A Model of Factors Influencing Health-Related Quality of Life among Thais with Colorectal Cancer and a Permanent Colostomy

Sukanda Bunkong, Manee Arpanantikul, Yupapin Sirapo-ngam, Supreeda Monkong, Chukiat Viwatwongkasem, Karin Olson*

Abstract: Enhancing health-related quality of life among colorectal cancer survivors with a colostomy has become a significant concern for healthcare professionals. An understanding of factors involved in this condition and treatment, and how these work to affect the health-related quality of life of cancer survivors is a foundation for developing effective interventions. This cross-sectional study aimed to develop and test a health-related quality of life model among people with colorectal cancer and a permanent colostomy. Data were collected from 232 Thais with colorectal cancer and a permanent colostomy from six tertiary hospitals in southern Thailand by using seven instruments, including the Demographic and Health-related Data Form, the Social Support Questionnaire, the Bowel Function Inventory-Colorectal Surgery, the Center for Epidemiologic Studies Depression Scale, the Body Image Scale, the Chula ADL Index, and the Quality of Life Index-Cancer version III. Descriptive statistics and structural equation modeling were used for analyzing the data.

The results indicated that the final model fitted with the empirical data and explained 72% of the variance in health-related quality of life. Three factors, carcinoembryonic antigen, gender, and age, had an indirect effect on health-related quality of life through different paths. Six factors, religion, social support, bowel symptoms, depressive symptoms, body image disturbance, and functional status, had both direct and indirect effects on health-related quality of life, with body image disturbance being the strongest effect. Nurses and other health professionals can use the findings of this study to design a comprehensive intervention to improve the quality of life for this group of patients. Such an intervention needs to target all the factors of this study, especially improving body image, functional status, and social support, and managing bowel and depressive symptoms. This intervention should be further tested in clinical practice.

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Introduction

Colorectal cancer (CRC) was reported in 2020 to be the third leading cause of death among people under the age of 70.[1] In Thailand, the Global Cancer Institute of the World Health Organization reported in 2020 that the age-standardized rates of CRC in

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Thailand were 19/100,000 for men and 15.2/100,000 for women.[2] The highest incidence of CRC (about > 50% of cases) was found in people aged 55-70 year.[3] The 5-year Thai prevalence of CRC was around 426,366 cases in 2020 (42.78% in men and 57.22% in women).[2] CRC was identified as 11% of the cancer burden in Thailand,[4] and the incidence of CRC is expected to increase by 2025 to account for 21% of female cancer cases and 29% of male cases.[5]

The gold standard treatment of CRC is surgery to remove the diseased colon and make a colostomy, an artificial opening created through the abdominal wall to bypass the colorectal function, allowing the excretion of feces and gases.[6] Adjuvant chemotherapy and the addition of radiotherapy may be supplementary to reduce disease recurrence and enhance survival.[7] If the tumor invades the sphincter, an abdominoperineal resection is necessary. This resection was reported in surgery with approximately 40% of people with rectal cancer, and a permanent colostomy was created with the latter procedure.[8-9]

Living with a permanent colostomy often has a negative impact on the overall health-related quality of life (HRQOL) of people with CRC (PW-CRC).[10] PW-CRC are likely to experience a wide range of degrees of physical, psychological, social, and spiritual dysfunction.[11] Performing a colostomy affects the physical domain changing the physiology of appearance and body and requiring specific care. Other main problems related to QOL include, but are not limited to, excrement leakage, complications related to colostomy, and pain.[12]

Various studies have indicated that many factors lower HRQOL, such as low self-efficacy before discharge,[13] high levels of carcinoembryonic antigen (CEA),[14] low levels of social support,[15-16] disturbed body image,[17] increased depressive symptoms,[11] Islamic practices and beliefs,[11] younger age,[18] and female gender.[19] All the studies mentioning these factors usually used a predictive cross-sectional design but did not include all these factors simultaneously. Comprehensive interventions based on strong theoretical foundations to improve the HRQOL of PW-CRC require an understanding of how these factors work to influence HRQOL. Thus, this study sought to develop and test a model of factors influencing HRQOL among Thais with colorectal cancer and a permanent colostomy.

Conceptual Framework and Literature Review

This study was guided by the revised Wilson and Cleary model (WCM) for HRQOL[20] and a literature review regarding the factors associated with QOL and HRQOL in people with colostomies. In the revised WCM,[20] overall QOL is defined as subjective well-being or satisfaction with life overall. Individual and environmental characteristics and general health perceptions directly affected the overall QOL. Biological function, symptoms, and functional status indirectly affected overall QOL through general health perception.[20] However, HRQOL was interchangeably used with overall QOL to identify peoples' health and functioning.[20] In this study, four non-modifiable factors (CEA, gender, age, and religion) and five modifiable factors (social support, bowel symptoms, depressive symptoms, body image disturbance, and activities of daily living (ADL) were selected to form the causal model and are described below:

Carcinoembryonic antigen (CEA) represents the biological function. Changes in biological function can directly or indirectly influence health outcomes. For PW-CRC, CEA, a glycoprotein involved in cell adhesion, is a tumor marker that is often used for postoperative surveillance for disease progression. Increased CEA is associated with poor prognosis. This can result in changes to all components of health, including symptoms, functional status, general health perceptions, and overall QOL.[21]

