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# Clinical Characteristics and Treatment Patterns of Patients with Colorectal Cancer

Habib Ullah[1] | Muhammad Ehsan[1] | Fizza Mukarram[2]

[1]Department of Laboratory Technology, Shaikh Zayed Hospital, Lahore, Pakistan | [2]University of Health Sciences, Lahore, Pakistan

***Correspondence:** Muhammad Ehsan (ahspreparations512@gmail.com)

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**Abstract**

**Background:** Colorectal cancer (CRC) is regarded as one of the most frequently occurring cancers in the world, and an important cause of morbidity and mortality in cancer patients. The current study aimed to evaluate the characteristics, tumor profile, treatment, and factors related to advanced colorectal cancer. **Methods:** This cross-sectional analytical study used a descriptive approach (n=150) including colorectal cancer patients who were diagnosed histopathologically in the oncological and surgical department of tertiary care hospitals. The data was collected through a data collection form, and the information collected included the demographic characteristics, clinical symptoms, location of the tumor, histological type, tumor grade, status of lymph nodes, clinical stage, treatment modalities, chemotherapy regimen, and clinical outcomes (SPSS version 24.0). **Results:** The mean age was 58.7 ± 12.1 years, and 60.0% were male. Sixty-one percent of patients had colon tumors, and 38.7% had rectal tumors. The most frequently occurring histological diagnosis was adenocarcinoma (87.3%), with involvement of the lymph nodes seen in 59.3%. Stage III disease was the most common (42.0%), and Stage II was the second most common (28.0%). The most frequently used treatment modality was surgery with chemotherapy (44.7%), and the most frequently used chemotherapy was FOLFOX (48.6%). Poor outcomes were significantly related to the advanced stage. **Conclusion:** There was a strong need for early diagnosis, early referral, and risk-based screening for better clinical outcomes and survival, as the majority of patients presented with advanced disease with nodal involvement.

**Keywords:** Colorectal cancer, clinical characteristics, treatment patterns, chemotherapy, tumor staging, oncology, colorectal malignancy

## Introduction

Colorectal cancer (CRC) is a relatively common gastrointestinal malignancy and is a significant cause of cancer morbidity and mortality in the world [1]. It is growing due to population ageing, urbanization, dietary changes, physical inactivity, obesity, the presence of smoking, and other factors related to lifestyle [2]. Typically, CRC develops in the colon or rectum as a progressive sequence of adenomas and cancers, making screening and early detection possible[3]. Yet, most of the time, patients are diagnosed at a late stage, particularly in the context of low awareness, screening access, and timely referral[4]. The clinical signs of CRC vary with the tumour site and the stage of the disease. Weight loss, bowel movement changes, pain in the abdomen, anemia, fatigue, and rectal bleeding are the most common symptoms of this disease[5]. The site, histological type, grade of differentiation, the presence of lymph nodes, and TNM stage are significant factors for prognosis and treatment decision-making [6,7].

Adenocarcinoma is the most common histological subtype, and poor differentiation and positivity of nodes correlate with aggressive disease and worse prognosis[8]. The treatment of CRC is a multidisciplinary approach and varies based on the stage, location, and fitness of the patient. The primary treatment method for localized disease is surgery, while chemotherapy, chemoradiotherapy, and palliative care are employed as indicated by clinical conditions[9]. In the adjuvant or advanced setting, regimens like FOLFOX, CAPOX, and FOLFIRI are often employed [10]. Assessment of clinical characteristics and treatment patterns can help detect diagnostic and treatment gaps and facilitate improved patient care. Context-specific evidence on the clinical profile, treatment patterns, and predictors of advanced-stage colorectal cancer remains limited, warranting further investigation[11]. Hence, this study aimed to evaluate the clinical features, tumour profile, treatment and factors associated with advanced disease of colorectal cancer patients.

