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**ADHERENCE TO RECOVERY EXERCISE PROGRAM OF  
SCAPULOHUMERAL ARTICULATION AFTER BREAST  
CANCER SURGERY**

Dina-Magdalena Puscas (a,b)\*, Patriciu Achimas-Cadariu (a), Catalin Vlad (a), Florina Pop (b),  
Simona Tache (a)

\* Corresponding author

(a) Universitatea de Medicina si Farmacie "Iuliu Hatieganu" Cluj Napoca, România, E-mail: dina.puscas@yahoo.com,  
(b) Institutul Oncologic "Ion Chiricuta" Cluj Napoca, România, E-mail: dina.puscas@yahoo.com, Tel. +40765.459455

**Abstract**

The adherence to the recovery exercise program is the key to the optimal results in regaining the shoulder's full range of motion. Patients and methods: This study was carried out on 30 patients with breast cancer following mastectomy and axillary lymph node dissection. We applied The Rotterdam Symptoms Checklist and A Brief Self Report Questionnaire on the first day after breast surgery and after one, three and six months. Results: The results revealed that the poorer the quality of life is perceived by the patient, the higher is the patient's adherence to the recovery program. Also, the higher adherence at moment zero post surgery is, the higher the chance is to be high also after one, three and six months. Patients from our study evaluate their quality of life based mostly on the presence or the lack of psychological symptoms, despite the physical symptoms. Psychological state of the patient influences her activity score and vice-versa, return to the daily activities improves the psychological symptoms. **Conclusion:** The evaluation of the overall state of health of the cancer patients after surgery and their activity level is important in determining their future adherence to the exercise program and the success of recovery.

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**Keywords:** Breast cancer; supportive care; physical exercise.

## 1. Introduction

Exercise is commonly recommended to women after breast cancer surgery, yet it is difficult for patients and health professionals to adopt safe and beneficial types and modes of exercise. Well-designed exercises are effective and beneficial for improving women's physical, physiological, and psychological



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health outcomes after breast cancer treatment as well as to facilitate changes in exercise behaviors (Chung, Lee, Hwang & Park, 2013).

The most common physical effects of early exercise training after breast surgery for cancer is that it improves central transport, regional blood flow, the autonomic nervous system, skeletal muscle physiology, and vasculature reactivity (Whellan, 2012). Reduced stress, reduced risk of cardiovascular disease and reduced risk of cancer recurrence are also among the many benefits of physical activity for cancer survivors (Cuevas, Hughes, Long, Ghosh & Li, 2014). These benefits have been shown to translate into improved overall quality of life (Breast Cancer Surv Early physiotherapy after breast cancer surgery improves overall quality of life, 2005). Also, the psychological effects of exercise training can't be ignored. Psychological benefits include enhancements in mood and vigor and decreases in depression and anxiety (Courneya & Friedenreich, 1997).

Given the physical and mental benefits of physical activity for breast cancer survivors, focusing on the associations between exercise, stress, and understanding the motivation to engage in exercise is an important area of research (Cuevas, Hughes, Long, Ghosh, Li & al, 2014). Poor adherence can lead to suboptimal effectiveness of treatment regimens, threats to patient safety, and increasing healthcare costs for disease management (Gardner, 2014).

The terms adherence or cooperation are preferred to compliance. Compliance infers that the patient is a passive recipient-which he or she is there to do whatever the health care professional recommends. The second is that the responsibility for the patient's inability to adhere to an exercise regimen is a shared responsibility, and rests with the patient and the physical therapist (Chung, Lee, Hwang & Park, 2013).

Patient adherence usually relates to attending appointments, following advice and undertaking prescribed exercise. Patient adherence to physical therapy home exercise programs is estimated between 35 and 72% (Rizzo, 2015).

Measuring adherence to home-based physical activity intervention requires methodology that captures activities of daily living such as housework and gardening in addition to intentional aerobic exercises such as walking and jogging and leisure activities such as bowling and golfing. In a home-based physical activity program, activities of daily living, aerobic exercises, and leisure activities all are important components of physical activity (Swenson, Nissen & Henly, 2010).

