Original Article

Selected Factors Related to Adaptation among Colorectal Cancer Older Adults with Colostomy

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Abstract

OBJECTIVES: To examine the adaptation among colorectal cancer older adults with colostomy and the correlations between selected factors and adaptation to colostomy.

MATERIAL AND METHODS: This correlational descriptive study included 100 older adults with colorectal cancer who had undergone colostomy for one month after being discharged from the hospital. Five questionnaires were used to collect the data. Data were analyzed using descriptive statistics, Pearson's product moment statistics, Spearman's rank order statistics, Kruskal-Wallis statistics, Independent t-test statistics, and One-way ANOVA statistics.

RESULT: The majority of participants were young-old adults and their age ranged from 60-88 years old (70.82 ± 8.23). Most participants had a high score of adaptation (153.98 ± 17.04). Ostomy self-care ability and adaptation had a moderate level of correlation with statistical significance of ($r = 0.37$, $p < 0.05$). However, age group, functional ability, the type of colostomy, complications related to the colostomy, and social support had no statistically significant correlations with adaptation.

CONCLUSION: The findings from this study benefit nurses and healthcare providers to understand adaptation among colorectal cancer older adults with a colostomy. These findings can be used as information to assess the ability to perform ostomy self-care in colorectal cancer older adults with a colostomy. However, promoting ostomy self-care is a concern in the old-old adults (aged 85 and above). They might need help from caregivers.

Keywords: adaptation, colostomy, older adults, colorectal cancer

Colorectal cancer is one of the most common cancers, and its incidence increases with age.[1] The number of people diagnosed with colorectal cancer tends to rise every year. From colorectal cancer statistics, colorectal cancer is the third leading cancer both in men and women in the United States.[2] In Thailand, the Hospital-Based Cancer Registry Annual Report 2017, reported that the new cases of colorectal cancer were the second order in men, and the third order in women.[3] Moreover, people sixty-five years of age have the third order of colorectal cancer incidence and the second order in terms of mortality rate. Furthermore, more than seventy-five percent of individuals aged seventy years old or older die from colorectal cancer.[2]

The treatment gold standard of colorectal cancer and the most commonly used is surgery with stoma creation[4]. Stoma or ostomy is an artificial opening on the abdominal wall through which waste material can pass out of the body from the bowel or urinary tract.[5] However, for colorectal cancer, the main objective for stoma creation is the building of fecal diversion or colostomy, which could be a permanent colostomy or a temporary colostomy. However, both temporary and permanent colostomies have negative impacts on the patients in many aspects, including sexual problems, psychological distress, impaired self-esteem, and being a burden to other people such as their family members[6] especially for older adults with colostomy.

Older adults that are diagnosed with colorectal cancer and that have undergone surgery with a colostomy have to adapt themselves not only to the cancer diagnosis but also to the colostomy itself. After the colostomy surgery, older adults with colorectal cancer may face several changes, such as emotional change, psychological change, or immediate complications

related to the colostomy.[6,7] Most of older adults experienced a decrease in social status and role function. Adaptation among older adults might be different from that in adulthood due to the differences in functional status, social context, and role context.

Many factors have been reported to be associated with adaptation, mostly about psychological and psychosocial aspects, such as acceptance of the stoma, social interaction, stoma self-efficacy, spiritual well-being.[8,9] However, as previous studies included both adult and older adult participants, the results cannot be generalized to the older adult group. Furthermore, the aging population is increasing globally and it is crucial to do research in the aging group in order to understand and to be able to widely generalize among the aging population.

In this study, the researcher used the Roy adaptation model as a conceptual framework to view colostomy patients in terms of a holistic concept, composed of the bio-psycho-social domain. The researcher chose the factors that might affect adaptation among colorectal cancer older adults with a colostomy in this study, including the age group, functional ability, the type of colostomy, complications related to the colostomy, ostomy self-care ability, and social support. Focal stimuli are the type of colostomy and complications related to the colostomy while contextual stimulus is social support. Adaptive levels are age group, functional ability, and ostomy self-care ability. Two types of the stimuli and adaptive level have an impact on coping mechanism resulting in adaptation.

