ORIGINAL ARTICLE

Prevalence of Peptic Ulcer Disease and Dietary Pattern among Students of a Private University in Nigeria

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ABSTRACT

Background: Despite advancements in the medical management of Peptic Ulcer Disease (PUD), its prevalence persists as a significant health concern, especially in Western Sub-Saharan Africa.

Aims: This study aimed to ascertain the prevalence of PUD among university students and to investigate the dietary habits of affected individuals.

Methods: A descriptive cross-sectional study was conducted, involving 340 students recruited from five faculties at a private university in Ibadan, Nigeria. Data pertaining to socio-demographics, PUD history, identified triggers, and dietary habits were collected using a structured questionnaire. Statistical analysis was performed using SPSS (Version 26), employing descriptive statistics to summarize findings and Spearman's correlation to assess associations between variables.

Results: The observed prevalence of PUD among the 340 university students was 12.4%. Among those with PUD, a substantial majority were female (87.8%), with 43.9% being in their fourth year of study. Approximately half (51.2%) of the respondents reported experiencing PUD crises 1–3 days per week. More than half were currently on medication, and 12.2% had received prior treatment. Key identified triggers included starvation (90.2%), stress (80.5%), and specific food items (85.4%). Regarding dietary habits, 63.4% occasionally consumed hot spicy foods, 68.3% drank carbonated beverages, 39.0% consumed fatty foods 2–3 times per week, and 29.3% consumed energy drinks. Notably, sex, family history, starvation, and stress demonstrated a significant negative correlation with the frequency of crises ($p < 0.05$).

Conclusion: In conclusion, this study elucidates the prevalence of PUD within the university student population and underscores the critical role of lifestyle factors in both the management and prevention of PUD crises within the academic community.

Keywords: Peptic Ulcer Disease; University Students; Triggers; Lifestyle; Dietary Habits.

1 INTRODUCTION

Peptic Ulcer Disease (PUD) is a prevalent gastrointestinal condition characterized by erosions in the stomach or duodenal lining (Eniojukan *et al.*, 2017; Lanas & Chan, 2017). The primary etiologies of PUD include acid erosion and *Helicobacter pylori* infection, with additional contributing factors such as consumption of spicy foods, use of non-steroidal anti-inflammatory drugs (NSAIDs), smoking, and alcohol intake (Dunlap & Patterson, 2019; Lanas & Chan, 2017). Globally, PUD affects approximately 10% of the global population (Hooi *et al.*, 2017), with a notably higher prevalence in sub-Saharan Africa (Archampong *et al.*, 2016). Despite advances in medical treatment, PUD remains a chronic condition, with a global incidence rate of 44.26 per 100,000 population, Western Sub-Saharan Africa exhibits a higher incidence of 62.88 per 100,000 population and a mortality rate of 6.69 per 100,000 population (Zhang *et al.*, 2023).

Dietary habits significantly influence the development and management of PUD (Zhang *et al.*, 2023). Specifically, irregular meal timings, particularly deviations exceeding two hours, have been associated with a thirteen-fold increased risk of developing gastritis and *H. pylori* infection compared with adherence to regular meal patterns (Lim *et al.*, 2013). Among university students, poor dietary habits are prevalent, including the frequent skipping of meals, especially breakfast, and a high consumption of energy-dense foods (Ikujenlola & Adekoya, 2020; Ogundele *et al.*, 2023). These dietary patterns have been associated with an increased risk of metabolic diseases and adverse mental health outcomes (Lee *et al.*, 2019; Pengpid & Peltzer, 2020).

The clinical presentation of PUD varies considerably. Some individuals experience minimal indigestion or mild abdominal discomfort post-meals, while others may remain entirely asymptomatic. Common symptoms typically include epigastric pain, nausea, vomiting, appetite loss, weight reduction, and fatigue. Asymptomatic cases of PUD frequently go undiagnosed, potentially leading to severe complications such as gastrointestinal hemorrhage. Within the student population, these symptoms can markedly impair class attendance, disrupt study schedules, and negatively impact overall academic performance.