Gender, age, and religion represent the characteristics of the individual. Many studies reveal that females have a lower HRQOL than men, especially in physical and social functioning. Females experience pain, fatigue, and depression higher than males.[19] Women may have a low tolerance threshold against psychological and physical stressors due to physiological reasons.[19] Further, age influences HRQOL. After colostomy surgery, older people may face emotional and psychological changes and have a complication-related colostomy. Older adults can experience a decrease in social and role function.[6] Although older adults had impaired physical and social function, their overall QOL was better than younger ones. This is probably due to their ability to adjust themselves and gain more confidence over a longer period of time.[18] Religion and religious and spiritual beliefs also influence HRQOL. For example, a study demonstrated that religion significantly contributed to spiritual and psychological well-being and people with no religious beliefs had a worse QOL than those who did.[12] Another study with Muslim patients found that they faced physical problems in maintaining clean skin before performing physical religious rituals such as prayer.[10]

Social support, defined as the perception of the people perceiving social support from their family members, friends, and health care providers,[22] is viewed as a characteristic of the environment. Studies reveal that social support positively influences patients' HRQOL.[13,16] Social support from medical staff is a major constituent of the psychological adjustment of a colostomy.[16] Moreover, support from family is the most important source to confront suffering.[16] Family support has been found to have a positive correlation with self-efficacy contributing to effective self-care, which in turn positively influences QOL.[23] Married patients have rated their psychological, social, and spiritual well-being higher than those living alone.[13]

Bowel symptoms, depressive symptoms, and body image disturbance (BID) are commonly reported symptoms in PW-CRC with a permanent colostomy. Thus, they were conceptualized to represent a construct of "symptoms." Patients may experience a loss of confidence due to uncontrollable defecation, flatulence, and body image disturbance.[11,17] These problems reduce their social relations resulting in decreased QOL.[17] Having a colostomy may result in changes in body image causing patients to worry about the odor and sound that may be offensive to society.[24] Moreover, patients have to change their dressing style because of colostomy, which also affects QOL.[25] However, if the patient is unable to adapt to having a new colostomy, it may cause psychological problems such as depression.[24] Depression has been found to be significantly associated with QOL.[25]

Activities of Daily Living (ADL) assessment is commonly used to indicate an individual's functional status. People with colostomies are often embarrassed to perform social activities or might isolate themselves from social functioning. One study found they had decreased desire to do activities outside their homes and in ADL.[24] This can result in changes to overall QOL,[17,24] or lead to the development of depression.[11]

General health perceptions are individuals' overall perceptions of their health. They may be influenced by biological functions, symptoms, and functional ability, the earlier components of the revised WCM model.[20] In this study, general health perception was a subscale of the tools used to measure overall QOL. To avoid collinearity among selected variables, it was excluded from the causal model of this study.

Based on the revised WCM,[20] as well as an extensive review of related literature on HRQOL in the target group, the Model of Factors Influencing Health-Related Quality of Life among PW-CRC with a permanent colostomy was developed. The causal relationships among CEA, gender, age, religion, social support, bowel symptoms, depressive symptoms, BID, and ADL on HRQOL are displayed in **Figure 1**. It was hypothesized that the model would fit with the empirical data.

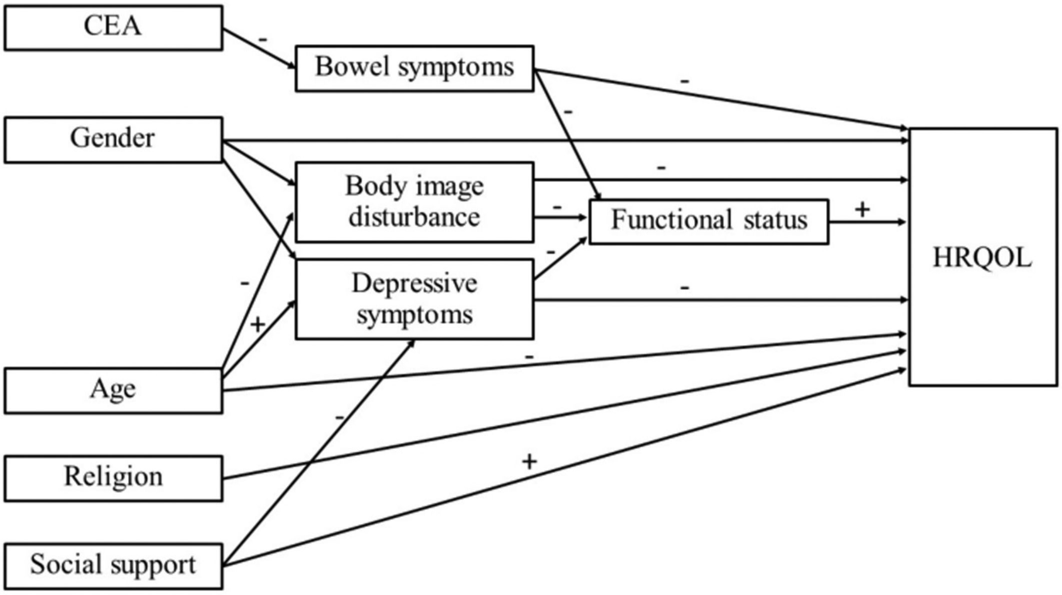

Figure 1. The conceptual framework and initial model of HRQOL in Thais with CRC and a permanent colostomy (CEA = Carcinoembryonic antigen)

Methods

Study design: This was a cross-sectional, correlational study. The writing of this report followed the STROBE Statement Checklist of items that should be included in reports of cross-sectional studies.

