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Original article

Health-related quality of life of patients living with ostomy in Thailand and cost implications

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Background: Ostomy surgery profoundly affects life of the patient, both physically and psychologically. Health-Related Quality of Life (HRQOL) is an important evaluation of health outcome that has not been studied in Thai patients with ostomy.

Objectives: We determined HRQOL of patients living with ostomy, correlated factors, and average cost of ostomy supplies per month.

Methods: Cross-sectional study with questionnaires was carried out given to 107 patients with ostomy at King Chulalongkorn Memorial Hospital. Self-administered individual factors questionnaire, WHOQOL-BREF-THAI questionnaire, and ostomy appliances satisfaction questionnaire surveys were employed.

Results: Response rate was 75.9%. Cronbach's alpha of the WHOQOL-BREF-THAI questionnaire was 0.883. The mean of overall HRQOL scores was 82.5 (SD = 11.0) out of 130. It reveals that most participants had moderate HRQOL levels and were satisfied with ostomy appliances. Social relationships domain of WHOQOL-BREF-THAI had the highest number of participants who had poor HRQOL level. Significant factors related to HRQOL were gender, age groups, obesity, marital status, payment scheme, financial status, skin disorders, and underlying diseases. The mean cost of ostomy supplies per month per stoma was 1,770 Thai Baht (SD = 858.9). One-piece ostomy appliance system had lower cost with better HRQOL scores and better ostomy appliances satisfaction scores. However, the sample size was limited for the one-piece system.

Conclusion: Most Thai patients living with ostomy have moderate quality of life, and they adjust well. The social relationships compromises are major issues that healthcare professionals should address with this group of patients. Ostomy supplies can be an important expense for patients.

Keywords: Health-related quality of life, ostomy, ostomy accessories, ostomy appliances, ostomy supplies, stoma

An ostomy is like a new organ to the patient who received stoma surgery. It is located on the abdominal surface, being created by colorectal or urinary surgery, in order to provide a new path for elimination of feces, intestinal effluent, or urine. The patients need ostomy appliances to collect their waste and have to adjust with the devices. They have to take care of their ostomy and hygiene, secure the ostomy bag to prevent leakage, sore skin, and odors [1, 2]. They have to cope with changes in dietary habits and sexual activities. The latter could be a threat to the stability of their marriage. There are recorded instances of suicide, depression, social isolation, and psychological breakdown after stoma surgery [3, 4]. Having ostomy affects the well-being of the owner. Patients living with ostomy have unique characteristics, different from other kind patients. So far, to our knowledge, the situation has not yet been probed among Thai patients. In this primary survey, Health-Related Quality of Life (HRQOL) is used to evaluate the health outcome of this group of patients.

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Materials and methods

A questionnaire survey was done. The design was cross-sectional and descriptive. Study population was a group of patients of King Chulalongkorn Memorial Hospital, Bangkok, Thailand, living with ostomy and had to come to the ostomy nurse clinic and/or had appointment with colorectal physicians scheduled between August and October 2010. All the participants were at least 18-years-old and had stoma for more than three months. They were invited to respond to questionnaires. The sample size estimation was 97 participants, calculated from a formula of estimated single mean with 95% CI based on SD of WHOQOL-BREF scores 6.26 from a previous study [5]. Additionally, another 10% was added for missing data. Therefore, the sample size estimation of this study was 107 participants. Because the expected response rate was 70%, 153 patients were needed.

Data was collected by self-administered individual factors questionnaire, WHOQOL-BREF-THAI questionnaire, and ostomy appliances satisfaction questionnaire. An information sheet was provided to the subjects and informed consent was obtained before collecting the patient's data. The patients filled up all the questionnaires by themselves in a private room. If the patients could not fill the questionnaires by themselves, the investigator would read the questions and filled in the answers from the patients without adding any explanation. The completed questionnaires were kept in sealed opaque envelopes.

The cost per month of ostomy supplies comprised of ostomy appliances cost and ostomy accessories cost. They were estimated based on the wear time and unit cost of ostomy appliances and usage of ostomy accessories from the individual factors questionnaire.

Questionnaires

- Self-administered individual factors questionnaire: A set of questions comprised of items on demographic data and clinical data.

