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Risk Factors Associated with Symptomatic Haemorrhoidal Disease in A Rural Population of North India: A Cross-Sectional Study

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Abstract

Background: Haemorrhoidal disease is a common benign anorectal condition and an important cause of morbidity. Multiple factors, including lifestyle, dietary habits, bowel practices, and socioeconomic status, are implicated in its development; however, evidence from rural North Indian population remains limited.

Aim: To evaluate the risk factors associated with symptomatic haemorrhoidal disease in a rural population of North India.

Materials and Methods: This descriptive cross-sectional study was conducted over one year at a rural tertiary care centre in North India. A total of 244 patients with clinically diagnosed haemorrhoidal disease were enrolled using a consecutive sampling technique. Data on demographic characteristics, dietary and bowel habits, lifestyle factors, and quality of life were collected using a structured proforma. Diagnosis was confirmed by per-rectal examination and proctoscopy. Data was analyzed descriptively and presented as frequencies and percentages.

Results: The mean age of participants was 42.15 ± 12.74 years, with a male predominance (76.2%). Most patients belonged to the upper-lower (35.7%) and lower-middle

(33.6%) socioeconomic classes. Low dietary fibre intake (<15 g/day) was observed in 58.2% of patients, while 66% reported inadequate daily fluid intake (≤2 L). Prolonged sitting or standing and constipation-related bowel habits were frequently noted.

Conclusion: Symptomatic haemorrhoidal disease in rural North India is strongly associated with modifiable lifestyle and dietary factors. Targeted public health education and lifestyle modification may substantially reduce the disease burden.

Keywords: Haemorrhoids; Risk factors; Rural population; Diet; Lifestyle; Constipation

Introduction

Haemorrhoids are normal vascular cushions of the anal canal formed by a network of arteriovenous connective tissues draining into the superior and inferior haemorrhoidal veins. Haemorrhoidal disease is defined as the symptomatic enlargement and distal displacement of these normal anal cushions, resulting from dilatation of the submucosal vascular tissue of the distal anal canal.[1] Anatomically, haemorrhoids are classified as internal or external based on their location relative to the dentate line.

Haemorrhoidal disease is one of the most common anorectal disorders worldwide. Due to their rich vascular supply, sensitive location, and tendency to engorge and prolapse, haemorrhoidal cushions are frequent causes of anorectal symptoms and are often blamed for most anal complaints. However, it is essential to exclude other serious causes of gastrointestinal bleeding before attributing symptoms solely to haemorrhoidal disease.[2]

Although rarely life-threatening, haemorrhoidal disease causes significant physical and psychological morbidity through symptoms such as bleeding per rectum, prolapse, pain, and pruritus, resulting in impaired quality of life.[3] The global prevalence of symptomatic haemorrhoids is estimated to be approximately 4.4%, with nearly half of the population experiencing symptoms at some point during their lifetime. The true prevalence is likely underestimated due to social stigma and reluctance to seek medical care.

Internal haemorrhoids arise from endoderm and are lined by columnar epithelium, making them typically painless, whereas external haemorrhoids originate from ectoderm and are covered by squamous epithelium, rendering them painful due to rich somatic innervation. Haemorrhoids become symptomatic when they enlarge, thrombosed, inflamed, or prolapse.[4]

The exact etiopathogenesis of haemorrhoidal disease remains unclear; however, several risk factors have been identified. These include modifiable factors such as low dietary fibre intake, inadequate hydration, constipation, prolonged straining, sedentary lifestyle, occupational posture, smoking, and alcohol consumption, as well as non-modifiable factors such as age, sex, and genetic predisposition. The influence of these risk factors varies across populations due to differences in sociodemographic characteristics, dietary patterns, toileting practices, and lifestyle habits.

Most available Indian studies are retrospective and predominantly urban-based, with limited data from rural populations, particularly in northern India. Understanding population-specific risk factors is essential for developing effective preventive strategies. The present study was therefore undertaken to evaluate the risk factors associated with symptomatic haemorrhoidal disease in a rural population of North India.

Materials and Methods

Study Design and Setting

A cross-sectional study was conducted in the Outpatient Department of General Surgery at Bhagat Phool Singh Government Medical College for Women.