Sample and Settings: The participants were recruited from six tertiary hospitals in southern Thailand. The inclusion criteria were being adults ≥ 30 years of age with no cognitive impairment; having been diagnosed with CRC, stage II-IV; and having a permanent colostomy for no less than six months. Participants were excluded if they had major complications of radiotherapy and chemotherapy (such as severe nausea/vomiting, severe fatigue, severe weakness, and white blood cells (WBC) count ≤ 4,000 cells/mm^3). The sample size needed for structural equation modelling analysis is usually large. A general rule of thumb is to have as large a sample as one can, especially when the model contains many variables.[26] In this study, the 225-sample size was calculated using parameters of expected small to medium effect size = 0.26; six latent variables with 138 observed variables; alpha = .05; and power = .80.[27]

Stratified sampling was used to select the settings. In the first stage, eight tertiary hospitals that met the criteria as being representative of hospitals in southern Thailand were purposively selected. They were divided into three groups based on the characteristics of settings: Group 1 Centre Hospital (six hospitals); Group 2 Cancer Centre Hospital (one hospital); and Group 3 University Hospital (one hospital). For the second stage, lottery sampling was employed. The number of PW-CRC with a permanent colostomy was chosen based on the proportion of the population in each hospital (**Figure 2**). All participants who visited an outpatient department (OPD) on the date of data collection and met the inclusion criteria were approached, then invited to participate. Two hundred and forty eligible participants were approached. Five did not want to participate due to time conflicts with personal matters, and two felt too tired. Eventually, 232 participants were enrolled in the study.

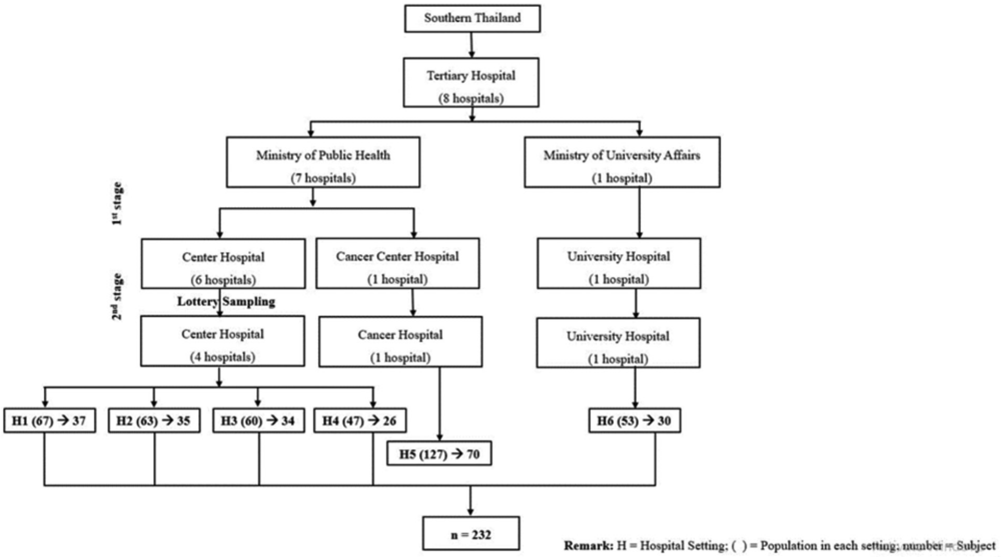

Figure 2. Stratified sampling method used to select the settings and participants

Ethical Considerations: This study was approved by the Institutional Review Board of the Faculty of Medicine Ramathibodi Hospital (ID 03-60-72), Mahidol University, Thailand. All participants meeting the inclusion criteria were informed fully about research objectives, processes, and their rights, including the preservation of confidentiality and anonymity. Informed consent and agreement were obtained from all participants with the permission of hospital authorities and unit heads. Participants' rights were protected throughout the study, including the right to withdraw at any time without repercussion.

Instruments: Seven instruments were used to collect the data, including the Demographic and Health-related Data Form, the Social Support Questionnaire (SSQ), the Bowel Function Inventory-Colorectal Surgery (BFI-CRS), the Center for Epidemiologic Studies Depression (CES-D) Scale, the Body Image Scale (BIS), the Chula ADL Index (CAI), and the Quality-of-Life Index: Cancer version III (QLI-CVIII). All instruments, except the BFI-CRS, were already translated into Thai. Thus, the BFI-CRS was translated, with permission, from English into Thai by the researchers and back into English using the back-translation technique.[28] All instruments, except the demographic data form, were pilot-tested for reliability using Cronbach's alpha coefficient with 30 PW-CRC and a permanent colostomy. The range of the score, reliability results of the pilot study, and the main study are presented in **Table 1**.