Despite the well-established impacts of PUD, there remains a paucity of data concerning its prevalence and the associated dietary patterns among university students. This study aims to address this knowledge gap by determining the prevalence of PUD within this demographic and systematically examining the dietary habits of those afflicted with the condition. A thorough understanding of these factors is crucial for development of targeted interventions designed to enhance the health and academic outcomes of affected students.

2 MATERIAL AND METHODS

2.1 Study Design and Population

This descriptive cross-sectional study employed a quantitative research methodology to investigate the prevalence of Peptic Ulcer Disease (PUD) and dietary habits among undergraduate students of Lead City University (LCU), a private institution located in Nigeria.

2.2 Sampling and Data Collection

Sampling procedure

The study population was drawn from the student body of LCU. The sample size was determined using the Cochran formula, based on a reported prevalence rate of 28.0% for PUD among university students in South-South Nigeria (Eniojukan *et al.*, 2017). This calculation yielded a target sample size of 340, incorporating a 10% attrition rate. A multi-stage random sampling technique was employed: initially, five out of ten faculties at LCU were selected via simple random sampling. Subsequently, two departments were randomly selected from each of the selected faculties, and participants were then randomly recruited from within these departments.

A total of 340 students were initially approached for participation. Of these, 41 respondents, who self-reported a prior diagnosis of PUD, completed the subsequent detailed phase of the study.

Data collection

Data were systematically collected through a structured questionnaire designed to elicit information concerning participants' socio-demographic characteristics, PUD history, identified PUD triggers, and prevailing dietary habits.

Socio-demographic characteristics: Information on participants' socio-demographic characteristics, including age, sex, religious affiliation, and academic level, was gathered via the questionnaire.

PUD history: Participants were queried regarding the frequency of PUD crises, current and past medication use for PUD, and any family history of the condition.

Triggers of PUD: Respondents were presented with a predefined list of commonly recognized triggers associated with PUD symptomatology. These included periods of starvation, psychological stress, NSAIDs use, smoking, alcohol consumption, and certain specific food items.

Dietary habits: Drawing upon a comprehensive review of extant literature, food items commonly implicated in triggering PUD symptoms were identified. These identifications informed the development of specific questionnaire items designed to assess respondents' consumption pattern of the aforementioned foods. The assessed dietary items encompassed, but were not limited to, caffeine, alcohol, spicy foods, chewing gum, fatty foods, milk, carbonated beverages, energy drinks, and probiotic-rich foods.

Data acquisition proceeded in two distinct phases:

- *First phase:* The self-reported prevalence of PUD was assessed. Participants were directly asked about any prior diagnosis of PUD and their responses were subsequently validated through a structured inquiry regarding specific PUD-related symptoms. This phase involved the participation of all 340 respondents.

- *Second phase:* Only participants who confirmed a previous PUD diagnosis during the initial screening were invited to proceed. These 41 eligible respondents then completed additional, more detailed sections of the structured questionnaire pertaining to their condition. Participants who provided a negative response to the initial prevalence question were consequently excluded from this subsequent phase.

2.3 Statistical Analysis

All collected data were subjected to statistical analysis using the Statistical Package for the Social Sciences (SPSS) version 26. Descriptive statistics, comprising frequency and percentage distributions, means, and standard deviations,

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were employed to summarize the demographic and key study variables. Spearman's rank-order correlation was utilized to ascertain associations between continuous and ordinal variables. All statistical tests were conducted as two-tailed, with a *p*-value of < 0.05 predefined as indicative of statistical significance. Data Where applicable, results are presented as correlation coefficients with their corresponding 95% confidence intervals (CI).

Ethical approval for this study was formally secured from the Lead City University Research and Ethics Committee under approval number LCU-REC/24/071.

3   RESULTS

3.1 Prevalence of PUD and Sociodemographic Characteristics of Respondents

Among the 340 students assessed in this study, 12.4% reported a prior diagnosis of PUD. Within the subgroup of diagnosed individuals (n=41), the demographic profile indicated that the majority (82.9%) were aged 25 years or younger. Females constituted the predominant proportion (87.8%), and most respondents identified as Christians (78.0%). Furthermore, a substantial number of these students were enrolled in their third (26.8%) or fourth (43.9%) year of undergraduate study.

