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Original Article

Quality of Life After Colorectal Cancer Surgery and Its Association with Spousal Caregiver Burden: A Cross-Sectional Study

Mina Alvandipour[1], Shima Afzali[1], Eisa Nazar[2], Gooya Tayyebi[3*]

1. Department of Surgery, School of Medicine, Mazandaran University of Medical Sciences, Sari, Mazandaran Province, Iran

2. Psychiatry and Behavioral Sciences Research Center, Addiction Institute, Mazandaran University of Medical Sciences, Sari, Iran

3. Department of Psychiatry, School of Medicine, Mazandaran University of Medical Sciences, Sari, Iran

Background: While colorectal cancer surgery improves clinical outcomes, it frequently imposes long-term physical and psychosocial challenges on both patients and their families. Evidence regarding the relationship between postoperative quality of life (QoL) and spousal caregiver burden remains limited, particularly within non-Western populations. This study aimed to evaluate the QoL of patients following colorectal cancer surgery and to examine its association with the psychological burden experienced by their spouses.

Materials and Methods: A descriptive cross-sectional study was conducted, recruiting 99 patient–spouse dyads from two hospitals in northern Iran in 2023. Patient QoL was assessed using the WHO Disability Assessment Schedule II (WHODAS II), and caregiver burden was evaluated using the Zarit Burden Interview (ZBI). Inclusion criteria comprised adults with confirmed colorectal cancer living with a caregiving spouse; those with severe cognitive impairment or incomplete data were excluded. Data were analysed using Pearson's correlation and Chi-squared tests.

Results: The mean age of patients was 61.84 ± 12.10 years, and that of spouses was 51.14 ± 13.12 years. The majority of patients underwent anterior resection (55.6%) or low anterior resection (30.3%). Patients reported moderate disability (mean WHODAS II score: 22.20), particularly regarding social participation. The mean caregiver burden score was 6.98. Significant positive correlations were identified between caregiver burden and patient difficulties in social participation ($r=0.308$, $p=0.002$) and communication ($r=0.202$, $p=0.045$).

Conclusion: Postoperative QoL among colorectal cancer patients was suboptimal, with lower QoL scores being associated with a greater caregiver burden. These findings highlight the necessity for family-centred care and the implementation of targeted support strategies for spousal caregivers.

Keywords: Quality of Life, Colorectal Cancer, Caregiver Burden, WHODAS-II, Zarit Burden Interview

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Corresponding author:
Gooya Tayyebi
Department of Psychiatry, School of Medicine, Mazandaran University of Medical Sciences, Sari, Iran
E-mail: g.tayyebi@yahoo.com

Introduction

Colorectal cancer (CRC) is among the most prevalent malignancies worldwide, with an increasing incidence observed in both developed and developing countries. It currently ranks as the third most common cancer globally and remains a major contributor to cancer-related mortality (1). Whilst advances in diagnostic methods, surgical techniques, and multimodal therapies have significantly improved survival rates, (2) the increasing life expectancy of CRC survivors has shifted clinical focus from mere survival to the optimisation of quality of life (QoL) (3).

Surgical intervention remains the cornerstone of CRC management, with techniques ranging from anterior resection (AR) and low anterior resection (LAR) to abdominoperineal resection (APR). Although these procedures are effective for local tumour control, they often result in considerable functional impairments, including defecatory dysfunction, urinary and sexual complications, and the potential necessity for a permanent stoma (4-6). Up to 50% of long-term CRC survivors report chronic gastrointestinal symptoms that adversely impact their QoL (7-8). Furthermore, neoadjuvant chemoradiation-despite its role in local control-may exacerbate these complications, including bowel dysfunction, fatigue, and emotional distress (9).

The World Health Organization defines QoL as an individual's perception of their position in life within the context of the culture and value systems in which they live, and in relation to their goals, expectations, standards, and concerns (10). Health-related QoL (HRQoL) has consequently become a critical endpoint in oncology research, as it serves as a comprehensive indicator of clinical effectiveness, psychosocial outcomes, and patient satisfaction (11). Whilst QoL assessments for cancer patients are now widely established, the psychological and emotional impact of CRC surgery on caregivers-particularly spouses-remains under-explored.