Aging refers to the complex biological changes that progressively occur over time, affecting most organ systems in the body. Anatomical and physiological changes often lead to a gradual decline in functional capacity that increases with age. From these age-related changes, older adults experience a reduction in their body reserve, resulting in a decrease in their abilities to perform daily activities[10] especially having the colostomy. The researcher chose the variable of age and functional ability for this study. Age is categorized into three groups[11] as the study variable: the young-old (60 to 74 years), middle-old (75 to 84 years), and old-old (85 and above). The age group refers to the adaptive level affecting an individual's adaptation. Different age groups will respond differently to coping or adaptation. Therefore, the adaptation in each age group might differ.

Complications in peristomal skin problems result in negative outcomes of living with an ostomy.[8] The onset of these complications occurs most frequently 21 to 40 days after the stoma creation[7]. The type of stoma has a significant correlation with the frequency of skin complications.[12] A rod to support loop colostomy frequently causes higher skin complications.[13] Stomal or peristomal complications and the type of stoma as a predictor of variables are found to significantly influence the adjustment of stoma patients.[14] Around one month after the stoma creation is a critical period for colostomy patients. Moreover, colostomy patients confront a transition period with the process of adjustment to their new situation. With skin deterioration from age-related changes, complications related to the colostomy might be different between adult and aging people. Therefore, the researcher chose the type of colostomy and complications related to the colostomy as independent variables.

Ostomy self-care ability and social support has been reported to be associated with adaptation of colostomy patients. According to the Roy adaptation model,[15] adaptive level is the ability to adapt within a person. Ostomy self-care ability is as adaptive level that affects adaptation. With the difference in ostomy self-care ability, the person will respond differently in coping or adaptation. Moreover, as Roy mentioned, contextual stimuli have an impact on coping mechanisms resulting in adaptation.[15] Social support is as a contextual stimulus that influences adaptation. With the difference in social support, the person will respond differently in coping or adaptation. Therefore, the researcher selected ostomy self-care ability and social support as the independent variable in this study.

According to the Roy adaptation model,[15] Roy views persons as an adaptive system composed of input, a coping process, and output. When persons confront stimuli, they will process the stimuli to the adaptive mode using a coping mechanism—the regulator subsystem and cognator subsystem. Those stimuli will involve a person's adaptation in all four adaptive modes: the physiological mode, the self-concept mode, the role function mode, and the interdependence mode. If persons have an effective response, they can adapt themselves effectively. In contrast, if persons have an ineffective response, they cannot adapt themselves effectively.

Colorectal cancer older adults with a colostomy confront with stimuli that threaten their lives, and they have to adapt themselves to the changing environment, which is the colostomy. There are two possible ways to promote personal adaptation according to the Roy adaptation model, which are: managing the stimuli or; increasing the person's capability of adaptation. In terms of the nursing role for colostomy patients, a nurse can promote a person's adaptive level which is ostomy self-care ability in helping colostomy patients with regards to adaptation.

Thus, the purpose of this study is to examine the adaptation among colorectal cancer older adults with a colostomy and to examine the correlations among the selected factors (age group, functional ability, the type of colostomy, complications related to the colostomy, ostomy self-care ability, and social support) and adaptation to the colostomy. The findings from this study will be important information for nurses or healthcare providers in terms of understanding how colorectal cancer older adults adapt themselves to a colostomy. Moreover, the results from this study will guide nurses to develop nursing interventions for colorectal cancer older adults with a colostomy to more successfully lead to effective adaptation.

Materials and Methods

This study was a correlational descriptive design. The inclusion criteria was as follows:

1. Sixty years old or above,
2. Diagnosed with colon/rectal cancer and underwent elective surgery with a colostomy for one month after being discharged from the hospital,
3. Cognitive intact measured by Mini-Cog Thai version and participants had to obtain 3 on the score or higher,
4. Able to communicate and understand the Thai language
5. Willing to participate in this study.

