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Sociodemographic and Clinical Determinants of Delayed Diagnosis in Colorectal Cancer

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KEYWORDS

Colorectal cancer, diagnostic delay, sociodemographic determinants.

ABSTRACT:

Background: Colorectal cancer is a leading cause of cancer-related mortality worldwide, with delayed diagnosis contributing to advanced disease and poorer outcomes. Sociodemographic disparities and healthcare access variations influence diagnostic timelines, particularly in low- and middle-income countries where screening remains limited. Understanding delayed diagnosis is essential for improving early detection and patient prognosis.

Objective: To evaluate sociodemographic and clinical determinants associated with delayed diagnosis among colorectal cancer patients.

Method: This cross-sectional observational study was conducted at the Department of Colorectal Surgery, Bangladesh Medical University, Dhaka, from January to December 2025. Sixty histopathologically confirmed colorectal cancer patients were enrolled. Data were collected through structured interviews and hospital records. Analysis was performed using SPSS version 26.0.

Results: Most participants were aged 40–59 years (53.3%) and male (63.3%), with rural residence predominance (65.0%). Rectal bleeding was the most common symptom (40.0%). Diagnostic delay exceeding three months occurred in 61.7% of patients. Delayed diagnosis was higher among rural residents (74.4%, p=0.012), individuals without formal education (83.3%, p=0.004) and those with a monthly income below 15,000 BDT (80.8%, p=0.009). Advanced-stage disease (stage III–IV) was observed in 83.8% of patients with delayed diagnosis compared with 34.8% diagnosed within three months (p<0.001).

Conclusion: Delayed diagnosis of colorectal cancer is associated with socioeconomic disadvantage and advanced-stage presentation. Targeted awareness programs, improved healthcare access and strengthened referral systems may facilitate earlier diagnosis and better outcomes.

Introduction

Colorectal cancer remains one of the leading causes of cancer-related morbidity and mortality worldwide, with rising incidence observed across both developed and developing countries [1,2]. Recent global estimates indicate that colorectal cancer ranks among the top three most commonly diagnosed malignancies, reflecting substantial public health challenges [1]. Epidemiological transitions, lifestyle modifications and demographic ageing have contributed to increasing disease burden, particularly in low- and middle-income countries where healthcare resources remain limited [3,4]. Despite advances in screening and treatment, delayed diagnosis continues to significantly influence disease progression and survival outcomes.

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Early detection of colorectal cancer is strongly associated with improved prognosis and reduced mortality, yet many patients still present at advanced stages [2,5]. Diagnostic delay may occur at multiple levels, including patient-related factors, healthcare system barriers and socioeconomic determinants [6]. Studies have demonstrated that lower educational attainment, limited income and rural residence are frequently linked with delayed healthcare access and later-stage diagnosis [7,8]. Such disparities are especially evident in resource-constrained settings where awareness of cancer symptoms and access to specialized care remain limited.

The growing incidence of early-onset colorectal cancer has further intensified concerns regarding timely diagnosis and clinical awareness [5]. Research has highlighted that atypical symptom presentation and insufficient recognition of early warning signs can prolong diagnostic intervals, ultimately leading to more advanced disease at presentation [9]. Furthermore, global analyses suggest that prolonged time to diagnosis is associated with poorer clinical outcomes and increased mortality risk, emphasizing the importance of identifying modifiable determinants of delay [10,11].

In South Asian contexts, including Bangladesh, socioeconomic disparities, variations in healthcare utilization and limited screening programs may contribute to diagnostic challenges [7]. Previous regional studies have indicated that health-seeking behavior, financial constraints and healthcare accessibility play significant roles in influencing diagnostic timelines among colorectal cancer patients [8]. Understanding these determinants is essential for developing targeted interventions aimed at improving early detection and reducing disease burden.

