 5:1. There were two peak periods of seasonal perforations: February to May (40%) - crop pre-planting/religious fasting season, and August to October (32%) - crop harvest and farm-produce loading/haulage period. July was the least period of perforation (4%).

**Conclusion:** The study reveals that duodenal perforations were five times more common than gastric perforations in Edo state (South - south region of Nigeria). Gastro - duodenal perforations were related to seasonal and geographic variations; being more common among peasant farmers, farm - produce loaders/haulers and the pre-planting/bush clearing seasons. This season when combined with the religious fasting periods accounted for 72% of perforations. Prognosis was related to time of presentation at hospital which was also directly related to seasons of economic strength (harvest period of farm produce) of the peasant farmer. To reduce incidence of gastro - duodenal perforations in Edo State - (South - south of Nigeria), it is the authors' opinion that there is a need to educate the Edo state populace (especially peasant farmers and farm-produce loaders/haulers), on the consequences of non-steroidal anti-inflammatory drugs abuse.

**Keywords:** Seasonal variation; Gastro-duodenal perforation; Fasting; Non-steroidal anti-inflammatory drugs

### Introduction

Gastro - duodenal Perforation is an important complication of peptic ulcer disease and a contemporary surgical challenge contributing significantly to morbidity and mortality of the disease

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[1-8]. It results in acute abdomen and requires prompt diagnosis and surgical intervention to improve outcome [3,9-14]. Use of non-steroidal anti-inflammatory drugs is an important aetiological factor [1-3]. It may occur in seasons [4,15-18]. There appears to be a pattern of seasonal variation with religious and/or geographical seasonal changes [19-24]. This research article intends to study the pattern of seasonal variation of gastro - duodenal perforation in University of Benin Teaching Hospital (UBTH) - the premier tertiary health establishment in the south - south region (tropical rainforest zone) of Nigeria. UBTH meets substantial surgical needs of this region and adjoining states. It is the authors' opinion that our report will therefore be a true reflection of the disease pattern in this region of Nigeria.

**Aim**

To highlight the pattern of seasonal variation of gastro-duodenal perforations in University of Benin Teaching Hospital and some associated aetiological factors.

**Patients and Methods**

Consecutive records of all patients diagnosed and operated from January 2013 to December 2017, were assessed using a pro forma, the medical records, operative notes, Pathology and Surgery departmental records. Information of all cases of gastro-duodenal perforation, confirmed at laparotomy, were entered into the pro forma and analyzed considering socio-demography, seasonal pattern, associated aetiological factors and intra-operative findings. All patients presented with features of peritonitis and were optimized, pre-operatively, with Intravenous fluids and broad spectrum antibiotics (cefuroxime and metronidazole) in therapeutic doses. All patients had simple closure reinforced with omental patch. Microsoft Excel 2016 was used for data analysis. Ethical approval was obtained from the departmental ethical committee, University of Benin Teaching Hospital (see attached approval).

**Results**

There were 112 prospective consecutive patients with intra-operatively confirmed gastro - duodenal perforations during the 5 - year study period. The records of 108 patients (96.4%) were adequate for analysis of the study. Crude incidence was 21.6 cases per year. Gastro-duodenal perforations constituted 64.3% of all gastrointestinal perforations seen during the study period. Age and Sex Distribution: Age range 18 to 79 years. Mean age 47 ± 16 years. Bimodal cluster age distribution 3<sup>rd</sup> to 4<sup>th</sup> decade (37%) and 6<sup>th</sup> to 7<sup>th</sup> decade (44.4%). Male preponderance in all age groups. Male to Female ratio is 2:1. Occupation: Peasant farmers (27.7%), Farm produce loaders/haulers (21.3%) were most common. Clergy (2.1%) was the least. Site of Perforation: Duodenal perforations were 5 times more common than gastric perforations. All perforations were benign acute perforations. Monthly Distribution of Gastrointestinal Perforations: Two peak periods of perforations: February to May (40%) and August to October (32%). July was the least (4%) period of perforation.