- WHOQOL-BREF-THAI questionnaire: The WHOQOL-BREF is the acronym of WHOQOL instrument developed by the World Health Organization to assess an international cross-cultural HRQOL. This instrument was developed collaboratively in several centers worldwide including Thailand (WHOQOL-BREF-THAI). It comprises of 26 items that are categorized into four domains, namely, physical health, psychological, social relationships, and environment [6]. The HRQOL scores in each domain and overall scores were classified into HRQOL levels as poor, moderate, and good HRQOL according to the cut-off points in **Table 1**.

- Ostomy appliances satisfaction questionnaire: The VAS (Visual Analogue Scale) 0-10 scores of the five facets, comfortable while wearing, ability to control the odor, appearance, easy to use, and overall satisfaction.

Statistical analysis

The statistical analysis was conducted by SPSS program version 13. The association among demographic variables, clinical variables, HRQOL scores, and ostomy appliances satisfaction scores was assessed by univariate analysis, which included t-test and one-way analysis of variance (ANOVA) for normal distribution data. Mann-Whitney U test and Kruskal-Wallis test were used if the data did not have normal distribution. The results were reported by median and inter-quartile range (IQR).

Results

HRQOL scores

From 141 eligible patients approached, 107 agreed to participate (75.9% of response rate). The mean score of physical health domain was 21.9 out of 35 (SD = 3.3), psychological domain was 18.8 out of 30 (SD = 3.2), social relationship domain was 8.7 out of 15 (SD = 1.9), environment domain was 26.8 out of

Table 1. Cut-off points of HRQOL levels of WHOQOL-BREF-THAI questionnaire [6].

Domain	Poor HRQOL	Moderate HRQOL	Good HRQOL
Physical health	7-16	17-26	27-35
Psychological	6-14	15-22	23-30
Social relationships	3-7	8-11	12-15
Environment	8-18	19-29	30-40
Overall	26-60	61-95	96-130

40 (SD = 4.1), and the overall domain was 82.5 out of 130 (SD = 11.0).

HRQOL levels

The HRQOL domain scores and overall domain scores of individual participants had been categorized into HRQOL levels from the cut-off points as shown in **Table 1**. Most participants had moderate HRQOL level in every domain as shown in **Figure 1**. The social relationships domain had the highest number of participants who had poor HRQOL.

Demographic characteristics vs. HRQOL

Mean and standard deviation of HRQOL scores and percentage of each subgroup of demographic characteristics are shown in **Table 2**. Based on the analysis of factors related to HRQOL, gender, age groups, obesity, marital status, payment scheme, and financial status were significantly influenced.

Clinical characteristics vs. HRQOL

The mean period since surgery was 3.9 years (SD = 6.0). The ostomy accessories that participants frequently used were protective skin barrier paste (59.1%), cotton (58.1%), protective powder (45.2%), adhesive tapes (39.8%), and alcohol (12.9%). The underlying diseases frequently found were cancer (42.1%), hypertension (29.0%), diabetes mellitus (21.5%), and hyperlipidemia (14.0%). Mean, standard deviation of HRQOL scores, and percentage of each subgroup of clinical characteristics are shown in **Table 3**. On analysis of factors related to HRQOL, skin disorders and underlying disease were significantly influenced.

Ostomy appliances satisfaction scores

Overall, participants were satisfied with their ostomy appliances in every satisfaction facets. The one-piece ostomy appliances system had higher satisfaction scores than two-piece appliances system in every facet as shown in **Table 4**.

Cost implications of ostomy supplies

The cost collected in this study was the cost per month of ostomy supplies from the perspective of the provider. The mean of overall cost per month per stoma of ostomy supplies was 1,770 baht (SD = 858.9). The mean ostomy supplies cost per month of participants who used one-piece system was 855.7 baht (SD = 484) and those who used two-piece system was 1,802.8 baht (SD = 852.5). The mean unit cost of one-piece system was 105.5 baht (SD=39.6), and 237.9 baht (SD = 41.5) for two-piece system (ostomy base and ostomy bag).