Although several international studies have examined factors associated with delayed diagnosis, evidence from Bangladesh remains scarce. Existing literature has largely focused on epidemiological patterns or clinical characteristics rather than exploring the combined impact of sociodemographic and healthcare-related variables on diagnostic delay [7,8]. Therefore, this study aims to evaluate the sociodemographic and clinical determinants of delayed diagnosis in colorectal cancer patients treated at a tertiary care center in Bangladesh. By identifying key factors associated with delayed presentation and advanced disease stage, the findings may contribute to improved clinical awareness, optimized referral pathways and policy-level strategies to enhance early detection.

Materials & Methods

This cross-sectional observational study was conducted at the Department of Colorectal Surgery, Bangladesh Medical University (BMU), Dhaka, Bangladesh. The study period extended from January to December 2025. A total of 60 patients diagnosed with colorectal cancer were included in this study.

Inclusion Criteria:

1. Histopathologically confirmed colorectal cancer patients.
2. Patients aged 18 years or older.
3. Patients attending the colorectal surgery department during the study period.
4. Patients with complete clinical and sociodemographic data.

Exclusion Criteria:

1. Patients with recurrent colorectal cancer.
2. Patients with severe cognitive impairment preventing interview.
3. Patients are unwilling to participate or withdraw consent.

Data collection procedure

Informed consent was obtained from each participant after explaining the study objectives, procedures and confidentiality safeguards. Patients diagnosed with colorectal cancer during the study period were recruited consecutively to minimize selection bias. Sociodemographic data, clinical history, presenting symptoms, healthcare-seeking patterns and diagnostic timelines were collected using a structured questionnaire. Clinical information, including stage at diagnosis and diagnostic intervals, was extracted from hospital records and pathology reports to ensure accuracy and reduce recall bias. Face-to-face interviews were conducted by trained researchers to maintain consistency in data collection procedures. Descriptive statistics were used to summarize frequencies, percentages and distributions of variables. Inferential statistical analysis included chi-square tests to assess associations between sociodemographic variables and

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diagnostic delay, as well as relationships between diagnostic interval and cancer stage. Statistical significance was considered at $p<0.05$. All analyses were performed using SPSS version 26.0. Confidentiality of patient information was strictly maintained.

Results

Table 1. Sociodemographic Characteristics of Study Participants (n = 60)

Variable		Frequency (n)	Percentage (%)
Age Group (years)	<40	6	10.0
	40–59	32	53.3
	≥60	22	36.7
Sex	Male	38	63.3
	Female	22	36.7
Residence	Rural	39	65.0
	Urban	21	35.0
Education Level	No formal education	18	30.0
	Primary (1–5 years)	20	33.3
	Secondary or higher	22	36.7
Monthly Family Income (BDT)	<15,000	26	43.3
	15,000–30,000	21	35.0
	>30,000	13	21.7

Table 1 presents the sociodemographic characteristics of the study participants. The majority of patients were aged 40–59 years (53.3%), followed by ≥60 years (36.7%), while only 10.0% were younger than 40 years. Male participants constituted 63.3% and females represented 36.7%. Most participants resided in rural areas (65.0%) compared with urban regions (35.0%). Regarding education, 30.0% had no formal education, 33.3% completed primary education and 36.7% had secondary or higher education. Nearly half of the participants (43.3%) had a monthly family income below 15,000 BDT, while 21.7% reported an income exceeding 30,000 BDT.

Table 2. Clinical Characteristics and Diagnostic Interval (n = 60)

Variable		Frequency (n)	Percentage (%)
Primary Presenting Symptom	Rectal bleeding	24	40.0
	Altered bowel habit	18	30.0
	Abdominal pain	10	16.7
	Weight loss/anemia	8	13.3

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Time to Diagnosis	≤3 months	23	38.3
	>3 months (Delayed)	37	61.7
Healthcare First Contact	Government hospital	29	48.3
	Private clinic	17	28.3
	Local practitioner/pharmacy	14	23.3
Stage at Diagnosis	Stage I–II	21	35.0
	Stage III–IV	39	65.0

