# Factors Predicting Postoperative Quality of Life among Rectal Cancer Patients in Thailand: A Retrospective Cohort Study

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Postoperative Quality of Life Among Rectal Cancer Patients in Thailand
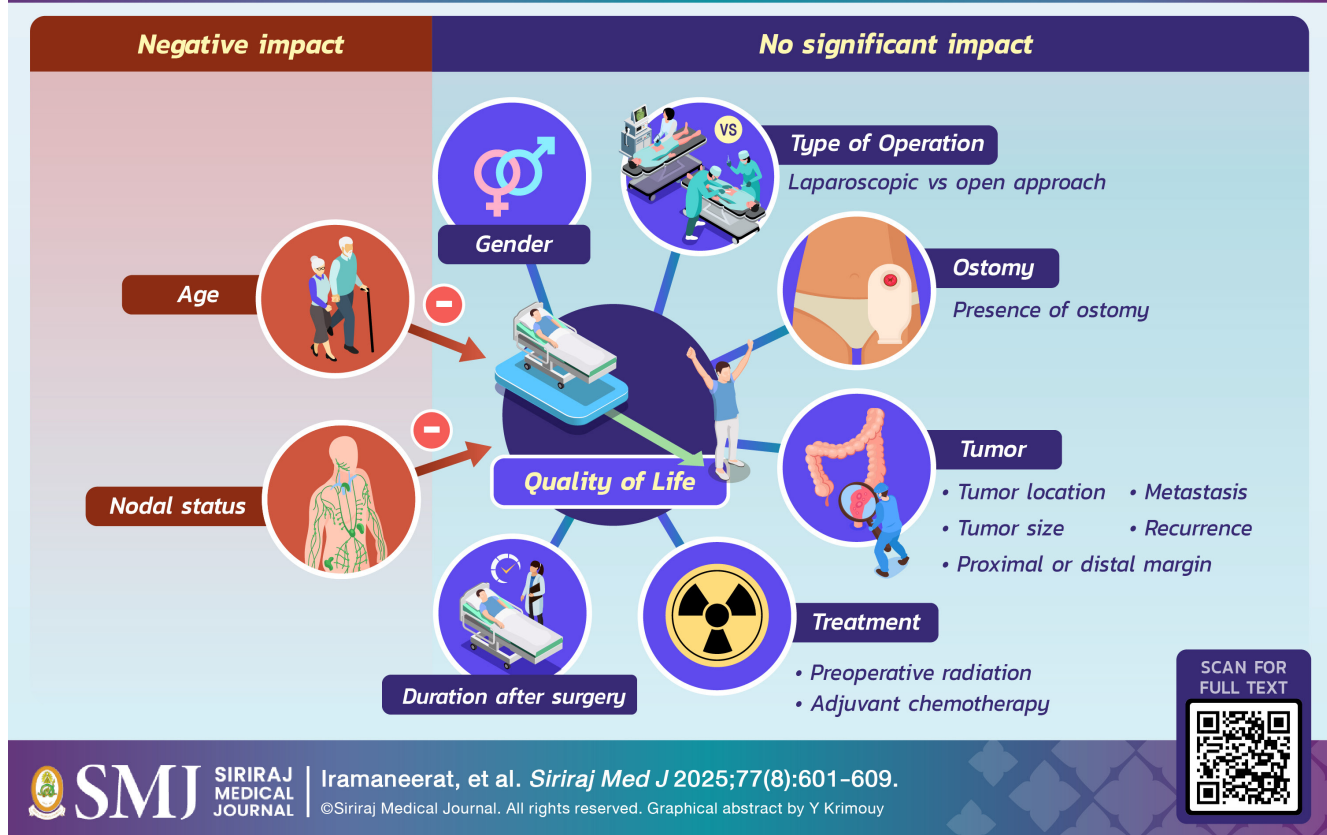
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ABSTRACT

Objective: The objectives of this study were to evaluate the postoperative quality of life (QoL) measures of Thai rectal cancer patients, and to determine which factors impact the QoL.