A purposive sampling technique is used in this study. The sample size was calculated by using the G* power software program.[16] The previous research about adaptation in role functions of women with permanent colostomy[17] ($r = 0.417$, $p < 0.01$) was used to calculate the sample size. With $\alpha = 0.05$, power of the test = 0.80, medium effect size = 0.30, then the sample size is 84. The researcher increased the attrition rate by 20 percent resulting in a total of 100 participants in this study. Three medical centers in Bangkok were selected as a research setting and the sample size from each setting was calculated by the proportion of the research population as follows: 26 participants from Somdech Phra Debaratana Medical Center, Ramathibodi Hospital, 16 participants from National Cancer Institute of Thailand, and 58 participants from Phramongkutklao Hospital. The data collection was conducted from June to December 2018.

Six instruments were used in this study, including the screening tool and five questionnaires for data collection. The screening tool was the Mini-Cog Thai Version Test. The instruments to collect the data were: 1) Demographic Questionnaire; 2) Barthel Activities of Daily Living Index Questionnaire; 3) Ostomy Self-care Ability Questionnaire; 4) Social Support Questionnaire, and 5) Adaptation Questionnaire. Permission to use the instruments was granted.

The questionnaires

Instruments	Developed by	Characteristic of instruments	Interpretations
1. The Mini-Cog Thai Version Test	Borson, et al.[18] Trongsakul et al[19]	Three-item recall and clock drawing test	The total score ranges from 0-5 ≥ 3 score is indicated cognitive intact and include in this study
2. The Demographic Questionnaire	The researchers based on the literature review and Roy adaptation model related to colorectal cancer older patients' context.	15 items with demographic characteristic of participants	
3. The Barthel Activities of Daily Living Index Questionnaire (BAI).	Mahoney et al[20] Jitapunkul, et al[21]	10 items	Scoring: Each item has a different score which depends on its difficulty (0-3) The total score ranges from 0-20 0-4 = Dependent 5-11 = Partially dependent ≥ 12 = Independent
4. The Ostomy Self-care Ability Questionnaire	Lonil et al[22] Teerathongdee et al[23]	18 items (8 items in physical self-care ability, 4 items in mental self-care ability, 6 items in social self-care ability)	Scoring 0 = cannot do by oneself and needed caregiver 1 = can do by oneself but sometimes need caregiver 2 = can do by oneself The total score ranges from 0-36 0-12 = Low ostomy self-care ability 13-24 = Moderate ostomy self-care ability 25-36 = High ostomy self-care ability
5. The Social Support Questionnaire	Schaefer et al[24] Kaveevivitchai et al[25]	15 items with 5-Likert scales (to measure informational support, emotional support, and tangible support from three sources of social support including family, relatives and friends, healthcare providers.)	Scoring 0 = never received support 1= received little support 2 = received some support 3 = received support quite a bit 4 = received great support The total score ranges from 0-60 00.00-12.00 = Very low social support 12.01-24.00 = Low social support 24.01-36.00 = Moderate social support 36.01-48.00 = High social support 48.01-60.00 = Very high social support
6. The Adaptation Questionnaire	The researchers based on the literature review and Roy adaptation model related to colorectal cancer older patients' context.	43 items (16 positive questions, 27 negative questions) with 5-Likert scales (16 items in physiological domain, 11 items in self-concept domain, 8 items in role function domain, 8 items in interdependence domain)	Scoring for positive questions 1 = the participant disagrees with the statement in the question 2 = the participant slightly agrees with the statement in the question 3 = the participant moderate agrees with the statement in the question 4 = the participant very agrees with the statement in the question 5 = the participant strongly agrees with the statement in the question For negative questions, the score was reversed from the positive question scoring.

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The questionnaires were tested for reliability by applying Cronbach alpha coefficient. The reliabilities of the fourth to the sixth parts were .83, .91, and .89 respectively from pilot study with 10 participants. The reliabilities of the third to the sixth parts were .90, .80, .80, and .80 respectively from 100 participants. Participants answered the questions by themselves spending around 30-40 minutes to complete the the questionnaires. If they had any problems, or could not understand the questionnaire, the researcher added further explanation.

Ethical considerations: This study was approved by the Human Research Ethics Committee, Faculty of Medicine Ramathibodi Hospital, Mahidol University (No. MURA2018/293), National Cancer Institute of Thailand (ID 233_2018T_OUT563), and Phramonkutklao Hospital (ID Q009q/61_Exp). The potential participants were informed of the purpose of the study, data collection procedure, and their rights to refuse or withdraw from the study at any time with no effect on their quality of care. Informed consent was signed by the participant before collecting data. The participants' information was kept confidentially, only used for statistical analysis purposes, and reported as a group data.