Table 1. Cronbach's alpha coefficients representing internal consistency reliability of the study instruments and the respective range of scores

Instruments	Cronbach's alpha		Range of scores
	Pilot test	Actual study	
Bowel Function Inventory-Colorectal Surgery (BFI-CRS)	0.88	0.90	0-54
Thai version of the Center for Epidemiologic Studies Depression Scale (CES-D)	0.84	0.92	0-60
Body Image Scale (BIS)	0.92	0.93	0-30
Chula ADL Index (CAI)	0.96	0.91	0-9
Social Support Questionnaire (SSQ)	0.90	0.92	0-60
Quality of Life Index-Cancer Version III (QLI-CV III)	0.93	0.94	0-30

The Demographic and Health-related Data Form was developed by the primary investigator (PI) to obtain socioeconomic characteristics, including age, gender, marital status, educational level, religion, working status, monthly income, sufficient income, medical payments, when the colostomy was performed, colostomy complications, type of current treatment, health problems, cancer site, stage of cancer, colostomy site, and CEA.

The Bowel Function Inventory-Colorectal Surgery (BFI-CRS) was used to measure bowel function in a previous study with PW-CRC after sphincter-saving surgery.[29] The original instrument consisted of 22 items using a 4-point Likert scale ranging from 0 (not at all) to 3 (very much). The BFI-CRS was used to measure bowel symptoms in this present study. Therefore, items that did not represent symptoms were excluded (e.g., "knowing what to eat to control our bowel" and "knowing what medicines to take to control your bowel"). The PI used the back-translation technique to translate the BFI-CRS into the Thai language. The first translation from English to Thai was done by the PI, and the second translation from Thai to English was done by two bilingual translators.[28] Next, three experts (an enterostomal therapy nurse, a nurse instructor, and a surgeon with gastrointestinal expertise) conducted content validation of the instrument. After modification based on the panel of experts, the modified BFI-CRS comprised 18 items. The content validity index (CVI) yielded a value of 1.00. A higher score indicates higher severity of bowel symptoms.

The Center for Epidemiologic Studies Depression (CES-D) Scale was originally developed by Radloff in 1977 to assess depressive symptoms in general populations. The Thai version was translated in 1990 by Worapongsathorn et al.[30] and was used to diagnose or evaluate the severity of illness over the course of treatment.[30] Major components of the CES-D scale are depressed mood, psychomotor retardation, sleep disturbance, feelings of guilt and worthlessness, feelings of helplessness and hopelessness, and loss of appetite and consist of 20 items with a 4-point Likert scale ranging from 0 (none of the time) to 3 (all of the time). Four positive items are reversed before summing the scores. An example item is "I was happy." A higher score indicates higher severity of depressive symptoms. This instrument can be used for screening depression.[30] For criterion validity, the cut-off point score at ≥ 16 is considered indicative of depression (with a sensitivity of 86.6%, specificity of 96.67 %, and Cronbach's alpha coefficient of 0.91).[30]

The Body Image Scale (BIS) was first developed by Hopwood et al. in 2001 to measure BID in breast cancer.[31] It comprises 10 items, using a 4-point Likert scale, about affective items (feeling feminine, feeling attractive), behavioral items (finding it hard to look at oneself naked, avoiding people because of appearance), and cognitive items (satisfied with the appearance, or with scar). It was translated into Thai by Songtish et al., who used the instrument with 242 women with breast cancer who had undergone surgery and had completed treatment.[32] To fit with this study, some original items were modified. For instance, one item mentioned "feminine/ masculine." It did not fit with PW-CRC and a permanent colostomy. Thus, it was modified to "a healthy body," which was closer to colostomy patients' body image. One item was added, namely, "Have you been feeling fear that others shun you as a result of your colostomy?" Finally, the modified Thai version consists of 11 items using a 4-point Likert scale ranging from 0 (not at all) to 3 (very much). Five positive items are reversed before summing the scores. A higher score indicates higher severity of body image disturbance.

The Chula ADL Index (CAI) was originally developed to assess the ADL of older Thai people.[33] It is composed of five items, walking outdoors, cooking, doing heavy housework, exchanging money, and using public transport. The item responses are coded on the scales ranging from unable (scored 0) to independent (scored 1, 2, or 3), with items 3 and 4 scored 0 and 1, items 2 and 5 scored 0, 1, and 2; and item 1 scored 0, 1, 2, and 3. For example, item 1, "Walking outdoors," is rated as 0 = unable, 1 = wheelchair independent or walking with the help of two assistants, 2 = walking with help from one assistant, and 3 = independent. A higher score indicates a higher degree of functional independence.