Materials and Methods: We reviewed the medical records of rectal cancer patients who underwent abdominoperineal resection or low anterior resection between 2009 and 2012. We sent out Functional Assessment of Cancer Therapy – Colorectal (FACT-C) questionnaires to patients who met the criteria. The T-test, Kendall's Tau-b, and Pearson correlation were used to select potentially significant predictors (p-value <0.1), which were then included in the multiple regression analysis to predict FACT-G (General QoL) and FACT-C (General QoL + concerns related to colorectal cancer) scores.

Results: We analyzed data from 144 patients (out of 480 patients who met the criteria). The average FACT-G and FACT-C scores were 87.34 and 106.79, respectively. The factor that had a significant negative impact on FACT-G was age (t = -2.67, p = 0.008). The factors that had a significant negative impact on FACT-C were nodal status (t = -1.98, p = 0.05) and age (t = -2.66, p = 0.009).

Conclusion: The postoperative QoL of Thai rectal cancer patients is similar to the QoL measures reported in a prior study. The QoL measures were found to be negatively impacted by age and lymph node status. Gender, the type of operation, presence of ostomy, location of the tumor, preoperative radiation, adjuvant chemotherapy, laparoscopic approach, duration after surgery, proximal and distal margins, tumor size, metastasis, and recurrence showed no impact on the QoL.

Keywords: Quality of life; rectal cancer; FACT-C, Multiple regression (Siriraj Med J 2025; 77: 601-609)

INTRODUCTION

Colorectal cancer is a significant public health problem in Thailand. Its incidence is high, being ranked the second and third most common cancer in males and females, respectively.[1] It is the only malignancy in Thailand showing an increased incidence in both genders in the past decade.[2] The treatment of rectal cancer is an important part of addressing this problem. One critical aspect of treating rectal cancer patients is considering their postoperative quality of life. Curing these patients often impacts their quality of life.[3] Rectal cancer patients can experience a wide range of sequelae after surgery such as fecal urgency, urinary incontinence, impotence, dyspareunia, anxiety, and depression. These sequelae can impact their quality of life (QoL).[3-5]

Many researchers have demonstrated that the quality of life of rectal cancer patients is influenced by many factors. Li et al. showed that the QoL could be impacted by age, gender, socioeconomic status, and the presence of stoma.[6] Some researchers have reported that low anterior resection patients have a better QoL than patients who underwent abdominoperineal resection (APR).[7] On the other hand, there are many studies that have shown that APR patients do not have a worse QoL than low anterior resection (LAR) patients.[8-10] Some researchers have suggested that the impact of the type of surgery on the QoL is inconclusive.[11] Many studies have shown that the QoL is influenced by the patient and tumor characteristics, the surgical technique, the use of preoperative radiation, and the method and level of anastomosis.[3,12] There are also some factors that have been shown to have no impact on QoL, such as gender, duration after surgery, the level of anastomosis[13], and the presence of permanent colostomy.[14] Clearly, determining the factors that impact the postoperative QoL in rectal cancer patients is quite difficult, and it is therefore not surprising that the data in the literature provide somewhat inconclusive findings. A patient's QoL could be changed significantly by several sociodemographic and clinical factors. However, there was a lack of evidence on which factors would impact QoL in Thai rectal cancer patients. A QoL study of Thai rectal cancer patients is needed to gain an insight into how to improve patients' QoL after surgery in the context of Thailand.

There are many quality of life measures that contain a module related to colorectal cancer patients. The most commonly used are: the European Organization for Research and Treatment of Cancer Quality of Life Questionnaires (EORTC) QLQ-C$_{30}$ and QLQ-CR$_{38}$, and Functional Assessment of Cancer Therapy – Colorectal (FACT-C).[15] In this study, we employed FACT-C to assess quality of life because the instrument has already been validated and translated into the Thai language following the FACIT translation project procedure and guidelines.

The objectives of the present study were: (1) to evaluate the postoperative quality of life measures (FACT-C) of Thai rectal cancer patients, and (2) to determine which factors impact the quality of life.