Spouses frequently serve as the primary source of support; therefore, the burden they endure can significantly affect their own long-term well-being. Existing literature demonstrates that caregiver distress is closely correlated with the functional limitations and emotional states of patients (12). For instance, Aylaz *et al*. (2021) demonstrated a strong positive correlation between patients' disability scores and their spouses' burden levels, as measured by the WHODAS-II and the Zarit Burden Interview (13).

Despite the global attention devoted to QoL in cancer survivors, research evaluating the reciprocal impact of CRC surgery on both patients and their spouses is rare within the Iranian context. Cultural norms, religious practices, and limited psychosocial resources may significantly influence both the perception of, and adaptation to, disease-related disability. Consequently, this study aims to assess the QoL of patients following colorectal surgery and to examine its association with caregiver burden among their spouses. By identifying the most affected domains and elucidating the interrelation between patient disability and caregiver stress, this research seeks to advocate for family-centred care and inform the development of targeted postoperative support strategies.

Materials and methods

Study Design and Setting

This descriptive, cross-sectional study was conducted in 2023 at two tertiary referral centres—Imam Khomeini Hospital and Shafa Hospital—in Sari, Iran, under the auspices of the Mazandaran University of Medical Sciences. The primary objective of this study was to evaluate the quality of life (QoL) in patients who had undergone colorectal cancer surgery and to examine the corresponding psychological burden experienced by their spousal caregivers.

Study Population and Sampling

The study population comprised patients who had undergone surgical treatment for colorectal adenocarcinoma within the previous ten years, were currently married, and resided with their spouse. A total of 99 patient–spouse dyads were recruited using a convenience sampling method during scheduled follow-up visits. The inclusion criteria for patients were: age ≥18 years, absence of concurrent major medical or psychiatric comorbidities, no chemotherapy administered within the preceding eight weeks, no recent hospitalisation (excluding elective stoma

closure), and no evidence of tumour recurrence or metastatic disease at the time of recruitment. Patients were excluded if they had experienced major postoperative complications, such as anastomotic leakage, sepsis, or a history of intensive care unit (ICU) admission. Furthermore, any patient–spouse dyad in which either party was unwilling to participate or unable to complete the questionnaires was excluded from the study.

Data Collection Instruments

Data were collected using three validated instruments, alongside a structured demographic and clinical checklist.

WHO Disability Assessment Schedule II(WHODAS -II):

This 36-item instrument evaluates functional disability across six domains: cognition, mobility, self-care, interpersonal interactions, life activities, and social participation. Higher scores denote greater functional limitation. The Persian version has been previously validated and demonstrated high internal consistency (Cronbach's alpha = 0.92) (14).

Short Form-36 Health Survey (SF-36):

This 36-item questionnaire assesses health-related quality of life (HRQoL) across eight domains: physical functioning, role limitations due to physical health, bodily pain, general health, vitality, social functioning, role limitations due to emotional problems, and mental health. Two summary component scores-the Physical Component Summary (PCS) and the Mental Component Summary (MCS)-are derived from these domains. The validated Persian version was utilised (15).

Zarit Burden Interview (ZBI):

This 22-item scale assesses the subjective burden experienced by caregivers, rated on a five-point Likert scale. It is a widely recognised tool for evaluating caregiver stress and has demonstrated excellent reliability within Iranian populations (16). In addition to these validated instruments, a demographic and clinical checklist was employed to record data regarding age, gender, educational attainment, occupation, and surgical history.

Surgical Classification

Patients were categorised into three groups based on the surgical approach, the extent of the colonic or rectal resection, and the anatomical level of the anastomosis relative to the anal verge:

Abdominoperineal Resection (APR):

This procedure involves the radical resection of the rectum and anal canal, resulting in a permanent end-colostomy. As the anal sphincter mechanism is not retained, patients experience significant alterations to bowel function, necessitating substantial lifestyle adjustments and ongoing stoma-related care.

