A Cohort Study on Lifestyle Impact in Peptic Ulcer Dynamics among Paramedical Students

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Abstract:

Background: This study investigates the impact of lifestyle factors on the epidemiology of Peptic Ulcer Disease (PUD) among paramedical students residing in Komarapalayam, India. The aim is to enhance awareness of lifestyle-related risks, identify influential behaviours, and evaluate the effectiveness of lifestyle-focused interventions in reducing susceptibility to PUD. **Methods:** A nine-month prospective cohort study was conducted with 404 paramedical students aged 17-28 years. A validated lifestyle assessment questionnaire was used to identify high-risk behaviours, including dietary habits, stress levels, sleep patterns, physical activity, and substance use (e.g., smoking or alcohol consumption). Tailored educational sessions focused on promoting health-conscious lifestyle modifications. Statistical analyses with a significance threshold of $p \leq 0.05$ evaluated the correlation between lifestyle factors and PUD symptoms. **Results:** Lifestyle choices emerged as pivotal in influencing PUD prevalence and symptomatology: Skipping meals, high consumption of spicy or processed foods, and irregular eating patterns significantly increased the risk of PUD symptoms. Chronic stress and limited coping mechanisms correlated with higher symptom frequency. Inadequate sleep or inconsistent sleep patterns were strongly associated with prodromal symptoms. Sedentary lifestyles were linked to a higher prevalence of PUD symptoms, with active students reporting fewer gastrointestinal complaints. Students who engaged in smoking or alcohol consumption had a disproportionately higher risk of PUD. Hostellers reported the highest prevalence of PUD at 10.3%, attributed to communal eating habits, irregular schedules, and increased stress levels. **Conclusion:** This study emphasizes the critical role of lifestyle in the dynamics of Peptic Ulcer Disease among students. Early intervention through personalized education and the promotion of health-conscious choices, particularly regarding diet, stress management, and sleep, can significantly mitigate the risk of PUD. These findings advocate for incorporating lifestyle-focused health education programs in tertiary institutions to improve student well-being and reduce disease susceptibility. This lifestyle-centric approach provides actionable insights for enhancing preventive healthcare strategies targeting PUD in young adults.

Key words: Preventive healthcare, dietary habits, Paramedical students, Lifestyle factors

Introduction

Peptic Ulcer Disease (PUD) is a common and debilitating gastrointestinal disorder (2) that arises due to the disruption of the protective mucosal barrier in the stomach or duodenum, resulting in the erosion of the underlying tissues (1). This pathophysiological imbalance occurs when the aggressive factors—such as gastric acid and pepsin—outweigh the body's natural defence mechanisms, including mucus production and bicarbonate secretion (5). A multitude of lifestyle-related factors, including poor dietary habits, psychological stress, erratic sleep patterns, sedentary behaviour, and the consumption of harmful substances, are significant contributors to the pathogenesis and exacerbation of PUD (6). In particular, students are often subjected to high-stress environments, irregular eating schedules, and unhealthy eating choices, making them particularly vulnerable to gastrointestinal ailments like PUD.(8)

In the Indian context (7), the prevalence of PUD is alarmingly high, with duodenal ulcers affecting approximately 4% to 10% of the population, and gastric ulcers affecting a much smaller proportion (4). It is increasingly evident that lifestyle factors are central to the development and progression of this disease (18). Factors such as irregular eating habits, the consumption of highly processed or spicy foods, the reliance on caffeinated beverages, smoking, alcohol use, and chronic stress are rampant among students, particularly those residing in hostels or crowded student accommodations(3). Furthermore, the lack of physical activity, erratic sleep patterns, and irregular meal timings significantly exacerbate the risk of PUD. (1, 9, 10)

PUD's effects on students' health and academic performance are profound. (14) The disease not only leads to chronic gastrointestinal discomfort but also negatively impacts cognitive function, concentration, and overall academic achievement. Students, especially those with busy schedules, often overlook the early warning signs of PUD or fail to seek timely medical intervention, exacerbating the severity of the condition (18). Inadequate diagnosis and treatment are also compounded by a general lack of awareness regarding the relationship between lifestyle factors and gastrointestinal health (13). Moreover, the prevalence of Helicobacter pylori, a primary etiological agent in PUD, is notably higher in environments characterized by poor sanitation and overcrowded living conditions—both of which are commonly found in student hostels. (19,20)

This study intends to rigorously investigate the association between lifestyle choices and the prevalence of Peptic Ulcer Disease among residential students (7). Specifically, it will focus

on hostellers, day scholars, and paying guests, evaluating how factors such as diet, stress levels, sleep hygiene, physical activity, and substance use contribute to the onset and progression of PUD (3,4). Additionally, this study aims to assess the level of awareness among students regarding the relationship between their lifestyle habits and PUD risk, and to evaluate the impact of targeted educational interventions on improving lifestyle behaviours (9). By examining these factors, this research will offer critical insights into the role of lifestyle modification in the prevention and management of PUD, ultimately informing the development of tailored health promotion strategies that can alleviate the burden of gastrointestinal disorders in the student population.