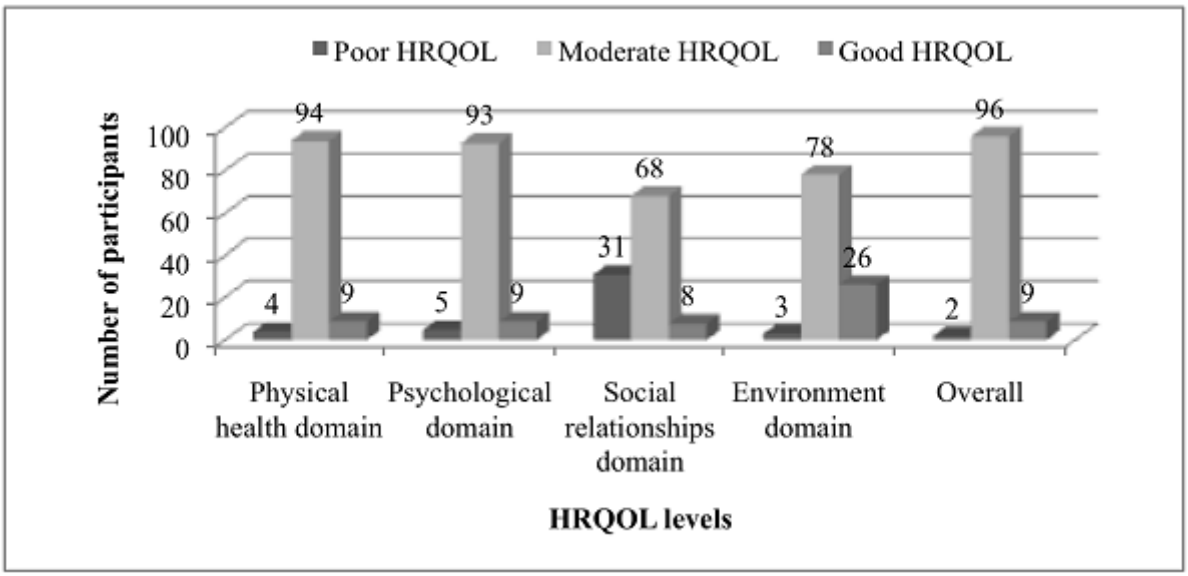

Figure 1. HRQOL levels in each domain of WHOQOL-BREF-THAI questionnaire.

Table 2. Demographic characteristics of participants and HRQOL scores among different subgroups.

Variable	Frequency (%)	Physical health Mean (SD)	Psychological Mean (SD)	Social relationship Mean (SD)	Environment Mean (SD)	Overall Mean (SD)
Gender						
Male	54 (50.5)	22.6 (3.1)	19.3 (3.2)	9.0 (1.9)	27.4 (4.3)	84.9 (10.9)
Female	53 (49.5)	21.2 (3.4)	18.3 (3.2)	8.4 (1.9)	26.2 (3.9)	80.2 (10.7)
p-value		***0.023***	0.242[a]	0.103	0.169	***0.027***
Age groups						
18-40	9 (8.4)	24.6 (1.9)	19.3 (2.8)	9.6 (1.9)	25.7 (5.3)	85.0 (11.1)
41-60	35 (32.7)	22.9 (3.6)	19.6 (4.3)	9.4 (1.9)	27.1 (4.3)	85.7 (12.6)
>60	63 (58.9)	20.9 (2.9)	18.2 (2.4)	8.2 (1.8)	26.8 (3.9)	80.4 (9.7)
p-value		***0.001***	0.323[b]	***0.003***	0.671	0.059
BMI (Obesity)						
Underweight	10 (9.5)	21.1 (4.9)	17.5 (4.3)	8.7 (2.5)	26.5 (4.9)	79.5 (15.9)
Normal weight	68 (64.8)	21.4 (2.7)	18.4 (2.7)	8.5 (1.8)	26.8 (3.8)	81.3 (8.9)
Overweight/Obesity	27 (25.7)	23.7 (3.5)	20.4 (3.5)	9.4 (1.8)	27.0 (4.9)	87.3 (12.9)
p-value		***0.006***	***0.009***	0.077	0.947	***0.035***
Missing	2 (1.9)					
Marital status						
Single	12 (11.3)	22.6 (2.7)	18.0 (1.6)	8.6 (1.8)	24.9 (3.5)	79.8 (7.1)
Married/Living as married	66 (62.3)	22.0 (3.1)	19.2 (3.2)	9.0 (1.8)	27.5 (4.2)	84.2 (11.1)
Separated/Divorced	10 (9.4)	24.3 (3.8)	19.4 (5.2)	9.1 (2.4)	26.0 (5.5)	85.3 (15.4)
Widowed	18 (17.0)	19.7 (3.0)	17.3 (2.4)	7.6 (1.5)	26.4 (2.9)	77.2 (8.2)
p-value		***0.003***	0.122	***0.038***	0.200	0.064
Missing	1 (0.9)					
Payment scheme						
Cash (Self-support)	9 (8.4)	20.8 (1.1)	18.4 (1.9)	7.8 (1.6)	25.8 (2.9)	78.8 (5.2)
Government/Organization	44 (41.1)	21.4 (3.3)	18.6 (2.8)	8.6 (2.0)	27.0 (4.4)	81.8 (10.9)
Universal coverage	47 (43.9)	22.1 (3.4)	18.7 (3.6)	8.8 (1.8)	27.0 (4.1)	82.7 (11.2)
Social security/Insurance	7 (6.6)	24.9 (3.2)	20.3 (4.3)	10.0 (2.1)	28.4 (5.0)	90.7 (14.4)
p-value		***0.042***	0.631	0.127	0.616	0.167
Financial status						
Inadequate income	30 (28.0)	22.0 (3.0)	18.0 (3.4)	8.1 (1.9)	25.1 (5.1)	79.0 (11.0)
Adequate income	77 (72.0)	21.8 (3.4)	19.1 (3.1)	9.0 (1.9)	27.5 (3.5)	83.9 (10.8)
p-value		0.864	0.142	***0.027***	***0.007***	***0.039***
All	**107**	**21.9 (3.3)**	**18.8 (3.2)**	**8.7 (1.9)**	**26.8 (4.1)**	**82.5 (11.0)**