Low Anterior Resection (LAR):

This procedure involves the resection of the lower rectum while preserving the anal sphincter. In LAR, the anastomosis is performed within 6 cm of the anal verge, facilitating bowel continuity and negating the requirement for a permanent stoma, which generally supports a more favourable postoperative quality of life.

Anterior Resection (AR):

In this operation, the affected segment of the colon or upper rectum is resected, with the anastomosis situated at or above 7 cm from the anal verge. This category includes procedures such as sigmoid colectomy; these generally present different functional outcomes compared with LAR and APR, as they typically allow for more conventional bowel management (17).

This classification system enabled a comparative analysis of functional outcomes and associated caregiver burden relative to the specific surgical intervention performed.

Procedure

Eligible patients and their spouses were interviewed in private consultation rooms within the surgical wards. To ensure participant comfort and cultural sensitivity, each couple was interviewed by a same-gender researcher who had undergone rigorous training in the administration of the study instruments. Interviews were conducted in person and lasted between 30 and 45 minutes. Whilst the interviewers were not blinded to the surgical procedure, standardised protocols were strictly followed to minimise interviewer bias. Prior to participation, all individuals received comprehensive

verbal and written information regarding the study objectives, and provided written informed consent.

Ethical Considerations

The study protocol received formal approval from the Research Ethics Committee of Imam Khomeini Hospital, Mazandaran University of Medical Sciences (Approval Code: IR.MAZUMS.IMAMHOSPITAL.REC.1403.067). All participants were provided with comprehensive information regarding the study's objectives and procedures and subsequently provided written informed consent. Participants were explicitly advised of their right to withdraw from the study at any stage without consequence to their clinical care. To maintain confidentiality, all personal identifiers were removed, and data were anonymised prior to statistical analysis.

Statistical Analysis

Data were analyzed using SPSS version 20. Descriptive statistics including mean, standard deviation, and frequency distributions were used to summarize demographic and clinical characteristics. The Kolmogorov–Smirnov test was applied to assess the normality of continuous variables. Depending on distribution characteristics:

Pearson or Spearman correlation coefficients were calculated to assess associations between WHODAS-II scores and caregiver burden.

Independent t-tests or Mann-Whitney U tests were used for two-group comparisons.

One-way ANOVA or Kruskal–Wallis tests were used for comparisons across more than two groups.

Chi-square or Fisher's exact tests were applied for categorical variables.

A p-value of less than 0.05 was considered statistically significant.

Results

A total of 99 patient–spouse dyads participated in the study. The mean age of the patients was 61.84 ± 12.10 years, with an approximately equal gender distribution (50.5% male). Regarding educational attainment, 50.5% of patients had completed a high school diploma or less, whilst 21.2% held post-secondary qualifications. A large proportion of the patient cohort were retired or unemployed. The mean age of the spouses was 51.14 ± 13.12 years, with 58.6% being female. Nearly half of the spouses (49.5%) had completed a high school education or less, and 43.4% held higher education degrees; the majority were homemakers or engaged in informal employment.

Regarding the surgical approach, 55.6% of patients had undergone anterior resection (AR), 30.3% low anterior resection (LAR), and 14.1% abdominoperineal resection (APR).

The mean total score on the WHO Disability Assessment Schedule (WHODAS-II) was 22.20 ± 16.86, indicating a moderate degree of functional impairment across the study population. Among the WHODAS-II domains, the most affected areas were 'life activities' (mean = 6.28 ± 6.01) and 'participation in society' (mean = 4.63 ± 4.08), followed by 'mobility' (mean = 4.10 ± 3.51). The lowest mean scores were observed in the 'understanding/communication' (1.81 ± 3.45) and 'getting along with others' (2.09 ± 2.77) domains **(Table 1)**. The mean caregiver burden score, as assessed by the Zarit Burden Interview (ZBI), was 6.98 ± 8.97, reflecting a mild to moderate level of burden among the majority of spouses.