The Social Support Questionnaire (SSQ) was developed by Schaefer et al. in 1981 to measure perceived social support. This instrument consists of two parts, which are used to assess tangible, informational, and emotional support separately. Part I focuses on tangible support, and part II focuses on informational and emotional support. The SSQ was translated into Thai in 1988 by Hanucharurnkul[34] and modified in 1993.[35] This modified version has been used to assess support from family members, friends, and healthcare providers in advanced cancer patients.[22] It consisted of 15 items divided into three categories. Each category includes five items: one item for informational support, two items for emotional support, and two items for tangible support. The responses are based on a 5-point Likert scale ranging from 0 (never received support) to 4 (almost always received support). An example item is "Helping you during your present illness." A higher score indicates higher perceived social support.

The Quality-of-Life Index: Cancer version III (QLI-CVIII) was originally developed, by Ferrans and Powers in 1985,[36] to measure QOL in people with cancer. It was used to assess the satisfaction with and the importance of various aspects of life. Later, it was modified into Thai, using the same wording as the Thai QLI cardiac version.[22] The QLI-CVIII is a self-administered instrument of two parts: the first measures satisfaction with various domains of life, and the second measures the importance of each aspect. There are 33 items in each part, totaling 66 items, using a 6-point Likert scale. In the first part, the scale ranges from 1 (very unsatisfied) to 6 (very satisfied). In the second part, the scale ranges from 1 (without any importance) to 6 (very important). Both satisfaction and importance sections are distributed into four subscales, including health/functioning (13 items), social and economic (8 items), psychological/spiritual (7 items), and family (5 items). An example item is "Your ability to take care of yourself without health." For calculating the satisfaction score: (1) the scale must be subtracted from 3.5 from satisfaction responses. For example, the original scales are 1, 2, 3, 4, 5, and 6; the results are -2.5, -1.5, -0.5, +0.5, and +2.5, respectively, (2) weighting the satisfaction score with the important items, multiplying each recorded score by the raw score of importance section (1, 2, 3, 4, 5, and 6), (3) the total score is calculated by adding the weighted scores of every response and dividing by the total number of answer items, and (4) possible score variation is from -15 to 15, and the final score adds 15 to avoid a negative score.[22] A higher score indicates a higher degree of HRQOL.

Data Collection: Data were collected from August 2017 to May 2018 at the surgical OPD of the six tertiary hospitals mentioned above by the PI. Before data collection, potential participants were approached by staff to obtain permission to conduct the study. The study's purpose, procedures, and information regarding confidentiality were described. Structured interviews were completed in 45-60 minutes. During interviews, if participants had any problems, such as fatigue, the interview was stopped until the participant was willing and able to answer the questionnaires.

Data Analysis: Descriptive statistics were used to describe participants' demographics, as well as other variables. Pearson's correlation coefficients were used to analyze the relationships between variables. The assumptions of structural equation modeling (SEM) analysis, including normality, linearity, homoscedasticity, and multicollinearity, were tested and met. The SEM was used to identify the direct and indirect effects of the influenced factors and to test a hypothetical model of HRQOL among PW-CRC and a permanent colostomy.

Results

Characteristics of the participants: Of 232 participants, 130 were males (56%), with a mean age of 61.30 years (SD = 11.60). More than half were married (68.5%). Most participants were Buddhist (76.7%), had worked (83.6%), had a permanent colostomy for <3 years (75.4%), and were diagnosed with rectal cancer (99.1%) and stage III cancer (66.8%). Two-fifths of them had complications (40.1%). Regarding current treatment, 52.6% had been receiving radiation therapy. Additionally, the average CEA level was 5.7 ng/ml (SD = 2.41), with a normal range of ≤ 2.5 μg/L.

Characteristics of study variables: The social support scores ranged from 19 to 58, with a mean of 38.1 (SD = 9.40). The bowel symptom scores ranged from 12 to 33 with a mean of 24.4 (SD = 3.90), while the depressive symptom scores ranged from 4 to 39 with a mean of 19.40 (SD = 7.70). The body image disturbance scores ranged from 3 to 24 with a mean of 14.70 (SD = 6.40), and the functional status scores ranged from 3 to 9 with a mean of 7.80 (SD = 2.00). Lastly, the HRQOL scores ranged from 10 to 27, with a mean of 19.70 (SD = 4.10).

Correlational analyses: The correlation between the seven independent variables and the dependent variable are presented in **Table 2**. Relationships among all independent variables, except that of CEA and HRQOL, were significant (p < .05).

Table 2. Correlation matrix of the study variables (N = 232)

Variables	AGE	CEA	BS	DS	BID	FS	SS	HRQOL
Age (AGE)	1.00							
Carcinoembryonic antigen (CEA)	-.01	1.00						
Bowel symptoms (BS)	.16	.32**	1.00					
Depressive symptom (DS)	.09	.23**	.50**	1.00				
Body image disturbance (BID)	-.04	.07	.40**	.78**	1.00			
Functional status (FS)	-.51**	-.23**	-.42**	-.22**	.04	1.00		
Social support (SS)	-.29**	-.07	-.47**	-.47**	-.29**	.31**	1.00	
Health-related quality of life (HRQOL)	-.15*	-.10	-.39**	-.65**	-.50**	.45**	.58**	1.00