Adherence to an exercise program depends on patient's motivation at the time of behavior. The theory of self-determination offers an explanation for differences in adherence to exercise. SDT is based on the assumption that the choices an individual makes are driven by self-determined motives and/or externally determined motives. Typically, when exercise goals are self-determined, they reflect intrinsic motivation based on enjoyment, competence, and social interaction.

When goals are not self-determined, but rather, interjected or controlled, they reflect motivation that is driven by external sources; in general, research findings have demonstrated that this kind of motivation undermines the development of autonomy, and is therefore not optimal for sustaining an intentional physical activity. Presumably, when individuals feel pressured to exercise, they lack the enjoyment and inner motivation to continue, causing them to discontinue their behavior (Kohlstedt, Weissbrod, Colangelo & Carter, 2013).

The most common factors motivating participants were to improve overall health, improve functional abilities, and enhance confidence and to reduce musculoskeletal issues (Jurkiewicz, Marzolini & Oh, 2011).

Also, when provided with supervision and support, previous sedentary men and women can achieve and maintain high levels of aerobic activity (Cadmus-Bertram, Irwin, Campbell, Duggan & Foster-Schubert, 2014).

Studies have shown that subjects provided with regular feedback on their progress during an exercise program achieve higher physical activity levels and are less likely to drop out of the program than those without such feedback (Shakudo, Takegami, Shibata, Kuzumaki & Higashi, 2011).

A greater adherence is observed in the moderate intensity programs. Prescribing a higher frequency increased the accumulation of exercise without a decline in adherence, whereas prescribing a higher intensity decreased adherence and resulted in the completion of less exercise (Perri, Anton, Durning, Ketterson & Sydeman, 2001).

Patients at a higher level of education and at older ages have a greater probability to follow the indications (Uc-Coyoc, Coello-Reyes, Perez-Reynaud & Ponce, 2014). As adults move through the life-course, their leisure lifestyles tend to center on a decreasing number of familiar activities, with a period of gradual disengagement from many aspects of social life and an increasing tendency towards home-centered leisure (Thurston & Green, 2004).

Other factors that influence adherence are: demographic factors, health status, physical and psychological factors (Picorelli, Pereira, Pereira, Felicio & Sherrington, 2014).

One study showed that the unstructured group had higher exercise adherence, increased enjoyment, and higher self-selected exercise intensity compared to the structured group. Reflective journal analysis revealed increased feelings of relatedness, enjoyment, competence and personal achievements in the unstructured group. These results show that during the adoption phase of an exercise program, less structure in daily sessions may elicit greater levels of enjoyment. This may facilitate compliance to an exercise program in the short-term and ultimately the development motivation for long-term adherence to exercise (Motschieder, & Coutts, 2010).

To increase self-worth and long-term adherence to physical activity, exercise and fitness professionals use strategies like: (a) increasing motivation and enjoyment relative to activity, (b) making activity a high priority in a woman's life, (c) improving or deemphasizing body image, (d) increasing a woman's ability to access support, and (e) facilitating the use of self-regulation strategies (Huberty, Ransdell, Sidman Flohr & Shultz, 2008).

Adherence to exercise in women with breast cancer is challenged by internal and external conditions and may be improved by attention to the impact of treatment side effects and by supporting patient self-efficacy towards changing health behavior (Husebø, Karlsen, Søreide & Bru, 2015).

Support from health care practitioners can promote patients' autonomous motivation and greater long-term behavioral persistence (e.g., adherence to physiotherapists' recommendations) (Lonsdale, Hall, Williams, McDonough & Ntoumanis, 2012).

We believe that a group-based intervention may yield better results compared to individualized program as it may enhance social support and increase skills in building relationship between members of the group (Azizan, Justine & Chua, 2013).

