Original Article

Body Image and Quality of Life Correlation after Treatment in Thai Breast Cancer Patients

Dolrudee Songtish, MD[1], Prinya Akranurakkul, MD[1]

[1] Department of Surgery, Faculty of Medicine, Srinakharinwirot University, Nakhon Nayok, Thailand

Objective: This study aimed to identify the correlation between body image (BI) perception and quality of life (QoL) in Thai breast cancer patients. Moreover, we investigated the change of BI and QoL over time in breast cancer patients who underwent mastectomy and breast conserving therapy (BCT).

Materials and Methods: Sixty Thai breast cancer patients who diagnosed at least one year at MSMC during July, 2016 to April, 2017 were asked to complete the questionnaires. We collected demographic data and history of breast cancer treatment from medical record. All participants were evaluated about BI and QoL by completed Thai version of body image scale (TBIS), EORTC QLQ-C30 and EORTC QLQ BR-23. The data were assessed at month 0 and 6th. Spearman's rho Correlations and repeated measures ANOVA were used to analyze the relation and change of BI and QoL over time.

Results: Thirty patients underwent BCT. Mean age was 54.7 years and 73.3 percent was in early stage breast cancer. Moderate correlation were presented between BI and emotional functioning, and upset by hair loss. BCT group had lower score statistical significant in physical functioning, social functioning and future perspective comparing to mastectomy group. Additionally, patients whose age more than 55 years had better QoL in social functioning and other functional measurements (p-value <0.05) than younger patients. Changing of BI between mastectomy and BCT over 6-month period did not affect by time but time and type of surgery interaction had been found in TBIS score (F (1, 58)=6.79, p=0.012). Global health status in both group were decreased overtime (F (1, 58)=5.84, p=0.019).

Conclusion: BI was correlated to QoL in Thai breast cancer patients. Younger patients had lower QoL comparing to older patients. BI perception and QoL had changed over time depend on type of surgery.

Keywords: Quality of life; Body image; Breast cancer; Surgery; Thai

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Breast cancer has been the leading cancer in Thailand for years, in 2015, cancer registration showed age-standardized incidence rates (ASR) for breast cancer was 31.4 per 100,000[1]. Although advanced in breast cancer treatment improved survival rate of breast cancer patient, the treatment itself left both temporary and permanent morbidities which affected patient's quality of life (QoL)[2]. Surgery is still the mainstay for treatment in early breast cancer. Both mastectomy and breast conserving therapy (BCT) have equal outcomes in both recurrence rate and survival rate[3]. BCT aims to preserve the breast and improves cosmetics outcome, however BCT results in breast deformity up to 20 to 30% of the patients[4,5]. Not only concerning about cancer recurrence, breast cancer patients were burden by breast cancer treatments such as body image (BI) changing, lymphedema or frozen shoulder which persisted even their treatments finished. Early breast cancer detection and advanced treatment resulted in prolong survival among breast cancer patients, better QoL was one of the aims for breast cancer care. Several studies reported correlation between BI satisfaction after breast cancer treatment and QoL, level of stress, sexuality and self-esteem in breast cancer patients[6,7]. Alteration in breast contour affected patient's psychological aspect differently such as younger patients had more undesirable impression after surgery than older patient regardless operative type[8]. Post treatment changes also impact a woman's sense of well-being and adjustment in later life. Since cosmetic outcome is an important parts in determine post-surgical success, it should be integrated into the comprehensive assessment of QoL in breast cancer patients.

Cosmetic evaluation dividend into quantitative measurement such as body measurement[9] and computer analysis[10,11], another was qualitative assessment which composed of medical personnel opinion and patient evaluation. Although medical personnel assessment was useful for post-surgical evaluation, its result was inconsistent and varied from study to study. Patient cosmetics self-assessment was showed correlation with quality of life. However, studies about BI and QoL in breast cancer patient

Correspondence to:

Songtish D.

Department of Surgery, Faculty of Medicine, Srinakharinwirot University, 62 Moo 7 Ongkharak, Nakhon Nayok 26120, Thailand.

