



Original Article

Effects of an Exercise Program on Physical Functions and Quality of Life for Mastectomy Patients*

Lee, Ja-Hyung¹⁾ · Cho, Jae-Kyung²⁾ · Oh, Jina³⁾ · Kim, Sung-Hee⁴⁾ · Kim, Yae-Young⁵⁾

- 1) Professor, College of Nursing Science, Ewha Womans University
- 2) Research Professor, College of Nursing Science, Ewha Womans University
- 3) Assistant Professor, Department of Nursing, College of Medicine, Inje University
- 4) Doctoral candidate, College of Nursing Science, Ewha Womans University
- 5) Master candidate, College of Nursing Science, Ewha Womans University

*

1) . 2) . 3) . 4) . 5)
 1) 4) 2) 3) 5)

Abstract

Purpose: The purpose of this study was to investigate the effects of an exercise program on physical function and quality of life of mastectomy patients. **Method:** This study was conducted from October, 2004 to June, 2005. The subjects consisted of 60 patients with breast cancer(30 each in the experimental and control groups). The subjects in the experimental group participated in an exercise program for 16 weeks. Evaluation was performed four times in both the experimental and control group. **Results:** The results revealed an increase in physical function in the experimental group including wrist circumference, function of shoulder joint, stretching, and upper

endurance. Also, an increase in function scales in quality of life were significantly higher in the experimental group than the control group. In addition subjective comments on how they felt after participating in the exercise program were good in the experimental group. **Conclusion:** The 16-week exercise program showed a large positive effect on physical function and quality of life of breast cancer patients after a mastectomy.

Key words : Exercise program, Quality of life, Mastectomy patients

* 2004 (032350-2)
 : 2005. 11. 19. 1 : 2005. 11. 28. 2 : 2006. 2. 20. 3 : 2006. 3. 3. : 2006. 3. 10.
 • Address reprint requests to : Oh, Jina(Corresponding Author)
 Department of Nursing, Inje University
 Gaegum 2dong, Busanjin-gu, Busan 614-735, Korea
 Tel: +82-51-890-6833 Fax: +82-51-896-9840 E-mail: ohjina@inje.ac.kr

Cho, Kim & Kim, 2004).

2001 16.4% 1
 13.7% 2
 2003 16.8% 1 CD-ROM
 (15.3%), (10.8%) (Lee, Cho, Oh, Kim & Ahn, 2004).
 45-49 가 10
 (12) 20 (461), 85

가
 48.6%,
 34.3% (82.9%)가

1.

(Goss et al., 2003; Mock et al., 2001).

Rietman (2003)

가

가

가

2.

(Zabora, Brintzenhofesoc, Curbow, Hooler, & Piantadosi, 2001).

16

가
가

가 (McKenzie & Kalda, 2003). Pinto Maruyama(1999)

Oldervoll, Kassa, Hjermstad, Lund 1.

Loge(2004)

1

3

<Table 1>.

2.

가 ((Lee, Oh,

5.

SPSS win 10.0

χ^2 -test t-test

40 가 가

20 , 30

Repeated Measure ANOVA

가

Tukey

17(56.7%)

가

가

<Table 2>.

6.

2.

<Table 3>

<Table 4>

12cm

12cm

1.

(F=6.44, p=.014)

<Table 2> Homogeneity of sociodemographic and medical data

(N=60)