First, the physical activity program should be physically attainable and encouraging for the participant. In contrast to many group-based physical activity programs found in literature, home-based physical activity programs provide an opportunity to tailor the exercise to the participant. Individual tailoring is a means to ensure practical attainability. Such customization can be quite extensive, giving each participant his or her own specific training conditions. It can also be more structured, by providing levels of exercising and allowing the patients to progress through these levels at their own pace. In this study, structured individual tailoring is provided in order to keep the exercise program well-defined (Geraedts, Zijlstra, Zhang, Bulstra & Stevens, 2014).

## **2. The aim of this study**

The aim of this study is to observe a possible association between engaging in an exercise program and the general state of health including physical, psychological and kinetic condition of the patients who had undergone breast surgery for cancer.

## **3. Research methods (Materials and Methods)**

This study was carried out on 30 patients with breast cancer following mastectomy and axillary lymph node dissection in the Surgery Unit of the Institute of Oncology from Cluj-Napoca. In our study we applied two questionnaires: The Rotterdam Symptoms Checklist (De Haes, van Knippenberg & Neijt, 1990; de Haes, Olschewski, Fayers, Visser & Cull, 1987) and A Brief Self-Report Questionnaire (Ridgers, Timperio, Crawford & Salmon, 2012).

The Rotterdam Symptom Checklist (RSCL) is a well-known instrument for the assessment of symptom-related distress among cancer patients. We applied the RSC the day 1 after surgery. This questionnaire consists of 39 items: 23 items referring to different physical symptoms, 7 items referring to psychological distress, 8 items regarding functional status and an item regarding overall valuation of life.

We also applied A Brief Self-Report Questionnaire which contains two questions, after we obtained the written approval of senior researcher, Nick Ridges (Centre for Physical Activity and Nutrition Research (C-PAN), School of Exercise and Nutrition Sciences). This questionnaire was applied in the *Validity of a brief self-report instrument for assessing compliance with physical activity guidelines amongst adolescents* study. We applied this questionnaire on our adult patients the first day after breast surgery, after one, three and six months.

### 3.1 Ethical standards

We mention that the patients provided signed informed consent prior to inclusion in the study, and that the study was approved by the Committee on Ethics in Research of this institution.

### 3.2 Statistical analysis

The statistical analysis was done using the *Statistica 8* software. The strength of correlation between the analyzed data block of data was probed using the Pearson coefficient  $r$ , together with normal distribution assessment and a correlation matrix was generated to centralize the values. The statistical level of significance was set to be  $p = 0.05$ .

## 4. Findings (Results)

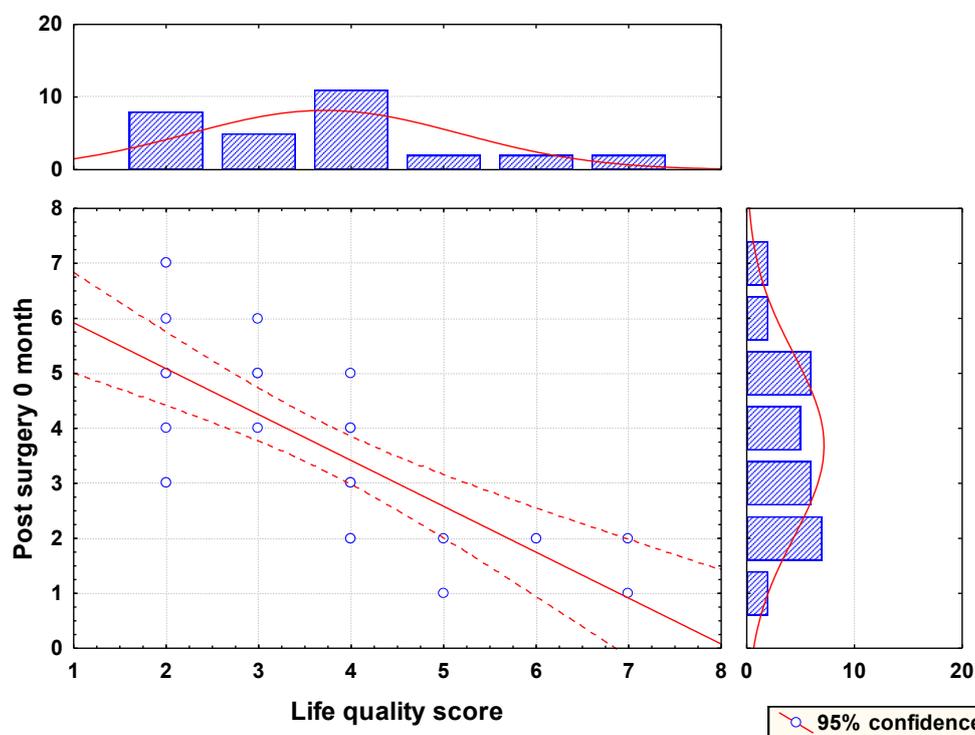
The results of our study show a significant negative correlation between “Life quality score” and “Post surgery 0 months” ( $r = -0.7335$ ,  $p < 0.000$ ), as it is shown in Table 1 and Figure 1. The poorer the quality of life is perceived by the patient, the higher is the patient’s adherence immediately after breast surgery for cancer. Informing patients about the benefits of the recovery exercise program is essential for obtaining patient’s adherence. It is extremely important that patients and their families to know that complete recovery in range of motion of the shoulder after breast surgery is possible. Discussions with a clinical psychologist may be very useful in finding self-determination and obtaining their adherence to the exercise program.