Statistical analysis revealed a significant positive correlation between patient limitations in social participation and caregiver burden (Spearman's rho = 0.308, p = 0.002), indicating that greater patient difficulty in social engagement is associated with increased emotional and caregiving stress. A weaker but significant association was also identified between communication difficulties and caregiver burden (rho = 0.202, p = 0.045). No significant correlation was observed between the overall disability score and the level of burden reported by spouses **(Table 2).**

Comparative analysis across surgical subgroups revealed no statistically significant differences in the total WHODAS-II score or the caregiver burden score between patients who underwent AR, LAR, or APR ($p > 0.05$ for all comparisons). Although patients who underwent LAR exhibited slightly higher mean scores in the 'mobility' and 'interpersonal functioning' domains, these differences did not reach statistical significance. Similarly, subgroup analysis by gender revealed no significant differences in disability or caregiver burden scores, although female patients

reported marginally lower scores in physical domains. Education level was not significantly associated with total disability or caregiver burden; however, patients with an educational attainment below a high school diploma presented with numerically higher total disability scores, suggesting a potential trend. Finally, patient age was significantly correlated with disability in the communication domain (rho = 0.229, p = 0.023), suggesting that older patients experienced greater impairment in cognitive and communicative functions. No significant correlation was found between age and overall disability or burden.

Table 1. Mean WHODAS-II Domain Scores and Caregiver Burden (ZBI) in Colorectal Cancer Patients (n = 99)

Domain	Mean	Standard Deviation (SD)
Understanding/Communication	1.81	3.45
Mobility	4.10	3.51
Self-care	3.29	3.10
Getting Along with Others	2.09	2.77
Life Activities	6.28	6.01
Participation in Society	4.63	4.08
Total WHODAS-II Score	**22.20**	**16.87**
Zarit Burden Score (Spouse)	**6.98**	**8.97**

Table 2. Spearman Correlation Between WHODAS-II Domains and Caregiver Burden Score (ZBI)

WHODAS-II Domain	Spearman's rho	p-value
Understanding/Communication	0.202	0.045*
Mobility	0.052	0.613
Self-care	0.006	0.954
Getting Along with Others	0.097	0.340
Life Activities	–0.127	0.210
Participation in Society	0.308	0.002**
Total WHODAS-II Score	0.073	0.472

Statistically significant correlations were found between caregiver burden and communication ($p < 0.05$) and social participation ($p < 0.01$)

Discussion

This study investigated the quality of life (QoL) in patients following colorectal cancer (CRC) surgery and explored its association with the psychological burden experienced by their spousal caregivers. Our findings indicate that patients experience a moderate level of functional impairment postoperatively, with the most significant deficits identified in 'life activities' and 'social participation'. Furthermore, a clear correlation between lower patient QoL and increased caregiver burden was observed, underscoring the bidirectional nature of patient recovery and family well-being.

The WHODAS-II results demonstrate that patients commonly encounter limitations in performing daily activities and maintaining social engagement. These findings align with existing literature; for instance, Aylaz *et al.* (2021) reported that postoperative QoL in CRC survivors declines significantly, affecting both patients and their spouses—particularly in domains such as self-care, life activities, and community participation (13).Similarly, Gürçayır *et al.* observed that whilst some functional metrics remain stable, a considerable proportion of patients report diminished global health following colorectal surgery (18). Furthermore, Toleutayeva *et al.* noted that although patients may maintain relatively preserved physical functioning, emotional well-being and social isolation remain primary concerns (19).

Our study identified that patient impairments in communication and social participation were significantly correlated with caregiver burden. This supports the hypothesis that when patients retain the

ability to comprehend, express their needs, and engage in daily activities, caregivers report lower levels of psychological stress. These results are consistent with research suggesting that effective patient–caregiver communication facilitates emotional support and reduces distress for both parties (20-22). Evidence from systematic reviews further indicates that strong communication and mutual understanding between patients and their spouses enhance intimacy, mitigate caregiver fatigue, and improve clinical outcomes (23).