[a] = Mann-Whitney U test, [b] = Kruskal -Wallis Test

Table 3. Clinical characteristics of participants and HRQOL scores among different subgroups.

Variable	Frequency (%)	Physical health Mean (SD)	Psychological Mean (SD)	Social relationship Mean (SD)	Environment Mean (SD)	Overall Mean (SD)
Amount of stoma						
One stoma	98 (91.6)	21.8 (3.2)	18.7 (3.1)	8.7 (1.9)	26.8 (4.1)	82.5 (10.9)
Two stoma	9 (8.4)	22.9 (4.2)	19.1 (4.6)	8.4 (1.6)	26.6 (4.9)	83.0 (13.4)
p-value		N/A	N/A	N/A	N/A	N/A
Types of stoma						
Colostomy	58 (54.2)	21.7 (3.5)	18.6 (3.6)	8.6 (2.1)	26.6 (4.4)	81.6 (12.1)
Ileostomy	11 (10.3)	22.0 (2.1)	18.8 (2.0)	9.5 (1.4)	26.4 (5.2)	83.3 (10.4)
Urostomy	29 (27.1)	22.0 (3.1)	18.9 (2.3)	8.8 (1.8)	27.6 (2.9)	84.0 (8.1)
Urostomy&Colos/Ileostomy	9 (8.4)	22.9 (4.2)	19.1 (4.6)	8.4 (1.6)	26.6 (4.9)	83.0 (13.4)
p-value		0.771	0.971	0.525	0.731	0.791
Type of surgery						
Temporary	33 (30.8)	22.1 (2.9)	19.0 (2.9)	9.2 (1.9)	26.7 (4.5)	83.4 (11.3)
Permanent	74 (69.2)	21.8 (3.5)	18.7 (3.3)	8.5 (1.9)	26.9 (4.0)	82.1 (11.0)
p-value		0.658	0.664	0.095	0.821	0.593
Years after the surgery						
<1 year	36 (33.6)	21.6 (3.3)	19.2 (3.1)	9.1 (1.9)	26.8 (4.3)	83.2 (11.7)
1-5 years	49 (45.8)	21.8 (3.6)	18.6 (3.7)	8.5 (2.0)	26.8 (4.2)	82.0 (11.6)
>5 years	22 (20.6)	22.4 (2.6)	18.4 (2.2)	8.7 (1.8)	26.8 (3.8)	82.5 (8.8)
p-value		0.682	0.570	0.345	0.997	0.895
Stoma site						
Upper quadrant	19 (17.7)	20.5 (3.1)	17.7 (2.4)	8.7 (1.8)	27.3 (3.6)	80.4 (10.2)
Between upper/lower	34 (31.8)	22.0 (3.3)	18.7 (3.1)	8.7 (1.7)	27.1 (3.7)	82.7 (10.0)
Lower quadrant	54 (50.5)	22.3 (3.3)	19.2 (3.5)	8.8 (2.1)	26.4 (4.6)	83.1 (12.0)
p-value		0.129	0.237	0.977	0.606	0.653
Types of ostomy appliances						
One-piece system	4 (3.7)	23.0 (3.3)	19.3 (2.4)	8.0 (1.4)	28.8 (1.3)	85.8 (8.5)
Two-piece system	103 (96.3)	21.8 (3.3)	18.7 (3.3)	8.7 (1.9)	26.7 (4.2)	82.4 (11.1)
p-value		N/A	N/A	N/A	N/A	N/A
Usage of ostomy accessories						
Use	93 (86.9)	22.0 (3.4)	18.9 (3.4)	8.7 (2.0)	26.8 (4.3)	82.8 (11.7)
Didn't use	14 (13.1)	21.1 (2.4)	18.1 (2.0)	8.6 (1.7)	26.6 (3.4)	80.8 (4.4)
p-value		N/A	N/A	N/A	N/A	N/A