Phone: +66-37-395085 ext. 11201, **Fax:** +66-37-395271

Email: dolrudee@g.swu.ac.th

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had inconclusive results, these may result from different socioeconomic status and culture. Kim, et al[12] reported patients who underwent BCT and mastectomy with reconstruction had higher QoL and BI perception than mastectomy alone, while Nissen, et al[13] reported lower QoL score in patient with BCT or mastectomy with reconstruction comparing to mastectomy patient. Moreover, mastectomy with reconstruction patient had more mood disturbance and poorer well-being.

Since there are differences in culture and language between the West and Thailand, the study aim to evaluate BI correlation with QoL and QoL changing over time in Thai breast cancer patients.

Materials and Methods

A longitudinal study was conducted at HRH Princess Maha Chakri Sirindhorn Medical Center (MSMC) which was university hospital during July 2016 and April 2017. We enrolled 60 breast cancer patients who were diagnosed for at least 12 months, underwent unilateral breast cancer surgery and completed their course of chemo-radiation, and were aged more than 18 years. We excluded patients previously diagnosed with mental and psychological disorders, had a Karnofsky Performance Scale of less than 80%, and who were illiterate. Sample size was calculated by using the confidential interval which was derived for Pearson correlation when reliability was at less 0.50, α level of 0.05 and power of 95.

When ethical approval was obtained from the Institutional Review Board of the Faculty of Medicine of Srinakharinwirot University,SWUEC/E-188/2558,eligible breast cancer patients who attended out-patient clinics during routine follow-up were sequentially invited to participate in the study. All participants were given detailed research objectives before they gave informed consent and completed the self-administration of Thai version of the body image scale(TBIS), EORTC QLQ-C30 and EORTC QLQ BR-23. Participants were asked to complete the second questionnaire after 6 to 7 months during clinical follow-up (mean interval 6.18 months). All demographic and clinical data were collected from medical records.

Thai version of body image scale (TBIS) which validated by Songtish, D[14] has 10 items, each item score 0 to 3. Item 1 was excluded from analysis since it was incomprehensive from the cognitive interview and factor analysis. TBIS was used for BI evaluation. The European Organization for Research and Treatment of Cancer quality of life questionnaire (EORTC QLQ-C30) and The European Organization for research and treatment of cancer quality of life questionnaire-Breast cancer (EORTC QLQ BR-23)[15,16] which translated and validated into Thai version[17,18] were used to evaluate QoL for Thai breast cancer patients.

The following analysis used the Statistical Package for Social Sciences version 23 (SPSS Inc., Chicago, IL, USA). Patients' demographic data and clinical outcomes were reported in mean (SD) and percentage in subgroups according to surgical procedures. Since most QoL results do not have normal distribution, clinical variable which associated with BI and QoL were examined by Mann-Whitney test. Correlation of BI and QoL were tested by Spearman's correlation and repeated measures ANOVA.

Results

Participants' demographic and clinical data which divided by operative procedure were presented in Table 1. Mean age for all participants was 54.7 years. Thirty participants underwent mastectomy while others had BCT. Seventy-three percent of the participants were stage 0, I and II breast cancer, 23.3% were stage III and 3.3% were stage IV. Eighty percent of patients received chemotherapy, 78.3% underwent radiation while 83.3% taking hormonal therapy. Mean duration after breast cancer diagnosis was 58 months and the longest follow-up period was 79 months. Most of the participants in BCT group received college-level (or higher) education and 66.7% were company - employee and government officer.

From table 2, BI showed moderate negative correlation with emotional function (ρ=-0.53, p$\leq$0.001) while showed positive correlation with hair loss in symptom scale of QLQ-BR23 (ρ=0.52, p=0.006). Low negative correlation between BI and QoL were found in global health status, physical function, cognitive function and future perspective, however, low positive correlation were found with fatigue, pain, dyspnea, appetite loss, financial difficulties and systemic therapy side effects. We did not report BI score in QLQ-BR23 in analysis because the items overlapped with TBIS score.