*p < 0.05, **p < 0.01

Model testing: Before testing, the binary variables, including religion and gender, were coded as 0 = Muslim and 1 = Buddhist, and 0 = female and 1 = male, respectively. The initial model (**Figure 1**) had a poor fit to the data (χ^2 = 423.40, df = 18, p = .00, χ^2/df = 23.52, GFI = .78, AGFI = .32, NFI = .60, TLI = -.01, CFI = .60, and RMSEA = .31). Then, the hypothesized model was modified based on modification indices and model fit indices as well as theoretical support. The direct path from gender to functional status, from age to social support, from religion to body image disturbance, from bowel symptoms to social support, from bowel symptoms to depressive symptoms, and from religion to functional status, and the correlation paths between exogenous variables were added. The direct paths from gender to HRQOL, from age to body image disturbance, and from age to depressive symptoms were removed to improve the fit and parsimony of the model since these paths did not have a significant effect. Furthermore, all correlation paths between exogenous variables were dropped, except the correlation between age and religion. After adding paths and trimming the correlation between the errors of variance, the modified model was re-examined. Consequently, the final model fitted the data well (χ^2 = 34.20, df = 19, p = .02, χ^2/df = 1.80, GFI = .97, AGFI = .92, NFI = .97, TLI = .96, CFI = .99, RMSEA = .06) with all variables explain 72% of the variance of HRQOL (**Figure 3**). Among others, BID had the strongest direct effect on HRQOL (β = -.44, p < .001). The direct and indirect effects of all variables are shown in **Table 3**.

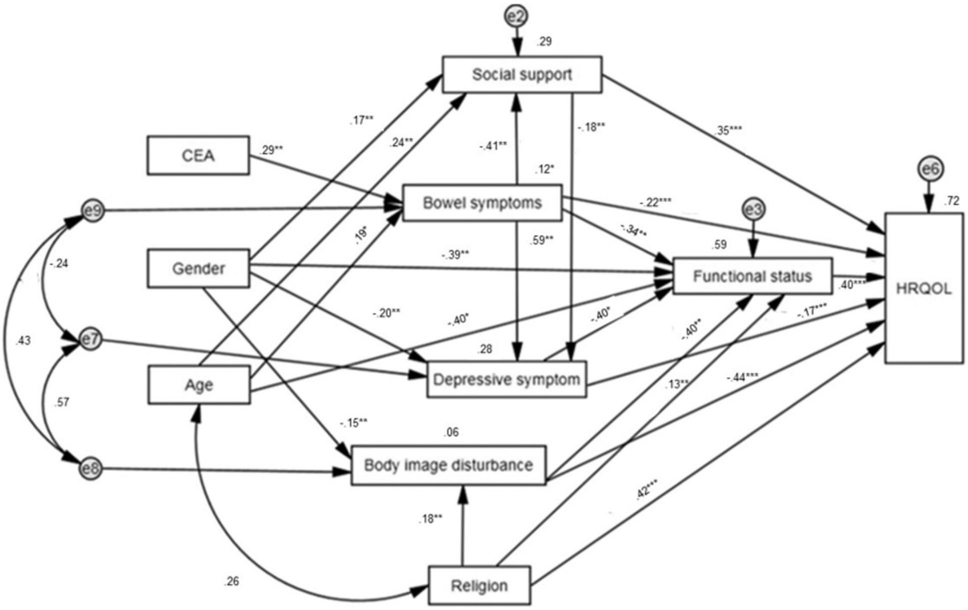

Figure 3. A modified model of factors influencing HRQOL among Thais with CRC and a permanent colostomy

χ^2 = 34.20, df = 19, p = .02, χ^2/df = 1.80, GFI = .97, AGFI = .92, NFI = .97, TLI = .96, CFI = .99, RMSEA = .06

$^*p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

CEA = Carcinoembryonic antigen

Table 3. Direct effect, indirect effect, and total effect of the independent variables on health-related quality of life in final model (N = 232)

Independent variables	**HRQOL**		
	Direct effect	**Indirect effect**	**Total effect**
Age	-	-.38***	-.38***
Gender	-	.09***	.09***
Religion	.42***	-.05***	.37***
Carcinoembryonic antigen (CEA)	-	-.20***	-.20***
Bowel symptoms	-.22***	-.50***	-.77***
Depressive symptom	-.17***	-.16***	-.33***
Body image disturbance	-.44***	-.16***	-.60***
Functional status	.40***	-	.40***
Social support	.35***	.06***	.41***

*** $p < 0.001$

Discussion

The findings of this study support the empirical adequacy of the revised WCM for HRQOL.[20] The HRQOL was influenced by several factors, including characteristics of the individual (CEA, gender, age, and religion) and environment (social support), symptoms, and functional status. All these factors explained 72% of HRQOL variance, which is considered a high contribution.

