ORIGINAL ARTICLE

Prevalence and Clinical Characteristics of Solitary Rectal Ulcer Syndrome in Patients with Rectal Bleeding: A Cross-Sectional Study in Karachi

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Abstract

Background: Solitary Rectal Ulcer Syndrome (SRUS) is an uncommon, benign disorder that often presents with rectal bleeding and can be misdiagnosed as other colorectal diseases.

Objective: This study aimed to determine the frequency of SRUS among patients presenting with rectal bleeding and to explore associated demographic and clinical characteristics.

Methods: A cross-sectional study was carried out from January 2025 to June 2025 at Abbasi Shaheed Hospital in Karachi. A total of 369 patients aged 16-70 years with rectal bleeding of less than one week's duration were enrolled. Sociodemographic data, smoking habits, and physical activity levels were recorded using a structured proforma. All participants underwent colonoscopy and mucosal biopsy for histopathological confirmation of SRUS. Data were analyzed in SPSS version 21.

Results: Among 369 participants, 262 (71%) were male. The mean age was 33.7±8.9 years, and the average duration of bleeding was 4.6±1.1 days. SRUS was diagnosed in 26 patients, giving a prevalence of 7.0%. All cases occurred in males. No significant associations were found between SRUS and age, smoking, physical activity, or socioeconomic status. Logistic regression results were exploratory and did not identify any independent predictors.

Conclusion: SRUS accounted for 7% of rectal bleeding cases in this cohort. The findings highlight the importance of considering SRUS in the differential diagnosis of lower gastrointestinal bleeding, particularly among young and middle-aged men. Broader multicenter studies are needed to identify underlying risk factors and improve early recognition of this underdiagnosed condition.

Keywords: *Solitary rectal ulcer syndrome, rectal bleeding, colonoscopy, histopathology, prevalence, Pakistan, risk factors, diagnostic awareness.*

INTRODUCTION

Solitary Rectal Ulcer Syndrome (SRUS) is a rare, benign, and often misdiagnosed condition of the rectum characterized by ulcerative or polypoid lesions of the rectal mucosa [1, 2]. Although typically non-malignant, SRUS can mimic inflammatory bowel disease or colorectal malignancy, leading to diagnostic delays [1, 3]. Patients most commonly present with rectal bleeding, mucus discharge, straining during defecation, and a sensation of incomplete evacuation [4, 5]. The condition is frequently underrecognized due to its variable presentation and overlap with other anorectal disorders [6]. The exact cause of SRUS remains unclear and is likely multifactorial. Contributing mechanisms include rectal mucosal prolapse, chronic constipation, excessive straining, and uncoordinated defecation [1, 7].

Prolonged mechanical and ischemic trauma to the rectal mucosa is thought to play a central role in its pathogenesis [8]. Chronic constipation, in particular, is associated with many of the symptoms observed in SRUS, including tenesmus, rectal pain, and bleeding [1, 8]. Epidemiological data suggest an incidence of approximately one case per 100,000 individuals annually, though this figure may underestimate its true prevalence because many cases remain undiagnosed [9]. Globally, SRUS has been reported across all age groups and in both sexes, but the distribution varies between populations [10]. Some studies indicate a slight male predominance, while others report higher frequencies in females [11, 12]. Lifestyle and sociocultural differences, such as dietary habits, defecation practices, and access to healthcare, may contribute to these variations [1, 9, 13]. Diagnosis relies on colonoscopic findings—typically solitary or multiple ulcers, erythematous mucosa, or localized friability—combined with histopathological confirmation [1, 2, 9].

Histological features include fibromuscular obliteration of the lamina propria and hypertrophy of the muscularis mucosae [1, 4, 8]. In Pakistan, SRUS remains an underdiagnosed entity. Most available evidence comprises isolated case reports or small retrospective series [10-16]. Few studies have evaluated its actual frequency among patients presenting with rectal bleeding, and even fewer have examined potential contributing factors such as smoking, physical activity,

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and socioeconomic status [11, 13, 15, 17]. These lifestyle and demographic parameters may influence bowel habits and mucosal health, thereby affecting susceptibility to SRUS [18-20]. Understanding their relationship to SRUS could help detect it earlier and develop more effective prevention strategies. This study was therefore designed to determine the frequency of SRUS among patients presenting with rectal bleeding at a tertiary care hospital in Karachi and to explore possible associations with demographic and lifestyle factors, including age, smoking, gastrointestinal symptoms, physical activity, and socioeconomic background.