MATERIALS AND METHODS

After obtaining ethical approval from The Institutional Review Board of our medical center (COA no. Si 230/2013), we retrospectively reviewed the medical records of patients aged 18–80 years old who were diagnosed with carcinoma of the rectum and who underwent APR (group 1) or LAR (group 2) between 2009 and 2012. The total number of eligible patients was 480. Power analysis prior to this study revealed that we needed 177 patients in order to reveal significant differences of FACT-C score of 10 points with power of 0.8 and Type I error rate of 0.05. We expected a 50% response rate from patients. We also considered the possibility of getting incomplete data from questionnaires. This led to our decision to send questionnaires to all 480 patients who met with the inclusion criteria. We excluded cases with non-adenocarcinoma. We assessed the patients' quality of life with a minimum postoperative time of 3 months to ensure the stability of the quality of life score. The retrieved data included age, gender, the type of operation, the presence of ostomy, location of the tumor from the anal verge (measured by colonoscopy), preoperative radiation, adjuvant chemotherapy, approach (laparoscopic or open surgery), duration after surgery, proximal and distal margins of the surgical specimen, pathological tumor size, TNM staging, and presence of recurrence.

We sent out Functional Assessment of Cancer Therapy – Colorectal (FACT-C) questionnaires to all cases that fit our inclusion criteria. If a patient had not returned the questionnaire within one month, they received a phone call to conduct the interview. If the questionnaire had missing data to the extent that QoL measures could not be calculated, the case would be excluded from the analysis. For missing data in other parameters, all data would be used for analysis without excluding any cases (pairwise missing value handling).

Quality of life measurements

The FACT-C questionnaire comprises five subscales: physical wellbeing (PWB, 7 items), social wellbeing (SWB, 7 items), emotional wellbeing (EWB, 6 items), functional wellbeing (FWB, 7 items), and colorectal cancer subscale (CCS, 9 items). The suggested quality of life indices are the Trial Outcome Index (TOI), FACT-general (FACT-G), and FACT-C. The Trial Outcome Index combines three subscales: PWB+FWB + CCS. FACT-G combines four subscales: PWB+SWB+EWB+FWB. FACT-C combines FACT-G with CCS.[16,17]

FACT-C has been demonstrated to give a valid and reliable measure of the quality of life of colorectal cancer patients. It has both concurrent and discriminant validity. FACT-C is sensitive to changes in the functional status. The subscale scores had Cronbach's Alpha scores in the range of 0.56–0.82. The Cronbach's Alpha scores of TOI, FACT-G, and FACT-C were 0.87, 0.84, and 0.87, respectively.[16,17]

Here, we report two measures for the quality of life: FACT-G (General quality of life: PWB+SWB+EWB+FWB) and FACT-C (Quality of life of colorectal cancer patients: PWB+SWB+EWB+FWB+CCS).

Statistical analysis

For dichotomous characteristics, we compared the quality of life measures between two groups of patients using the independent-samples t-test. For ordinal data, we conducted Kendall's tau-b correlation between the ordinal measures and quality of life measures. For interval measures, we conducted Pearson's correlation with the quality of life measures.

Based on the results of the univariate analysis, we selected independent variables that showed a statistically significant relationship ($p < 0.05$) and those that had a marginally significant relationship ($p < 0.10$) with the quality of life measures for inclusion in the multiple regression analysis. Basic assumptions for the regression analysis were checked, including the linearity, homoscedasticity, absence of multicollinearity, independent observations, and reliability of the measures. All the analyses were carried out with PASW Statistics 18.0.

RESULTS
Patient characteristics

Out of the 480 questionnaires sent out, we received back 70 completed forms (response rate 15%). We carried out phone interviews for 245 cases, with a response rate of 45% (109 patients). We excluded 34 patients from the analysis due to death and non-adenocarcinoma tumors. We excluded 1 patient from the analysis due to incomplete quality of life data in the returned questionnaire (Fig 1).