[a] = Kruskal-Wallis Test, N/A = Not Applicable (Number of participants per subgroup too small, not able to do the statistical test)

Table 3. Clinical characteristics of participants and HRQOL scores among different subgroups.

Variable	Frequency (%)	Physical health Mean (SD)	Psychological Mean (SD)	Social relationship Mean (SD)	Environment Mean (SD)	Overall Mean (SD)
Leakage						
Never	36 (33.6)	21.7 (3.2)	18.4 (2.7)	8.8 (1.8)	27.8 (3.3)	83.1 (9.5)
Once a month	45 (42.1)	22.2 (2.8)	18.9 (3.4)	8.7 (1.9)	26.8 (4.1)	83.2 (10.7)
More than once a month	26 (24.3)	21.6 (4.1)	19.0 (3.7)	8.7 (2.2)	25.3 (4.9)	80.5 (13.6)
p-value		0.694	0.716	0.969	0.059	0.450[a]
Skin disorder						
Never	33 (30.8)	21.0 (2.5)	18.3 (1.9)	8.5 (1.5)	27.8 (2.9)	81.9 (7.2)
Once a year	20 (18.7)	23.5 (4.3)	20.3 (4.5)	9.0 (2.7)	28.3 (4.9)	88.1 (15.1)
2-3 times a year	20 (18.7)	21.8 (3.3)	18.9 (2.5)	8.7 (2.3)	25.4 (3.5)	80.9 (10.0)
More than 4 times a year	34 (31.8)	21.9 (3.1)	18.3 (3.5)	8.8 (1.5)	25.8 (4.7)	80.9 (11.3)
p-value		0.058	0.335[a]	0.767[a]	***0.035***	0.259[a]
Underlying disease						
Absent	22 (20.6)	21.5 (3.4)	17.8 (2.9)	8.7 (1.8)	25.2 (4.6)	79.1 (11.3)
Present	85 (79.4)	22.0 (3.3)	19.0 (3.3)	8.7 (1.9)	27.2 (3.9)	83.4 (10.9)
p-value		0.501	0.121	0.983	***0.039***	0.107
Have cancer						
Absent	62 (57.9)	21.7 (3.6)	18.6 (3.1)	8.6 (1.9)	26.8 (3.9)	82.0 (10.9)
Present	45 (42.1)	22.1 (2.9)	18.9 (3.4)	8.9 (2.0)	26.8 (4.5)	83.2 (11.3)
p-value		0.498	0.649	0.501	0.994	0.604
Ostomy education						
Uneducated	7 (6.5)	20.9 (4.5)	18.0 (3.7)	9.3 (1.4)	26.9 (2.5)	81.3 (11.7)
Educated	100 (93.5)	22.0 (3.2)	18.8 (3.2)	8.7 (1.9)	26.8 (4.2)	82.6 (11.0)
p-value		N/A	N/A	N/A	N/A	N/A
All	**107**	**21.9 (3.3)**	**18.8 (3.2)**	**8.7 (1.9)**	**26.8 (4.1)**	**82.5 (11.0)**

[a] = Kruskal-Wallis Test, N/A = Not Applicable (Number of participants per subgroup too small, not able to do the statistical test)

Table 4. Ostomy appliances satisfaction scores from two types of ostomy appliances system.

