A Prospective Cohort Study on Metamorphosis of Peptic Ulcer Dynamics:

Insights into High Risk Paramedical Students Transformed Knowledge, Lifestyle and Symptoms Pattern

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A B S T R A C T

Background: This study explores the epidemiology of Peptic Ulcer Disease (PUD) among resident students in Komarapalayam, India, with the aim of increasing awareness, identifying influential lifestyle factors, and assessing intervention effectiveness.

Methods: A comprehensive nine-month prospective cohort study involving 404 paramedical students aged 17-28 was rigorously conducted. Data collection included a meticulously validated questionnaire, high-risk subgroup identification, and the implementation of educational interventions. Statistical analyses maintained a significance threshold at $p \leq 0.05$.

Results: The study findings revealed a striking contrast. While the actual incidence of Peptic Ulcer Disease was lower than anticipated, the prevalence of prodromal symptoms was surprisingly high. This underscores the critical need for early symptom identification. Tailored educational interventions exhibited great promise in improving PUD comprehension. Lifestyle choices played a substantial role in susceptibility, with hostellers experiencing the highest PUD prevalence at 10.3%—the efficacy of symptom-based assessments extended beyond healthcare domains.

Conclusion: This investigation underscores the urgency of early symptom recognition, personalized education, and proactive health-oriented choices to mitigate the onset of Peptic Ulcer Disease. It highlights the merit of symptom-based assessments and emphasizes the essential role of health education within tertiary institutions. This research catalyzes future initiatives aimed at enhancing the well-being of students in the context of Peptic Ulcer Disease.

Keywords: Early symptoms, Peptic Ulcer Disease, Incidence, Educational interventions

Introduction

Peptic ulcer disease (PUD) results from the erosion of the gastrointestinal (GI) mucosa (1). PUD emerges when the protective mechanisms of the gastrointestinal mucosa, like mucus secretion and bicarbonate production, are overwhelmed by the corrosive impact of gastric acid and pepsin (2). Significant contributors include Helicobacter pylori infection, aspirin, NSAIDs, alcohol, smoking, stress, and irregular eating patterns 3. Symptoms typically include mild indigestion, upper abdominal burning, or hunger pain, often relieved by food or antacids. Complications may entail gastro-duodenal bleeding, perforation, and significant morbidity (2, 3).

Ulcer sufferers often experience mild indigestion or post-meal discomfort, sometimes even without symptoms. Others may report upper abdominal burning or hunger pains, typically relieved by food or antacids (4). Peptic ulcer disease can lead to severe complications such as bleeding and perforation, as well as frequent illness, absenteeism, and academic struggles among students, particularly those with dietary limitations (5).

In India, PUD is prevalent, affecting 4% to 10% with duodenal ulcers and 0.03% to 0.05% with gastric ulcers. Concurrent ulcers affect 10% to 20% of gastric ulcer patients. The one-year prevalence of active ulcers is 1.8%, with lifetime rates between 1% and 14% for men and 8% to 11% for women (6). In South India, 44% have monthly heartburn, 14% use indigestion medication regularly, and 50% to 65% with GERD symptoms have esophagitis upon endoscopy (7).

Peptic ulcer disease profoundly impacts the quality of life and academic performance, especially among students who often grapple with undiagnosed or poorly managed conditions. Despite extensive research on student's nutritional status and various life factors, there is limited information available on the prevalence and challenges of PUD among students (8). PUD detrimentally affects the quality of life and achievements, frequently remaining undiagnosed or inadequately treated, leading to severe complications. The proliferation of Helicobacter pylori is closely associated with inadequate sanitation and crowded living conditions, highlighting the urgent need for further research and targeted health interventions among vulnerable populations (4-6).

Therefore, this study endeavors to explore the prevalence of Peptic Ulcer Disease (PUD) among residential students, with a specific focus on hostellers, day scholars, and paying guests. Additionally, we seek to assess their awareness and comprehension of PUD, identify lifestyle factors potentially influencing its development, and introduce educational interventions designed to mitigate its risk. This inquiry aims to offer valuable insights for crafting future health initiatives and educational approaches tailored to the unique requirements of residential students.

Materials and Methods

The investigation, spanning nine months, focused on discerning the prevalence of Peptic Ulcer Disease among a cohort of paramedical students in Komarapalayam, Namakkal District, Tamil Nadu, India. Employing the TARO YAMANE sample size calculator, an optimal sample size of 392 individuals was determined. However, data were collected from 404 participants to enhance robustness.