METHODOLOGY

This cross-sectional study was conducted from January to June 2025 in the Department of Gastroenterology at Abbasi Shaheed Hospital, Karachi. Ethical approval was obtained from the Institutional Review Board of Karachi Medical and Dental College (Reference ID: IRB/KMDC/KMU/93/2025), and all participants provided written informed consent before inclusion. The study was carried out in accordance with the principles of the Declaration of Helsinki.

Patients aged 16 to 70 years who presented with rectal bleeding of less than one week's duration were eligible for inclusion, regardless of gender. Patients were excluded if they had evidence of upper gastrointestinal bleeding, hemorrhoids, acute infectious diarrhea, inflammatory bowel disease, or a prior history of anorectal surgery.

A total of 369 consecutive patients meeting the inclusion criteria were enrolled using non-probability successive sampling. The sample size was calculated using the World Health Organization (WHO) software, assuming an expected prevalence of 20% [9], a 4% margin of error, and a 95% confidence level.

A structured proforma was used to collect sociodemographic information, medical history, smoking habits, and physical activity levels. Additional variables, such as socioeconomic status and prior gastrointestinal disturbances, were also documented. All participants underwent colonoscopy, during which mucosal biopsies were obtained for histopathological evaluation.

The diagnosis of SRUS was established when both colonoscopic and histopathological criteria were met. Typical colonoscopic findings included solitary or multiple ulcerations, mucosal erythema, localized friability, or polypoid lesions of the rectum. Histopathological confirmation required the presence of fibromuscular obliteration of the lamina propria, crypt architectural distortion, and hypertrophy of the muscularis mucosae. Only cases fulfilling both endoscopic and histopathological criteria were classified as SRUS-positive.

Data were analyzed using SPSS version 21. Continuous variables were expressed as mean ± standard deviation (SD), while categorical variables were summarized as frequencies and percentages. Differences between groups were assessed using the independent samples t-test for continuous variables and the chi-square test for categorical variables. Logistic regression analysis was performed to explore possible predictors of SRUS, including age, smoking, gastrointestinal disturbance, physical activity, and socioeconomic class. Because all cases of SRUS occurred in male patients, logistic regression was restricted to the male subgroup to maintain statistical validity. Given the limited number of SRUS cases (n = 26), the analysis was considered exploratory rather than confirmatory. A p-value ≤ 0.05 was taken as statistically significant.

RESULTS

A total of 369 patients presenting with rectal bleeding were evaluated during the study period. Of these, 262 (71%) were male, and 107 (29%) were female. The mean age was 33.7±8.9 years (range: 16-70 years). The average duration of rectal bleeding before presentation was 4.6±1.1 days (range: 1-15 days). SRUS was diagnosed in 26 patients (7.0%), while 343 (93.0%) had other causes of rectal bleeding (**Table 1**).

Table 1: Baseline characteristics of study participants (n=369).

Variable	Value
Age (years), mean ± SD	33.69 ± 8.87
Gender, n (%)	
Male	262 (71.0)
Female	107 (29.0)
Duration of bleeding (days), mean ± SD	4.64 ± 1.08
SRUS, n (%)	
Present	26 (7.0)
Absent	343 (93.0)

To identify possible demographic or clinical associations, baseline characteristics were compared between patients with and without SRUS (**Table 2**). Although SRUS was more frequent among males aged 30-40 years, these associations did not reach statistical significance. The mean bleeding duration also did not differ significantly between the two groups.

Table 2: Comparison of baseline characteristics by SRUS status (n=369).