Variables		Experimental	Control	X ² or F	P
		n(%) or mean(SD)	n(%) or mean(SD)		
Age	20-29	1 (3.3)	0 (0.0)	.099	.755
	30-39	6 (20.0)	5 (16.7)		
	40-49	13 (43.3)	12 (40.0)		
	50-59	6 (20.0)	9 (30.0)		
	60-69	4 (13.3)	4 (13.3)		
Marital status	Not married	1 (3.3)	1 (3.3)	.001	.999
	Married	28 (93.3)	28 (93.3)		
	Divorce	1 (3.3)	1 (3.3)		
Children	0	1 (3.3)	1 (3.3)	.547	.909
	1	4 (13.3)	4 (13.3)		
	2	16 (53.3)	18 (60.0)		
	3	6 (20.0)	5 (16.7)		
	4 or more	3 (10.0)	2 (6.7)		
Religion	Christian	11 (36.7)	9 (30.0)	.625	.732
	Buddhist	9 (30.0)	12 (40.0)		
	No religious	10 (33.3)	9 (30.0)		
Educational level	Elementary	5 (16.7)	3 (10.0)	.799	.850
	Middle school	6 (20.0)	4 (13.3)		
	High school	14 (46.7)	16 (53.3)		
	College or more	5 (16.7)	7 (20.0)		
Invaded site	Left	13 (43.3)	15 (50.0)	.074	.964
	Right	17 (56.7)	14 (46.7)		
	All	0 (0.0)	1 (3.3)		
Physical measurement	Weight(kg)	58.3(7.21)	57.2(6.01)	2.815	.991
	Height(cm)	158.0(4.21)	158.5(3.86)	.033	.856
	Wrist cir.(cm)	16.0(1.37)	15.9(1.06)	1.057	.308

<Table 3> Repeated measures ANOVA in comparison of physical functions

(N=60)

Variable	Group	n	Pretest M(SD)	Post - test 1 M(SD)	Post - test 2 M(SD)	Post - test 3 M(SD)	F	P
WC	Exp.	30	16.00(1.37)	16.07(1.31)	15.94(1.32)	15.88(1.34)	1.43	.236
	Cont.		15.97(1.06)	16.55(1.26)	16.61(1.56)	16.26(0.99)		
12WC	Exp.	30	22.97(2.20)	23.01(2.33)	22.88(2.19)	22.72(2.20)	6.44	.014
	Cont.		21.00(1.86)	21.92(1.69)	21.84(1.78)	21.63(1.74)		
FSJ	Exp.	30	16.40(4.28)	12.03(4.58)	13.3(3.94)	15.76(3.67)	5.43	.023
	Cont.		15.76(3.67)	11.26(2.22)	11.60(2.01)	11.76(3.09)		
ME	Exp.	30	0.63(1.16)	3.35(4.01)	2.11(3.42)	0.91(1.68)	10.51	.002
	Cont.		1.65(1.97)	5.67(4.67)	5.45(4.50)	3.98(3.71)		
UE	Exp.	30	46.66(13.66)	29.73(14.58)	34.03(13.55)	42.56(12.70)	7.57	.008
	Cont.		42.23(8.92)	25.23(9.80)	27.70(9.88)	27.70(9.88)		

* WC(Wrist circumference), 12WC(12cm above wrist circumference), FSJ(Function of shoulder joint), ME(Muscle extension(stretching)), UE(Upper endurance)

<Table 4> Tukey HSD in multiple comparisons of dependent variable

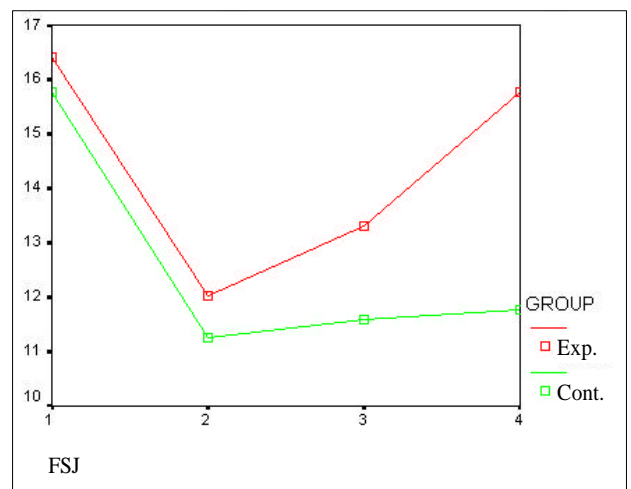
(N=60)