## Methodology

The cross-sectional study (March 2022 to August 2023) was conducted to know the clinical aspects and trend of management in CRC patients in oncology and general surgery departments of affiliated tertiary care shaikh zayed hospital Lahore. The study population consisted of patients with CRC diagnosed by histopathology who were under treatment or follow-up during the study period. The ethics review committee of the

institution approved the study before it started. Informed consent was obtained in writing by all participants, in the event of direct patient interviews. Full anonymity and confidentiality were observed during the study, and all the procedures followed were according to the rules of accepted ethical standards in clinical research in human subjects.

Non-probability consecutive sampling was used to recruit patients, the number of which was 150. Patients included were those with a histopathologic diagnosis of CRC in adults (18 years of age or older). Participants who declined to participate in the study or had incomplete medical records or a diagnosis of recurrent malignancy before the start of the study were excluded from the study. To standardize the study, there was an exclusion of patients with other primary gastrointestinal malignancies. A data collection form was created by structuring existing patient medical records and databases of oncology treatments, and data were collected using this data collection form. Socio-demographic, clinical, tumor, histological, and disease stage data, as well as treatment, chemotherapy, hospital stay, and postoperative complications, were collected.

The staging of the disease was based on the TNM staging system, which was divided into 4 clinical stages, defined by the well-defined oncologic guidelines. Assessment of pattern of treatment included documenting the type of treatment received (surgery, chemotherapy, chemoradiotherapy or palliative management). Information on chemotherapy regimens (FOLFOX, CAPOX and FOLFIRI) was also recorded. Available clinical records were used to assess clinical outcomes such as length of hospital stay, postoperative complications, progression of disease during follow-up and quality of life scores.

IBM SPSS version 24.0 was used for entering and analysing data. Data were presented as mean, standard deviation, frequency and percentage. Chi-square test was used to evaluate the associations between categorical data, and where appropriate, independent t-test and ANOVA were used for continuous data. Logistic regression analysis was used to determine the factors associated with advanced stage disease. A p-value of $< 0.05$ was regarded as a statistically significant value.

## Results

A total of 150 patients who underwent a histopathologic diagnosis of CRC were studied. The average age of the subjects was 58.7 ± 12.1 years, and the majority were men. The results include the demographic profile, description of tumor characteristics, clinical stage, presenting symptoms, treatment modalities, chemotherapy patterns, treatment outcomes, and factors associated with advanced disease. Table 1 presents demographic and clinical characteristics of participants of the study. There were 60.0% males and 40.0% females in the present study. The largest age group was 50-64 years of age, with 65 and older being the next largest group. The urban population was higher than the rural population. Twenty-six percent of the patients had a family history of cancer, and 34.7% of patients had a history of smoking.

**Table 1: Demographic and Clinical Characteristics of Colorectal Cancer Patients (n = 150)**

| Variable | Category | n (%) |
|---|---|---|
| Gender | Male | 90 (60.0) |
| | Female | 60 (40.0) |
| Age Group (years) | <50 | 32 (21.3) |
| | 50–64 | 71 (47.3) |
| | ≥65 | 47 (31.4) |
| Mean Age (years) | Mean ± SD | 58.7 ± 12.1 |
| Residence | Urban | 94 (62.7) |
| | Rural | 56 (37.3) |
| Family History of Cancer | Yes | 39 (26.0) |
| Smoking History | Yes | 52 (34.7) |

Table 2 lists characteristics of the tumors. The incidence of colon tumors was higher than that of rectal tumors. The most common histological type was adenocarcinoma, with mucinous adenocarcinoma being the second most common. The most of the tumors were moderately differentiated, and a significant number of patients had poorly differentiated tumors. A high proportion of the study population (over 50%) had involvement of the lymph nodes.

