RESEARCH ARTICLE

Effect of structured training programme on arm dysfunction, lymphoedema and quality of life after breast cancer surgery

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Abstract

Objective: To evaluate the effect of education given according to daily living activities model on arm dysfunction, lymphoedema and quality of life in patients undergoing breast cancer surgery.

Method: The randomised controlled study was done at a tertiary hospital and comprised patients undergoing breast cancer surgery who underwent breast cancer surgery from November 2017 to October 2018. After randomisation, the intervention group received education through specifically-designed tools, while the control group received routine care. Data was collected using a patient information form, the subjective perception of post-operative functional impairment of the arm scale, Katz index of daily living activities, the disabilities of the arm, shoulder and hand scale and the short form of the quality of life scale. Three interviews were conducted at post-surgery 1st week, 1st month and 3rd month. Data was analysed using SPSS 23.

Results: Of the 58 subjects, 29(50%) each were cases and controls. The overall mean age was 48.9±9 years. In the intervention group, the measurements of the upper arm circumference were significantly better than the control group ($p<0.05$). Also there were significant differences between the groups in terms of scales and indices used ($p<0.05$).

Conclusions: The intervention group recovered earlies than the control group.

Keywords: Breast cancer, lymphoedema, daily life activity model, quality of life, patient education.

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Introduction

Breast cancer is the most common diagnosis among women.[1,2] In Turkey, 25% of all cancers in women in 2015 were breast cancer.[3]

Complications, such as pain, limitation of movement, arm dysfunction and lymphoedema, can be seen in patients after breast cancer surgery and that early detection of problems positively affect the course of treatment.[4-6] According to the studies, postoperative arm dysfunction was found in patients with breast cancer post-surgical intervention and the perception of arm dysfunction in such patients affects daily living activities (DLAs) and hence, quality of life (QOL).[7-10]

Breast care nurses play an important role in identifying support requirements.[11-13] In addition, breast cancer related lymphoedema treatment expenditure has been reported to be $140,000 per person spread over two years.[14]

After breast cancer surgery, arm dysfunction is one of the most common problems as the arm-muscle strength decreases due to limitation of arm and shoulder movements on the operated side. Causes of upper extremity dysfunction which limits movement include pain associated with axillary dissection and incision line, oedema in the arm, fear of moving the arm, and tension caused by scar tissue.[15]

The DLA model leads to basic understanding about how much an individual can do independently.[16,17] The current study was planned to examine the effects of a specific training programme on patients' arm dysfunction levels, arm dysfunction perception status, levels of DLAs, lymphoedema and QOL in patients undergoing breast cancer surgery.

Patients and Methods

The randomised controlled study was done at a tertiary hospital in Kocaeli, Turkey and comprised patients who underwent breast cancer surgery from November 2017 to October 2018, using follow-up longitudinal, experimental model (Figure-1). Approval was obtained from the Faculty of Medicine ethics review committee and informed consent was obatined from the patients.

Those included were female patients aged >18 years undergoing breast-conserving surgery, mastectomy and lymph node dissection surgery who were aware of their respective diagnoses. The subjects did not have metastatic breast cancer or any other type of cancer, had no