Time		FSJ MD	ME MD	UE MD	QLQ - C30 MD	QLQ - BR23 MD
Pretest	Post test 1	4.43**	-3.37**	16.67**	26.67**	15.10**
	Post test 2	3.63**	-2.64**	13.58**	20.11**	16.34**
	Post test 3	2.32*	-1.30	9.32**	15.91**	18.11**
Post-test 1	Pre test	-4.43**	3.37**	-16.97**	-26.67**	-15.11**
	Post test 2	-.80	.73	-3.38	-6.56	1.23
	Post test 3	-2.12*	2.06	-7.65*	-10.75	3.00
Post-test 2	Pre test	-3.63**	2.64**	-13.58**	-20.11**	-16.34**
	Post test 1	.80	-.73	3.38	6.56	-1.23
	Post test 3	-1.32	1.33	-4.27	-4.19	1.77
Post-test 3	Pre test	-2.32*	1.31	-9.32**	-15.91**	-18.11**
	Post test 1	2.12*	-2.06	7.65*	10.75	-3.00
	Post test 2	.32	-1.33	4.27	4.19	-1.77

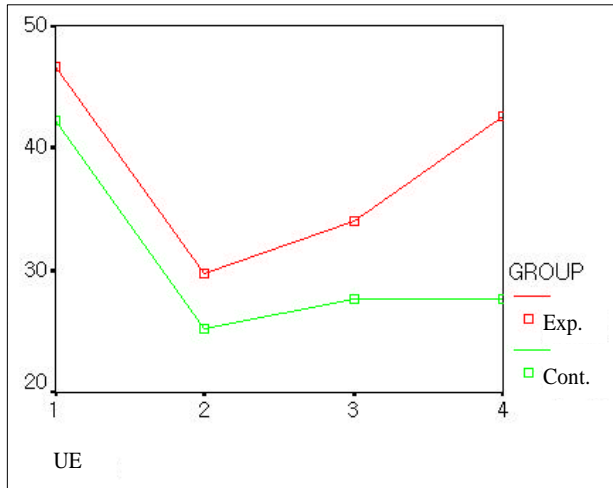
* Significant difference between the value of each test time(p<.005) by time contrast

** Significant difference between the value of each test time(p<.0001) by time contrast

p=.023),
 , 1 3
 , 1
 3
 <Figure 1>.
 가
 (F=10.51, p=.002),
 - 2 , 3
 가
 가 (F=7.57, p=.008),
 , 1
 3 , 1
 가
 가
 <Figure 2>.

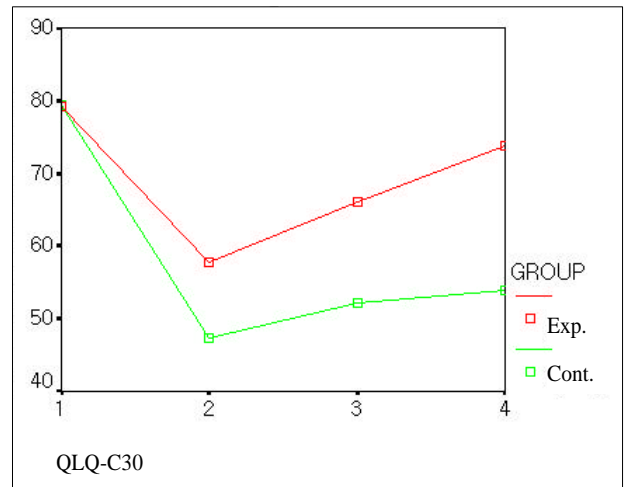


<Figure 1> Change of function of shoulder joint



<Figure 2> Change of Upper endurance

4 가
3 가
<Figure 3>. QLQ-C30 가
가 QLQ-BR23 가 (F=4.53,
4가 가 (F=4.53,
p=.039). , , ,
가 . 가 ,
EPRTC QLQ-BR23 가 ,
1 , 2 , 3