**Table 2: Tumor Characteristics Among Colorectal Cancer Patients (n = 150)**

| Variable | Category | n (%) |
|---|---|---|
| Tumor Location | Colon | 92 (61.3) |
| | Rectum | 58 (38.7) |
| Histological Type | Adenocarcinoma | 131 (87.3) |
| | Mucinous Adenocarcinoma | 14 (9.3) |
| | Other Types | 5 (3.4) |
| Histological Grade | Well Differentiated | 36 (24.0) |
| | Moderately Differentiated | 81 (54.0) |
| | Poorly Differentiated | 33 (22.0) |
| Lymph Node Involvement | Positive | 89 (59.3) |
| | Negative | 61 (40.7) |

As shown in Table 3, the majority of patients were diagnosed at stage III, followed by stage II and stage IV disease. Few patients were seen with Stage I disease. In total, 94 patients (62.7%) had an advanced disease (Stage III–IV). Rectal bleeding, abdominal pain, and change in bowel habits were the most common symptoms. Patients could provide more than one symptom, so several patients had more than one symptom. The surgery plus chemotherapy regimen was the most common treatment option. Surgery was performed on a lesser number of patients, primarily due to higher stage disease. Surgery with chemoradiotherapy was also applied and was mostly observed with more advanced disease in patients receiving chemotherapy alone and palliative treatment. Of those treated with chemotherapy (111 patients), the most common regimen was FOLFOX followed by CAPOX and FOLFIRI. Other regimens were used in smaller numbers as per the stage of the disease, clinical condition, and treatment plan.

**Table 3: Clinicopathological Spectrum of Selected Population**

| Clinical Stage at Diagnosis (n = 150) | | Presenting Symptoms of Colorectal Cancer Patients (n = 150) | |
|---|---|---|---|
| **Stage** | **n (%)** | **Symptom*** | **n (%)** |
| Stage I | 14 (9.3) | Rectal Bleeding | 96 (64.0) |
| Stage II | 42 (28.0) | Abdominal Pain | 88 (58.7) |
| Stage III | 63 (42.0) | Change in Bowel Habits | 79 (52.7) |
| Stage IV | 31 (20.7) | Weight Loss | 71 (47.3) |
| **Treatment Modalities Received by Patients (n = 150)** | | Fatigue | 63 (42.0) |
| **Treatment Modality** | **n (%)** | Anemia | 57 (38.0) |
| Surgery Alone | 28 (18.7) | Intestinal Obstruction | 24 (16.0) |
| Surgery + Chemotherapy | 67 (44.7) | **Chemotherapy Patterns Among Treated Patients (n=150)** | |
| Surgery + Chemoradiotherapy | 26 (17.3) | **Chemotherapy Regimen** | **n (%)** |
| Chemotherapy Alone | 18 (12.0) | FOLFOX | 54 (48.6) |
| Palliative Treatment | 11 (7.3) | CAPOX | 31 (27.9) |
| | | FOLFIRI | 17 (15.3) |
| | | Other Regimens | 9 (8.2) |

The association between clinical stage and treatment modality is shown in Table 4. Treatment patterns were different depending on the stage of the disease. Surgery alone occurred more often among individuals with Stage I and Stage II disease, and surgery and chemotherapy were most common among individuals with Stage III disease. Chemotherapy alone and palliative care were much more frequently used in Stage IV disease. There was a statistically significant ($p < 0.001$) association between clinical stage and treatment modality.

**Table 4: Association Between Clinical Stage and Treatment Modality**

| Clinical Stage | Surgery Alone | Surgery + Chemotherapy | Surgery + Chemoradiotherapy | Chemotherapy Alone | Palliative Care | p-value |
|---|---|---|---|---|---|---|
| Stage I | 9 | 4 | 1 | 0 | 0 | <0.001 |
| Stage II | 14 | 22 | 4 | 2 | 0 | |
| Stage III | 5 | 35 | 16 | 6 | 1 | |
| Stage IV | 0 | 6 | 5 | 10 | 10 | |

Patients with Stage III–IV disease had a significantly longer mean hospital stay compared with those having Stage I–II disease. Patients with high stage disease also had increased postoperative complications and at 1 year were more likely to experience disease progression. The higher the advanced-stage group scores on quality of life, the lower the scores were for the other group. The results of this study indicated that the clinical outcomes were worse in the presence of advanced disease (Table 5).