Mostly, non-modifiable variables, including CEA, gender, and age had only significantly indirect effects on HRQOL. CEA had an indirect effect on HRQOL through bowel symptoms and functional status. This finding concurred with the revised WCM, which maintained the biological function represented by CEA that had a direct effect on symptoms represented by bowel symptoms, and it could indirectly impact overall QOL via symptoms, functional status, and general health perceptions.[20] Based on previous findings, increasing the CEA level significantly correlated with a poorer prognosis of the disease.[21] Worsening of the disease resulted in increased bowel symptoms. In a previous study, bowel symptoms reduced the functional status resulting in decreased QOL.[17]

Gender had a negative indirect effect on HRQOL through body image disturbance, depressive symptoms, and functional status, indicating that being female had a reverse relationship to men. Women have rated their depression as higher than men,[19] and may be more concerned about changes in body image. Our finding supports a previous study that women reported lower HRQOL than men.[19] Women also had a statistically significant lower functional status, especially for their physical and emotional functioning.[19]

Age indirectly influenced HRQOL through bowel symptoms and functional status. This finding is not surprising because older adults experienced a decrease in role function and social status.[6] Moreover, older adults with CRC may frequently face complications related to colostomy. Thus, they might suffer from more bowel symptoms than younger adults.[6] These issues can result in changes to social and physical functioning and overall QOL.

Religion had both direct and indirect effects on HRQOL through body image disturbance and functional status. The positive path correlation indicated that Buddhists had a higher HRQOL than Muslims, and this result was congruent with a previous study.[12] Buddhists might apply direct moral principles, the Four Bhavanas, the Four Virtues Wheeling, and these moral principles can promote the basic meditation practice. These can help them adjust to their life, take care of their physical and mental health, and to be able to live happily, especially older adults.[37] Having a colostomy might also create difficulties for Muslims, particularly during Ramadan when they are stricter about purifying themselves, significantly affecting QOL.[11] A colostomy may also interfere with Muslims' ability to pray face downward on a prayer mat.

Social support presented as a positive direct effect on HRQOL in our study, a finding consistent with previous research.[15-16] The level of social support significantly affected HRQOL.[15] In our study, the mean social support score was 38.10 from a total score of 60, which indicated a high level of perceived social support. The possible reason was probably due to being older adults with a mean age of 61.30 years. In Thai society, older adults usually are taken care of by their spouses and children when they need help for their health, daily activities, and financial support. Thus, the participants in this study perceived a high level of social support. A previous study revealed that married patients reported a higher QOL than those who lived alone.[13] Family support was significant for acceptance and adaptation to a colostomy and HRQOL.[15] In addition, health care provider support also influenced HRQOL in terms of psychosocial adjustment.[16] People with a colostomy who received higher levels of social support report greater adaptation to life with a colostomy than those who received lower levels of social support.[15] Therefore, the HRQOL of participants in this study was not poor, possibly due to high social support.

Bowel symptoms had a negative direct effect on HRQOL in our study, and these can affect the patient's daily life.[24] Sometimes people cannot control their bowels, and feces can leak out; this has many consequences, including avoiding long journeys. As a result, normal routines and social activities are affected.[24] This finding is congruent with previous studies, which explained that intestinal gases and ostomy sounds make the patient decline to participate in social events.[38] Some patients have low confidence because of the altered defecation site.[24] Moreover, bowel symptoms, such as excrement leakage, affected physical well-being resulting in decreased QOL.[12]

Depressive symptoms presented a negative direct effect on HRQOL. This result, therefore, confirmed previous findings that depression was associated with worse QOL.[18] A previous study showed that more than half of patients reported depression after colostomy surgery, and depression significantly and negatively influenced spiritual function.[17] Depression may be with the colostomy itself. Alterations related to colostomies include body image disturbance, intestinal gas, and difficult social participation.[24, 38] These factors might cause suicidal thoughts,[17] but in this study, no participant reported suicidal thoughts.

Body image disturbance had the strongest negative direct effect on HRQOL. A previous study showed that the social domain in QOL significantly affected people with a colostomy. This surgery changed the body image of the patients with a huge impact on their social interaction.[17] People with a colostomy might feel embarrassed due to the odor and sound from colostomy.[13, 24] Colostomy causes odor and loss of control over the elimination of feces and gases.[38] These sensitive issues might affect patients' social functioning, which in turn, influences their HRQOL.

Functional status had a positive direct effect on HRQOL; higher functional status was related to better HRQOL. The daily lives of people with CRC and colostomies were changed. People with a permanent colostomy have difficulty performing ADL, having marital and social relations, and managing their finances.[10] Their functional status may be limited due to multiple physical problems, such as body image disturbance, bowel symptoms, and abnormal elimination functions, as mentioned previously.[24] Having a colostomy had an impact on daily activities such as social activity and outside work.[24] Similarly, a previous study showed that the social function scored the lowest among other QOL subscales. It is because uncontrolled excrement had a great impact on patients' confidence, which finally reduced their social activities.[17]

Limitations

This study had limitations in terms of generalizability because the data were collected from six tertiary hospitals in southern Thailand; therefore, generalizations regarding PW-CRC with a permanent colostomy in other parts of the country should be made with caution. The interpretation of causal relationships in the final model must be made cautiously because of this study's cross-sectional design, and a longitudinal study is recommended. In addition, the BFI-CRS measurement was tested only on CVI; therefore, it should be further tested for its construct validity.