**Table 1.** Correlation matrix for the studied variables

	Life quality score	Before surgery	Post surgery 0 month	Post surgery 1 month	Post surgery 3 months	Post surgery 5 months	Physical symptoms score	Psychological symptoms score	Activity level score
Life quality score	1.0000	.0956	<b>-0.7335</b>	<b>-0.5731</b>	<b>-0.6076</b>	<b>-0.5041</b>	<b>.7286</b>	.3121	-.2013
		$p < .615$	<b><math>p &lt; .000</math></b>	<b><math>p &lt; .001</math></b>	<b><math>p &lt; .000</math></b>	<b><math>p &lt; .005</math></b>	<b><math>p &lt; .000</math></b>	$p < .093$	$p < .286$
Before surgery		1.0000	.0240	.0361	-.1567	-.1998	.0721	-.3327	-.1950
			$p < .900$	$p = .850$	$p = .408$	$p = .290$	$p = .705$	$p = .072$	$p = .302$
Post surgery 0			1.0000	<b>.7171</b>	<b>.7166</b>	<b>.6392</b>	<b>-.5722</b>	-.1818	-.1074
				<b><math>p = .000</math></b>	<b><math>p = .000</math></b>	<b><math>p = .000</math></b>	<b><math>p = .001</math></b>	$p = .336$	$p = .572$
Post surgery 1 month				1.0000	<b>.9391</b>	<b>.8786</b>	<b>-.6427</b>	.0283	.1953
					<b><math>p = .000</math></b>	<b><math>p = .000</math></b>	<b><math>p = .000</math></b>	$p = .882$	$p = .301$
Post surgery 3 months					1.0000	<b>.9505</b>	<b>-.6544</b>	.0905	.2178
						<b><math>p = .000</math></b>	<b><math>p = .000</math></b>	$p = .634$	$p = .248$

<b>Post surgery 5 months</b>	1.0000	<b>-0.6445</b>	.1290	.3271
		<b>p=.000</b>	p=.497	p=.078
<b>Physical symptoms score</b>	1.0000		.1912	<b>-0.4802</b>
			p=.312	<b>p=.007</b>
<b>Psychological symptoms score</b>			1.0000	-.0256
				p=.893
<b>Activity level score</b>				1.0000

\*The Pearson correlation coefficients (r values) are marked if they are statistically significant, at  $p < 0.05$ .



**Figure 1.** Graphical representation of the correlation between “life quality score” and “post surgery 0 month” ( $r = -0.7335$ ,  $p < 0.000$ ).

The 95% confidence interval is marked in dotted line. The distribution of the values of the variables are plotted on the right and top axes respectively as histograms with normal distribution fitting.

Important positive correlation is observed in adherence to the recovery exercise program immediately after surgery and in 1, 3 and 6 months after mastectomy, as it is shown in Figure 2, Figure 3 and Figure 4. According to the data presented in these figures, the higher adherence at moment zero post surgery is, the higher the chance is to be high also after 1, 3 and 6 months.