**Table 5: Treatment Outcomes According to Clinical Stage**

| Outcome Variable | Stage I-II | Stage III-IV | p-value |
|---|---|---|---|
| Mean Hospital Stay (Days) | 6.4 ± 2.1 | 9.8 ± 3.7 | <0.001 |
| Postoperative Complications (%) | 11 (19.6%) | 31 (33.0%) | 0.041 |
| One-Year Disease Progression (%) | 8 (14.3%) | 36 (38.3%) | 0.002 |
| Quality of Life Score | 76.8 ± 12.4 | 61.5 ± 14.7 | <0.001 |

In Table 6, the factors associated with advanced disease. Age ≥ 65 years, smoking history, and location of the rectal tumor, as well as poor tumor differentiation, were significant factors in logistic regression analysis for advanced disease. The association with poor tumor differentiation was the highest for Stage III–IV disease. An increased odds ratio was seen with a positive family history, however not statistically significant. The overall regression model was statistically significant and had an $R^2$ value of 0.49 and model $\chi^2$ of 29.6 ($p < 0.001$).

**Table 6: Factors Associated with Advanced Disease (Stage III–IV)**

| Variable | Odds Ratio (OR) | 95% CI | p-value |
|---|---|---|---|
| Age ≥65 Years | 1.89 | 1.02–3.52 | 0.041 |
| Smoking History | 2.21 | 1.18–4.14 | 0.013 |
| Positive Family History | 1.76 | 0.91–3.39 | 0.089 |
| Rectal Tumor Location | 2.04 | 1.11–3.74 | 0.022 |
| Poor Tumor Differentiation | 3.46 | 1.71–7.01 | <0.001 |

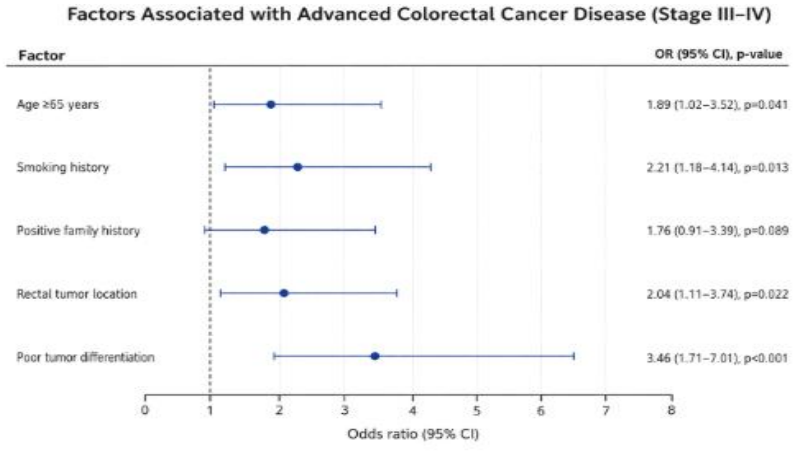


*Figure 1. Forest plot showing odds ratios and 95% confidence intervals for factors associated with advanced disease among colorectal cancer patients (n = 150).*

Poor tumor differentiation demonstrates the strongest association with advanced disease, followed by smoking history, rectal tumor location, and age>65 years (Figure 1 above). A positive family history was evaluated but did not reach statistical significance ((p = 0.089).

## Discussion

This study evaluated clinical features, tumor profile, treatment patterns, and factors associated with advanced colorectal cancer (CRC). It was found that the incidence of CRC was higher in old age; the average age was 58.7 ± 12.1 years; and the majority of the sample was male (60.0%). Commonly, patients were diagnosed at stage III; the most prevalent histological type was adenocarcinoma, and over half of the cases had lymph node involvement[12]. The most commonly used modality was surgery in conjunction with chemotherapy. The implications of these findings for clinical practice are of great significance, as many patients were diagnosed with regional spread, which is complex and the prognosis is poorer[13].