Table 1 provides a comprehensive summary of the sociodemographic characteristics of the study respondents' and the overall prevalence of PUD.

Table 1. Prevalence of PUD and sociodemographic characteristics of students with PUD

Variable	Frequency	Percentage
Do you have peptic ulcer?		
Yes	41	12.4
No	298	87.6
Age		
≤ 25	34	82.9
> 25	7	17.1
Sex		
Female	36	87.8
male	5	12.2
Religion		
Christianity	32	78
Islam	9	22
Level of study		
100 level	3	7.3
200 level	8	19.5
300 level	11	26.8
400 level	18	43.9
500 level	1	2.4

3.2 PUD History of Respondents

Regarding the reported PUD history among the respondents (n=41), approximately one-third reported experiencing PUD crises infrequently (seldomly each week), while half (51.2%) experienced crises occurrences on 1–3 days per week (Table 2). More than half of these respondents were currently receiving medication for PUD. A smaller proportion (12.2%) had a history of previous PUD treatment. Notably, a considerable majority (63.4%) reported that close family members had also been diagnosed with PUD.

Table 2 presents a summary of the PUD history of respondents.

Table 2. Medical history of respondents with PUD

Variable	Frequency	Percentage
How often do you have crises in a week?		
Seldomly	14	34.1
1–3 days	21	51.2
4–6 days	5	12.2
daily	1	2.4
Currently on drugs?		
No	18	43.9
Yes	23	56.1
Undergone treatment for peptic ulcer		
No	5	12.2
Yes	36	87.8
Family History of Peptic Ulcers		
No	14	34.1
Yes	26	63.4

3.3 Triggers of PUD Among Respondents

The respondents identified several factors as triggers for their PUD symptoms. The most frequently reported triggers included starvation (90.2%), psychological stress (80.5%), and certain specific food items (85.4%). Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) were cited as a trigger by 22.0% of respondents. Conversely, a large proportion of respondents indicated that smoking (90.2%), alcohol consumption (70.7%), and specific foods (14.6%) did not induce their PUD symptoms.

Table 3 presents a summary of the triggers of PUD among respondents.

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Table 3. Triggers of PUD among respondents

Variable	Frequency	Percentage
Starvation		
No	4	9.8
Yes	37	90.2
Stress		
No	8	19.5
Yes	33	80.5
Non-steroidal anti-inflammatory drugs (NSAIDs)		
No	32	78
Yes	9	22
Smoking		
No	37	90.2
Yes	4	9.8
Alcohol		
No	29	70.7
Yes	12	29.3
Certain foods		
No	6	14.6
Yes	33	85.4

3.4 Dietary Habits of Respondents with PUD

An examination of the dietary habits among respondents with PUD (n=41) revealed varied consumption patterns, as reported in Table 4. More than half (63.4%) reported occasional consumption of hot spicy foods, and 51.2% indicated they sometimes chewed gum. Fatty foods were consumed 2–3 times weekly by 39.0% of the participants. Regular milk consumption was reported by 65.9% of respondents, while 36.6% consumed probiotics 2–3 times per week. Carbonated beverages were consumed by a significant proportion of respondents (68.3%). In contrast, only 29.3% consumed energy drinks, with a minority (7.3%) reporting intake 2–3 times weekly.

Table 4. Dietary habits of respondents with PUD

Triggers	Frequency	Percentage
How often do you consume caffeine?		
Daily	6	15
2–3 times a week	9	22.5
4–6 times a week	2	5
Once a week	23	57.5
Do you consume alcohol		
No	28	70
Yes	12	30
Not at all	11	26.8
Sometimes	21	51.2
Usually	4	9.8
Always	5	12.2

Table 4. (Continued)