Interestingly, we did not observe statistically significant differences in patient disability or caregiver burden based on gender, educational attainment, or the specific surgical procedure. These findings suggest that the functional and emotional consequences of CRC surgery may transcend demographic factors, indicating that psychosocial interventions should be broadly implemented rather than restricted to specific patient subgroups. Nevertheless, patients who underwent low anterior resection (LAR) or abdominoperineal resection (APR) exhibited slightly higher disability in certain functional domains. This echoes the findings of Georges *et al.*, who reported worse outcomes regarding body image, continence, and sexual function among APR patients compared with those who underwent anterior resection (AR) (24).

An additional finding of note was the significant correlation between advancing age and difficulties in the 'understanding/communication' domain. This suggests that elderly patients may face particular challenges in expressing their needs and processing complex health information. This observation aligns with the work of van Weert *et al.*, who identified that older cancer patients prioritise clear communication, realistic expectations, and emotional support during interactions with healthcare providers (25). Consequently, our findings underscore the necessity of adopting age-sensitive communication strategies within postoperative care frameworks.

In summary, the results of this study highlight the bidirectional nature of the patient–caregiver relationship following colorectal surgery. Addressing the psychosocial requirements of both patients and their spouses is essential for holistic recovery. Healthcare systems should strive to integrate family-centred rehabilitation programmes and routine psychosocial evaluations to optimise outcomes for this patient population.

Conclusion

The findings of this study underscore the profound and enduring impact of colorectal cancer surgery on the functional status and quality of life (QoL) of patients, particularly within the domains of daily life activities and social participation. Crucially, the data reveal a significant correlation between patient disability and the psychological burden experienced by spousal caregivers, specifically regarding communication deficits and restricted societal engagement. These results reinforce the imperative for a family-centred approach to colorectal cancer care, acknowledging that patient recovery and caregiver well-being are intrinsically interdependent. By addressing functional limitations and providing targeted emotional support to caregivers, healthcare systems may significantly enhance the trajectory of postoperative recovery and long-term adaptation for both the patient and their family.

Limitations and Recommendations

This study has several inherent limitations. First, its cross-sectional design precludes the inference of causality or the assessment of temporal changes in quality of life. Consequently, longitudinal research is required to monitor functional and emotional outcomes across the broader colorectal cancer (CRC) trajectory. Second, the cohort was restricted to married patients residing with their spouses; this may not reflect the experiences of unmarried individuals, single caregivers, or alternative family structures. Third, although the cultural and religious homogeneity of the study population potentially enhances internal validity, it simultaneously constrains the generalisability of the findings to more diverse populations.

Future research should employ longitudinal designs incorporating larger and more heterogeneous samples to better delineate these relationships. Furthermore, investigation into the efficacy of targeted interventions-such as structured communication training, peer support groups, and caregiver education programmes-is warranted.

Clinically, it is imperative that healthcare systems routinely assess both patient disability and caregiver burden, particularly in the immediate postoperative period. Providing multidisciplinary support, including psychological counselling, access to social services, and structured rehabilitation, is essential. Integrating these evidence-based strategies into the standard of care for CRC patients may enhance postoperative recovery, mitigate caregiver burnout, and ultimately improve the quality of life across the entire cancer care continuum.

Declaration

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request

Conflicts of interest

The authors have nothing to disclose.

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Authors Contribution

Study Design: MA, GT
Data Collection: MA, GT, SA
Statistical Analysis: EN
Data Interpretation: MA, GT, ET, SA
Drafting the Article: MA, GT, EN, SA
Literature Search: MA, GT, SA
Funds Collection: MA
Final Approval: MA, GT

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Ethics approval and consent to participate

The study protocol received formal approval from the Research Ethics Committee of Imam Khomeini Hospital, Mazandaran University of Medical Sciences (Approval Code: IR.MAZUMS.IMAMHOSPITAL.REC.1403.067)

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