Table 2 describes the clinical characteristics and diagnostic interval among patients with colorectal cancer. Rectal bleeding was the most common presenting symptom (40.0%), followed by altered bowel habits (30.0%), abdominal pain (16.7%) and weight loss or anemia (13.3%). Diagnostic delay of more than three months was observed in 61.7% of patients, whereas 38.3% were diagnosed within three months. The initial healthcare contact was most frequently a government hospital (48.3%), followed by private clinics (28.3%) and local practitioners or pharmacies (23.3%). At diagnosis, 65.0% of patients presented with advanced-stage disease (stage III–IV), while 35.0% were in early stages (stage I–II).

Table 3. Association Between Sociodemographic Factors and Delayed Diagnosis (n = 60)

Variable		**Delayed (>3 months) n (%)**	**Non-Delayed n (%)**	**p-value**
Residence	Rural (n=39)	29 (74.4)	10 (25.6)	0.012
	Urban (n=21)	8 (38.1)	13 (61.9)	
Education	No formal (n=18)	15 (83.3)	3 (16.7)	0.004
	Primary (n=20)	13 (65.0)	7 (35.0)	
	Secondary+ (n=22)	9 (40.9)	13 (59.1)	
Income (<15,000 BDT)		21 (80.8)	5 (19.2)	0.009

Table 3 shows the association between sociodemographic factors and delayed diagnosis. A significantly higher proportion of rural residents experienced delayed diagnosis compared with urban residents (74.4% vs 38.1%, p=0.012). Patients without formal education had the highest frequency of delay (83.3%), followed by those with primary education (65.0%), whereas individuals with secondary or higher education demonstrated lower delay rates (40.9%) with statistical significance (p=0.004). Low monthly income (<15,000 BDT) was also significantly associated with delayed diagnosis, affecting 80.8% of participants (p=0.009).

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Table 4. Relationship Between Diagnostic Delay and Cancer Stage (n = 60)

Diagnostic Interval	Early Stage (I–II) n (%)	Advanced Stage (III–IV) n (%)	p-value
≤3 months (n=23)	15 (65.2)	8 (34.8)	<0.001
>3 months (n=37)	6 (16.2)	31 (83.8)	

Table 4 presents the relationship between diagnostic interval and cancer stage at presentation. Among patients diagnosed within three months, 65.2% were in early stages and 34.8% in advanced stages. In contrast, patients with delayed diagnosis showed a markedly higher proportion of advanced-stage disease (83.8%) compared with early-stage disease (16.2%), with a highly significant association ($p<0.001$).

Discussion

The present study identified significant sociodemographic and clinical determinants associated with delayed diagnosis among patients with colorectal cancer, highlighting the complex interplay between socioeconomic status, healthcare access and disease stage at presentation. A substantial proportion of participants experienced diagnostic delay exceeding three months and most patients were diagnosed at advanced stages. These findings are consistent with global observations indicating that delayed diagnosis remains a critical contributor to adverse clinical outcomes in colorectal cancer. Bray et al. reported that increasing global burden and mortality are partly attributable to late-stage detection, particularly in low-resource settings [1]. Similarly, Sung et al. emphasized that disparities in healthcare access and awareness contribute to delayed diagnosis and poorer prognosis [2].

The predominance of middle-aged and older individuals in this study aligns with epidemiological trends demonstrating higher colorectal cancer incidence in individuals over 40 years of age. However, the presence of younger patients also reflects emerging concerns regarding early-onset disease patterns described by Akimoto et al., who highlighted increasing incidence among younger populations and the need for earlier recognition of symptoms [5]. Sociodemographic disparities observed in the current study, particularly the higher proportion of rural residents experiencing diagnostic delay, support findings by Dantas et al., who demonstrated that social determinants significantly influence treatment and diagnostic timelines [6]. Rural populations often face structural barriers, including limited specialist availability and delayed referral pathways, contributing to prolonged diagnostic intervals.