The patient characteristics are shown in Table 1. The mean age of the patients was 60.93 years old. There were 53% male participants. Most patients underwent low anterior resection (LAR, 71.5%). Abdominoperineal resection (APR) was performed in 28.5% of cases. Open surgery was the majority operative approach (83.3%). The average tumor location was 7.54 cm above the anal verge as determined by colonoscopy. The proximal
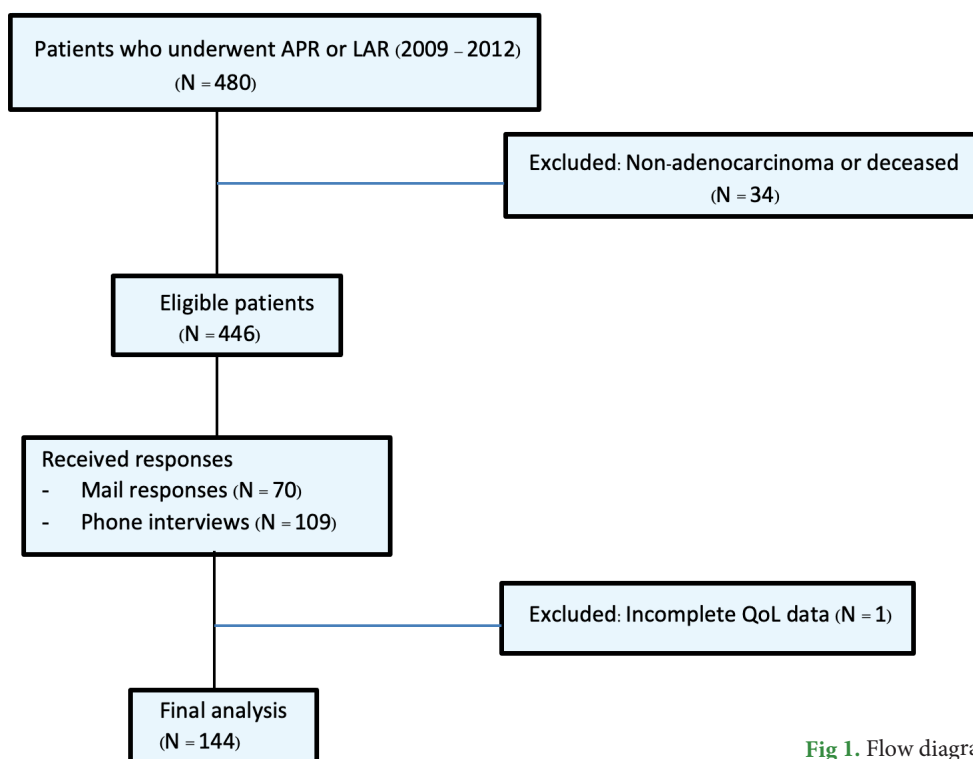
Fig 1. Flow diagram of the study.

TABLE 1. Characteristics of the study participants.

	N	Minimum	Maximum	Mean	SD
Age (years)	144	29	88	60.93	11.08
Distance from AV (cm)	133	2	15	7.54	3.41
Duration after surgery (months)	144	10	66	31.53	13.84
Proximal margin (cm)	144	0.50	61	10.39	6.82
Distal margin (cm)	144	0.10	10	2.25	1.71
Size of tumor (cm)	144	0.00	13.0	4.78	2.25

margin was 10.39 cm and the distal margin was 2.25 cm. The average size of tumor was 4.78 cm. The average duration after surgery was 31.5 months.

At the time of responding to the questionnaire, 51 patients (35.4%) had had ostomy. Most patients had no preoperative radiation (91%). Most patients (74.3%) were given adjuvant chemotherapy. There was local recurrence in 6.3% of cases and distant metastasis in 22.9%.

Quality of life measures

FACT-G and FACT-C scores are highly reliable measures. The FACT-G scores showed a Cronbach's Alpha of 0.93, based on 27 items. The FACT-C scores showed a Cronbach's Alpha of 0.94, based on 36 items.

The FACT-G scores ranged from 49 to 108, with an average of 87.34 and a standard deviation of 14.41. The FACT-C scores ranged from 59 to 136, with an average of 106.79 and a standard deviation of 17.78. Recently published data on Thai colorectal cancer surgical patients showed average postoperative FACT-C scores of 111.93.[18] Minimally important difference in FACT-C has been reported between 5 and 8.[19] This indicated that the QoL obtained from this study was slightly lower than the previous report, but not significant.