Study Population

The study included patients attending the surgical outpatient department with a clinical diagnosis of haemorrhoidal disease.

Inclusion Criteria

Patients aged 18–65 years with clinically diagnosed haemorrhoids confirmed by per rectal examination and proctoscopy.

Exclusion Criteria

Patients younger than 18 years or older than 65 years; those with pre-existing comorbid conditions such as malignancy, uncontrolled diabetes mellitus, chronic kidney or liver disease; patients on immunosuppressive therapy; immunocompromised patients (HIV, HCV, Hepatitis B); patients with inflammatory bowel disease; pregnant women; and patients who had previously undergone haemorrhoidectomy were excluded from the study.

Sample Size

The sample size was calculated based on an assumed prevalence of constipation of 25%, with a 95% confidence interval and 6% precision. The minimum required sample size was 244 patients.

Study Duration

The study was conducted over a period of one year after obtaining approval from the Institutional Scientific and Ethical Committees.

Sampling Technique

A consecutive sampling technique was employed. All patients fulfilling the eligibility criteria during the study period were included until the required sample size was achieved.

Data Collection and Methodology

A detailed history was obtained from each participant using a pre-structured proforma. Data collected included demographic variables, anthropometric measurements, smoking and alcohol consumption, family history, dietary habits (24-hour dietary recall method), physical activity, fluid intake, sleep duration, bowel habits, laxative use, occupation, and socioeconomic status assessed using the Modified Kuppuswamy scale. Quality of life parameters were also recorded. A comprehensive anorectal examination was performed in all patients, including inspection, digital rectal examination, and proctoscopy to confirm the diagnosis. Every effort was made to objectively document the associated risk factors.

Statistical Analysis

Collected data were entered into Microsoft Excel. Quantitative variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages. Results were displayed in tables and analysed using standard statistical methods.

Results

This descriptive cross-sectional study was conducted in the Outpatient Department of General Surgery at Bhagat Phool Singh Government Medical College for Women to evaluate the risk factors associated with symptomatic haemorrhoidal disease in a rural population of North India over a period of one year. The results are presented in the form of tables and graphical representations where appropriate.

Most patients were aged between 31 and 50 years, with a clear male predominance (male-to-female ratio of 3.2:1). The majority belonged to lower socioeconomic strata. Low dietary fibre intake and inadequate hydration were common findings. Constipation-related bowel habits, prolonged defecation time, and sedentary lifestyle patterns were frequently observed among the study participants.

Table 1: Demographic and Socioeconomic Profile of Study Subjects (n = 244)

Variable	Category	n (%)
Age group (years)	<20	9 (3.7)
	21–30	46 (18.9)
	31–40	63 (25.8)
	41–50	59 (24.2)
	51–60	36 (14.8)
	>60	31 (12.7)
Mean age (years)	—	42.15 ± 12.74
Gender	Male	186 (76.2)
	Female	58 (23.8)
Marital status	Married	210 (86.1)
	Unmarried/Widow	34 (13.9)
Socioeconomic status	Upper-lower	87 (35.7)
	Lower-middle	82 (33.6)
	Others	75 (30.7)

Table 2: Dietary Intake and Lifestyle Characteristics

Parameter	Category	n (%)
Fibre intake (g/day)	<15	142 (58.2)
	15–25	86 (35.2)
	>25	16 (6.5)
Fluid intake (L/day)	<2	161 (66.0)
	≥2	83 (34.0)
Sleep duration	<6 hrs	63 (25.8)
	6–8 hrs	150 (61.5)
	>8 hrs	31 (12.7)
Daytime sleep	Yes	102 (41.8)
	No	142 (58.2)

Table 3: Lifestyle Habits, Occupation, and Physical Activity

Variable	Category	n (%)
Smoking	Yes	116 (48.0)
	No	128 (52.0)
Alcohol intake	Yes	76 (32.0)
	No	168 (68.0)
Sitting/standing time	≤8 hrs/day	205 (84.0)
	>8 hrs/day	39 (16.0)
Exercise	None	39 (16.0)
	Mild–moderate	185 (75.8)
	Strenuous	20 (8.2)

