Prevalence of Peptic Ulcer Disease in Bo, Sierra Leone

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ABSTRACT

Background: Peptic Ulcer Disease (PUD), ulcer of the gastrointestinal tract in the region of the stomach. This is an important cause of morbidity and mortality throughout the world affecting the lives of millions of people in their everyday lives. However, sufficient and up-to-date data regarding the disease in Sierra Leone are largely lacking. **Objectives:** The aim of this study was to measure the prevalence of PUD among patients in Bo, Sierra Leone. **Materials and Methods:** The study was a retrospective study in which quantitative methods were used to collect data from a total of 3,754 outpatients ages 15 and older at Bo Government Hospital were tested for peptic ulcer disease between October 2020 and October 2021. Peptic ulcer disease (PUD) was clinically described as a disruption of the continuity of the gastrointestinal mucosal lining which appears as sores of at least 0.5cm in diameter. Data collected were analysed using Statistical Analysis System, version 9.4. **Results:** The overall prevalence of PUD was 32% (1,202/3,754). Of this, PUD prevalence was 58% (692/1,202) among females and 42% (510/1,202) among males. PUD prevalence was higher (42%) in patients 31 – 45 years old and lower (9.8%) in older patients (> 50 years). higher (42%) in patients 31 – 45 years old and lower (9.8%) in older patients (> 50 years). There is no previous published study of PUD in Sierra Leone. **Conclusion:** The results indicate a rise in burden from PUD in Bo city, Southern Sierra Leone and call for intervention to mitigate the situation.

Keywords: Bo Government Hospital, *Helicobacter pylori*, Non-Steroidal Anti-inflammatory Drugs, Peptic ulcer disease

INTRODUCTION

Peptic ulcer disease (PUD), clinically described as a disruption of the continuity of the gastrointestinal mucosal lining which appears as sores of at least 0.5cm in diameter, is one of the commonest ailments of the alimentary system, and affects about 4 million of the world's population annually, with incidence of complications in approximately 10-20% [1]. Peptic ulcer disease (PUD) is predominantly caused by the activities of *Helicobacter Pylori* and/or Non-Steroidal Anti-inflammatory Drugs (NSAIDs). The disease is transmitted largely by the oral–oral or fecal–oral routes, as a result of poor environmental sanitation, crowding, and fecal contamination of water source used for irrigation of vegetables in farms or domestic use [2], contaminated sourcing water from well and borehole [3,4],

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and smoking cigarettes[5,6].

In developing countries, 70% – 90% of the population harbor *H. pylori* which is mostly acquired during childhood, while in the developed countries, the prevalence is lower ranging from 30% to 40% [7]. In Asia, prevalence rates of 92% have been reported in Bangladesh [8] and 62% prevalence was found in Chinese.[9] Within the African continent, the West African region reports the following prevalence rates of *H. pylori*. For example, recently reported rates for patients were 75.4% in Ghana[10], 97% in Gambia[11], while studies from Nigeria by [12] in Kano reported a prevalence of 81%, Malu et al.[13] in Jos found a prevalence of 87%, while Aboderin et al. [14] reported 73% in South-West.

However, extensive literature search showed no available data on PUD from Bo district and Sierra Leone. Thus, the aim of this study was to measure the prevalence of PUD among patients in Bo, Sierra Leone.

MATERIALS AND METHODS

Study Design

A retrospective study was carried out to determine the prevalence of peptic ulcer disease among patients attending Bo Government Hospital (BGH). Quantitative methods will be used to collect data from the patients and later described, compared and analyze different variables.

Study Area

The study area was Bo Government Hospital, in Bo city, southern Sierra Leone. Bo, the second largest city in Sierra Leone, is located in the southern part of the country. The city is host to the Bo Government Hospital (BGH), the only public hospital, and it provides free health services along with access to some advanced diagnostics and therapies at a reasonable cost. The BGH is the preferred provider for medical care of residents from across the city, including those in the downtown area near the hospital as well as those at the outskirts of the city[15,16].

Study Population

All 3,754 patients referred to the BGH clinical laboratory for any of these types of tests during the study period were invited to be tested for PUD. The cost of the PUD test was free

Eligibility Criteria

All BGH outpatients (ages 15 and older) who lived within the Bo district and sought testing for selected conditions at the BGH laboratory during a 2-year period from October 2020 through October 2021 were eligible for inclusion in this study. Recruiting was not limited to patients who had been referred specifically for suspected PUD infection, but included any patients referred for biochemistry tests (such as a urinalysis test) or for testing for malaria, typhoid, or tuberculosis.

Study Procedure

Stool sample collection: Each patient received a clean, dry, grease free stool container without any preservatives and instructed to put stool sample for *H. pylori* testing.

Laboratory analysis for H. pylori stool antigen test: The test was based on the principle of immunochromatography in vitro for qualitative determination of *H. pylori* antigens in stool (Bio tracers TM). The test used *H. pylori* specific monoclonal antibodies coated on the membrane of the test device. The cap of the sample extraction tube was opened by unscrewing the cap. Using the sample collection stick attached to the cap, a fresh stool sample (about 50mg), approximately the size of a peanut was collected from at least four different sites of the specimen.

For liquid or watery stool specimen, 100µl (approximately two drops) of the sample was taken using a plastic disposable pipette. The sample collection stick was then inserted into the sample extraction tube containing Phosphate buffer and the tube was tightly closed to secure it. The tube was then swirled and shaken well to dissolve the stool sample. It was mixed homogenously with the

phosphate buffer in the sample extraction tube.
The testing device (cassette) was then taken out of the foil pouch and placed on a clean and flat surface, preferably on a bench. Then the dispenser cap of the sample tube was twisted off and by holding the tube vertically, five (5) drops of the mixture of the stool sample and buffer were dispensed into the sample well of the cassette test device. The results were read after 15 minutes.