Furthermore, this study will underscore the urgency of incorporating lifestyle-focused health education into academic curricula and student wellness programs. It will aim to bridge the gap between medical knowledge and practical lifestyle changes, encouraging students to make informed decisions about their health and adopt preventive measures. The findings will contribute to a deeper understanding of how subtle but impactful lifestyle choices can alter the trajectory of gastrointestinal health and lead to better outcomes for students grappling with the challenges of PUD. Through a comprehensive analysis of lifestyle patterns, this research aims to foster a shift towards healthier, more sustainable habits among the student demographic, thereby mitigating the risks associated with PUD and enhancing overall well-being.

Materials and Methods

The nine-month study aimed to examine the prevalence of Peptic Ulcer Disease (PUD) among paramedical students in Komarapalayam, Tamil Nadu, with a focus on lifestyle factors. A sample size of 404 participants, aged 17-28, was selected using random sampling and a self-validated questionnaire covering demographics, knowledge, and lifestyle habits such as diet, stress, physical activity, and substance use. Participants were divided into high-risk and low-risk groups, with high-risk individuals receiving tailored interventions focused on dietary adjustments, stress management, and increased physical activity.

The study tracked lifestyle changes over four months, assessing improvements in dietary behaviours, stress levels, and overall health habits. Data were analysed using Graph Pad Prism, applying statistical tests to identify significant changes in lifestyle practices, with a threshold of $p \leq 0.05$ to ensure robust findings. This research aims to highlight the impact of lifestyle modifications on PUD risk and provide insights for targeted health interventions.

Results and Discussion

The gender-wise distribution, detailed in Table 1, highlights notable differences between male and female students in both the initial and derived cohorts. Among the initial cohort of 404 participants, males constituted 52.7%, whereas females accounted for 47.3%. In the derived cohort of 127 high-risk students, females showed a slightly higher prevalence (52.8%) than males (47.2%). This finding is consistent with research indicating that female students may be more susceptible to lifestyle-related stressors such as irregular eating habits, sleep deprivation, and academic pressure, all of which are significant risk factors for PUD.

Gender	Total	
	Initial [N= 404]	Derived [n= 127]
Male	213 (52.7%)	60 (47.2%)
Female	191 (47.3%)	67 (52.8%)

Table 1: Gender-wise distribution

Age-wise analysis, as presented in Table 2, demonstrates that younger students, particularly those aged 17–19, were the most affected group. In the derived cohort, 61.4% of high-risk students belonged to this age range, compared to 46.5% in the initial cohort. Students aged 20–22 followed, while those aged 23–25 and 26–28 showed comparatively lower prevalence rates.

Age Wise Distribution		Hosteller		Day Scholar		Paying Guest		Total	
		Before	After	Before	After	Before	After	Before	After
AGE IN YEARS	17 – 19	56	32	53	8	29	34	138	78
	20 – 22	67	12	52	4	69	25	188	37
	23 – 25	11	2	10	2	40	8	61	12
	26 – 28	6	0	1	0	10	0	17	0
Total number of students based on their residence		140	46	116	14	148	67	404	127

Table 2: Age-Wise Analysis

The predominance of younger students, particularly paying guests, suggests that age-specific stressors such as adapting to new academic environments, inadequate meal patterns, and high workloads contribute significantly to PUD. These findings align with previous studies that emphasize the vulnerability of younger individuals to stress-induced gastrointestinal disorders.

As shown in Table 3, the residential status of students had a profound impact on PUD prevalence. In the derived cohort, paying guests exhibited the highest prevalence (52.8%), followed by hostellers (36.2%). Day scholars accounted for only 11.0%, reflecting a relatively lower risk. This pattern highlights the role of living conditions in influencing lifestyle choices, including diet quality, meal timings, and stress levels.