Conclusions and Implications for Nursing Practice and Future Research

The Model of Factors Influencing Health-Related Quality of Life (MFI-HRQOL) for people with permanent colostomy developed in this study fitted with the empirical data, and all variables could explain 72% of HRQOL, which is very high. This reflects the validity of the revised WCM.[20] This developed model clearly explains the direct and indirect effects of CEA, gender, age, religion, social support, bowel symptoms, depressive symptoms, body image disturbance, and functional status on HRQOL. It also reflects the philosophical perspective of nursing science as a holistic view of the interrelatedness of bio-psycho-social and spiritual domains of human beings. From this MFI-HRQOL, nurses can design the comprehensive intervention to improve HRQOL of PW-CRC and permanent colostomy by targeting all those modifying factors, especially improving body image, functional status, and social support as well as managing symptoms to control and reduce bowel and depressive symptoms. Special consideration should be made to people with higher CEA, older adults, women, and Muslims. However, the intervention should be further tested in clinical practice.

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โมเดลทำนายปัจจัยที่มีอิทธิพลต่อคุณภาพชีวิตคนไทยที่เป็นมะเร็งลำไส้ใหญ่และลำไส้ตรงที่มีทวารเทียมแบบถาวร

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บทคัดย่อ: การยกระดับคุณภาพชีวิตของผู้รอดชีวิตจากมะเร็งลำไส้ใหญ่และลำไส้ตรงที่มีทวารเทียมแบบถาวรเป็นเรื่องสำคัญที่บุคลากรทางการแพทย์ มีความตระหนัก ความเข้าใจเกี่ยวกับปัจจัยที่มีอิทธิพลกับคุณภาพชีวิตเป็นพื้นฐานสำคัญสำหรับการพัฒนาการดูแลที่มีประสิทธิภาพ การศึกษาเชิงพรรณนาแบบภาคตัดขวางนี้พัฒนาขึ้นเพื่อทดสอบแบบจำลองคุณภาพชีวิตของผู้ป่วยกลุ่มนี้ เก็บรวบรวมจากผู้ป่วยมะเร็งลำไส้ใหญ่และลำไส้ตรงที่มีทวารเทียมแบบถาวรจำนวน 232 คน จากโรงพยาบาลระดับตติยภูมิในภาคใต้จำนวน 6 แห่ง โดยใช้แบบสอบถาม 7 ฉบับ ได้แก่ แบบสอบถามข้อมูลส่วนบุคคลและข้อมูลที่เกี่ยวข้องกับสุขภาพ แบบวัดแรงสนับสนุนทางสังคม แบบสอบถามเกี่ยวกับอาการผิดปกติของลำไส้ แบบประเมินภาวะซึมเศร้า แบบประเมินภาพลักษณ์ แบบประเมินดัชนีการทำกิจวัตรประจำวันของจุฬา (จุฬาเอดีแอล) และแบบวัดดัชนีคุณภาพชีวิตของโรคมะเร็งฉบับ 3 การวิเคราะห์ข้อมูลใช้สถิติเชิงพรรณนาและสมการโครงสร้าง

ผลการวิจัย พบว่า แบบจำลองที่พัฒนาและผ่านการทดสอบขั้นสุดท้ายสามารถอธิบายความแปรปรวนของคุณภาพชีวิตของผู้ป่วยมะเร็งลำไส้ใหญ่และลำไส้ตรงที่มีทวารเทียมแบบถาวรได้ร้อยละ 72 สารบ่งชี้มะเร็งลำไส้ เพศ และอายุ มีเพียงอิทธิพลทางอ้อมต่อคุณภาพชีวิตเท่านั้น ปัจจัยที่มีอิทธิพลทั้งทางตรงและทางอ้อมต่อคุณภาพชีวิตผ่านการทำหน้าที่ มี 6 ปัจจัย ได้แก่ปัจจัยทางด้านศาสนา แรงสนับสนุนทางสังคม อาการผิดปกติของลำไส้ ภาวะซึมเศร้า การสูญเสียภาพลักษณ์ และการทำหน้าที่ โดยการสูญเสียภาพลักษณ์เป็นปัจจัยทำนายที่มีอิทธิพลสูงสุด ผลจากการศึกษาในครั้งนี้ช่วยให้พยาบาลและบุคลากรวิชาชีพด้านสุขภาพอื่นๆ สามารถออกแบบการดูแลที่ครอบคลุมเพื่อส่งเสริมคุณภาพชีวิตผู้ป่วยกลุ่มนี้ โดยคำนึงถึงปัจจัยที่พบในการศึกษานี้ทั้งหมด โดยเฉพาะอย่างยิ่งการส่งเสริมด้านภาพลักษณ์ การทำหน้าที่ และแรงสนับสนุนทางสังคม และการจัดการอาการทางลำไส้และอาการซึมเศร้า ทั้งนี้การดูแลที่จะพัฒนาต่อไป ควรนำไปสู่การศึกษาเพื่อทดสอบในทางคลินิก

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คำสำคัญ: แบบจำลองเชิงสาเหตุ มะเร็งลำไส้ใหญ่และลำไส้ตรง คุณภาพชีวิต การทดสอบแบบจำลอง ทวารเทียมแบบถาวร คนไทย

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