Comparing BI and QoL between mastectomy group and BCT group was presented in table 3. TBIS showed no statistical significant between two groups. Patients underwent BCT showed lower QoL in physical functioning, social functioning, sexual functioning, sexual enjoyment and future perspective comparing to mastectomy patients. According to age, QoL in patients older than 55 years old were better than younger patients significantly in social functioning, BI, sexual functioning, future perspective and upset of hair loss.

Longitudinal study of BI and QoL over 6 months period in patients underwent mastectomy and BCT were presented in Table 4. Time and surgical procedure had no significant affected to BI but surgical types had affected on BI depending on time (F (1, 58) = 6.79, p-value = 0.012). Over 6 months, patients in mastectomy group had better BI perception while BCT group had lower perception. Similar to BI, fatigue had affected by operative types depending on time (F (1, 58) = 4.31, p-value = 0.042). Time effect was also found on Global health status (F (1, 58) =5.84, p-value = 0.019), but it was not affected by surgical procedure. Participants in mastectomy group showed higher QoL in functional scales in QLQ-BR23 comparing to BCT groups. According to analysis, type of surgical procedure significantly influenced on sexual functioning (F (1, 58) = 12.43, p-value = 0.001), sexual enjoyment (F (1, 58) = 9.399, p-value = 0.006), future perspective (F (1, 58) = 9.52, p-

Table 1. Demographic data of Thai breast cancer patient who receiving mastectomy and breast conserving surgery

	Mastectomy (n=30)		Breast conserving therapy (n=30)		p-value
	n	Percent	n	Percent	
Age (year) (mean(SD))	54.7 (10.3)		47.5 (8.29)		
Breast cancer staging					0.08
Stage 0	1	3.3	6	20	
Stage 1	6	20	10	33.3	
Stage 2	12	40	9	30	
Stage 3	9	30	5	16.7	
Stage 4	2	6.7	0	0	
Chemotherapy	26	86.7	22	73.3	0.19
Radiation	17	56.7	30	100	<0.001
Hormonal treatment	26	86.7	24	80	0.48
Highest level of education					0.09
Primary school or under	12	40	4	13.3	
Secondary school	3	10	2	6.7	
Certificate/Diploma	6	20	4	13.3	
Degree	9	30	20	66.7	
Marital status					0.81
Single	3	10	3	10	
Married	23	76.7	22	73.3	
Divorced	3	10	3	10	
Widow	1	3.3	2	6.7	
Occupation					0.08
Housewife	10	33.3	2	6.7	
Officer	11	36.6	20	66.7	
Farmer	1	3.3	1	3.3	
Merchant	3	10	5	16.6	
Worker	5	16.6	2	6.7	
Income (baht/month)					0.02
<5,000	12	40	2	6.7	
5,000 to 9,999	2	6.7	4	13.3	
10,000 to 29,999	11	36.7	6	20	
≥30,000	5	16.6	18	60	

value = 0.003) but they all did not depended on time.

Discussion

A longitudinal descriptive study aimed to explore BI correlation with QoL in Thai breast cancer patients. Moreover, our study examined the BI and QoL changing over time. Participants' demographic data are similar to Thai breast cancer patients reported in Cancer registrations[1]. Participants in BCT groups were younger, had higher education and had active daily life. Age, character of work and daily activities may result in operation choice aiming to preserve breast image.