Test Outcome Measures: A red line appeared in the test area, indicated positive tests, and a line in the control zone only, indicated negative tests.
Participants who tested positive for PUD during this study were notified of their results by their clinical care providers during a scheduled follow-up visit to BGH. Those who tested positive were referred by their clinical care providers for follow-up testing and treatment according to BGH protocols.

Ethical Consideration

The goals and requirements of the study were explained verbally to ensure comprehension; all participants marked their consent on paper consent forms. Care was taken to assure the confidentiality of all survey responses and test results. The study protocol was approved by the research ethics committee of Njala University.

Statistical Analysis

These data were entered into a database and statistically analyzed with statistical analysis system (SAS Institute version 9.4), with Analysis of Variance (ANOVA) and Student-Newman-Keuls (SNK) test for post hoc means separation, to compare prevalence rates by sex and age group.

RESULTS

A total of 3,754 patients sought testing at BGH during the 2- years study. The overall prevalence of PUD seropositivity in the study population was 32% (1,202/3,754) (Table 1). Of this, the overall prevalence for the females in the study (ages 15–50+) was 58% (692/1,202); and for males, the overall prevalence was 42% (510/1,202). The prevalence rate differ significantly by sex (P = 0.0001) (Table 1).

Table 1: Sex distribution of PUD prevalence among patients attending at the Bo Government Hospital

Sex	Positive*	Negative	Total	*P-value*
Male	510 (42%) b	1027	1,537	
Female	692 (58%) a	1525	2,217	*0.001*
Total	1,202	2,552	3,754	

** Figures in the same column with the same letters are not significant at P < 0.05*

The prevalence by 5-year age group ranged from about 9.68% to 22.06%; and there was statistically significant trend by age, with PUD prevalence being higher (42%) in patients 31 – 45 years old and lower (9.8%) in older patients (> 50 years) (Table 2).

Table 2: Age distribution of PUD prevalence among patients attending at the Bo Government Hospital

Age	Number		Total	Percentage (%)*	*P-value*
	Male	Female			
15 - 20	49	76	125	10.40 f	
21 - 25	67	94	161	13.39 d	
26 - 30	77	102	179	14.89 c	
31 - 35	112	139	251	20.88 a	*0.0001*
36 - 45	96	126	222	18.47 b	
46 - 50	59	78	137	11.40 e	
50+	50	77	127	10.57 f	
Total	510	692	1,202	100	

**Figures in the same column with the same letters are not significant different at P < 0.05*

DISCUSSION

Based on the results of this study, the prevalence of PUD amongst patients who were attending the BGH was 32%. This prevalence in urban Bo city, Sierra Leone, is considerably higher than the 2.7% recorded among adult population in Sierra Leone by Fombah *et al.*[17] The figures in our study may actually be an underestimate and the magnitude of the problem may not be apparent because the study was conducted only in one area, thereby excluding high number of patients from the study. However, the result seems lower than that reported in other parts of sub-Saharan Africa, including the 81.7% [18], 73% [19], 43.5% [20], 52.27% [21], 92.2% [22], and 72% [23] in Cameroon. However, the rate in our study was also higher than those reported in other African countries. Studies in South Africa recorded 54.5% [24], and Kenya [25], reported rate of 66%. These differences might be due to

differences in the rate of risk factors for perforated peptic ulcer disease from one country to another.

Peptic ulcer disease were found to be most common in the fourth decade of life and tended to affect more females (58%) than males (42%). The higher PUD prevalence in females observed in the population may be unconnected with increased female association with modifiable risk factors of PUD. Females are found to be more associated with modifiable risk factors of starvation, stress, and depression than their male counterparts, as reported by Eniojukan et al.[26] and Zibima et al. [27]. Though the proportion of females associated with the use of NSAIDS, alcohol and smoking were less than males, the difference in magnitude was minimal and therefore, could play a role in increasing their risk for PUD. Similarly, a study from Cameroon Agbor et al.[20] and Nigeria[23] reported a higher *H. pylori* prevalence in females than in males. In contrast, studies from Bella et al. [18, 24,28], and Woodward et al.[29], reported higher prevalence of PUD among males than females.

The incidence of PUD seems to decrease with advancing age: the occurrences of *H. pylori* infection among the various age groups was high, at forty-two per cent (42%) in the age bracket between 31 - 45 years, but it was lower at 9.68% in the age group at least 50 years old and above. This might be due to fact that, *H. pylori* is acquired during young age as normal flora and treated. At present, Prodone (a combination of Pantoprazole Sodium + Domperidone SR Capsules), Rabeprazole Sodium Tablets and Omeprazole Capsules are the peptic ulcer disease medicine routinely available in Sierra Leone. Only the primary care facilities, the referral hospitals, have the ability to conduct PUD diagnostic test. This observation is in keeping with the reports of other studies that reported the decreasing prevalence with increasing age [30,31]. In contrast, other studies reported increasing of PUD prevalence with increasing age [32,33,34,35].

CONCLUSION

The results indicate a rise in burden from PUD in Bo city, Southern Sierra Leone and call for intervention to mitigate the situation.

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Author Contributions

AJS and EMZ conceptualised, designed and contributed to the implementation of the project. Both authors were also involved in the writing and revision of the manuscript. The authors read, approved the final manuscript and agreed to be accountable for all aspects of the work.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon reasonable request.

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Conflict of Interests

None declared.

Ethical approval

The study was approved by the Institutional Ethics Committee.

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