The inclusivity criteria were carefully designed to include students aged 17 to 28 of both sexes who provided informed consent. We excluded pregnant individuals, those lacking interest, and those with pre-existing medical conditions. Our data acquisition involved random selection across classes and the use of a self-validated questionnaire covering demographic details, knowledge appraisal, prevalence inquiries, and lifestyle factors. Participants were segregated based on symptomatology, with high-risk individuals receiving tailored guidance on lifestyle modifications and dietary suitability.

Our subsequent assessment was proactive, aiming to discern shifts within the high-risk cohort over four months and evaluate the emergence of supplementary risks. We also evaluated alterations in knowledge retention, lifestyle practices, and dietary behaviors among high-risk individuals, ensuring a comprehensive understanding of the situation.

Data analysis utilized Graph Pad Prism, employing statistical methodologies including the Wilcoxon matched-pairs test for intra-group comparisons and the Brown-Forsythe and Welch ANOVA tests for inter-group distinctions, with a significance threshold of $p \leq 0.05$.

Results

Socio-demographic characteristics of the students: The study investigated the social demographics of students, including gender,

age, and residential status, to discern their impact on susceptibility to PUD.

Gender-wise analysis revealed that out of 404 students surveyed initially, 213 were male (52.7%), and 191 were female (47.3%). Subsequent analysis identified 60 out of 213 male students (47.2%) and 67 out of 191 female students (52.8%) for follow-up, indicating a higher likelihood of PUD among female students. Age-wise distribution highlighted varying susceptibilities across different age groups. Students aged 17 to 19, particularly those residing as paying guests, exhibited higher susceptibility to PUD compared to other age groups. Residential status significantly influenced susceptibility, with only 14 out of 116-day scholars identified as being at risk of PUD, while 67 out of 148 paying guests were identified, emphasizing the disparate risk levels among different residential groups.

Prevalence of PUD among Pre-interventional Grouped Students: Among 404 pre-interventional grouped students, 10.3% were afflicted with Peptic Ulcer Disease (PUD), emphasizing its significance within the study cohort. Notably, hostel residents exhibited a higher incidence of PUD (4.4%) compared to students in other residential settings.

Pre- and Post-Intervention Knowledge Assessment on PUD among High-Risk Student Populations: In the study, a meticulous assessment of knowledge about PUD among a targeted group of 127 high-risk students was conducted, selected based on the frequency of signs and symptoms occurrences. Utilizing validated questionnaires, Table 1 presents the outcomes of assessments before and after an intervention, aiming to gauge the effectiveness of educational strategies. Employing the Wilcoxon matched-pairs signed-rank test, a statistically significant improvement in knowledge levels among all groups - Hostellers, Day Scholars, and Paying Guests (p < 0.05) was observed.

Impact of Lifestyle Factors on Peptic Ulcer Disease Susceptibility among High-Risk Student Populations: A comprehensive lifestyle assessment was conducted among the hosteller, day scholar, and paying guest students, encompassing dietary habits, meal frequency, and other lifestyle factors. Significant changes were observed post-intervention, particularly in the 'occasionally' category, across all groups. This category signifies behaviors or habits not consistently practiced but done from time to time. Among hostellers, where 127 students were assessed, dietary and lifestyle modifications significantly influenced susceptibility to PUD (p = 0.0004). Similarly, among day scholars (n = 14) and paying guests (n = 67), significant changes in the 'occasionally' category were noted post-intervention (p = 0.036 and p = 0.0004, respectively).

Influential Factors in Managing Regular Meals for Students among the Gathered Residents: Skipping meals among students is a significant risk factor for Peptic Ulcer Disease (PUD) due to increased stomach acid production. Table 2 indicates that among Hostellers, the number of students reporting "lack of time" as a reason for skipping meals significantly decreased from four students initially to one student after the intervention (p = 0.0313). For Day Scholars, there was a slight decrease in the number of students not eating properly, from six to four students. Among Paying Guests, the "lack of time" factor showed a significant change, with the number of students reporting this issue increasing from 24 to 36 after the intervention (p = 0.0156).