Variable	SRUS Present n(%)	SRUS Absent n(%)	p-value
Gender			
Male	26 (100)	236 (68.8)	0.075
Female	0 (0)	107 (31.2)	
Age Groups			
<30 years	8 (30.8)	163 (47.5)	0.121
30-40 years	12 (46.2)	117 (34.1)	
>40 years	6 (23.0)	63 (18.4)	
Bleeding Duration			
≤5 days	17 (65.4)	223 (65.0)	0.252
>5 days	9 (34.6)	120 (35.0)	

Since all SRUS cases occurred in males, logistic regression analysis was restricted to the male subgroup (n=262). This analysis was conducted to explore, in an exploratory capacity, whether variables such as age, smoking, gastrointestinal symptoms, physical activity, or socioeconomic class could predict SRUS occurrence. No independent predictors were identified, and all associations were statistically nonsignificant (**Table 3**).

Table 3: Predictors of SRUS among male patients.

Predictors	Odds Ratio (OR)	95% Confidence Interval (CI)	p-value
Age (per year increase)	1.03	1.00 - 1.06	0.062
Gastrointestinal disturbance	1.49	0.48 - 4.58	0.494
Smoking (Yes *vs.* No)	2.34	0.70 - 7.79	0.164
Physical activity (Active)	0.90	0.18 - 4.41	0.905
Social class (High *vs.* Middle)	0.70	0.12 - 4.06	0.690
Social class (Low *vs.* Middle)	0.86	0.07 - 10.47	0.900

DISCUSSION

In this study, Solitary Rectal Ulcer Syndrome (SRUS) was identified in 7% of patients presenting with rectal bleeding. This prevalence aligns closely with findings from previous local research, which reported rates of 6%-8% among similar patient populations in Pakistan [12-15,19]. Studies by Abid *et al*. [11], Sherwani *et al*. [12], and Ejaz *et al*. [13] reported prevalence rates of 6.2%, 6.8%, and 6.6%, respectively, while Sardar *et al*. [14] documented a slightly higher rate of 8.5%. Collectively, these results suggest that SRUS, though uncommon, represents a consistent and clinically meaningful diagnosis in patients with lower gastrointestinal bleeding in the regional setting. Another feature of the current study was the male predominance, accounting for all SRUS cases identified.

This observation mirrors the pattern reported by Sardar *et al*. [14], Nowsherwan *et al*. [15], and Anjum *et al*. [16], yet differs from international data, which often report SRUS as more frequent in females [1, 3, 17]. Lifestyle factors, sociocultural practices, and health-seeking behavior may contribute to this variation. In South Asian societies, males are often more likely to seek evaluation for rectal symptoms, while females may underreport such issues due to social barriers [18]. This gender disparity underscores the need for improved awareness and screening practices that are inclusive of both sexes. Age distribution in our cohort showed that SRUS was most frequent in patients aged 30-40 years, consistent with prior studies that have identified it as a disease of young and middle-aged adults [6, 8, 11]. Although logistic regression suggested a slight increase in SRUS risk with advancing age (odds ratio 1.03), this trend was not statistically significant ($p = 0.06$). Given the small number of SRUS cases, the analysis should be regarded as exploratory rather than confirmatory. The wide confidence intervals reflect the limited statistical power of this subgroup analysis. Future multicenter studies with larger samples are warranted to clarify whether age or other demographic factors truly influence SRUS risk [19, 20].

Smoking and low physical activity were not significantly associated with SRUS in this study. However, other reports have proposed that sedentary lifestyles and smoking-related mucosal ischemia may predispose individuals to rectal mucosal injury [9, 18, 20]. Similarly, socioeconomic status was not correlated with SRUS, contrasting with earlier evidence suggesting that psychosocial stress and limited healthcare access may exacerbate chronic constipation and straining - key contributors to SRUS development [1, 9, 20]. The absence of significant associations here may reflect the relatively homogeneous urban population studied or the small number of confirmed SRUS cases. An essential factor that warrants further emphasis is nutrition and dietary pattern, which play a critical role in bowel health and may indirectly influence the occurrence and healing of SRUS. Diets low in fiber - lacking fruits, vegetables, and whole grains can promote constipation and excessive straining, thereby increasing mucosal trauma [1, 3, 21]. Inadequate fluid intake contributes to the formation of hard stools, while low protein intake may delay mucosal repair [1, 3].