Univariate analyses

We carried out independent-samples t-tests to compare the quality of life between the two groups of patients, as shown in Table 2. The two parameters that revealed a significant difference between the groups were gender and surgical approach. Male patients have a better postoperative quality of life than female patients. Patients who underwent an open approach tended to have a better postoperative quality of life than those who underwent a laparoscopic approach.

Kendall's tau-b was used to examine the correlation between the T, N stages and quality of life (Table 3). The N stage showed a marginally significant negative correlation with both the FACT-G and FACT-C scores. A more advanced nodal status tended to be associated with a worse quality of life.

Table 4 shows the Pearson correlations between the interval measures and quality of life. Age was the only parameter that showed a significant correlation, whereby older people tended to have a worse postoperative quality of life (Fig 2).

TABLE 2. Comparisons of the quality of life between the patient groups.

		N	FACT-G	t	p	FACT-C	t	p
Gender	Male	76	89.40	1.83	0.07*	109.57	2.00	0.047**
	Female	68	85.03			103.69		
Operation	LAR	103	87.29	0.06	0.95	106.79	0.001	0.99
	APR	41	87.45			106.79		
Ostomy	Yes	51	86.73	0.37	0.71	106.01	0.39	0.70
	No	93	87.67			107.22		
Preop Radiation	Yes	13	86.62	0.19	0.85	105.46	0.28	0.78
	No	131	87.41			106.92		
Approach	Open	120	88.46	2.12	0.04**	108.31	2.32	0.02**
	Laparoscopy	24	81.71			99.21		
Postop chemo	Yes	107	86.67	0.95	0.35	105.73	1.22	0.22
	No	37	89.27			109.86		
M stage	0	137	87.11	0.82	0.41	106.47	0.95	0.35
	1	7	91.71			113.00		
Local recurrence	Yes	9	89.00	0.36	0.72	108.56	0.31	0.76
	No	135	87.22			106.67		
Distant metastasis	Yes	33	86.18	0.52	0.60	105.36	0.52	0.60
	No	111	87.68			107.22		

Note: * $p < 0.10$, ** $p < 0.05$.

TABLE 3. Correlation between the ordinal measures and quality of life.

Kendall Tau b	FACT-G	p	FACT-C	p
T stage	-0.10	0.14	-0.10	0.11
N stage	-0.11	0.09*	-0.12	0.06*

Note: * $p < 0.10$.

TABLE 4. Correlation between the interval measures and quality of life.

Pearson Correlation	FACT-G	p	FACT-C	p
Age (years)	-0.20	0.01**	-0.20	0.02**
Distance from anal verge (cm)+	-0.04	0.61	-0.03	0.70
Duration after surgery (months)	0.14	0.10	0.14	0.10
Proximal margin	0.10	0.22	0.12	0.15
Distal margin	-0.03	0.76	-0.01	0.87
Size of tumor (cm)	0.02	0.86	0.01	0.87

Note: ** $p < 0.05$.
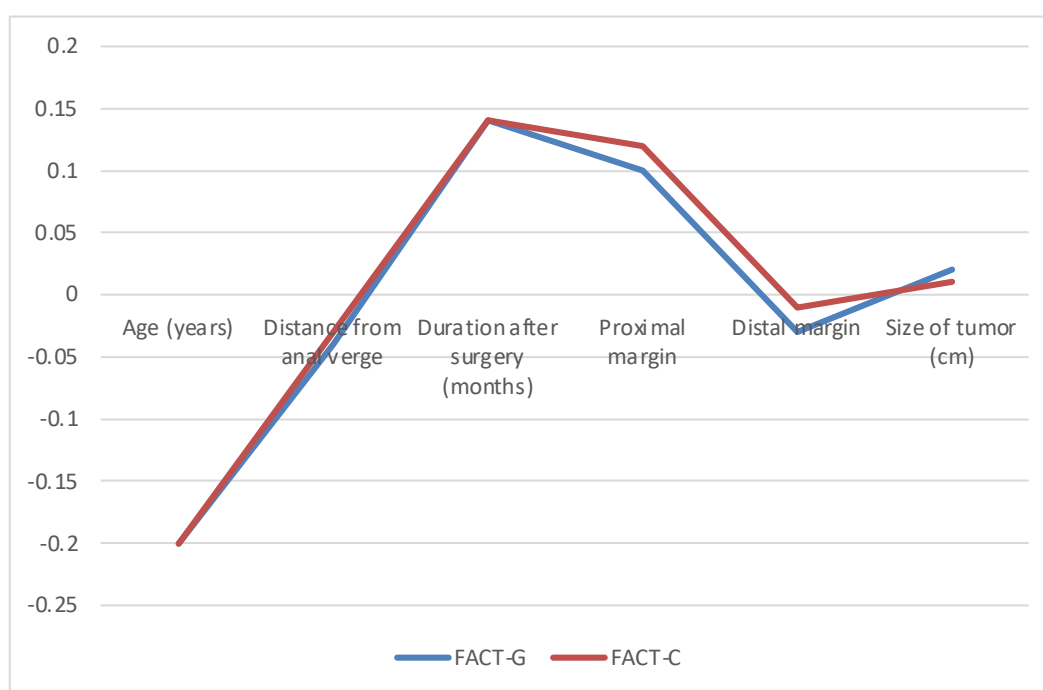
Fig 2. Correlation between predictors and QoL scores.