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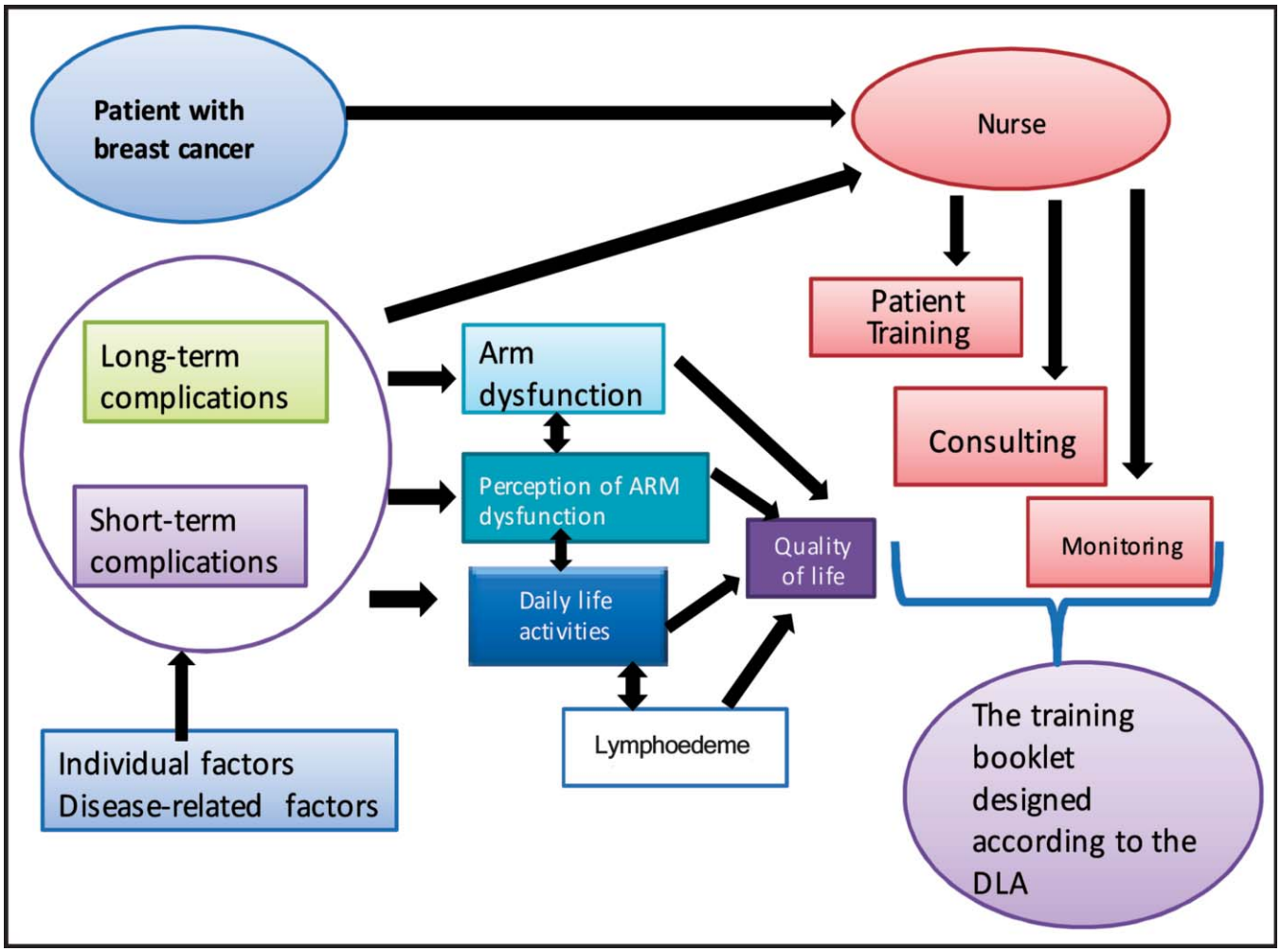

Figure-1: Conceptual components of research.

communication barrier, were at least elementary school graduates, had no defined severe mental disorder and who could speak Turkish. Those who did not meet the inclusion criteria or did not consent to participate were excluded.

The subjects were divided into intervention and control groups using random sampling method. Subjects were numbered from 1 to 60, and a randomisation scheme was created using an internet-based module.[18] Each patient was assigned to the group corresponding to the sequence number in the randomisation scheme. During the data collection process, intervention and control groups patients did not meet each other. The first patient was taken from the control group and randomisation was started.

Data was gathered through three interviews with the patients; the first meeting (T1) before discharge in the hospital, the second interview within the first month of the surgery (T2), and then in the third month post-surgery (T3). The data-collection tools were filled up by the researchers during face-to-face interviews.