Additionally, frequent consumption of spicy or highly processed foods can irritate the rectal mucosa [22]. Counseling patients to adopt a high-fiber diet, maintain proper hydration, and avoid excessive spice and irritants

is an essential component of preventive care and symptom management in SRUS. Our findings reinforce the need for both endoscopic visualization and histopathological confirmation in diagnosing SRUS. The variability in endoscopic appearance—ranging from erythematous mucosa to ulcerated or polypoid lesions—contributes to frequent misdiagnosis as inflammatory bowel disease or neoplasia [4, 9, 11, 12]. Increasing clinician awareness is imperative, particularly among primary care physicians and gastroenterologists, who often encounter patients with rectal bleeding. Timely colonoscopy and biopsy remain indispensable for accurate diagnosis [1, 9]. Although treatment outcomes were not assessed in this study, previous research highlights evolving therapeutic approaches. Conservative management, including dietary modification, bowel regulation, and avoidance of straining, remains first-line [1, 3, 9, 23, 24]. In refractory cases, minimally invasive techniques such as argon plasma coagulation (APC) and biofeedback therapy have shown encouraging results [22, 25]. Shahid *et al*. [25] reported mucosal healing in over three-quarters of patients treated with APC, while Hammad *et al*. [21] demonstrated improved outcomes in children receiving hydrocortisone enemas. Such advances underscore the importance of multidisciplinary collaboration involving gastroenterologists, colorectal surgeons, and pelvic floor specialists to optimize care.

LIMITATIONS

This study has several limitations. Being single-centered, its findings may not be generalizable to other populations—the absence of functional studies, such as anorectal manometry or defecography, limited the assessment of underlying defecatory dysfunction. Furthermore, logistic regression analysis was confined to males due to the absence of female SRUS cases, thereby limiting its robustness. Lastly, as a cross-sectional study, it could not establish temporal or causal relationships between lifestyle factors and SRUS occurrence. Despite these limitations, this study contributes meaningful local data on SRUS prevalence and highlights essential gaps in awareness, diagnosis, and prevention. By drawing attention to potentially modifiable risk factors, particularly diet, bowel habits, and delayed presentation, it provides a foundation for further clinical research and public health initiatives.

CONCLUSION

Solitary Rectal Ulcer Syndrome (SRUS) is an uncommon but clinically significant cause of rectal bleeding, particularly among young and middle-aged adults. In this study, SRUS accounted for 7% of patients presenting with rectal bleeding at a tertiary care hospital in Karachi. Although no independent predictors were identified, the findings highlight the need for clinicians to maintain a high index of suspicion for SRUS in patients with unexplained rectal bleeding. Diagnosis should rely on both colonoscopic and histopathological confirmation to avoid misclassification as inflammatory bowel disease or malignancy. Increasing awareness among general practitioners and primary care physicians is essential, as early recognition can prevent unnecessary interventions and chronic morbidity. Nutritional factors—including low dietary fiber, poor hydration, and excessive intake of spicy foods—may indirectly contribute to SRUS pathogenesis by promoting constipation and mucosal trauma. Preventive strategies, such as dietary counseling and bowel regulation, should therefore be part of comprehensive patient education. Future research should focus on larger, multicenter studies to identify modifiable risk factors and evaluate emerging therapies such as argon plasma coagulation, biofeedback, and photobiomodulation. Collaborative approaches between gastroenterologists, surgeons, and pelvic floor specialists can further enhance patient outcomes and reduce recurrence rates.

ETHICAL APPROVAL

Ethical approval was obtained from the Institutional Review Board of Karachi Medical and Dental College, Karachi (REF letter No. IRB/KMDC/KMU/93/2025). All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/ or national research committee and the Helsinki Declaration.

CONSENT FOR PUBLICATION

Written informed consent for publication of anonymized data was obtained from all study participants.

AVAILABILITY OF DATA

The data set may be acquired from the corresponding author upon a reasonable request.

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None.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORS' CONTRIBUTION

FT: Conceptualization, study design, data collection, manuscript drafting, and overall supervision

SPI: Statistical analysis, interpretation of data, and critical manuscript revision.

MT, QJ, and ASR: Assisted in patients' recruitment and data collection.

All authors have read and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

During the preparation of this work the author(s) limitedly used ChatGPT (GPT-4, OpenAI) to get language suggestions and do minor proofreading in some parts of the manuscript. After using this tool/ service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the published article.

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