Table 4: Bowel Habits, Stool Characteristics, and BMI

Parameter	Category	n (%)
Defecation/day	≤2 times	175 (71.7)
	>2 times	69 (28.3)
Time during defecation	≤10 min	178 (72.9)
	>10 min	66 (27.1)
Laxative use	Nil	136 (55.7)
	≥Once/week	108 (44.3)
BMI	Normal	180 (73.8)
	Overweight/Obese	56 (23.0)
	Underweight	8 (3.3)
Bristol Stool Scale	Type 1–2	107 (43.9)
	Type 3–4	116 (47.5)
	Type ≥5	21 (8.6)

Table 5: Symptom Severity and Quality of Life Assessment Symptom Severity

Symptom severity		PAC-QOL Score	
Severity	n (%)	Component	Mean ± SD
Nil	33 (13.5)	PAC-A	1.60 ± 0.72
Mild	131 (53.7)	PAC-B	2.95 ± 1.45
Moderate	61 (25.0)	PAC-C	4.36 ± 1.86
Severe	19 (7.8)	PAC-D	0.68 ± 0.49
		Total Score	9.59 ± 3.16

Discussion

Haemorrhoidal veins are normal anatomical structures located in the submucosal layer of the lower rectum. Due to their rich vascular supply, sensitive location, and tendency to engorge and prolapse, haemorrhoidal cushions frequently become symptomatic and represent a common cause of anorectal pathology. Over time, numerous treatment modalities have evolved, ranging from ancient practices such as cauterization and ligation to contemporary minimally invasive techniques, emphasizing the need for individualized management strategies.

Haemorrhoidal disease commonly affects adults, with prevalence increasing with age. In the present study, the most commonly affected age group was 31–50 years, which is consistent with findings reported by Ravindranath et al. [5] In contrast, other studies have demonstrated higher prevalence among older populations. These variations may reflect differences in lifestyle, occupational exposure, and healthcare-seeking behaviour.

Male predominance was observed in this study, with a male-to-female ratio of 3.2:1. This finding aligns with several Indian studies and may be attributed to occupational factors involving prolonged sitting or heavy physical activity, as well as sociocultural barriers limiting healthcare access among women. However, some studies have reported equal gender distribution or female predominance. Ravindranath GG et al have also reported a male predominance of 66.7% in their study.[5] While Johanson et al have reported that the incidence and prevalence of haemorrhoidal disease in both the sexes were approximately same[6].

Haemorrhoidal disease affects individuals across all socioeconomic groups, but socioeconomic status may influence its prevalence and risk factors. In the present study, most patients belonged to the upper-lower (35.7%) and lower-middle (33.6%) socioeconomic classes. This may be related to occupations such as farming and manual labor, which involve prolonged standing and strenuous physical activity. Similar findings were reported by Akriti et al.[7] In contrast, Lohsiriwat and Johanson & Sonnenberg reported a higher prevalence among individuals of higher socioeconomic status in Western populations. [1,6] These differences may be attributed to variations in occupational, lifestyle, and healthcare-seeking factors across different populations.

Dietary fibre plays an important role in the prevention and management of haemorrhoidal disease by promoting regular bowel movements and reducing constipation and straining. In the present study, 58.2% of participants consumed less than 15 g of fibre per day, while only 6.5% met the recommended intake of more than 25 g/day. This low fibre intake may have contributed to the development of haemorrhoidal disease. Similar findings have been reported by Alonso-Coello et al., who identified inadequate fibre intake as a significant risk factor and demonstrated that fibre supplementation reduces haemorrhoidal symptoms and bleeding.[8]

Although Peery AF et al. suggested that the role of fibre in haemorrhoidal disease may be less clear in individuals without bowel dysfunction, most studies support increased dietary fibre intake as an effective measure for preventing and managing haemorrhoidal disease.[9]. Low fibre consumption is a well-established risk factor for constipation and haemorrhoidal disease. Multiple studies have demonstrated that increased fibre intake significantly reduces symptom severity, bleeding, and recurrence. Although some literature questions fibre's role in patients without constipation, its overall benefits in bowel regulation justify its recommendation in both prevention and management strategies.