Initially,after collecting socio-demographic data, the intervention group was exposed to patient education through presentations under the guidance of a training book prepared by the researchers based on literature.[1,4,13,19-21] After the booklet was prepared, it was evaluated by three breast cancer surgeons, four breast cancer registered nurses, three nursing associate professors and three patients. Necessary changes were made and the book was finalised for application. Consultancy service was provided over the telephone. The training booklet was handed over to the intervenition group. Additionally, a link was sent from WhatsApp to the training booklet. The patients of the control group were given standard nursing care and their queries about the disease process were answered according to the Right to Information Act.[22] The training booklet given to the intervention group at the end of the data acquisition

Table-1: Schedule of data collection time points and outcomes assessed.

Time Points	Intervention Group (n=29)	Control Group (n=29)
T1	◆ Patient Information Form, SPOFIA, DASH, Katz-DLA, SF-36, Patient arm circumferences. ◆ Patient education was conducted in the patient education room under the guidance of presentation and training book. Consultancy service was provided by telephone.	◆ Patient Information Form, SPOFIA, DASH, Katz-DLA, SF-36, Patient arm circumferences. Standard nursing care.
T2	◆ The re-measurement of the data was repeated. The training was repeated and telephone counseling was provided.	The re-measurement of the data was repeated.
T3	◆ The re-measurement of the data was repeated. The training was repeated and telephone counseling was provided.	The re-measurement of the data was repeated.

SPOFIA: Subjective Perception of Post-Operative Functional Impairment of the Arm; DASH: Disabilities of the arm, shoulder and hand; SF: Short form.

process was also transmitted electronically to the control group (Table-1).

Data collection was done using a patient information form (PIF), the Subjective Perception of Post-Operative Functional Impairment of the Arm (SPOFIA) scale, the Disabilities of the Arm, Shoulder and Hand (DASH) scale, Katz Daily Living Activities (DLA) scale, and the short form (SF-36) QOL scale alsongside arm measurements for the evaluation of lymphoedema and pain conditions in both groups. The PIF was was generated on the basis of literature.[1,5,6,23]

The SPOFIA scale consists of 15 Yes-No questions to assess swelling, pain, decreased shoulder motion opening, numbness and the feeling of withdrawal on the skin of the arm.[6,23]

The DASH evaluates function and disability regarding upper extremity injuries. It is a five-point Likert scale ranging from 'No difficulty'to 'Not possible".[24]

The SF-36 scale has 36 questions and 8 sub-dimensions. The total points obtained from each sub-dimension vary between 0 indicating bad health and 100 indicating goodness.[25]

The Katz-DLA index is used to determine DLAs, such as bathing, dressing, toilet usage, movement, continence, nutrition etc. Each title is answered as "independent", "partially dependent", "dependent".[26]

The measurement of the arm circumference of the imflexible tape was done 15cm distally around the forearm, and 15cm proximal for upper arm circumference of the lateral epicontongue.

The power analysis was conducted using NC Statisticial Software-Power Analysis & Sample Size 11 (NCSS PASS 11) programme with an effect size of 0.20, alpha 0.05, and power 0.80.

Data was analysed using SPSS 23. In order to analyse the difference between categorical variables in the two groups, independent t test and repeated measures analysis of variance (ANOVA) were used at 3 different times.

Results

Of the 60 patients enrolled, 58(96.66%) completed the

Table-2: Comparison of demographic, socio-economic, and disease-related factors.

Characteristic		Groups		P
		Control Group (n = 29) N (%)	Intervention Group (n = 29) N (%)	
Educational status	Primary School	19(65,5)	18 (62,1)	0,294
	Secondary School	7(24,2)	4(13,8)	
	High School	3(10,3)	7(24,1)	
Marital status	Married	27 (93,1)	25(86,2)	0,670
	Single	2(6,9)	4(13,8)	
Childcare	Yes	0 (0,0)	8 (27,6)	0,004
	No	29 (100,0)	21 (72,4)	
Stage Disease	Stage 2	13 (44,8)	16 (55,2)	0,431
	Stage 3	16 (55,2)	13 (44,8)	
Surgical Type	MRM	8 (27,6)	10 (34,5)	0,244
	Breast protection surgery+ ALND	13 (44,8)	7 (24,1)	
	Breast protection surgery + SLND	8(27,6)	12 (41,4)	

MRM: Modifiye Radical Mastectomy. ALND: Axillary Lymph Node Disection. SLND: Sentinel Lymph Node Disection.