Different QoL among patients in each country may results from different race, culture, belief and lifestyle. Ganesh, et al[19] reported QoL in Malaysian breast cancer patients showing lower score in QLQ-C30 and QLQ BR-32 comparing to our study. Global health status in Malaysian was 65.7 (SD=21.4) while in Thais was 78.06 (18.60). Other scores in functional scale such as physical function was 81.7, role functioning was 82.3, which lower compared to our report. Shi, et al[20] also reported QoL of breast cancer patients in Taiwan showing difference QoL score whereas baseline global health status was 51.32 (22.38) and physical function was 38.59 (14.90). Although each study presented

Table 2. BIS and correlation to quality of life in breast cancer patients

	Mean (SD)	Spearman's rho correlations with BIS	p-value
Body image scale	3.05 (2.98)	1	-
QLQ-C30			
Global health status	78.06 (18.60)	-0.30	0.02
Functional scales			
Physical functioning	89.44 (10.14)	-0.27	0.03
Role functioning	91.39 (14.87)	-0.243	0.06
Emotional functioning	87.22 (14.59)	-0.529	<0.001
Cognitive functioning	86.39 (13.89)	-0.39	0.002
Social functioning	92.78 (14.51)	-0.24	0.06
Symptom scales			
Fatigue	27.78 (16.80)	0.40	0.001
Nausea and vomiting	3.89 (8.87)	0.17	0.20
Pain	17.22 (19.39)	0.28	0.03
Dyspnoea	12.78 (17.45)	0.31	0.01
Insomnia	23.33 (25.52)	0.15	0.25
Appetite loss	15.56 (19.85)	0.26	0.04
Constipation	18.33 (21.63)	-0.03	0.84
Diarrhea	5.00 (12.00)	0.29	0.02
Financial difficulties	8.33 (15.79)	0.36	0.005
QLQ-BR23			
Functional scales			
Body image	88.19 (14.97)	-0.56	<0.001
Sexual functioning	89.44 (14.76)	0.09	0.49
Sexual enjoyment	72.22 (21.59)	0.14	0.46
Future perspective	68.33 (25.62)	-0.31	0.02
Symptom scales			
Systemic therapy side effects	16.35 (16.20)	0.36	0.004
Breast symptoms	13.75 (13.45)	0.18	0.17
Arm symptoms	13.15 (13.49)	0.14	0.28
Upset by hair loss	25.64 (27.17)	0.52	0.006

difference QoL scores between populations, other variables which associated with QoL seem to have similar trends.

Correlation of BI and QoL revealed good BI perception; lower score, had association with high QoL in global health status, functional scale and low symptom scale in both QLQ-C30 and QLQ-BR23. Moderate correlation was found between BI, emotional functioning and upset of hair loss while others part of QoL showed low association such as global health status, physical functioning, role functioning and social functioning. Whereas BI had no correlation with sexual functioning and sexual enjoyment. Our results reflected BI perception and QoL in Thai breast cancer patients which showed minimal concern about their appearance and less concern about sexual life. Since Thai women concern with filial duties and housework more than social activity, this may consequence from traditional lifestyle and culture. Even though BI perception showed no correlation sexual life, it correlated to other domains in QoL especially in functional scales. Contrary to report from Thanarpan, et al.[21] which showed no correlation of cosmetic outcome with QoL, the author claimed that low power study causing the negative study. Moreover, the different outcomes may cause from difference tool for measuring cosmetic outcome. Our study using patient report outcome while Thanarorn, et al using quantitative measurement, BCCT.core.

Clinical variables related with QoL were examined by various studies. Surgical type had diverse influenced on QoL. Unlike others studies, Thai breast cancer patients who underwent mastectomy had better QoL in physical