Triggers	Frequency	Percentage
How often do you consume fatty foods?		
Daily	6	15
2–3 times a week	9	22.5
4–6 times a week	2	5
Once a week	23	57.5
Do you consume milk?		
No	7	17.1
Yes	27	68.8
Sometimes	7	17.1
How often do you consume probiotics (e.g., yoghurt, cheese)?		
Daily	2	4.9
2–3 times a week	15	36.6
4–6 times a week	3	7.3
Once a week	21	51.2
Do you consume carbonated drinks?		
No	13	31.7
Yes	28	68.3
How often do you consume carbonated drinks in a week?		
Daily	3	7.3
2–3 times a week	10	24.4
4–6 times a week	2	4.9
Once a week	15	36.6
Do you consume energy drinks?		
No	29	70.7
Yes	12	29.3
How often do you consume energy drinks?		
Daily	1	2.4
2–3 times a week	3	7.3
4–6 times a week	2	4.9
Once a week	11	26.8

3.5 Correlations of Factors Associated with the Frequency of Crises

Spearman's rank-order correlation analysis identified significant associations between the reported frequency of PUD crises and several investigated factors (Figure 1). Both sex (p = 0.026) and religious affiliation (p = 0.045) demonstrated a significant correlation with crisis frequency. Furthermore, a family history of PUD (p = 0.011) was significantly associated with a higher frequency of crises. Regarding dietary and lifestyle factors, caffeine consumption (p = 0.038), as well as starvation (p = 0.007) and stress (p = 0.007), exhibited significant correlations with the frequency of PUD crises.
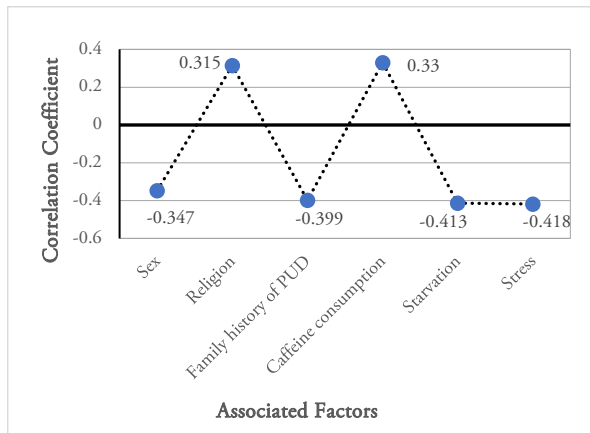
Figure 1. Correlations of factors associated with the frequency of crises

4   DISCUSSION

The findings of the present investigation illuminate a noteworthy prevalence of PUD among university students, with identifiable sociodemographic patterns and specific dietary habits exerting an influence on the manifestation and progression of this condition. A comprehensive understanding of these factors is crucial for developing targeted interventions that aim to manage and prevent PUD within this specific population.

The observed prevalence rate of 12.4% recorded in this study surpasses those reported in some previous studies (Anaemene & Ochogu, 2022) and exceeds the global prevalence rate of 8.4% (Salari *et al.*, 2022). However, this rate falls below the prevalence documented among staff and students at another Nigerian university (Eniojukan *et al.*, 2017) and among students in Ethiopia (Bayana *et al.*, 2021). These variations underscore the diverse epidemiological landscape of PUD, likely influenced by regional and population-specific factors.

A significant proportion of students reported experiencing PUD crises with considerable weekly frequency and were either currently undergoing pharmacotherapy or had a history of treatment for PUD treatment for PUD. This observation aligns consistently with previous studies that indicated a high incidence of prevalent PUD symptoms among students, frequently necessitating medications to alleviate ulcer pain (Anaemene & Ochogu, 2022; Bayana *et al.*, 2021; Eniojukan *et al.*, 2017). Additionally, a substantial number of respondents disclosed a family history with PUD, which corroborates existing literature suggesting a genetic or familial predisposition to the condition (Dunlap & Patterson, 2019; Siddique, 2014).