<Figure 3> Comparison on 4 functional scales of QLQ-C30

3.
EORTC QLQ-C30 , , ,
가 5가 , , ,
(F=8.17 p=.006)
가 <Table 5>. ,
EORTC QLQ-C30 ,
4 1
가 ,
3 가
1

<Table 5> Repeated measures ANOVA in comparison of quality of life

(N=60)

Scale	Group	n	Pretest M(SD)	Post - test 1 M(SD)	Post - test 2 M(SD)	Post - test 3 M(SD)	F	P
QLQ-C30	Global health quality of life scale							
	Exp.	30	51.67(25.75)	39.44(23.46)	52.78(22.03)	56.11(21.44)	1.31	.258
	Cont.		68.06(60.26)	38.06(21.41)	57.78(18.94)	57.22(15.89)		
	Five functional scales							
	Exp.	30	79.16(15.64)	57.79(22.11)	66.67(17.99)	73.72(12.68)	8.17	.006
	Cont.		79.46(12.56)	47.41(20.85)	52.14(18.17)	53.82(16.59)		
Symptom scales								
Exp.	30	21.52(18.91)	39.05(21.75)	31.67(16.69)	22.04(12.40)	.79	.379	
Cont.		16.84(12.02)	41.09(17.11)	36.57(15.19)	26.89(13.14)			
QLQ-BR23	Four functional scales							
	Exp.	30	61.24(16.48)	56.19(20.75)	55.68(18.83)	50.25(10.64)	4.53	.039
	Cont.		64.68(18.58)	43.45(13.38)	43.06(14.25)	42.85(13.21)		
	Symptom scales							
	Exp.	30	21.28(17.44)	43.29(25.81)	30.04(16.09)	21.66(12.73)	.36	.549
	Cont.		20.83(16.31)	40.63(17.25)	33.99(16.76)	29.48(12.27)		

4. 가 5 75.7%
 (National Cancer Information Center, 2005)
 가
 , 가, , 가
 4 , , 가 가
 가, , 가
 , 8 12cm
 <Table 6>
 가
 Courneya (2003)

<Table 6> Subjects' description about exercise

Category	Theme	Raw data
Complications prevention	Edema prevention	가
	Insomnia prevention	() ()
Physical functions increase	Flexibility increase	.
	Activity increase	가 가
Psychological relaxation	Mood improvement	.. 가 , ... ()
	Anxiety decrease	.
Recognition of exercise importance	Importance of regular exercise	?
	Importance of exercise by stage	1 3 가

(Box, Reul -Hirche, Bullock-Saxton & Furnival.,
2002) 가 가 1 2
가 가 Segal (2001)
Wingate, Croghan, Natarajan 가 2
Michalek(1989), Na (1999), Cho(2004)
가 . Kim Kim(2003)
Isakson Feuk
(2000) 21%가 6
가 , 2%가 1~2
가
Bosompra, Ashikaga, O'Brien, Nelson, Skelly(2002)가 . Irwin (2003)
2~4 63%가 2
, 13~34%가
가
18 60%가 Goodwin (1998)
(Sugden, Rezvani, Harrison & Hyghes, 1988), 가가 2.5~6.2Kg
2 (Gaskin,
LoBuglio, Kelly, Doss, & Pizitz, 1989). 가
6 10% 가가
가 Yoo(1996)
59.1% 가
, 84.6% , Courneya (2003) Ajzen (theory of
, Chae Choe(2001) planned behavior)
2 가
가
Na (1999) 3 EORTC QLQ-C30
, Wingate, Croghan, Natarajan Michalek(1989) 가 ,
ROM 1 가 , EORTC QLQ-
BR23 가
Bendz Olsen(2002) 가 .
Ferrell, Grant, Funk, Otis-Green Garcia(1998) 298
가 가
, 가
4 , Kim(2002)
Cho(2004) 가
1

가

가

4

4

1

3

가 가
가

4

가

가

가

가가

가

(Helgeson, Cohen, Schilz & Yasko, 1999; Holley & Borger, 2001; Cho, 2004).