Table 3. BIS and QoL according to surgical procedures and age

	Operation			Age variable		
	Mastectomy (mean (SD)) (n=30)	Breast conserving therapy (mean (SD)) (n=30)	p-value*	Age ≤55 years (mean (SD)), (n=34)	Age >55 years mean (SD)), (n=26)	p-value*
Body image scale	3.70 (3.23)	2.40 (2.59)	0.12	3.26 (2.96)	2.76 (3.03)	0.353
QLQ-C30						
Global health status	76.11 (20.96)	80.00 (16.02)	0.58	79.41 (17.43)	76.28 (20.23)	0.569
Functional scales						
Physical functioning	91.33 (10.81)	87.56 (9.22)	0.03	87.65 (10.13)	91.79 (9.85)	0.052
Role functioning	92.78 (16.19)	90.00 (13.56)	0.19	88.73 (16.77)	94.87 (11.32)	0.088
Emotional functioning	88.33 (14.11)	86.11 (15.22)	0.54	86.52 (16.15)	88.14 (12.51)	0.981
Cognitive functioning	87.22 (13.62)	85.56 (14.34)	0.65	85.78 (13.06)	87.18 (15.13)	0.543
Social functioning	95.56 (13.79)	90.00 (14.90)	0.04	89.22 (17.35)	97.44 (7.73)	0.03
Symptom scales						
Fatigue	27.04 (16.93)	28.52 (16.93)	0.61	29.41 (17.70)	25.64 (15.64)	0.496
Nausea and vomiting	4.44 (9.72)	3.33 (8.07)	0.70	3.43 (7.97)	4.49 (10.06)	0.816
Pain	17.22 (21.66)	17.22 (17.22)	0.68	20.10 (20.42)	13.46 (17.65)	0.186
Dyspnoea	12.22 (18.54)	13.33 (16.60)	0.67	14.71 (18.69)	10.26 (15.68)	0.374
Insomnia	21.11 (28.34)	25.56 (22.63)	0.31	25.49 (24.69)	20.51 (26.79)	0.363
Appetite loss	13.33 (18.77)	17.78 (20.96)	0.40	12.75 (20.12)	19.23 (19.26)	0.137
Constipation	16.67 (16.95)	20.00 (25.67)	0.90	17.65 (20.49)	19.23 (23.42)	0.893
Diarrhea	6.67 (13.56)	3.33 (10.17)	0.28	4.90 (11.98)	5.13 (12.26)	0.942
Financial difficulties	8.89 (17.36)	7.78 (14.34)	0.94	11.76 (18.13)	3.85 (10.860)	0.058
QLQ-BR23						
Functional scales						
Body image	88.89 (16.57)	87.50 (13.45)	0.47	85.29 (15.49)	91.99 (13.63)	0.041
Sexual functioning	95.00 (10.85)	83.89 (16.07)	0.004	85.78 (15.96)	94.23 (11.49)	0.034
Sexual enjoyment	84.85 (17.41)	64.91 (20.70)	0.03	69.70 (22.79)	79.17 (17.25)	0.316
Future perspective	75.56 (23.05)	61.11 (26.38)	0.03	62.75 (24.29)	75.64 (25.91)	0.033
Symptom scales						
Systemic therapy side effects	15.87 (17.12)	16.98 (15.65)	0.38	18.63 (16.67)	13.37 (15.35)	0.093
Breast symptoms	13.06 (14.13)	14.72 (12.70)	0.35	14.71 (11.05)	12.50 (16.20)	0.159
Arm symptoms	12.59 (12.96)	13.70 (14.20)	0.79	13.40 (14.15)	12.82 (12.84)	0.975
Upset by hair loss	20.00 (27.60)	30.56 (26.43)	0.58	35.71 (27.62)	13.89 (22.28)	0.029

* Nonparametric test by Mann-Whitney test

functioning, social functioning, sexual functioning, sexual enjoyment and future perspectives than patient in BCT groups. In contrast, Ganesh, et al[19] reported that BCT group had better QoL in symptom scale of QLQ-C30. Additionally, Kim, et al[12] showed that BCT group had better QOL in BIS, social functioning and role functioning. Age is one of the factors which affected QoL. Patient who older than 55 years had better QoL than younger patients' especially in functional scale such as social functioning, BI, sexual functioning and future perspective but had lower score in symptom scale such as upset of hair loss.

Body image changing over 6 months showing that mastectomy patients had better body perception while BCT group had lower body perception. Fatigue has increased in both groups over time. Patients underwent mastectomy satisfied with sexual life more than BCT patients and this did not depend on time. Likewise, Wu et al[22] reported BI and QoL in Taiwanese patients over 5 years showing that

patients receiving mastectomy had stable BI perception and QoL over time. While patients underwent BCT had fluctuated trend of BI perception and QoL. Hopwood et al[23] also stated improvement of BI over 5 years in BCT patients except arm symptom which persisted. Comparing BI and QoL changing in breast cancer patient, mastectomy patient trend to had positive BI change while BCT patients had variation in BI and QoL in long period. The trend of BI and QoL in our study reflected different culture socioeconomic status of Thai breast cancer patient which mastectomy group are older and non-officers satisfied with BI and sexual life while BCT group are younger and had more concerning about BI, sexual life and future perspective.