Beyond *Helicobacter pylori* infection, peptic ulcers are known to be associated with a multiplicity of risk factors, encompassing socioeconomic, environmental, and psychological determinants (Yim *et al.*, 2021). Previous studies have established associations between PUD and factors such as diet, irregularity of meal intake, breakfast skipping, smoking, alcohol, certain medications (including NSAIDs), and emotional stressors (Anaemene & Ochogu, 2022; Eniojukan *et al.*, 2017; Fashner & Gitu, 2015; Lanas & Chan, 2017; Wang *et al.*, 2011). In the current study, starvation, psychological stress, NSAIDs, and specific food items were identified as key triggers for PUD among the surveyed students. Conversely, respondents reported that smoking and alcohol did not act as triggers for their PUD symptoms. This particular finding, while contrasting with general understanding, resonates with some studies that challenge the universal significance of these factors as primary contributors to PUD exacerbation (Kawamura *et al.*, 2013). Nonetheless, it is widely acknowledged that smoking, through its potential to stimulate gastric acid production and impede ulcer healing (Søreide *et al.*, 2015), is generally considered a relevant factor.

The dietary assessment further revealed that a majority of respondents occasionally consumed hot spicy foods, which have been associated with PUD exacerbation (Eniojukan *et al.*, 2017). A significant proportion also consumed fatty foods, carbonated beverages, and energy drinks, all of which are generally contraindicated for individuals with PUD (Eniojukan *et al.*, 2017). The consumption of milk was also prevalent among respondents. The impact of milk on PUD remains contentious, as it has been noted to potentially induce gastric acid production, thereby exacerbating pain in some individuals (Anaemene & Ochogu, 2022; Eniojukan *et al.*, 2017).

Spearman's rank-order correlation analysis revealed significant associations between the frequency of crises and several demographic and lifestyle variables. Sex was demonstrated to be significantly correlated with crisis frequency (p = 0.026), indicating potential distinctions in the pattern of crisis occurrence between males and female students. This observation aligns with existing research that has identified significant associations between PUD prevalence and sex differences (Kavitt *et al.*, 2019; Marques *et al.*, 2011). Females have been suggested to be more susceptible to PUD (Eniojukan *et al.*, 2017) potentially due to a heightened association with stress and starvation compared to their male counterparts, although some studies disagree (Bello *et al.*, 2018). Religious affiliation also demonstrated a significant correlation (p = 0.045), suggesting that certain religious practices or beliefs may influence the frequency of crises. This could be attributable to the high proportion of Christian respondents, as religious fasting, a common practice

in Christianity, has been reported as a contraindicated risk factor for PUD (Dongo *et al.*, 2017).

Consistent with previous research (Wang *et al.,* 2011), a family history of PUD was significantly associated with the frequency of crises (p = 0.011), highlighting a potential genetic or familial predisposition to the condition. Additionally, lifestyle factors such as caffeine consumption (p = 0.038) and starvation (p = 0.007) exhibited significant correlations with crisis frequency, unequivocally indicating the crucial role of dietary habits in the exacerbation of PUD symptoms. Starvation is a frequently reported risk factor among student population, which not only aggravates the condition (Ezilkkavia *et al.,* 2024) but also reflects a broader issue of normalized food insecurity and hunger among students, often referred to as the "starving student" phenomenon (Crutchfield *et al.,* 2020; Maynard *et al.,* 2018). This has severe health implications that could adversely affect academic performance. Students may experience period of starvation due to demanding academic schedules, reduced appetite, financial constraints affecting food access, or limited availability of meals at convenient times.

Psychological stress, corroborating findings from numerous other studies (Lee *et al.*, 2017; Wang *et al.*, 2011; Yim *et al.*, 2021), emerged as another significant correlating factor (p = 0.007), underscoring the substantial impact of psychological and emotional well-being on the frequency of PUD crises. University education is commonly associated with high levels of stress, with full-time students frequently adhering to rigorous academic schedule from morning until late evening, followed by extensive periods dedicated to assignments and personal study. Such sustained periods of intellectual and emotional exertion can elevate stress levels and negatively affect the gastrointestinal system (Konturek *et al.*, 2011). Therefore, it is imperative to equip university students with effective strategies for managing stress in its multifaceted manifestations.

4   CONCLUSIONS

Despite the inherent limitations of this study, especially the reliance on self-reported PUD diagnoses among participants—a methodology that carries the potential for underreporting in asymptomatic individuals who may opt not to participate—the findings underscore the critical importance of considering both sociodemographic and lifestyle factors in the effective management and prevention of PUD crises, especially within the university student population.

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