Types of appliances	N	Comfortable Median (IQR)	Ability to control the odor Median (IQR)	Appearance Median (IQR)	Easy to use Median (IQR)	Overall satisfaction Median (IQR)	Sum scores Median (IQR)
One-piece system	4	8.5 (1.8)	10.0 (0.8)	9.0 (2.8)	9.5 (1.0)	9.5 (1.8)	45.5 (5.5)
Two-piece system	103	8.0 (2.0)	8.0 (2.8)	8.0 (4.0)	8.0 (2.0)	8.0 (2.6)	40.0 (11.0)
Overall	107	8.0 (2.0)	8.0 (3.0)	8.0 (4.0)	8.0 (2.0)	8.0 (3.0)	40.0 (10.0)

Table 5. Cost of ostomy supplies per month per stoma (116 stoma, N = 107).

Cost per month per stoma (baht)	One-piece system (4 stoma, N = 4)		Two-piece system (112 stoma, N = 103)		Overall (116 stoma, N = 107)	
	Mean (SD)	%	Mean (SD)	%	Mean (SD)	%
Ostomy appliances	810.5 (496.6)	94.7	1596.6 (777.7)	88.6	1569.4 (781.6)	88.7
Ostomy accessories	45.2 (16.9)	5.3	206.2 (210.6)	11.4	200.6 (209.0)	11.3
Ostomy supplies	855.7 (484.0)	100	1802.8 (852.5)	100	1770.0 (858.9)	100

Reliability of the WHOQOL-BREF-THAI questionnaire

The WHOQOL-BREF-THAI questionnaire, which was used in this study, shows a high internal consistency in overall HRQOL scores with the Cronbach's alpha of 0.883. The Cronbach's alpha in each domain was 0.535 for physical health domain, 0.671 for psychological domain, 0.452 for social relationships domain, and 0.804 for environment domain.

Discussion

This study received a better response rate than expected. The missing data was less than 10%. All data of 107 participants were included in data analysis. Therefore, this study had adequate sample size.

WHOQOL-BREF-THAI (26 items) is the abbreviated version of WHOQOL-THAI instrument (100 items). The WHOQOL-BREF-THAI has been tested for its psychometric properties in a large population against the WHOQOL-THAI, and it was discovered that this brief version is shorter, simpler, and more convenient to be used in community survey and has better comprehensibility [6]. Therefore, using the WHOQOL-BREF-THAI questionnaire in this study was suitable due to limited patient's time and busy clinical environments. This study had a high internal consistency with a high Cronbach's alpha coefficient for its overall HRQOL scores at 0.883 .

Various QOL assessment tools have been developed. Some are disease-specific instruments for particular patients, for example: COH-QOL (the City of Hope QOL Ostomy questionnaire) [7]. Others are generic instruments that can be applied to all people, for example: WHOQOL-BREF-THAI. Although measures that are more specific will be more sensitive to detect changes in a particular condition, generic instruments have the advantage of allowing comparisons between disease groups and help on decisions such as resource allocation. In comparison with a previous study, which studied HRQOL of breast cancer patients after mastectomy at King Chulalongkorn Memorial Hospital [8], the female ostomy patients who had cancer showed better HRQOL scores in every domain including the overall scores. Both groups had the same HRQOL level, which was moderate. Therefore, the female patients living with ostomy and cancer tended to have the ability to adjust to their new body image better than breast cancer patients who had mastectomy.

The most important reason why this study chose the generic instrument like WHOQOL-BREF-THAI instead of the specific instrument like COH-QOL, was the items of the questionnaire. The COH-QOL questionnaire contains four items of sexual activity while WHOQOL-BREF-THAI has only one item. Asian people tend to have more conservative sexual attitudes, and they are more confined in their expression of sexuality [9]. Besides, discussion on sexual matters outside of marriage is generally considered inappropriate [10]. Thai culture does not accept discussion on sexual activity in public, which is in

agreement with the results of this study. The largest part of the missing data included items on sexual activity. Six participants refused to answer any of the questions.