**Discussion**

Gastro - duodenal perforations constituted 64.3% of all gastrointestinal perforations seen during the study period. The crude incidence is 21.6 cases/year during the study period which is similar to earlier reports in Benin and Irrua [25,26]. Our crude incidence report is two and half times more than that reported by Mabogunje in Zaria [16]. Other studies reported lower incidence [12,27-30].

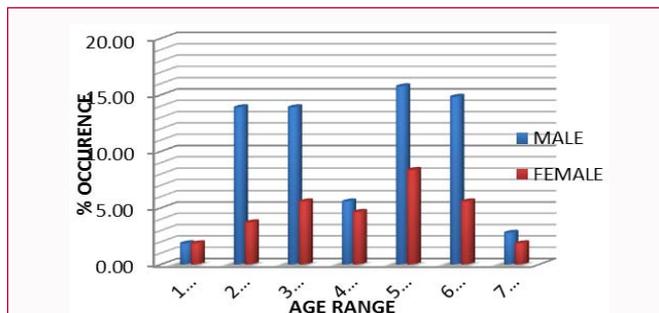


Figure 1: Age and Sex Distribution.

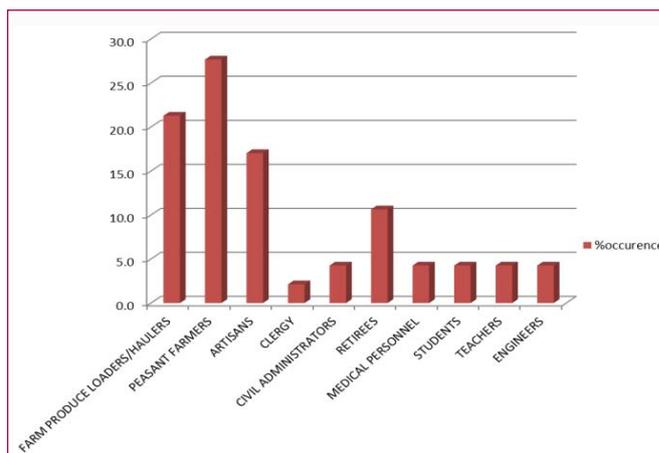


Figure 2: Occupation.

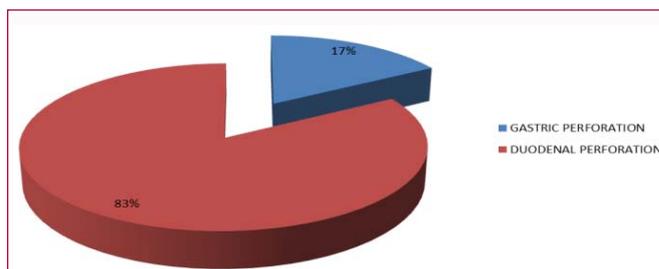


Figure 3: Site of Perforation.

This variation in crude incidence rates may be due to geographical differences in exposure to risk factors. Majority of patients in the study used over the counter non-steroidal anti-inflammatory drugs (e.g. diclofenac and ibuprofen) for joint/muscle aches sustained as a result of the manual farm work or produce haulage. Only six patients either occasionally drank alcohol or used tobacco in any form. The male gender was more commonly affected. Male to female ratio was 2:1. This finding was compatible to that reported by Hernandez-Diaz and Rodriguez [31]; however, it was lower than that reported by other researchers [12,16,25,27,32-36]. There was a clinical age distribution. A bimodal age distribution occurred with peaks between 21-40 years (37%) and between 51-70years (44.4%) (Figure 1). The younger age group was more involved in rigorous peasant manual labour, loading and haulage of farm products with associated body aches, while the older age group was more involved with religious fasting rites. However, both age groups' freely used/abused Non-Steroidal Anti- Inflammatory Drugs (NSAIDs) for associated body aches. Increased use of NSAIDs for arthritis amongst the older age group may also account for the high incidence in this age group

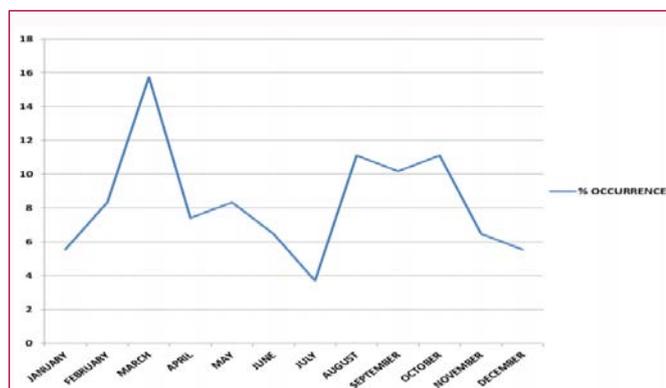


Figure 4: Monthly Distribution of Gastroduodenal Perforations.