Occurrences of Signs and Symptoms among the Derived group of students: Monitoring signs and symptoms such as abdominal pain, bloating, and changes in eating habits is essential for early detection and targeted intervention of Peptic Ulcer Disease (PUD) in students. Table 3 shows significant changes in symptoms among different student groups: "Nausea and Vomiting" improved across all groups, "Heartburn" and "Abdominal Pain" decreased notably for Hostellers and Paying Guests, and "Loss of Appetite" showed a significant decline, particularly among Paying Guests. "Bloating" and "Irritation While Consuming Food" improved universally, while "Bad Breath" reduced for Hostellers and Paying Guests but not for Day Scholars. The statistical analysis confirmed significant symptom improvement for Hostellers and Paying Guests, while Day Scholars showed non-significant changes. The comparison between groups using ANOVA indicated significant differences, highlighting the varying effects of the intervention across the student populations.

Self-Care Strategies and Non-Medical Interventions for Symptom Alleviation among Students: Figure 2 shows the adoption of home remedies by 127 students before and after a four-month follow-up. Initially, only a small number of students used these remedies.

However, after receiving guidance, their use increased significantly. This suggests that the provided guidelines effectively promoted the use of home remedies, enhancing students' self-care practices for managing peptic ulcer symptoms.

Discussion

The prevalence rate of PUD in the present study is 10.3%, surpassing the rates reported in previous studies, such as 5.70% (9), 6.25% (10), and 7.9% (18) among students, respectively. This could be attributed to the low diagnostic rate, as opined (11). This variance may stem from disparities in diagnostic rates and the global reduction in PUD prevalence due to improved medical therapies. Notably, hostel-residing students exhibit a prevalence rate of 4.4%, contrasting with other residential students. The higher prevalence of H. pylori-related PUD among female students, observed in other developing countries, has been ascribed to poor hygiene practices and crowded living conditions. This underscores the necessity for further investigation into the actual rate of PUD among university students to facilitate targeted interventions (19).

A significant portion of students displayed signs suggestive of PUD, particularly exacerbated during the academic term. This aligns with findings from a study that noted that 41.3% of students at Jimma University (1), Ethiopia, experienced symptoms suggestive of PUD, predominantly emerging post-enrollment (13). Similarly, another study reported a slightly lower prevalence of dyspeptic symptoms (37.5%) among university staff (14). Dyspeptic symptoms are characteristic of PUD, as corroborated by over 83% of patients with gastric ulcers in a study conducted in Iran (20). Accurate diagnosis is imperative, given the overlapping signs among various gastrointestinal ailments (12).

Consequently, many students turned to self-medication without undergoing confirmatory diagnosis. Approximately 46.4% of students regularly resort to antacids for gastritis-related discomfort. Similarly, a study observed that a majority of respondents, comprising both university staff and students, relied on over-the-counter medications without undergoing proper diagnostic procedures (15).

Inadequate dietary practices, stemming from constraints related to meal timing and availability, lecture schedules, and dietary sensitivities, potentially contribute to the observed prevalence of underweight individuals in this study. Such factors, compounded by demanding academic schedules, may precipitate starvation and exacerbate morbidity in PUD cases (16). Prior research underscores the pervasive impact of time constraints on dietary habits, with studies reporting instances of complete starvation among PUD-afflicted students due to congested academic timetables. For instance, a study reported 100% starvation among students with PUD, attributing it to a lack of time to eat due to congested academic schedules (17). Beverages such as coffee and soft drinks, known to elevate gastric acid production, pose additional challenges by inducing mucosal irritation, gastric distension, and dyspepsia (3). Conversely, the use of antacids or antiulcer medications to mitigate gastric acidity may disrupt optimal food digestion, potentially leading to deficiencies in vital nutrients such as folic acid and Vitamin B12 (5). Embracing a healthy lifestyle characterized by the regular consumption of nutritious diets and upholding robust living standards holds promise in significantly alleviating symptoms among PUD-afflicted students, potentially leading to an 80% reduction in symptomatology (12).

Conclusion

Peptic Ulcer Disease poses a significant health concern for students, impacting both their well-being and academic performance. The study identifies a paradox: while PUD prevalence appears low, symptom frequency is high, highlighting the need for early symptom recognition and awareness campaigns. Tailored education initiatives for high-risk students have proven effective, showcasing the potential of personalized healthcare education. Residential factors, particularly among Paying Guest students, contribute to higher susceptibility. Lifestyle choices, notably diet and meal frequency, significantly influence PUD risk. Early detection remains crucial, emphasizing the value of symptom-based assessments. The study findings underscore the importance of healthcare student awareness and advocate for tailored interventions, early recognition, and knowledge empowerment to enhance student well-being regarding Peptic Ulcer Disease.