Our study is the first report on BI correlation with QoL and longitudinal change of BI and QoL after treatment in Thai breast cancer patients. Data represents patients' perception and satisfaction of body appearance and QoL in a different culture from other studies. BI showed correlation with emotional function but not correlation to sexual activity. It correlate to other functional scales which indicated working and social capability such as physical functioning, cognitive functioning and future perspective. Though, data of BI and QoL over 6 months were limited, it can represent the trend of change for Thai breast cancer patients.

The study had some limitations that should be cautious when interpreting results. Firstly, our study aim to find the correlation of boy image to QoL so the sample size may inadequate to interpreted association with clinical variables. As a result, our study cannot detect difference of BIS between patient underwent mastectomy and BCT, contrast to previous report by Songtish, D[14]. Secondly, we conducted the study under 6-month period so there were inadequate data to analysis BI and QoL for longer period. Future studies should include associated clinical variables, BI and QoL for extended period so that we can evaluate both treatment outcome along with QoL for Thai breast cancer patients.

Conclusion

Evaluation BI and quality of life in Thai breast cancer should include in assessment for breast cancer care. Since advanced multidisciplinary cancer treatments improve survival rate, quality of life is one component to determine success of care. Not only surgery that affected BI but other treatments also left morbidity to the patients. Our study reported BI correlation with other parts of QoL. Additionally, BI perception and QoL has changed over time, patient should have continuous QoL evaluation during of breast cancer surveillance. The results will assist physician recognition and immediate intervention.

What is already known on this topic?

Breast cancer and its treatment has affected patients' image and quality of life but their correlation between each other had not defined.

What this study adds?

Body image had correlation with some part of quality of life such as emotional function, cognitive function and future perspective. Body image and quality of life were affected by surgical type and time.

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Potential conflicts of interest

The authors declare no conflict of interest.

References

1. Imsamran W, Pattatang A, Supaattagorn P, Chiawiriyabunya I, Namthaisong K, Wongsena M, et al. Cancer in Thailand Vol. IX, 2013-2015. Bangkok: Cancer Registry Unit, National Cancer Institute; 2018.
2. Hau E, Browne L, Capp A, Delaney GP, Fox C, Kearsley JH, et al. The impact of breast cosmetic and functional outcomes on quality of life: long-term results from the St. George and Wollongong randomized breast boost trial. Breast Cancer Res Treat 2013;139:115-23.
3. Fisher B, Anderson S, Bryant J, Margolese RG, Deutsch M, Fisher ER, et al. Twenty-year follow-up of a randomized trial comparing total mastectomy, lumpectomy, and lumpectomy plus irradiation for the treatment of invasive breast cancer. N Engl J Med 2002;347:1233-41.
4. Johansen J, Overgaard J, Rose C, Engelholm SA, Gadeberg CC, Kjaer M, et al. Cosmetic outcome and breast morbidity in breast-conserving treatment—results from the Danish DBCG-82TM national randomized trial in breast cancer. Acta Oncol 2002;41:369-80.
5. Budrukkar AN, Sarin R, Shrivastava SK, Deshpande DD, Dinshaw KA. Cosmesis, late sequelae and local control after breast-conserving therapy: influence of type of tumour bed boost and adjuvant chemotherapy. Clin Oncol (R Coll Radiol) 2007;19:596-603.
6. Nicholson RM, Leinster S, Sassoon EM. A comparison of the cosmetic and psychological outcome of breast reconstruction, breast conserving surgery and mastectomy without reconstruction. Breast 2007;16: 396-410.
7. Thomson HJ, Potter S, Greenwood RJ, Bahl A, Barker J, Cawthorn SJ, et al. A prospective longitudinal study of cosmetic outcome in immediate latissimus dorsi breast reconstruction and the influence of radiotherapy. Ann Surg Oncol 2008;15:1081-91.
8. Kenny P, King MT, Shiell A, Seymour J, Hall J, Langlands A, et al. Early stage breast cancer: costs and quality of life one year after treatment by mastectomy or conservative surgery and radiation therapy. Breast 2000;9:37-44.
9. Hauben DJ, Adler N, Silfen R, Regev D. Breast-areola-