Table-3. Effect Of SPOFIA. Katz-DLA. DASH, SF-36-subscale on points averages between groups and time of education given.

	Control Group (n:29)		Intervention Group (n:29)		T	P
	Mean	**Sd**	**Mean**	**Sd**		
SPOFIA T1	9.58	1.59	9.58	1.15	0.000	1.000
SPOFIA T2	2.57	1.59	1.97	1.05	-1.751	0.085
SPOFIA T3	2.41	2.01	0.79	0.67	-4.118	*0.000
	p=0.000	Difference = 1 > 2	p=0.000	Difference = 1>2 > 3		
Katz T1	11.59	1.240	12.03	2.353	-0.908	0.368
KatzT2	17.38	0.561	17.14	1.246	0.951	0.346
Katz T3	18.00	0.000	17.97	0.186	1.000	0.326
	p=0.000	Difference = 1 < 2 < 3	p=0.000	Difference = 1 < 2 < 3		
DASH T1	4.06	0.319	4.11	0.267	-0.625	0.535
DASH T2	2.12	0.405	1.63	0.295	5.218	*0.000
DASH T3	1.39	0.270	1.11	0.081	5.216	*0.000
	p=0.000	Difference = 1 < 2 < 3	p=0.000	Difference = 1 < 2 < 3		
SF-36 SUBSCALE						
Physical Function T1	34.65	9.05	37.59	12.15	2.082	0.302
Physical Function T2	70.52	12.41	81.38	15.52	0.576	0.005
Physical Function T3	85.00	8.01	93.45	6.56	0.691	0.001
	p=0.000	Difference =1<2<3	p=0.000	Difference =1<2<3		
Physical role Difficulty T1	0.86	4.64	0.00	0.00	4.302	0.322
Physical role Difficulty T2	43.10	21.02	68.10	23.99	2.959	0.001
Physical role Difficulty T3	75.00	22.16	90.51	34.98	1.236	0.048
	p=0.000	Difference =1<2<3	p=0.000	Difference =1<2<3		
Pain T1	46.90	13.694	49.24	14.009	-0.645	0.522
Pain T2	78.90	11.308	81.17	10.603	-0.791	0.433
Pain T3	85.66	6.715	83.59	17.906	0.583	0.562
	p=0.000	Difference =1<2<3	p=0.000	Difference =1<2		
General health T1	45.55	15.736	47.45	22.845	-0.368	0.714
General health T2	59.41	19.822	65.00	19.245	-1.089	0.281
General health T3	71.93	18.722	73.45	21.856	-0.284	0.778
	p=0.000	Difference =1<2<3	p=0.000	Difference =1<2<3		
Vitality T1	43.62	24.564	55.52	25.855	-1.796	0.078
Vitality T2	54.66	23.297	65.17	22.499	-1.749	0.086
Vitality T3	65.17	19.571	70.52	19.427	-1.044	0.301
	p=0.001	Difference =1<2<3	p=0.001	Difference =1<2<3		
Social function T1	53.02	25.586	59.05	26.705	-0.879	0.383
Social function T2	83.19	20.668	73.71	19.861	1.782	0.080
Social function T3	90.09	14.707	87.07	18.140	0.696	0.489
	p=0.000	Difference =1<2<3	p=0.000	Difference =1<2<3		
Emotional role Difficulty T1	45.98	46.644	47.13	50.014	-0.091	0.928
Emotional role Difficulty T2	81.61	45.063	80.46	35.093	0.108	0.914
Emotional role Difficulty T3	86.21	30.234	87.36	36.093	-0.131	0.896
	p=0.002	Difference =1<2	p=0.002	Difference =1<2		
Mental Health T1	49.10	22.371	62.48	19.695	-2.417	0.019
Mental Health T2	58.48	22.307	66.90	19.709	-1.522	0.134
Mental Health T3	65.52	21.365	70.48	21.015	-0.892	0.376
	p=0.009	Difference =1<2	p=0.027	Difference =2<3		

Sd (Standard deviation), t (Independent Sample T Test), * p<.05. p<.01 ve p < .001 there is significant difference in the level.