Multivariate analysis

Four parameters were selected as predictors in the multiple regression: gender, approach, age, and nodal status. We transformed the nodal status data from ordinal data into dichotomous data (0 = negative, and 1 = positive) prior to running the regression analysis.

A multiple regression analysis using gender, approach, age, and nodal status to predict FACT-G revealed a model that did not violate the regression assumptions. The model could predict FACT-G with a coefficient of determination (R^2) of 0.11, Adjusted R^2 of 0.08, $F_{(4,139)}$ = 4.18, p = 0.003. The only significant predictor was age (coefficient -0.28, t -2.67, p = 0.008, 95% confidence interval [-0.489, -0.073]).

Multiple regression analysis using gender, approach, age, and nodal status to predict FACT-C also revealed a model that did not violate the regression assumptions. The model could predict FACT-C with a coefficient of determination (R^2) of 0.12, Adjusted R^2 of 0.09, $F_{(4,139)}$ = 4.67, p = 0.001. The significant predictors were the nodal status (coefficient -5.76, t -1.98, p = 0.05, 95% confidence interval [-11.52, 0.00]), and age (coefficient -0.34, t -2.66, p = 0.009, 95% confidence interval [-0.60, -0.09]).

DISCUSSION

This cross-sectional observational study provided valuable insights regarding the postoperative QoL of rectal cancer patients. Our first objective was to evaluate the QoL of Thai rectal cancer patients. The FACT-G and FACT-C scores obtained from this study were very similar to the scores reported in the literature. The reported FACT-G and FACT-C scores from a previous validation study were 84.47–91.48 and 107.71–114.29, respectively.[16] These findings suggest that the postoperative QoL of Thai rectal cancer patients was comparable to that of people from other settings.

Our second objective was to determine the factors that impact the patient QoL. Our study revealed two important factors that can impact the postoperative quality of life in rectal cancer patients: age and lymph node status. Both factors had a negative impact on the quality of life. Every year's increase in age of a patient at the time of diagnosis led to a decrease of 0.28 and 0.34 points in FACT-G and FACT-C, respectively. Having a positive lymph node led to a decrease of 5.76 points in FACT-C. Yost et al. showed that a difference in FACT-C score of 5–8 points was clinically important.[19] Our findings suggested that only a few years' age difference might not have a significant impact on the QoL. A difference of age around 20 years would likely be needed to observe any clinically important impact on QoL. On the other hand, having a positive lymph node led to significant impact on the QoL. This is an important issue because the majority of rectal cancer patients in Thailand had positive lymph nodes. Our study revealed positive lymph nodes in 57.6 percent of cases. This concurred with prior study in Thailand which had a positive lymph node in 56.5% of cases.[20]

One notable finding in this study was QoL measures in patients who underwent open surgery were better than those of patients who underwent laparoscopic procedures. However, when exploring the data, we only observed this from univariate analysis. When conducting multiple regression analysis, after controlling age, nodal status, and gender, the surgical approach did not show significant impact on QoL measures. The observed impact of surgical approach in the univariate analysis seems to be a mediated effect. When investigating the relationship between surgical approach and nodal status, age, and gender, we found that patients who underwent laparoscopic approach were slightly older, had greater proportion of female, and more positive lymph node status.