Ethical Considerations

Ethical approval for this study was granted by the Institutional Ethics Committee for Research on Human Subjects (ECRHS) at JKKMMRF's Annai JKK Sampoorani Ammal College of Pharmacy, B. Komarapalayam, Namakkal (DT), Reference number: EC/PHARM.D/2022-05.

Tables

Table 1. Knowledge Assessment

[N = 127] No. of students having Good knowledge about PUD	Hosteller		Day Scholar		Paying Guest	
	Initial	Derived	Initial	Derived	Initial	Derived
1. What do you think causes peptic ulcers?	15	35	8	13	28	46
	D = 20		**D = 5**		**D = 18**	
2. Person with a peptic ulcer should eat?	33	42	10	12	21	39
	D = 9		**D = 2**		**D = 18**	
3. Frequent milk should be encouraged.	17	23	5	9	37	52
	D = 6		**D = 4**		**D = 15**	
4. Person with peptic ulcer should rest after eating?	18	38	9	13	30	43
	D = 20		**D = 4**		**D = 13**	
5. Caffeinated drinks should be avoided?	32	39	8	11	42	49
	D = 7		**D = 3**		**D = 7**	
6. Carbonated drinks should be encouraged?	10	38	9	12	45	56
	D = 28		**D = 3**		**D = 11**	
7. Do grainy foods such as corn, groundnut, and cashews affect ulcers?	13	29	2	7	26	47
	D = 16		**D = 5**		**D = 21**	
Statistical Analysis Wilcoxon matched sign rank test [Two Tailed]	P value = 0.015625 P < 0.05 Significant [*]		P value = 0.015625 P < 0.05 Significant [*]		P value = 0.015625 P < 0.05 Significant [*]	

Table 2. The factors influencing student's meal skipping behaviors are outlined

[n = 127]	Hosteller		Day Scholar		Paying Guest	
	Initial	Derived	Initial	Derived	Initial	Derived
Lack of time	4	1	1	0	24	36
Diet	2	0	6	4	9	5
Loss of appetite	3	4	4	5	12	5
laziness to get or cook food	16	15	0	4	19	12
Economic crisis	2	1	0	0	2	1
Reduced food choices	19	12	3	1	1	4

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Nil	0	13	0	0	0	4
Statistical Analysis Wilcoxon matched sign rank test [Two Tailed]	P value = 0.0313 P < 0.05 Significant [*]		P value = 0.1250 P > 0.05 Non-Significant		P value = 0.0156 P < 0.05 Significant [*]	

Table 3. Sign and symptoms distribution among Residents at Higher risk students.