Table 3: Residential status of students

Accommodation	Hosteller	Day Scholar	Paying Guest	Total
Initial Cohort	140	116	148	404
Derived Cohort	46	14	67	127

The higher prevalence among paying guests can be attributed to factors such as limited control over meal preparation, irregular eating schedules, and suboptimal living conditions. Hostellers also face similar challenges but to a lesser extent, whereas day scholars, having access to home-cooked meals and more stable routines, experience lower risks.

Accommodation Related Lifestyle factors – "HOSTELERS"

In our assessment of Hosteler student lifestyle, we employed a validated questionnaire encompassing ten facets, including dietary habits and meal frequency. Responses were categorized as 'often, 'occasionally,' and 'never.' Our cohort consisted of 127 students from the baseline study, followed by a subsequent evaluation.

For the ***'often'*** category, we utilized the Wilcoxon matched signed rank test to compare pre and post-responses, yielding a non-significant p-value of ***0.2089***. In contrast, the ***'occasionally'*** category demonstrated significant changes. Employing the same analysis, we obtained a highly significant p-value of ***0.0004***, indicated by **[***]**. The ***'never'*** category exhibited no substantial changes, with a p-value of ***0.0761***.

To delve deeper, we calculated the differences between pre-and post-values within each category. These differences were subjected to robust scrutiny using the Brown-Forsythe and Welch ANOVA tests, revealing a significant p-value of 0.0036, marked by [**].

These statistical choices were motivated by the need to account for variance heterogeneity and data distribution. The results underscore that specific dietary and lifestyle changes, notably within the ***'occasionally'*** category, significantly influence susceptibility to PUD among hosteller students.

Accommodation Related Lifestyle factors – "DAY SCHOLARS"

In our comprehensive exploration of day scholar student's lifestyle factors, we administered an extensive questionnaire consisting of ten pivotal questions, encompassing aspects like daily meal frequency. Responses were categorized into 'often,' 'occasionally,' and 'never.' Among our substantial cohort of 404 students, we meticulously evaluated 14 day scholar students.

Additionally, it is essential to clarify that the 14-day scholar students were meticulously assessed based on their high risk of developing peptic ulcers. The baseline data were obtained from this high-risk group, and the follow-up study was exclusively conducted among these 14

students. Categorizing them by their high-risk status allowed for a more focused and meaningful assessment of lifestyle changes and their potential impact.

To gauge the significance of lifestyle changes within each category (‘often,’ ‘occasionally,’ ‘never’), we conducted rigorous statistical analyses.

The ***‘often’*** category yielded a non-significant p-value of ***0.6562*** for the comparison of before-and-after data, using the Wilcoxon Signed Rank Two-Tailed Test. In contrast, the ***‘occasionally’*** category exhibited notable changes. Employing the same Wilcoxon Signed Rank Two-Tailed Test, we obtained a significant p-value of ***0.036***, which denotes **[*]** of significance. However, the ***‘never’*** category showed no statistical significance, with a p-value of ***0.0527***.

To further scrutinize the differences among the three groups (‘often,’ ‘occasionally,’ ‘never’), we calculated the disparities between before-and-after values within each category. For this analysis, we selected ***the Brown-Forsythe and Welch ANOVA test***, which revealed a significant p-value of ***0.0169***, denoting [*] of significance.

Notably, the ***‘occasionally’*** category emerged as the most significant contributor to the results among day scholar students, emphasizing the importance of these lifestyle changes in influencing susceptibility to PUD.

Accommodation Related Lifestyle factors – “PAYING GUEST”

In our investigation of paying guest students, we conducted a comprehensive analysis of lifestyle determinants potentially affecting their susceptibility to PUD. From our initial pool of 404 students, we carefully identified a subset of 67 individuals characterized by an elevated predisposition to PUD.

This selected cohort underwent pre- and post-assessments, with responses stratified into three distinct categories: ‘often,’ ‘occasionally,’ and ‘never,’ pertaining to a spectrum of lifestyle-related inquiries.

The table shows that, within the ***‘often’*** category, we observed no statistically significant alterations **(p = 0.666).** In contrast, the ***‘occasionally’*** category exhibited noteworthy and statistically significant shifts (**p = 0.0004**, denoted by [*]), while the **‘never’** category displayed no substantive variations ***(p = 0.1513)*** following analogous statistical evaluation.