[4,22,37-39]. Although there was no occupational group exempt, peasant farmers and farm-produce loaders/haulers accounted for 49% of cases (Figure 2). This is similar to reports from Ile-Ife and Irrua (Nigeria), both studies reported a high incidence of perforation amongst farmers [26,40]. Of clinical note is the low incidence of gastro - duodenal perforation amongst clergy (2.1%). The sedentary life style, work of the clergy may account for this. In our study, 5 out of every 6 perforations occurred in the duodenum (Figure 3). This predominance of duodenal perforations is similar to that reported by other researchers [16,30,32,33,36,40,41]. All perforations were acute perforations. Only 3 patients had antecedent history of peptic ulcer disease. Bimodal peak periods were observed in this study; February to May (40%) and August to October (32%). The month of March had the highest perforations (16%) and July had the least (4%) (Figure 4). This is at variance with reports by Mabogunje in Zaria and Vovor in Senegal. They reported peaks in August to December, and December to January respectively [16,17]. In our study, February-May coincides with the pre-planting (bush clearing) and planting season in our environment. This is the period of increased manual labour amongst peasant farmers. It appears to be the period of increased risk of abuse of NSAIDs for body pains from manual labour, as most patients allude to this. The incidence of perforations was lowest during the peri-harvest period of July. The month of July coincides with the peri - harvest period and the period of minimal manual work done in the farms. August - October period in our study, coincides with the harvest season in our environment. This is also a period of increased peasant manual labour, loading/hauling of farm produce. Moreover, in the elderly peasant farmer, the cold, humid rainy season (August-October) worsens arthritic pains with the attendant effect for more NSAIDs consumption hence the increased perforation during these periods of seasonal change [22]. It is the authors' opinion that the low perforation rates observed between November and December, which is also a period of rest from farm work and abundant food after the harvest, is probably salutary for peasant farmers. The study also revealed a high incidence of perforations during the religious fasting periods that generally occur between February and May annually. This high incidence of perforation during periods of religious fasting is similar to reports by other researchers [19-21,26,42]. In our environment, majority of the populace (farmers and farm-produce loaders/haulers) are Christians. This seasonal religious rite coincides with the high pre-planting and planting seasonal perforation incidence observed in the study - Peasant farmers consuming NSAIDs on an empty stomach. 63% of all perforations occurred during the raining season (farming period) when compared to the dry season. More use of NSAIDs during this farming period, may be contributory [22,23].

Early presentation ( $\leq 48$  hr) by patients with peritonitis was more common in the harvest period than in the bush clearing and planting season because farmers were economically more buoyant in the former season than in the latter season and thus could afford hospital bills. Lower mortality/morbidity was also directly related to early presentation to the hospital and harvest seasons in the study because the patients were more economically buoyant during this period.

## Conclusion

The study reveals that duodenal perforations were five times more common than gastric perforations in Edo state (South - south region of Nigeria). Gastro-duodenal perforations were related to seasonal and geographic variations; being more common among manual peasant farmers and farm-produce loaders/haulers, pre-planting/bush clearing seasons and during religious fasting periods. Prognosis was related to time of presentation at hospital which was also directly related to seasons of economic strength of the peasant farmer (harvest period). To reduce incidence of gastro-duodenal perforations in Edo State - (South-south of Nigeria), it is the authors' opinion that there is a need to educate the Edo state populace (especially farmers and farm - produce loaders/hauling youths, elderly) on the consequences of NSAID either for body aches secondary to manual work, arthritis or during religious fasting rites.

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