T1: One week post-operative measurement

T2: First month measurement after surgery

T3: Third month measurement after surgery

SPOFIA: subjective perception of post-operative functional impairment of the arm scale; DASH: Disabilities of the arm, shoulder and hand; SF: Short form.

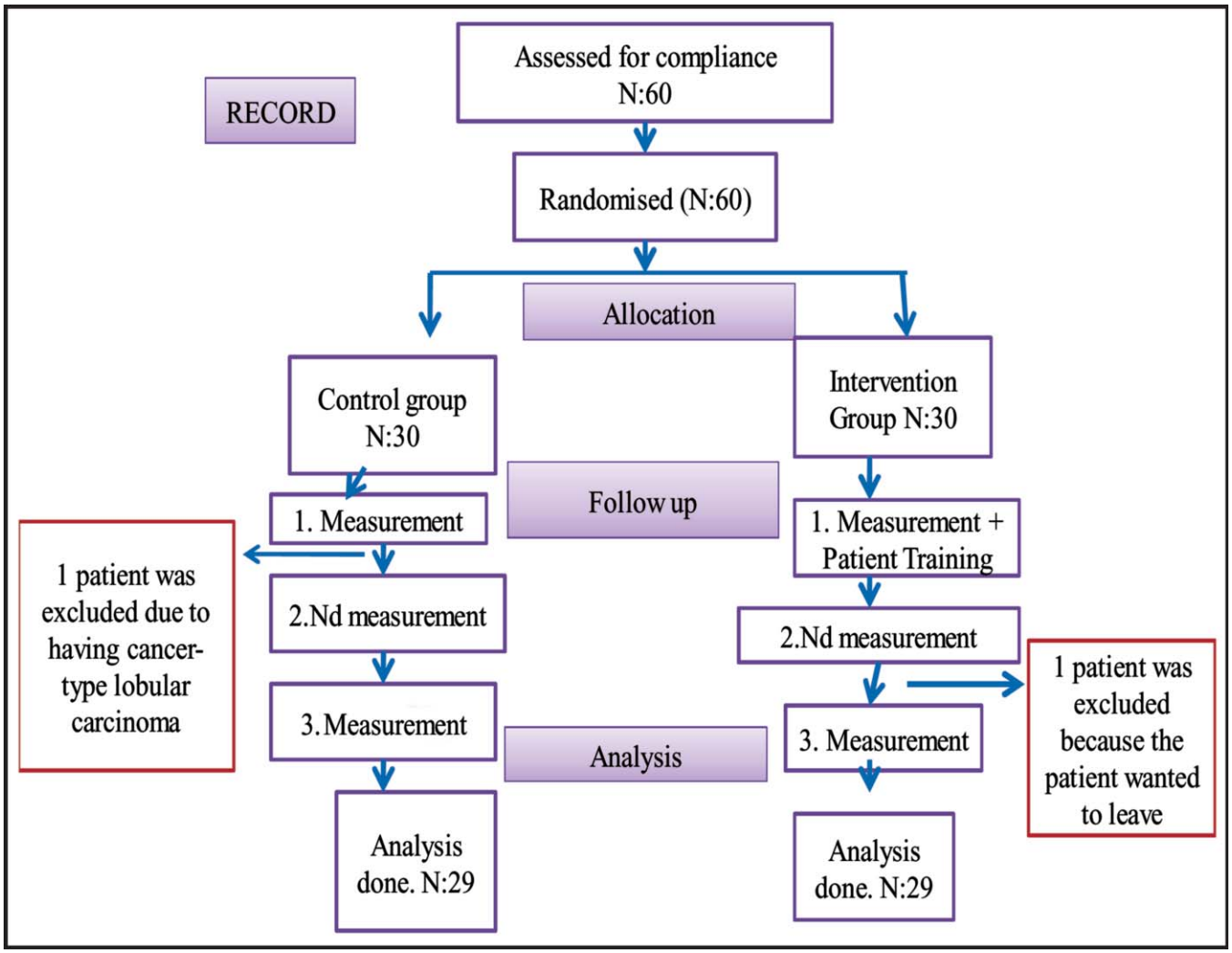

Figure-2: Consort flow diagram.

study; 29(50%) in each of the two groups (Figure-2). The overall mean age was 48.9±9 years. The demographic, socio-economic and disease-related variables of the groups were not significantly different ($p>0.05$). Only the number of children who needed pre-school care was significantly higher in the intervention group (Table-2).