가

2004 8

2005 6

I, II

60

(30)

가 가 2

(χ^2 -test, t-test)

4, 8, 16

repeated measures ANOVA

(Tukey)

가

References

- Benz, I., & Olsen, M. F. (2002). Evaluation of immediate versus delayed shoulder exercise after breast cancer surgery including lymph node dissection - A randomized controlled trial. *The Breast, 11*, 241-248.
- Bosompra, K., Ashikaga, T., O'Brien, P., Nelson, L., & Skelly, J. (2002). Swelling, numbness, pain, and their relationship to arm function among breast cancer survivors: a disablement process model perspective. *Breast J, 8*(6), 338-348.
- Box, R. C., Reul-Hirche, H. M., Bullock-Saxton, J. E., & Furnival, C. M. (2002). Shoulder movement after breast cancer surgery: results of a randomized controlled study of postoperative physiotherapy. *Breast Cancer Res Treat, 75*, 5-50.
- Chae, Y. R., & Choe, M. A. (2001). Effects of exercise on cardiopulmonary functions and shoulder joint functioning in breast cancer patients undergoing radiation therapy after breast surgery. *J Korean Acad Nurs, 31*(3), 454-466.
- Cho, Ok-Hee (2004). Effect of a comprehensive rehabilitation program for mastectomy patients. *J Korean Acad Nurs, 34*(5), 809-819.
- Courneya, K. S., Friedenreich, C. M., Sela, R. A., Quinney, H. A., Rhodes, R. E., & Handman, M. (2003). The group psychotherapy and Home-based physical exercise(GROUP-HOPE) Trial in cancer survivors: Physical fitness and quality of life outcome. *Psycho-Oncology, 12*, 357-374.
- Ferrell, B. R., Grant, M. M., Funk, B. M., Otis-Green, S. A., & Garcia, N. J. (1998). Quality of life breast cancer survivors: implications for developing support services. *Oncol Nurs Forum, 25*(5), 887-895.
- Gaskin, T. A., LoBuglio, A., Kelly, P., Doss, M., & Pizitz, N. (1989). Strech: A rehabilitative program for patients with breast cancer. *Southern Med J, 82*(4), 467-469.
- Goodwin, P. J., Esplen, M., Butler, K., Winocur, J., Pritchard, K. & Brazel, S. (1998). Multidisciplinary weight management in locoregional breast cancer: results of a