Educational status emerged as a significant determinant of delayed diagnosis, with individuals lacking formal education showing the highest rates of delay. Rahman et al. reported similar findings in a Bangladeshi population, where lower education levels were associated with reduced awareness of colorectal cancer symptoms and delayed healthcare-seeking behavior [7]. Socioeconomic factors, particularly low monthly income, were also significantly associated with delayed diagnosis in this study. Mandelblatt et al. previously identified socioeconomic deprivation as a key factor contributing to late-stage colorectal cancer diagnosis, emphasizing the role of financial constraints in accessing timely medical evaluation [12]. These findings collectively suggest that socioeconomic inequality remains a major barrier to early detection.

Clinical characteristics observed in this study further highlight patterns of delayed presentation. Rectal bleeding was the most common presenting symptom, yet a considerable proportion of patients were diagnosed at advanced stages. Fritz et al. described that red-flag symptoms such as rectal bleeding often remain under-recognized by patients or healthcare providers, leading to missed opportunities for early diagnosis [13]. Moreover, Walter et al. demonstrated that symptom interpretation and health-seeking behavior significantly influence diagnostic intervals, reinforcing the importance of patient awareness and primary care responsiveness [9]. The reliance on government hospitals as the primary point of healthcare contact in this study may reflect accessibility and affordability factors, but it may also

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indicate systemic delays related to referral pathways and diagnostic resources.

One of the most important findings of this research was the strong association between delayed diagnosis and advanced-stage disease. Patients diagnosed after more than three months were substantially more likely to present with stage III–IV cancer. This observation supports evidence from Tørring et al., who reported that longer diagnostic intervals were consistently associated with advanced-stage colorectal cancer across multiple populations [14]. Similarly, Pita-Fernández et al. demonstrated that diagnostic delay negatively influences survival outcomes, underscoring the clinical importance of timely diagnosis [15]. Neal et al. further emphasized that prolonged time to diagnosis correlates with poorer cancer outcomes, reinforcing the need for interventions targeting early detection [11].

The findings also reflect broader challenges faced by healthcare systems in low- and middle-income countries. Khan and Lengyel noted that limited screening programs, insufficient awareness and healthcare infrastructure constraints contribute to delayed cancer diagnosis in resource-limited settings [4]. The current study's results align with these observations, suggesting that strengthening early detection strategies and improving access to specialized care may reduce diagnostic delays and improve disease outcomes. Additionally, Suryani et al. reported that healthcare-seeking behavior and healthcare system factors play a significant role in determining diagnostic timelines, further supporting the multifactorial nature of delay observed in this study [8].

Overall, the results emphasize that the delayed diagnosis of colorectal cancer is influenced by a combination of demographic, socioeconomic and healthcare-related factors. Addressing these determinants requires comprehensive strategies that include improving public awareness, enhancing primary healthcare training and strengthening referral systems. Such approaches may contribute to earlier diagnosis, reduced disease burden and improved survival outcomes for patients with colorectal cancer.

Conclusion

Delayed diagnosis of colorectal cancer is strongly associated with rural residence, lower educational attainment and reduced socioeconomic status. A significant proportion of patients presented with advanced-stage disease, emphasizing the clinical consequences of prolonged diagnostic intervals. Early recognition of symptoms and improved healthcare accessibility may play crucial roles in reducing diagnostic delay. Strengthening referral systems and increasing public awareness could contribute to earlier diagnosis and improved clinical outcomes in colorectal cancer patients.

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Conflicts of interest: There are no conflicts of interest.