Data analysis

Data were analyzed by using Statistic Package for the Social Science (SPSS) version 18 (Mahidol University). Descriptive statistics was used for demographic data, selected variables, and adaptation. The interval data were checked for normal distribution by Kolmogorov-Smirnov test. Pearson's product moment correlation, Spearman's rank correlation, Kruskal-Wallis statistics, Independent t-test statistics, and One-way ANOVA statistics were used to compare the difference mean score of adaptation and selected variables.

Results

A total of 100 older adults with colorectal cancer participated in the study, the majority were male (65%). Their age ranged from 60-88 years old (70.82 ± 8.23), and most of them were young-old adults. More than half the participants (67%) were married. Forty-one percent of participants had primary education. Most participants (87%) were retired from work. Their monthly income ranged from 600-500,000 Baht (27,273 ± 59950.37). More than three-fourths of the participants (79%) had a good perception of their income, including sufficient income (44%) and had some savings (35%), respectively. Fifty-four percent of the participants reimbursed medical spending from the government. More than three-fourths of the participants (79%) had caregivers to help them to take care of their colostomies, and 51.90% were their sons/daughters. The caregiving activities related to the colostomy were changing colostomy appliances (100%) and emptying colostomy bag (63.29%).

Nearly three-fourths of the participants (73%) in this study were diagnosed with rectal cancer. More than one-third of the participants (38%) were colorectal stage 4. The mean of duration since diagnosis was 4.13 ± 2.39 months. Most of the participants (88%) had underlying diseases, and nearly half of them (46.6%) had at least two underlying diseases. The most three common underlying diseases were hypertension (75%), dyslipidemia (48.86%), and diabetes mellitus (21.59%), respectively. The majority of the participants (58%) received surgery treatment only, and the rest received neoadjuvant therapy (chemotherapy and/or radiation). More than fifty percent (56%) were end colostomy while 44% were loop colostomy. The mean length of hospital stay was 11.35 ± 8.21 days. Fifty-three percent of the participants had complications related to the colostomy. Some participations (n = 53) had more than one complication and the three most common complications were skin irritation (77.36%), leakage (50.94%), and ulcer (35.85%), respectively.

Adaptation scores of the participants ranged from 112-193 (153.88 ± 16.98). High score referred to high adaptation. From the total 5 score, the mean score of each domain was as follows; physiological mode was 3.56 ± 0.37, self-concept mode was 3.72 ± 0.72, role function mode was 3.87 ± 0.50, and interdependence mode was 3.16 ± 0.64. The data of adaptation and details are shown in Table 1. Then analyzing the adaptation by item, the highest mean-scoring item of adaptation belonged to the role function mode (4.87 ± 0.34): "You are enthusiastic about listening to and following the suggestions from the doctors or nurses about your present illness." On the other hand, the lowest mean-scoring item of adaptation belonged to the physiological mode (1.36 ± 0.69): "You cannot control gas from the colostomy. More than half of the participants (69%) were young-old adults.

Functional ability scores of the participants ranged from 4-18 (16.91 ± 2.62). More than half of the participants (93%) independently performed activities daily of living (score ≥ 12). **Ostomy self-care ability** scores of the participants ranged from 13-35 (24.36 ± 5.52). All participants had a moderate to a high level of ostomy self-care ability, which 50% had a moderate level and 50% had a high level of ostomy self-care ability. Then analyzing the ostomy self-care ability by domain, the participants had a low mean score for physical self-care ability, which mostly mentioned about colostomy care and managing with colostomy complications. **Social support score** of the participants ranged from 18-60 (48.42 ± 8.88). The majority of participants (56%) had a very high level of social support. The descriptive data of study variables and adaptation are presented in Table 1.

Kruskal-Wallis statistics was used to compare the difference in mean score of adaptation for the age group variable. There were no statistically significant differences in the mean score of adaptation in age group ($\chi^2 = 2.016$, $p = 0.365$). A comparison to the mean score of adaptation by age group, using Kruskal-Wallis statistics, is shown in Table 2.