- Phased II study. *Breast Cancer Res Treat*, 48, 53-64.
- Goss, P. E., Ingle, J. N., Martino, S., Ronerts, N. J., Muss, H. B., Picart, M. J. (2003). A randomized trial of letrozole in postmenopausal women after five years of tamoxifen therapy for early-stage breast-cancer. *N Engl J Med*, 349(19), 1793-1802.
- Helgeson, V. S., Cohen, S., Schilz, R., & Yasko, J. (1999). Education and peer discussion group intervention and adjustment to breast cancer. *Arch Gen Psychiatry*, 56, 340-347.
- Holly, S. H., & Borger, D. (2001). Energy for living with cancer: preliminary findings of a cancer rehabilitation group intervention study. *Oncol Nurs Forum*, 28(9), 1393-1396.
- Irwin, M. L., Crumley, D., McTieman, A., Bernstein, L., Baumgartner, R., Gilliland, F. D., Kriska, A., & Ballard-Barbash, R. (2003). Physical activity levels before and after a diagnosis of breast carcinoma. *Cancer*, 97(7), 1746-1757.
- Isaksson, G., & Feuk, B. (2000). Morbidity from axillary treatment in breast cancer: a follow-up study in a district hospital. *Acta Oncol*, 39(3), 335-336.
- Kim, H. S., & Kim, N. J. (2003). The effects of rubber-band exercise on daily living fitness among stroke patient. *Korean J Phys Edu*, 42(5), 649-655.
- Kim, Y. S. (2002). *A descriptive study of quality of life for breast cancer survivors*. Unpublished master dissertation, Seoul National University, Seoul.
- Lee, J. H., Oh, J., Cho, J. K., Kim, S. H., & Kim, Y. Y. (2004). Development of educational materials and information demands on disease control for patients with breast cancer. *Nursing Science*, 16(1), 1-9.
- Lee, J. H., Cho, J. K., Oh, J., Kim, S. H., & Ahn, H. I. (2004). Development of an exercise program for postmastectomy patient. *Korean J Women Health Nurs*, 10(4), 301-310.
- McKenzie, D. C., & Kalda, A. L. (2003). Effect of upper extremity exercise on secondary lymphedema in breast cancer patients; a pilot study. *J Clin Oncol*, 21, 463-466.
- Mock, V., Pickett, M., Ropka, M. E., Lin, E. M., Stewart, K. J., Rhodes, V. A., McDaniel, R., Grimm, P. M., Krumm, S., & McCorkle, R. (2001). Fatigue and quality of life outcomes of exercise during cancer treatment. *Cancer Practic*, 9(3), 119-127.
- National Cancer Information Center, Cancer statistical data. Retrieved October, 2005, from <http://www.ncc.nkr:9000/>
- Na, Y. M., Lee, J. S., Park, J. S., Kang, S. W., Lee, H. D., & Koo, J. Y. (1999). Early rehabilitation program in postmastectomy patients: A prospective clinical trial. *Yonsei Med J*, 40(1), 1-8.
- Oldervoll, L. M., Kassa, S., Hjermsstad, M. J., Lund, J. A., & Loge, J. H. (2004). Physical exercise results in the improved subjective well-being of a few or is effective rehabilitation for all cancer patients?. *Eur J Cancer*, 40, 951-962.
- Pinto, B. M., & Maruyama, N. C. (1999). Exercise in the rehabilitation of breast cancer survivors. *Psychooncology*, 8(3), 191-206.
- Rietman, J. S., Dijkstra, P. U., Hoekstra, H. J., Eisma, W. H., Szabo, B. G., Groothoff, J. W., & Geertzen, J. H. B. (2003). Late morbidity after treatment of breast cancer in relation to daily activities and quality of life: a systemic review. *Eur J Surg Oncol*, 29, 229-238.
- Segal, T., Evans, W., Johnson, D., Smith, J., Colletta, S., Gayton, J., Woodard, S., Wells, G., & Reid, R. (2001). Structured exercise programs can improve the physical functioning of women with stage I or II breast cancer. *J Clin Oncol*, 19(3), 657-665.
- Sugden, E. M., Rezvani, M., Harrison, J. M., & Hyghes, L. K. (1988). Shoulder movement after the treatment of early stage breast cancer. *J Clin Oncol*, 10(3), 173-181.
- Wingate, L., Croghan, I., Natarajan, N., & Michalek, A. M. (1989). Rehabilitation of the mastectomy patient: A randomized, blind, prospective study. *Arch Phys Med Rehabil*, 70(1), 21-24.
- Yoo, Y. S. (1996). Effects of aquatic exercise program on the shoulder joint function, immune response and emotional state in postmastectomy patients. *J Cathol Med Colle*, 49(2), 805-817.
- Yun, Y. H., Park, Y. S., Lee, E. S., Bang, S. M., Hep, D. S., Park, S. Y., C. H. & Wear, K. (2004). Validation of the Korean version the EORTC QLQ-C30. *Quality Life Res*, 13(4), 863-868
- Zabora, J., Brintzenhofesoc, K., Curbow, B., Hooler, C., & Piantadosi, S. (2001). The prevalence of psychological distress by cancer site. *Psycho-Oncology*, 10, 19-28.