What was also interesting in this study was the negative findings. For instance, many factors that were supposed to impact the postoperative quality of life turned out to have no significant impact. This seems to be conflicting with findings from prior studies which conducted in other settings.[3,6 – 10,12] This finding leads to a challenging issue related to QoL research, which is how to compare QoL impacts in different settings and populations. Consequently, how surgery impacts the QoL of rectal cancer patients in practice is a complicated issue. A study conducted on different groups of subjects with different healthcare systems, sociodemographic factors, and religious and spiritual belief systems could lead to different findings.

An important issue to consider is the extent to which the variability in QoL could be explained by the variables under study. Our regression model could explain only 12% of the variability in FACT-C. A large amount of unexplained variability in FACT-C is thus still unaccounted for and needs further investigation. This study only looked at patients' biological characteristics, tumor characteristics, and medical treatment factors. There was evidence suggesting that QoL could be influenced by sociodemographic factors.[18,21 - 23] Future study exploring the impact on the QoL by considering the sociocultural and psychological factors should be undertaken. Furthermore, future study employing prospective, multicenter design could be considered to validate the findings from this study.

There are several limitations to this study to note. First, this was a single center study conducted in Thailand. The QoL of the Thai patients in this study could be influenced by many factors that might be different between institutions or countries, such as pre- and postoperative care, surgical approaches, the support system, and healthcare structure. The second limitation is the small sample size. It is possible that failure to detect a significant impact on the QoL by some factors might be due to inadequate power in the sample set. The third limitation is the low response rate. Despite our best efforts to reach out to patients by mail and telephone, we obtained information from only 30% of those who fit our inclusion criteria. It is possible that the patients who we did not collect information from might have had different postoperative experiences. This could also lead to selection bias in the results. The fourth limitation is the wide range of postoperative durations included in this study. We obtained QoL data from patients from 10–66 months after surgery. There is some evidence in the literature that suggests that rectal cancer patients could experience an improvement in their QoL with a longer postoperative duration.[24] We explored this issue in our data by comparing the FACT-G and FACT-C scores between five groups of patients based on duration after surgery: less than one year, between

1–2 years, between 2–3 years, between 3–4 years, and more than 4 years. One-way ANOVA revealed that the QoL measures were not different between the different time points.

CONCLUSION

The postoperative QoL of Thai rectal cancer patients was similar to the QoL measures reported in a prior study.[16] Two factors showed a significant negative impact on the QoL: age and lymph node status. Gender, the type of operation, the presence of ostomy, location of the tumor, preoperative radiation, adjuvant chemotherapy, laparoscopic approach, duration after surgery, proximal and distal margins, tumor size, metastasis, and the presence of recurrence showed no significant impact on the QoL. When a surgeon provides preoperative counseling to rectal cancer patients, this information could be helpful in predicting the prognosis, especially among patients with advanced age and positive lymph node status. A surgeon should offer a tailored intervention to met with individual patients' situation, considering all potential factors that could impact their QoL.

Data Availability Statement

The datasets generated and analyzed in this study are not publicly available. However, they can be accessed upon reasonable request made to a corresponding author.

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DECLARATIONS
Grants and Funding Information

Conflict of Interest

All authors confirm that they have no personal or professional conflicts of interest to declare relating to any aspect of this research study.

Registration Number of Clinical Trial

This study is not a registered clinical trial.

Author Contributions

Conceptualization and methodology, CI; Data collection NO; Data analysis, CI; Manuscript preparation, CI and NO; Critical review and editing, CI, NO, WR, VL, and SP. All authors reviewed the results and approved the final version of the manuscript.

Use of Artificial Intelligence

Artificial intelligence was not used in the preparation of the manuscript. All study concepts, analysis, interpretation, and writing were carried out by the authors. Artificial intelligence was used only in preparation of graphical abstract.

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