According to **Tables 2 and 3**, it can be seen that the social relationships domain of WHOQOL-BREF-THAI questionnaire had the worst HRQOL scores. As shown in **Figure 1**, the number of participants who had poor HRQOL level was highest in social relationships domain. The social relationships domain was incorporated with personal relationships, social support, and sexual activity [6]. Many participants stopped or decreased social and leisure activities and/or stopped or decreased their sexual activity because they were embarrassed by their body image, the odor, and gas. They were distressed by the leakage of their waste and feeling of unattractiveness while wearing the ostomy appliances. These previous factors caused the negative influence on patient's relationships, both social and sexual [11]. The presence of an ostomy was associated with lower rates of sexual activity and higher erectile dysfunction in men [11]. Results from previous study showed that approximately half of ostomy patients did not have sexual relations after ostomy surgery [3]. Besides the psychological issue, the physical changes after ostomy surgery were also the important factors that caused problems on sexual activity. Nerve damage and scars related to the surgery caused the erectile dysfunction in male and dyspareunia in female, which affected sexual abilities and satisfaction [3, 12]. Social supports also played important roles on HRQOL of ostomy patients. The absence of social support might cause difficult adjustment in ostomy patients, which might cause social isolation and other psychological problems [13]. Provision or withdrawal of husbands' or partners' support can have a considerable impact on the psychosocial adjustment of ostomized patients [14]. Awareness of patients' social relationship allows healthcare professional to identify those who are likely to have problems and devote more resources to the patients. Interventions that may help the ostomy patients include pre- and post-operative education and provision of ostomy support groups [15]. Psychotherapy might be needed for patients with severe problems.

The younger age had a higher HRQOL scores than the older age. The younger age would be able to adjust themselves with their ostomy better than older age and would be more able to take care of their ostomy by themselves than older age, which might need caregivers to take care of their ostomy.

Length of time (years) after the surgery did not have any association with HRQOL scores. Participants who had surgery less than one year had the highest HRQOL scores, which might be caused by the types of surgery received. Because 61.1% of participants who had surgery less than one year had temporary ostomy while participants who had surgery between one to five years and more than five years had temporary ostomy only 18.4% and 9.1%, respectively. In this study, temporary ostomy had better HRQOL scores than permanent ostomy, as shown in **Table 3**. If the types of surgery were similar in every subgroup in terms of years after the surgery, more years should have better HRQOL scores.

Participants who used one-piece ostomy appliances system had HRQOL scores and satisfaction scores higher than those who used two-piece ostomy appliances system. This might be caused by other reasons such as years since surgery and the price of ostomy appliances. Participants who used one-piece system in this study had more years since surgery (median = 4.2 years (IQR = 21.5) than participants who used two-piece system (median = 1.4 years (IQR = 3.2). Having more years since surgery allowed participants to have familiarity with their stoma and their ostomy appliances. Participants who used a one-piece system might prefer it because of cost. Moreover, this study had only four participants who used the one-piece system. A larger sample size of those who used one-piece system would be needed to analyze characteristics of the one-piece system in more detail.

This study might have a selection bias and referral bias. As participants were patients who regularly came to the ostomy nurse clinic and/or had appointments with colorectal physicians as scheduled, the participants tended to have favor with their ostomy appliances since they came to hospital to buy the ostomy appliances regularly and repeatedly. Therefore, the satisfaction scores of ostomy appliances were quite high.

Wear time of ostomy appliances from this study was longer than studies from the United States [16] and United Kingdom [17]. In the United States and United Kingdom, the ostomy patients disposed of all the ostomy appliances after use. While 59.2% of study participants reused the ostomy bag instead of being disposed as recommended by the manufacturers.

The ostomy supplies are necessary elements that every patient living with ostomy needs to use, resulting in additional expense to the patient. Healthcare provider should consider this expense due to the increasing number of patients living with ostomy.

The results of this study might not be generalized in some aspects and circumstances. King Chulalongkorn Memorial Hospital is a medical school so some operating characteristics and environments might be different from other hospitals in Thailand or other countries.

Conclusion

Most Thai patients living with ostomy have moderate quality of life, and they have adjusted themselves well. Social relationships are the major domain that healthcare professionals should focus on. As ostomy supplies can be a significant expense, early identification of these problems may allow interventions that are more effective. Further study of these patients with negative social relationship outcomes is warranted. Additional information on one-piece appliance system may be useful.

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