References

1. Bray F, Laversanne M, Sung H, Ferlay J, Siegel RL, Soerjomataram I, Jemal A. Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA: a cancer journal for clinicians. 2024 May;74(3):229-63.
2. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, Bray F. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA: a cancer journal for clinicians. 2021 May;71(3):209-49.
3. Xi Y, Xu P. Global colorectal cancer burden in 2020 and projections to 2040. Translational oncology. 2021 Oct 1;14(10):101174.
4. Khan SZ, Lengyel CG. Challenges in the management of colorectal cancer in low-and middle-income countries. Cancer Treatment and Research Communications. 2023 Jan 1; 35:100705.
5. Akimoto N, Ugai T, Zhong R, Hamada T, Fujiyoshi K, Giannakis M, Wu K, Cao Y, Ng K, Ogino S. Rising incidence of early-onset colorectal cancer—a call to action. Nature reviews Clinical oncology. 2021 Apr;18(4):230-43.
6. Dantas AA, Oliveira NP, Martins LF, de Camargo Cancela M, Torres-Roman JS, Bezerra de Souza DL. Social determinants in the delay of starting colorectal cancer treatment. PLoS One. 2026 Jan 8;21(1): e0338727.
7. Rahman I, Islam S, Islam MZ. Socio Demographic Determinants and Co-

Journal of Chemical Health Risks

www.jchr.org

JCHR (2026) 16(1), 1826-1832 | ISSN:2251-6727

Morbidities of Colorectal Cancer: Findings of a Case-Control Study. Bangladesh Armed Forces Medical Journal. 2024;57(2):1-6.

8. Suryani ND, Wiranata JA, Puspitaningtyas H, Hutajulu SH, Prabandari YS, Handaya AY, Hardianti MS, Taroeno-Hariadi KW, Kurnianda J, Purwanto I. Determining factors of presentation and diagnosis delays in patients with colorectal cancer and the impact on stage: a cross-sectional study in Yogyakarta, Indonesia. ecancermedicalscience. 2024 Sep 11; 18:1761.
9. Walter FM, Emery JD, Mendonca S, Hall N, Morris HC, Mills K, Dobson C, Bankhead C, Johnson M, Abel GA, Rutter MD. Symptoms and patient factors associated with longer time to diagnosis for colorectal cancer: results from a prospective cohort study. British journal of cancer. 2016 Aug;115(5):533-41.
10. Hanna TP, King WD, Thibodeau S, Jalink M, Paulin GA, Harvey-Jones E, O'Sullivan DE, Booth CM, Sullivan R, Aggarwal A. Mortality due to cancer treatment delay: systematic review and meta-analysis. bmj. 2020 Nov 4;371.
11. Neal RD, Tharmanathan P, France B, Din NU, Cotton S, Fallon-Ferguson J, Hamilton W, Hendry A, Hendry M, Lewis R, Macleod U. Is increased time to diagnosis and treatment in symptomatic cancer associated with poorer outcomes? Systematic review. British journal of cancer. 2015 Mar;112(1): S92-107.
12. Mandelblatt J andrews H, Kao R, Wallace R, Kerner J. The late-stage diagnosis of colorectal cancer: demographic and socioeconomic factors. American Journal of Public Health. 1996 Dec;86(12):1794-7.
13. Fritz CD, Otegbeye EE, Zong X, Demb J, Nickel KB, Olsen MA, Mutch M, Davidson NO, Gupta S, Cao Y. Red-flag signs and symptoms for earlier diagnosis of early-onset colorectal cancer. JNCI: Journal of the National Cancer Institute. 2023 Aug 1;115(8):909-16.
14. Tørring ML, Murchie P, Hamilton W, Vedsted P, Esteva M, Lautrup M. Publisher's copyright statement: This work is licensed under the Creative Commons Attribution-Noncommercial-Share Alike 4.0 Unported License. Additional information. journal of cancer. 2017 Sep 7;117(6):888-97.
15. Pita-Fernández S, González-Sáez L, López-Calviño B, Seoane-Pillado T, Rodríguez-Camacho E, Pazos-Sierra A, González-Santamaría P, Pértega-Díaz S. Effect of diagnostic delay on survival in patients with colorectal cancer: a retrospective cohort study. BMC cancer. 2016 Aug 22;16(1):664.