The male predominance found in this study matches the trend of other studies where men have been shown to have a higher rate of CRC than women[14]. This could be due to smoking habits, nutrition, obesity, exposure to work-related chemicals, and later seeking medical care[15]. Patients aged 50-64 years had the highest number of patients, followed by those over 65 years. A similar age trend was reported, with a higher incidence of CRC in the middle-aged and elderly population[16]. This aids age-based screening, early evaluation of bowel symptoms, and timely referral[17]. The findings related to detected tumors indicated that tumors of the colon were more prevalent than those of the rectum, and adenocarcinoma was the most common histological type of tumor. This is in line with earlier studies that reported adenocarcinoma as the most common type of CRC[18]. The majority of the tumors were moderately differentiated, with the remaining 22.0% poorly differentiated. Poor differentiation is a significant prognostic factor in their favor, as it indicates aggressive biology and is associated with nodal involvement, advanced stage, recurrence, and poor survival[19]. Higher disease burden and delay were identified, as 59.3% of patients had lymph node involvement[20].

Late diagnosis is also indicated by the stage distribution. Stage III was the most prevalent, with only 9.3% of patients presenting with Stage I disease. Overall, 62.7% of patients had stage III–IV disease. This is similar to the pattern observed in studies where delayed presentation and diagnostic delay were associated with advanced disease[21]. Rectal bleeding, abdominal pain, and change in bowel habits were the most frequent symptoms. These are identified early symptoms of CRC and indicate that diagnostic evaluation should be undertaken[22]. The other frequent symptoms were weight loss, fatigue, and anemia. Treatment modality was dependent on stage. Surgery was performed more commonly in Stage I and II disease than in any other stage of disease, and surgery plus chemotherapy was most commonly performed in Stage III disease. Stage IV (palliative) care and chemotherapy were the primary treatments used. This is similar to the standard CRC management, that is, surgery is the primary curative modality of treatment for localized disease, and chemotherapy or chemoradiotherapy is used in addition for node-positive, rectal, and metastatic disease[23]. FOLFOX was the most common regimen, followed by CAPOX and FOLFIRI[24].

Poor outcomes were found with the advanced stage of the disease. Patients with Stage III-IV exhibited higher scores of progression at one year and lower scores of quality of life in comparison to patients with Stage I-II.Patients with Stage III-IV had longer hospital stay, more complications, higher scores of progression at one year, and lower scores of quality of life at one year than did patients with Stage I-II. Other studies also found that the burden of treatment, risk of recurrence, and a decrease in quality of life are associated with advanced CRC[25].

There are some limitations in this study. The cross-sectional design does not allow for causal interpretation, and the setting of tertiary care can contain more advanced referred cases. Limited follow-up and non-probability sampling may impact generalizability. Further multicenter trials with longer follow-up periods and larger patient populations, as well as inclusion of screening history, molecular markers, and survival analysis, are suggested. The results of the study overall highlight a need for earlier diagnosis, risk-based screening, smoking prevention, and multidisciplinary management of colorectal cancer.

## Conclusion

In this study, it is confirmed that colorectal cancer is often diagnosed at an advanced stage, there is a high prevalence of lymph node involvement, and the presence of predominant adenocarcinoma. Chemotherapy was the predominant treatment modality, with advanced stage being linked to more complications, increased disease progression, and decreased quality of life, as well as longer hospital stay. Advanced disease was predicted by poor tumor differentiation, smoking history, age, and location of the tumor within the rectum. Clinically, early screening, timely diagnosis, and multi-disciplinary management are critical. Larger Longitudinal studies are suggested to evaluate survival outcomes.

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