To delve deeper into these disparities among the tripartite categories (‘often,’ ‘occasionally,’ ‘never’), we meticulously computed the inter-group discrepancies in responses. This entailed the application of the ***Brown-Forsythe and Welch ANOVA test***, yielding a noteworthy p-value of ***0.013***, signifying two stars of significance, denoted by [**].

In summation, our discerning exploration highlights the potential ramifications of lifestyle modifications, particularly within the ‘occasionally’ responding cohort of paying guest students, concerning their susceptibility to PUD. This illuminating revelation bears profound implications for prospective health interventions and education strategies.

In alignment with the findings of ***Anaemene and Ochogu (2022***) study, examination of 297 participants revealed that approximately 68.2% exhibited behaviours such as breakfast skipping, cigarette smoking and alcohol consumption. Additionally, 59.1% adhered to fasting periods, with a notable 63.2% consistently practicing mastication before swallowing. Remarkably, our research showcases substantial enhancements in the lifestyles of these students when comparing pre and post-intervention analyses.

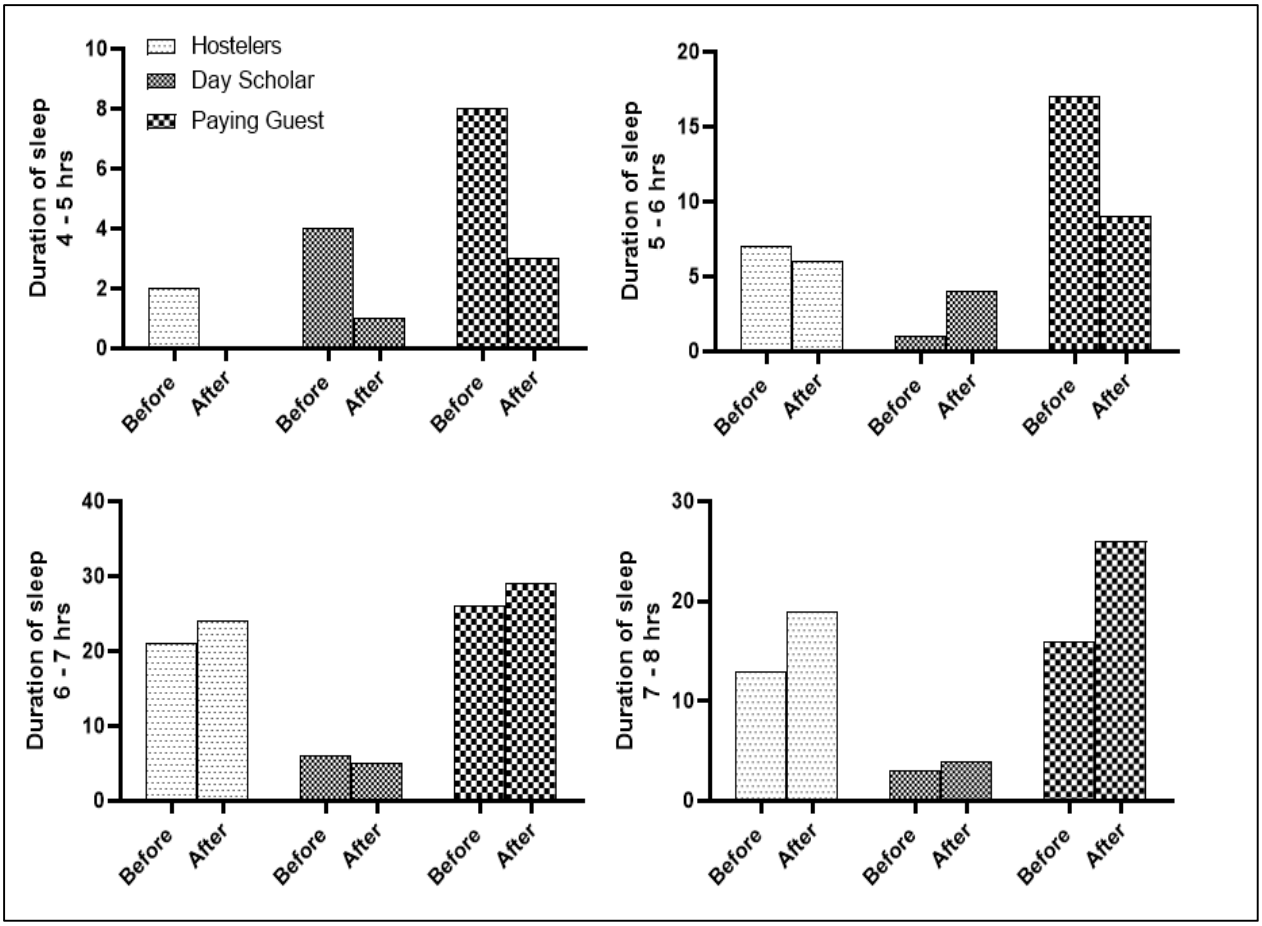
Exploring the Impact of Sleeping Pattern and Meal Habits of Derived group of students from the initial cohort study.