Constipation is considered an important risk factor for haemorrhoidal disease. In the present study, constipation was the most common risk factor, and the majority of patients had Bristol Stool Scale type 2 stools (38.5%). These findings are consistent with those of Peery AF et al. & Loder et al. who reported that preventing and treating constipation helps reduce recurrent symptomatic haemorrhoids.[9,10] Chronic constipation is believed to contribute to the degeneration of supportive anal tissue and the distal displacement of anal cushions, thereby promoting haemorrhoidal disease.[5] However, Johanson JF et al. reported that diarrhoea, rather than constipation, was associated with haemorrhoidal disease, highlighting the ongoing debate regarding the exact role of constipation in its pathogenesis.[6] Despite this, the findings of the present study support constipation as a major risk factor for haemorrhoidal disease.

Laxative use serves as an indirect indicator of constipation, an important risk factor for haemorrhoidal disease. In the present study, 55.7% of participants did not require laxatives, while 21.7% used them 1–2 times per week, 11.5% used them 3–4 times per week, and 10.7% required them almost daily. Studies have shown that appropriate laxative use can reduce constipation, straining, and haemorrhoidal symptoms. Tan et al. reported that regular laxative use helped alleviate symptoms by reducing straining during defecation.[11] However, Bapat et al. found that excessive use, particularly of stimulant laxatives, was associated with an increased risk of complications such as bleeding and prolapse.[12]

Adequate fluid intake is an important modifiable factor in the prevention and management of haemorrhoidal disease, as it helps soften stools, promotes regular bowel movements, and reduces constipation and straining during defecation. In the present study, nearly half of the patients (49.2%) consumed only 1–2 litres of fluid per day, while 27% consumed 2–3 litres and only 7% reported intake of more than 3 litres daily. Inadequate hydration may contribute to the development of hard stools and constipation, thereby increasing the risk of haemorrhoidal disease. Similar findings were reported by Rojas et al. (2020), who observed that individuals consuming less than 1.5 litres of fluid per day were more likely to experience constipation and haemorrhoidal symptoms.[13] These findings highlight the importance of maintaining adequate hydration as part of the prevention and management of haemorrhoidal disease. Sleep duration and daytime sleeping did not show a significant association with haemorrhoidal disease in this study.

Smoking and alcohol consumption have been proposed as potential risk factors for haemorrhoidal disease due to their effects on vascular health, inflammation, and tissue integrity. In the present study, haemorrhoidal disease was almost equally prevalent among smokers (52%) and non-smokers (48%) and also non-alcoholic (69%) and alcoholic 31% participants suggesting no significant association with haemorrhoidal disease. Similar findings were reported by Peery AF et al & Catherine et al. who found no relationship between smoking and alcohol intake with haemorrhoidal disease.[9,14] In contrast, Khan et al identified alcohol consumption as a modifiable risk factor for haemorrhoidal disease.[15] Overall, the relationship of smoking and alcohol consumption with haemorrhoidal disease remains inconclusive and warrants further investigation.

Prolonged sitting and standing are considered important occupational risk factors for haemorrhoidal disease due to increased pressure on the anorectal veins and impaired venous circulation. In the present study, 59.8% of patients spent 4–8 hours per day sitting or standing, while 16% reported 8–12 hours daily. A positive association

was observed between haemorrhoidal disease and occupations involving prolonged sitting or standing, particularly among farmers. Similar findings were reported by Al-Masoudi et al. (2024), who found a higher prevalence of haemorrhoidal symptoms among individuals engaged in sedentary occupations and prolonged sitting.[16].