Independent t-test statistics was used to compare the difference in mean score of adaptation for the type of colostomy and complications related to the colostomy. There were no statistically significant differences of the mean score of adaptation in both the type of colostomy (t = -0.340, $p = 0.735$) and complications related to the colostomy (t = 1.550, $p = 0.124$). A comparison of the mean score of adaptation by type of colostomy and complications related to the colostomy, using independent t-test statistics, is shown in Table 3.

Pearson's product moment correlation was used to examine the correlation between ostomy self-care ability, social support and adaptation. Ostomy self-care ability and adaptation had a positively-moderate correlation with statistical significance (r = 0.370, $p < 0.05$) while social support and adaptation had no correlation. Spearman's rank correlation was used to examine the correlation between functional ability and adaptation. Functional ability had no correlation with adaptation. Correlation between ostomy self-care ability, social support, functional ability and adaptation is shown in Table 4. Researchers performed additional analysis as follows.

Table 1: Descriptive data study variables and adaptation (n = 100)

Variables	n (%)
Age group (Years); Mean ± SD	70.82 ± 8.23
Young-old: 60-74	69 (69)
Middle-old: 75-84	22 (22)
Old-old: ≥ 85	9 (9)
Functional ability; Mean ± SD	16.91 ± 2.62
Dependent: 0-4	1 (1)
Partial independent: 5-11	6 (6)
Independent: ≥ 12	93 (93)
Ostomy self-care ability; Mean ± SD	24.36 ± 5.52
Low: 0-12	50 (50)
Moderate: 13-24	50 (50)
High: 25-36	0 (0)
Social support; Mean ± SD	48.42 ± 8.88
Very low: 00.00 - 12.00	0 (0)
Low: 12.01 - 24.00	2 (2)
Moderate: 24.01 - 36.00	8 (8)
High: 36.01 - 48.00	34 (34)
Very high: 48.01 - 60.00	56 (56)
Adaptation; Mean ± SD	153.88 ±16.98

Table 2 : Compare the mean score of adaptation by age group using Kruskal-Wallis statistics (n = 100)

Age group	Mean rank	Chi-square	*p*
Young-old	51.89		
Middle-old	43.32	2.02	0.37
Old-old	57.39		

One-way ANOVA statistics was used to compare the difference in mean score of ostomy self-care ability of the age group variable. The mean score of ostomy self-care ability among young-old group, middle-old group, and old-old group were 26.36 ± 4.68, 21.32 ± 4.41), and 16.44 ± 3.00, respectively. Among these three age groups, there was at least one pair of age groups with a difference in mean score of ostomy self-care ability with statistical significance (F = 25.693, $p = 0.000$). Scheffe statistics was used to compare the pair of age groups and ostomy self-care ability. It was found that there was a difference in mean score of ostomy self-care ability among all three age groups with statistical significance ($p < 0.05$). A comparison of the difference in mean score of ostomy self-care ability by age group using One-way ANOVA statistics and details are presented in Table 5 and Table 6.

Table 3 : Compare the mean score of adaptation by type of colostomy and complications related to the colostomy using independent *t*-test statistics (n = 100)

Variables	n	Mean ± SD	*t*	*p*
The type of colostomy				
End colostomy	56	153.46 ± 18.50	-0.34	0.74
Loop colostomy	44	154.64 ± 15.17		
Complications related to the colostomy				
No	47	156.77 ± 16.06	1.5	0.12
Yes	53	151.51 ± 17.66		

Table 4 : Correlations between ostomy self-care ability, social support, functional ability and adaptation (n = 100)

Variables	Adaptation
Ostomy self-care ability	r = 0.37*
Social support	r = 0.13
Functional ability	r_s = 0.17

* $p < 0.05$,
r = Pearson's product moment correlation, r_s = Spearman's rank order

Table 5 : A comparison of the difference in mean score of ostomy self-care ability by age group using One-way ANOVA statistics (n= 100)

Source of variance	Sum of square	df	Mean square	*t*	*p*
Between-groups	1044.10	2	522.05	25.69	0.00
Within-group	1970.94	97	20.32		
Total	3015.04	99			