The mean upper right arm circumference was greater in the intervention group compared to the higher left upper arm circumference in the control group ($p<0.05$).

SPOFIA T3, DASH T2 and DASH T3 values were higher in the control group ($p<0.05$). The difference in T1, T2 and T3 measurements was significant for SPOFIA, Katz-DLA and DASH ($p<0.05$).

Physical and mental function scores were significantly higher in the intervention group (Table-3).

Discussion

Findings showed that Katz-DLA, SPOFIA, SF-36 and DASH scores recovered as time elapsed post-operation. The intervention group recovered earlier. For the planning of nursing initiatives aimed at controlling risk factors, the identification of the patients' DLA is critical.[17] Besides, it is thought that complications such as arm dysfunction and lymphoedema in postoperative patients will affect the quality of life and DLAs. Therefore, to prevent or minimise these problems, nurses' education and consultancy service is of great importance. Studies suggest patients undergoing breast cancer surgery suggest that the patients need training and they want to get counseling from the same nurse.[27,28] During the treatment process, affected DLAs and lymphoedema[29] have been reported. Although studies evaluating DLAs in oncology patients[30] have been conducted, no study assessing DLAs in patients undergoing surgical intervention due to breast

cancer were not found in literature. A systematic review and some studies, however, reported difficulties in carrying out DLAs in patients.[24,31,32]

In the current study, dependence levels decreased with time post-surgery.

Breast cancer can lead to functional losses, such as shoulder dysfunction and loss of upper extremity muscle strength, which are a result of the disease's own nature, radical surgical interventions and radiotherapy applications.[15,33] Arm problems are frequently seen after breast surgery and can affect DLAs of patients and complications may be minimized by taking preventive measures and performing regular follow-up.[9] The DASH scale is frequently used in this regard.[24] Feeling of heaviness in the arm and pain have been reported in such patients.[33,34] Positive results have been reported with exercise related to arm-shoulder movements after breast surgery.[35,36] "Perception of arm dysfunction" is a new concept.[6,23] A systematic review noted that patients tend to have more symptoms like pain, heaviness and swelling in the arm. Axillary lymph node dissection and radiotherapy therapy in surgical treatment of breast cancer are among the reasons that increase the risk of lymphoedema in this group of patients.[31,37] Lymphoedema may develop in early and late stages after breast cancer surgery.[32,38] There was no increase in lymphoedema in certain studies.[5,9] To improve the QOL of breast cancer patients, therapeutic approaches, including exercises as well as psychosocial and spiritual support, are reported to have contributed to the improvement.[23,36,39] SF-36 provides information about the level of physical health and the ability to fulfill DLAs.[40] In a study, the disease phase of the patients ' QOL was found to be associated with information about the disease.[41]

The applied surgical type is also influenced by patients' QOL. The body appearance, sexual function and sexual satisfaction is better, and symptoms of the arm and chest are less in such patients.[42] Modified radical mastectomy (MRM) has given better results in this regard.[5,43] In patients with Axillary Lymphnode Disection (ALND), the feeling of heaviness in the arm and swelling has been seen more often.[44]

The current study has limitations, like lack of a long-term followup. We recommend a minimum of six-month followup. Also, it is recommended that training given in the current study should be repeated both before and after discharge from hospital as part of the followup. New training methods to cover all QOL aspects shall also be devised. Finally, an alternative to the Katz-DLA scale needs to be developped that may evaluate DLAs.

Conclusion

Mean scores improved as the time elapsed post-operation increased. Intervention group was found to recover earlier compared to the control group.

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