In this study, we delve into the intricate web of student’s daily routines, meticulously exploring three pivotal aspects: the typical duration of sleep during the night, the preferred sleeping postures, and the underlying reasons behind meal skipping. These elements collectively form the core of our investigation, as they bear a profound connection to the overarching hypothesis of our study.

To undertake this comprehensive assessment, we have partitioned students into three distinct categories: Hostellers, Day Scholars, and Paying Guests. Within each category, we meticulously examine the patterns of sleep, postures adopted during rest, and the motives driving meal skipping.

In total, our study encompasses 127 students, meticulously selected from a larger pool of 404 individuals identified as high-risk candidates for peptic ulcer disease. These three facets, woven into the fabric of our study, not only align with our research hypotheses but also offer valuable insights into the intricate tapestry of students’ daily lives.

Fig 1: Typical Duration of Sleep during the Night among students



Influential Factors in managing Regular Meals for students among the grouped residencies

Skipping meals among students may unknowingly contribute to the development of PUD, as irregular eating patterns can increase stomach acid production and stress, weaken the immune system, and delay gastric emptying. Adequate meals play a crucial role in maintaining digestive health.

In our study, we meticulously evaluated the factors influencing the behavior of 127 students, all of whom were identified as being at a higher risk. To assess these factors, we conducted surveys both before and after implementing our intervention, which involved raising awareness and providing guidance.

In Table 4, Factors were assessed among three groups: Hosteller (46 students), Day Scholar (14 students), and Paying Guest (67 students). The results revealed significant changes in behavior among the different groups. Here's a concise summary of the key findings:

→ Among **Hosteller's,** the most significant change was observed in the **"lack of time"** factor, with only one student reporting this issue after our intervention, compared to four before.

→ For **Day Scholars**, there was no significant change in most factors, except for **"diet,"** where the number of students not eating properly decreased from six to four.

→ Among **Paying Guests,** the **"lack of time"** factor showed significant improvement, with 24 students reporting this issue before and 36 after our intervention.

The statistical analysis, using the Wilcoxon matched signed rank test, confirmed the significance of these changes, with p-values of ***0.0313 (Hosteller)*** and ***0.0156 (Paying Guest).***

In summary, among these factors, **"Lack of Time"** appears to be the most influential factor contributing to meal-skipping among students, particularly among **Paying Guests,** both before and after the intervention. Paying Guests seem to be more affected by meal-skipping due to various factors, including lack of time and diet, compared to Hostellers and Day Scholars.

[n = 127]	**Hosteler**		**Day Scholar**		**Paying Guest**	
	Before	**After**	**Before**	**After**	**Before**	**After**
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
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 [*]	

In our study, the ***lack of time*** emerges as the most influential factor contributing to male students skipping meals, both before and after intervention. This contrasts with ***Anaemene D.I***

et al. (2022) study, where ***early morning lectures*** were the predominant cause of missed meals among students.

Conclusion

Our study identified Hostellers as the group most susceptible to peptic ulcer disease (PUD), followed by Paying Guests, with Day Scholars showing the least risk. Hostellers exhibited the most irregular meal patterns, including frequent skipping of meals and increased consumption of spicy foods and carbonated drinks, which significantly heightened their PUD risk. Paying Guests showed some improvement in meal regularity but still indulged in unhealthy dietary habits, contributing to moderate susceptibility. Irregular meal patterns and late-night snacking adversely impacted sleep quality, particularly among Hostellers and Paying Guests, leading to insufficient restorative sleep (<6 hours), which exacerbates gastric acid secretion, delays healing, and increases PUD risks. Statistical analysis ($p = 0.0004$) revealed significant lifestyle changes influencing PUD susceptibility, with irregular meals, poor sleep, and stress forming a detrimental triad. These findings highlight the urgent need for interventions promoting regular meals and better sleep hygiene to mitigate PUD risk among vulnerable student groups.

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