The number of bowel movements per day is an important factor influencing the pressure and strain exerted on the anal veins, which plays a critical role in the pathogenesis of haemorrhoidal disease [16.] Ray-Offor et al. (2019) emphasized that both increased and decreased frequency of defecation were associated with haemorrhoidal disease. Extremes of bowel habits—whether constipation or frequent loose stools—can exacerbate venous pressure and straining, supporting the concept of a U-shaped relationship between bowel frequency and haemorrhoidal risk.[17]

Regular physical activity plays an important role in maintaining bowel health and may help prevent and manage haemorrhoidal disease by improving bowel motility and circulation. Current recommendations from the WHO and American Heart Association advise at least 30 minutes of moderate-intensity exercise on most days of the week. Shin et al. also reported that moderate physical activity (20–60 minutes, 3–5 days per week) can improve quality of life and help manage haemorrhoidal symptoms. However, while regular exercise is beneficial, activities involving excessive straining or increased intra-abdominal pressure may contribute to the development or worsening of haemorrhoidal disease.[18]Therefore, appropriately tailored exercise regimens should be encouraged.

Prolonged toilet sitting and straining during defecation are important risk factors for haemorrhoidal disease. In the present study, 47.5% of patients spent 5–10 minutes on defecation, while 27% spent more than 10 minutes, indicating that most patients required longer than the normal 3–5 minutes. Increased defecation time is associated with greater straining and higher anorectal venous pressure, leading to distal displacement of the anal cushions. Similar findings were reported by Ray-Offor et al, & Catherine et al., Hall et al, who demonstrated a significant association between prolonged toilet sitting and haemorrhoidal disease.[17,14,19] Furthermore, squatting has been shown to facilitate easier defecation by reducing straining through a more favourable anorectal angle.[20] These findings suggest that prolonged toilet sitting and excessive straining are important modifiable risk factors for haemorrhoidal disease..Adopting proper defecation posture and minimizing toilet time are important preventive strategies.

Obesity has been proposed as a risk factor for haemorrhoidal disease due to increased intra-abdominal pressure, impaired venous return, and chronic inflammation. In the present study, most patients had a normal BMI (73.8%), while 19.7% were overweight and only 3.3% were obese, suggesting no significant association between BMI and haemorrhoidal disease. Similar findings were reported by Peery et al., who found no clear relationship between BMI and haemorrhoidal disease.[9] However, Akriti et al. identified obesity as a risk factor, while Shin et al. highlighted its association with chronic constipation, an important contributor to haemorrhoidal disease. [7,21] Thus, the relationship between BMI and haemorrhoidal disease remains inconclusive.

The Patient Assessment of Constipation Quality of Life (PAC-QOL) questionnaire is the most validated and specific tool for assessing the quality of life in patients with constipation. The PAC-QOL questionnaire

effectively measures this burden, providing valuable insights into the interplay between constipation, haemorrhoids, and quality of life. In present study Mean quality of life score (PAC-QOL) of study population was observed to be 9.59 ± 3.162 with median of 10.0 and Interquartile Range (IQR) ranging from 7-12 with minimum individual quality of life score of 1 and maximum individual quality of life score of 18. Several studies have demonstrated that successful management of constipation leads to significant improvements in both haemorrhoidal symptoms and PAC-QOL scores. Research by Roy Patankar et al. and Qiuxiang Yu et al. confirmed that addressing constipation effectively enhances overall quality of life in haemorrhoidal patients Both surgical and conservative treatments have been shown to improve quality of life in patients with haemorrhoidal disease.[22,23] Non-surgical measures such as increased dietary fibre intake and stool softeners have been associated with improved PAC-QOL scores by reducing constipation and symptom severity. These findings highlight the importance of a comprehensive treatment approach that addresses both constipation and haemorrhoidal disease to improve patient quality of life.

Conclusion

Haemorrhoidal disease is strongly influenced by modifiable lifestyle and dietary factors, particularly constipation, low dietary fibre intake, inadequate hydration, physical inactivity, prolonged defecation time, and socioeconomic status. In contrast, BMI, smoking, and alcohol consumption did not show a significant association with the development of haemorrhoidal disease in this study.

Addressing modifiable risk factors through dietary modification, adequate fluid intake, regular physical activity, and effective management of constipation can significantly reduce disease burden and improve quality of life. Preventive strategies and early lifestyle interventions should be emphasized over aggressive surgical management whenever possible. Further large-scale, multicentric analytical studies involving diverse populations are recommended to better elucidate the etiopathogenesis of haemorrhoidal disease and strengthen evidence-based preventive strategies.

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