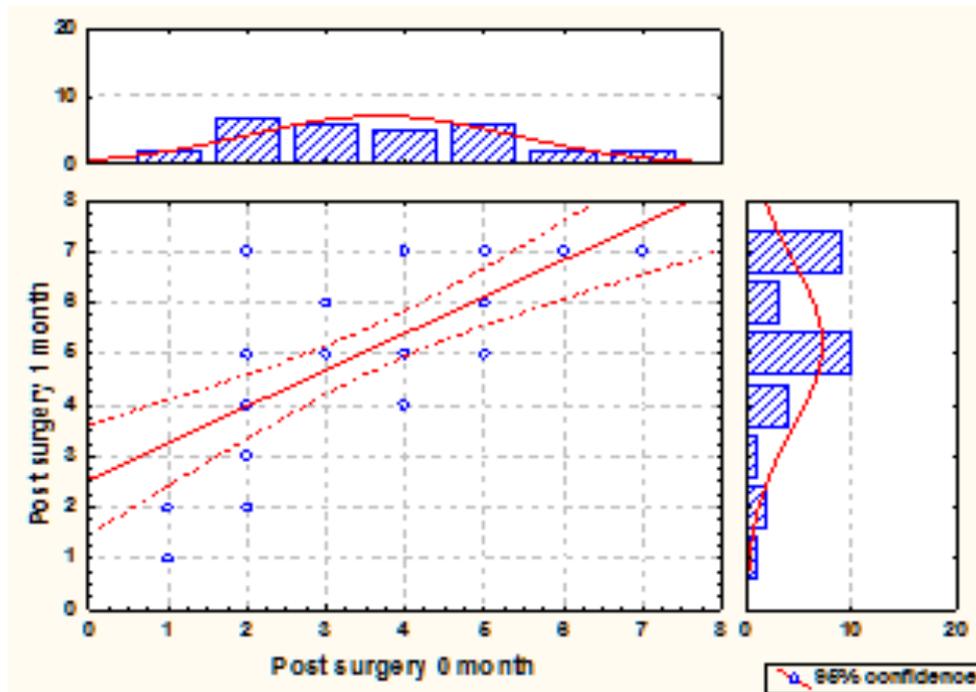


Figure 2. Graphical representation of the correlation between “Post surgery 0 month” and “Post surgery 1 month”