nipple proportion. Ann Plast Surg 2003;50:510-3.
10. Godden AR, O'Connell RL, Barry PA, Krupa KCD, Wolf LM, Mohammed K, et al. 3-Dimensional objective aesthetic evaluation to replace panel assessment after breast-conserving treatment. Breast Cancer 2020;27:1126-36.
11. Cardoso MJ, Cardoso JS, Wild T, Krois W, Fitzal F. Comparing two objective methods for the aesthetic evaluation of breast cancer conservative treatment. Breast Cancer Res Treat 2009;116:149-52.
12. Kim MK, Kim T, Moon HG, Jin US, Kim K, Kim J, et al. Effect of cosmetic outcome on quality of life after breast cancer surgery. Eur J Surg Oncol 2015;41:426-32.
13. Nissen MJ, Swenson KK, Ritz LJ, Farrell JB, Sladek ML, Lally RM. Quality of life after breast carcinoma surgery: a comparison of three surgical procedures. Cancer 2001;91:1238-46.
14. Songtish D, Hirunwiwatkul P. Development and validation of the body image scale among Thai breast cancer patients. J Med Assoc Thai 2013;96 Suppl 1:S30-9.
15. Aaronson NK, Ahmedzai S, Bergman B, Bullinger M, Cull A, Duez NJ, et al. The European Organization for Research and Treatment of Cancer QLQ-C30: a quality-of-life instrument for use in international clinical trials in oncology. J Natl Cancer Inst 1993;85:365-76.
16. Fayers P, Aaronson N, Bjordal K, Groenvold M, Curran D, Bottomley A. The EORTC QLQ-C30 scoring manual. 3rd ed. Brussels: European Organisation for Research and Treatment of Cancer; 2001.
17. Silpakit C, Sirilerttrakul S, Jirajarus M, Sirisinha T, Sirachainan E, Ratanatharathorn V. The European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30): validation study of the Thai version. Qual Life Res 2006;15:167-72.
18. Glangkarn S, Promasatayaprot V, Porock D, Edgley A. Measuring quality of life in thai women with breast cancer. Asian Pac J Cancer Prev 2011;12:637-44.
19. Ganesh S, Lye MS, Lau FN. Quality of life among breast cancer patients in Malaysia. Asian Pac J Cancer Prev 2016;17:1677-84.
20. Shi HY, Uen YH, Yen LC, Culbertson R, Juan CH, Hou MF. Two-year quality of life after breast cancer surgery: a comparison of three surgical procedures. Eur J Surg Oncol 2011;37:695-702.
21. Thanarpan P, Somrit M, Rungarun J, Paytai R, Duangjai S, Chanon K, et al. Cosmetic outcomes and quality of life in Thai women post breast conserving therapy for breast cancer. Asian Pac J Cancer Prev 2015;16:4685-90.
22. Wu TY, Chang TW, Chang SM, Lin YY, Wang JD, Kuo YL. Dynamic changes of body image and quality of life in breast cancer patients. Cancer Manag Res 2019;11:10563-71.
23. Hopwood P, Haviland JS, Sumo G, Mills J, Bliss JM, Yarnold JR. Comparison of patient-reported breast, arm, and shoulder symptoms and body image after radiotherapy for early breast cancer: 5-year follow-up in the randomised Standardisation of Breast Radiotherapy (START) trials. Lancet Oncol 2010;11:231-40.