| [n = 127]	Hosteller		Day Scholar		Paying Guest	
	Initial	Derived	Initial	Derived	Initial	Derived
1. Nausea and vomiting	28	7	12	4	39	26
	D = -21		**D = -8**		**D = -13**	
2. Heartburn	36	24	6	4	50	16
	D = -12		**D = -2**		**D = -34**	
3. Bloating	21	19	9	8	38	24
	D = -2		**D = -1**		**D = -14**	
4. Loss of appetite	40	36	11	7	38	49
	D = -4		**D = -4**		**D = 11**	
5. Abdominal pain	35	16	10	4	35	13
	D = -19		**D = -6**		**D = -22**	
6. Burping often	24	8	1	2	45	17
	D = -16		**D = 1**		**D = -28**	
7. Irritation while consuming food	28	14	7	5	36	25
	D = -14		**D = -2**		**D = -11**	
8. Bad breath	17	8	3	4	42	26
	D = -9		**D = 1**		**D = -16**	
Statistical Analysis Wilcoxon matched sign rank test **[**Two Tailed]	P value = 0.0078 P < 0.05 Significant [**]		P value = 0.0546 P > 0.05 Non-Significant		P value = 0.0234 P < 0.05 Significant [*]	
Statistical Analysis Comparing the difference of the three groups	**BROWN FORSYTHE AND WELCH'S ANOVA TEST** P value = 0.0051 P value < 0.05 Significant [**]					
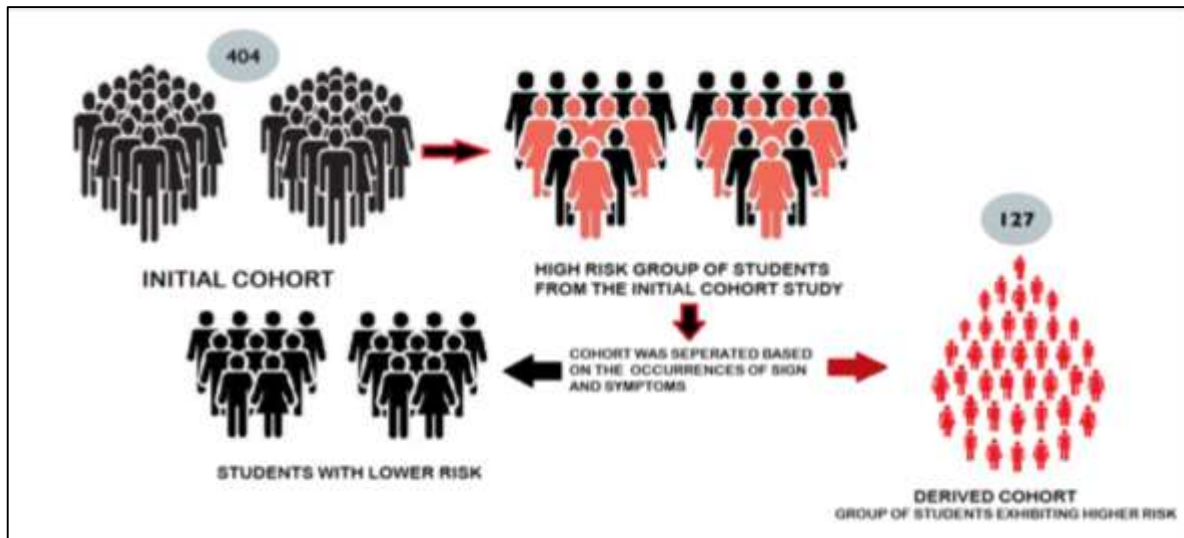
Figure 2. Study Plan and Cohort Separation
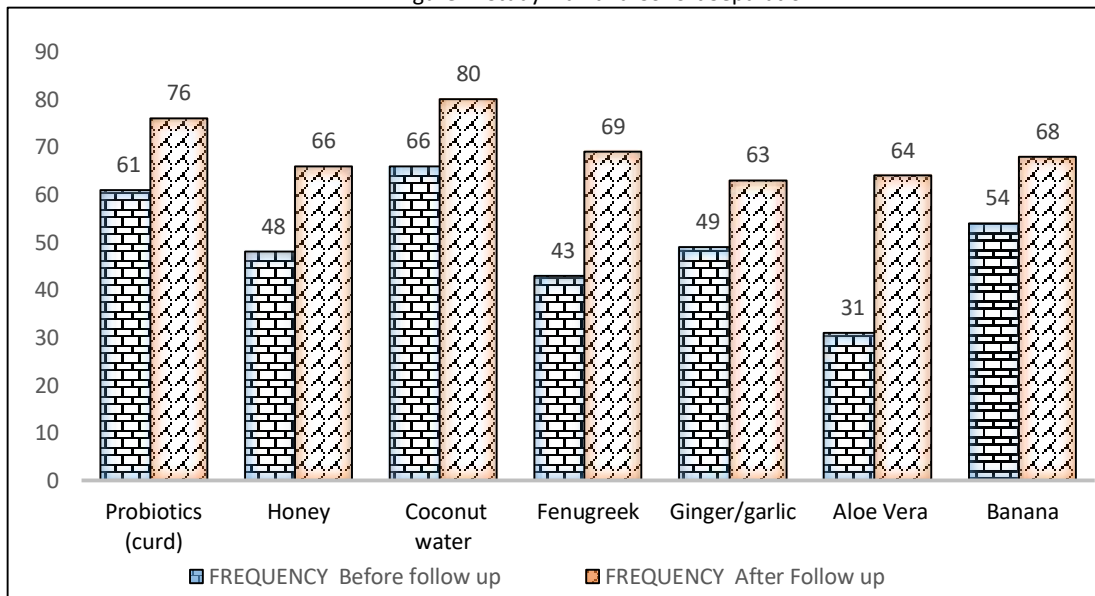
Figure 1. Non Pharmacological / Home remedies followed by the students

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