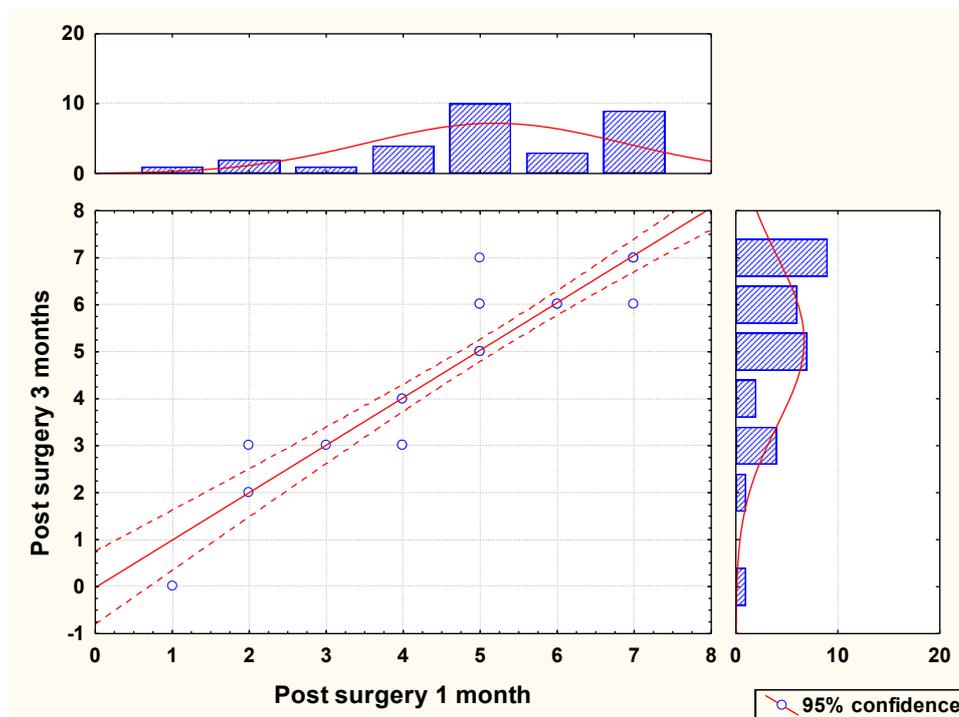
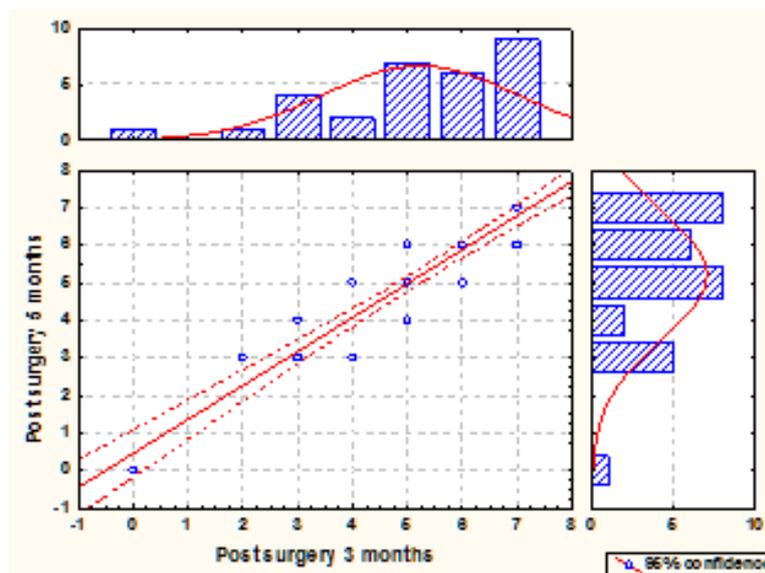


Figure 3. Graphical representation of the correlation between “Post surgery 1 month” and “Post surgery 3 months”



**Figure 4.** Graphical representation of the correlation between “Post surgery 3 months” and “Post surgery 6 months”

There is a correlation between how the patients evaluate their life’s quality and the psychological symptoms they have after surgery. The fact that results from statistical analysis doesn’t highlight a correlation between life quality score and physical symptom score, indicates that patients from our study evaluate their quality of life based mostly on the presence or the lack of psychological symptoms like irritability, worrying, depressed mood, nervousness, despairing about the future, tension, anxiety, despite physical symptoms like lack of appetite, soreness, pain, dizziness, tension, nausea, tiredness, digestion problems.

The ability of taking care of herself and perform activities of daily living correlates with the life quality score, as it is shown in the Table 1 (activity level score and life quality score). It is very important for the patient that they regain their independence in keeping body hygiene, housework, shopping, walking and climbing stairs by herself.

Psychological state of the patient influences her activity score and vice-versa, return to the daily activities improves the psychological symptoms by regaining independence, trust and enhanced self-motivation.

## 5. Conclusions

The evaluation of the overall state of health of the cancer patients after surgery and their activity level is important in determining their future adherence to the exercise program and the success of the recovery program.

According to the data from our study, the higher adherence at moment zero post surgery is, the higher the chance is to be high also after 1, 3 and 6 months.

It is important that patients benefit from psychological support and counseling to find and enhanced self-motivation for starting the exercise program, considering that patients evaluate their quality of life based mostly on the presence or the lack of psychological symptoms, despite physical symptoms.

Extensive information about the benefits of the exercise program of the patients who evaluate their life quality score as poor and obtaining their families' support is the key in accomplishing the best results with the recovery exercise program.

Psychological state of the patient influences her activity score and vice-versa, return to the daily activities improves the psychological symptoms.

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