Table 6 : Compare the difference mean score of ostomy self-care ability by age group using Scheffe statistics (n= 100)

Age group	Mean ± SD	Young-old	Middle-old	Old-old
Young-old	26.36 ± 4.68		5.04*	9.92*
Middle-old	21.32 ± 4.41			4.87*
Old-old	16.44 ± 3.00			

*$p < 0.05$

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Discussion

The majority of participants were male, and they were middle-old age which is relevant to the statistics in Thailand and other countries.[2,3] The higher incidence of colorectal cancer in males more than females may be caused by biological and health behavioral factors. The highest percentage of developing colorectal cancer occurred in the middle-old age group.[1]

The results from this study are relevant to a previous study reported by Merlin et al.[1] which stated that the incidence of colorectal cancer increased with increasing age. The majority of participants were retired or unemployed. On the other hand, some of the participants (13%) were still working. Though having a colostomy, they could function and maintain their roles such as working while having colostomy. However, the participants had an adequate monthly income and some savings. For medical payments, the majority of participants were reimbursed by the government. They did not have any problems with medical payments.

Most participants had an underlying disease, and had more than two diseases. The most common diseases were hypertension, dyslipidemia, and diabetes mellitus. The results from this study were relevant to a report from previous research that stated that the most underlying diseases with colorectal cancer patients were hypertension, dyslipidemia, and diabetes mellitus,[23] respectively. The majority of participants were diagnosed with rectal cancer. Colorectal stage 4 was mostly diagnosed. The signs and symptoms of colorectal cancer included a change in bowel habits, including diarrhea, constipation or narrowing of the stool, rectal bleeding, blood in the stool, cramping or abdominal pain, weakness and fatigue, or unintended weight loss.[4] However, those signs and symptoms might not be specific until the patients visit the hospital for further investigation leading to late diagnosis. Most of the participants received concurrent chemo-radiotherapy before surgery. According to guidelines issued by the American Cancer Society,[4] a standard treatment for colorectal cancer is a combination of surgery, chemotherapy, and radiation. In this study, participants received treatments corresponding with the standard treatment. Most participants had immediate complications related to the colostomy. The three most frequently-experienced complications were skin irritation, leakage, and ulcer, respectively. The results of this study are relevant to the study by Salvadalena[7] which reported that peristomal skin problems occurred most frequently from 21 to 40 days after stoma creation.

Participants had a high adaptation score referring to an effective response. The participants used the cognator subsystem to respond to the colostomy. From the results of this study, the participants showed effective responses in the role function mode corresponding to their health condition as a patient. However, one month after surgery, the older adults were in the recovery phase. Most of them could perform independent activities of living, but they still needed some help, especially regarding colostomy care. Due to not being able to care for themselves regarding the colostomy, older adults felt dependent on their family members and this could lead to an ineffective response—some of them (young-old group) needed more time to learn and practice the skill by themselves, some of them (old-old group) needed help from others.

Ostomy self-care ability and adaptation had a positively-moderate level of correlation with statistical significance. After analyzing the between age group and ostomy self-care ability, the results revealed that there were differences in the mean score of ostomy self-care ability among three age groups with statistical significance. Yong-old group had the highest mean score of ostomy self-care ability. However, old-old group had the lowest mean score of ostomy-self-care ability. Young-old group had a high score on ostomy self-care ability meaning they could take care of their colostomies resulting in effective response while old-old group had a moderate score on ostomy self-care ability. From age-related changes, older adults in old-old group might have problems with poor eyesight, resulting in difficulty in managing the colostomy. They might need help from others and they still needed colostomy care.

Before leaving the hospital, the colostomy patients and their caregivers were taught how to take care of the colostomy by healthcare providers. The one month period immediately after surgery was a critical period for older adults to adapt themselves to a colostomy. After surgery and hospitalization, older adults might face pain or post-operative complications, and they needed more time for rehabilitation compared to adults[2]. With the age-related change, older adults might have limitations in doing colostomy care by themselves and needed caregivers during the recovery phase. Therefore, most of the participants (79%) had a family member as a caregiver in helping them take care of a colostomy such as changing and/or emptying a colostomy bag.

There were no correlations among age group, functional ability, the type of colostomy, complications related to the colostomy, social support and adaptation in this study. The majority of the participants were young-old adults and most of them could perform activities of daily living independently, except for bowel function due to the colostomy. It is a limitation of the study to generalize to other samples. After surgery, colorectal older adults may have symptoms such as headache, and fainting or dizzy symptoms for a short period. One month after hospitalization, these symptoms may subside or disappear themselves and do not affect the colostomy patients. However, the physiologic responses related to disease-specific responses for having a colostomy, such as not being able to control one's gas from the colostomy, or not being able to control elimination from the colostomy, still had an impact on colostomy patients causing a low mean score and low adaption.

Regarding the type of colostomy and complications related to colostomy, most of the participants had an end

colostomy, while the rest had a loop colostomy. The majority had complications related to the colostomy, and the most common complications in this study were skin irritation, leakages, and ulcers, respectively. The results from this study were relevant to previous studies that also reported that early peristomal skin complications in ostomated patients were irritant dermatitis.[7] However, there was no difference between two types of colostomy. In contrast, Jayarajah et al.,[26] found that loop ostomies had fewer complications than end ostomies. There was another study revealed that using a rod to support a loop colostomy caused higher complications.[13] In this study, the percentage of complications between end colostomy and loop colostomy did not differ. Colostomy patients had an appointment with the colostomy clinic after discharge from the hospital. Enterostomal therapy (ET) nurses educated both the patients and caregivers how to prevent complications related to the colostomy. Though the participants had complications related the colostomy, the complications were carefully observed and managed by healthcare providers.

For social support, the participants had a very high level of social support, mainly from their families and healthcare providers, including information, emotion, and help. In terms of informational support, the participants in this study received medical treatments from the tertiary hospital facilitated by professionals that were expert in specialized care, such as colorectal surgeons, oncologists, or enterostomal therapy nurses. The participants received information about the disease, prognosis, or details about medical treatments from the colorectal surgeons or oncologists. In addition, both the patients and caregivers received colostomy care knowledge and activities related colostomy care from the enterostomal therapy nurses. For these reasons, the informational support score was high in this study. Regarding emotional support and tangible support, most of the participants were married and had their spouses or sons/daughters as caregivers. Therefore, participants had an opportunity to get both emotional support and help from family. As mentioned, the emotional support and tangible support scores were high in this study. However, some participants had no support from family (6%) or relatives/ friends (1%). Participants in this group still got support from healthcare providers which was the main support for people in this group.

According to the Roy adaptation model,[15] there are two specific relationships in the interdependence mode: a significant other and a support system. A significant other is a person who is considered to be the most important to the individual. In this study, a significant other is a caregiver who takes care of the older adult. A support system is a relationship including individuals or groups. Relationship in the family, and relationship with the health care providers are support systems in this study. Participants in this study had very high social support, especially from their family members or caregivers and health care providers. Before processing to behavior or adaptation, social support or support systems are the mediators in the system.[15] It might be that social support is indirectly affected by other variables regarding adaptation. In this study, Roy adaptation model helps health care providers to better understand older adults with colorectal cancer with a colostomy in terms of their bio-psycho-social needs.

Conclusion

One month after surgery with a colostomy is a crucial period for older adults with colorectal cancer and they have to adapt themselves to a colostomy. They might be confronted with post-operative problems such as pain, peristomal skin complications, wound infection and may require more time for rehabilitation. Although, many of them may perform daily activities living independently, some still need help with colostomy care. Older adults with colorectal cancer also need more time to adapt themselves to colostomy care skills and to increase their ability to take care of their colostomies. Ostomy self-care ability correlate with the patients' capability to manage the colostomy. Older adults with colorectal cancer use their abilities to manage with stimuli. Through coping mechanisms, behaviors according to four adaptive modes are presented and all four adaptive modes are connected. If older adults with colorectal cancer with a colostomy have a problem in any domain, other domains will be affected. The Roy adaptation model helps health care providers in the understanding of the adaptation among older adults with a colostomy and reveals the factors related to adaptation, thus guiding healthcare providers to help the patients effectively to adapt.

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