

# The Effect of Physiotherapy on Resilience and Perceived Stress in Patients with Colorectal Cancer

SIMA SADAT GHAEMIZADE SHUSHTARI<sup>1</sup>, MOHAMMAD ADINEH<sup>1</sup>, NEDA HATAMI<sup>2</sup>, FARIBA MOBAREZ<sup>1</sup>, SHEKOUFE FATEHI MOGHADAM<sup>1</sup>, MASOUMEH SAEEDI LANDI<sup>1</sup>, AHMAD SHAHVANDARI<sup>1\*</sup>

<sup>1</sup>Department of Special Nursing Care Group, Ahvaz University of Medical Science, Ahvaz, Iran

<sup>2</sup>Master of Surgical Technoogy, Operating Room Group, School Of Nursing and Midwifery , Ahvaz University of Medical Science, Ahvaz,Iran  
Correspondence to Ahmad Shahvandari

## ABSTRACT

**Background:** Colorectal cancer is a deadly disease with varying degrees of prevalence in different parts of the world. Because of the need for improve the quality of life in cancer patients.

**Aim:** To determine the effect of physiotherapy on resilience and perceived stress in patients with colorectal cancer.

**Method:** This clinical trial study was performed using patients with colorectal cancer referred to the oncology department of Imam Khomeini Hospital in Ahvaz in 2017. Patients were randomly allocated in two groups (43 people) of intervention and control. The intervention group underwent physiotherapy for 12 sessions of 30 minutes. Perceived stress and Connor and Davidson resilience questionnaire were used to collect data. Data analysis performed using SPSS software version 22. The significance level was considered to be 0.05.

**Results:** Resilience levels were higher but perceived stress levels were lower in intervention in compared with control group. After the intervention, there is a significant difference between the control group and the intervention. Resilience and perceived stress variables in the intervention group shows a significant difference before and after the intervention.

**Conclusion:** Physiotherapy affects individual and social abilities, social support, family cohesion, personality structure, resilience and perceived stress in patients with colorectal cancer.

**Keywords:** Physiotherapy, Resilience, Stress, Colorectal cancer

---

## INTRODUCTION

Cancer is commonly perceived as a life-threatening and potentially traumatic disease, perceptions exacerbated due to its sudden onset and uncontrollable nature<sup>1</sup>. Cancer is the cause of 12% deaths worldwide, and about 12 million new cases are detected yearly<sup>2,3</sup>. Cancer is the second leading cause of death after cardiovascular disease and the number of cancer cases is increasing in the world<sup>4</sup>. Therefore, cancer is a threat for the health of human societies, and it is also a diverse disease that can affect many different parts of the body<sup>5</sup>. This disease has serious physical and psychological effects on patients<sup>6</sup>. Colorectal cancer is a common and deadly disease with varying degrees of prevalence in different parts of the world. This type of cancer is the third most common type of cancer in the world and the fourth most common in Iran with an incidence rate of 5000 new cases every year<sup>7,8,9</sup>. In the Netherlands, about 15.000 people are detected with colorectal cancer annually<sup>10</sup>. This type of cancer is the second leading cause of cancer death after breast cancer in women, and is the third place after lung and prostate cancer in men<sup>11</sup>.

Receiving a cancer diagnosis and undergoing its treatment together comprise an extremely stressful experience for many cancer patients that can render individuals vulnerable to long-lasting negative psychological outcomes, including emotional distress, depression, endangering self-esteem, anxiety, fatigue, and impaired quality of life, which all of this leads to psychological stress in the patients<sup>12-16</sup>. Stress is a response to a real or imagined threat that leads to physiological reactions. Stress increases the transcendental growth of the masses by affecting the

immune system and the masses themselves. Severe and long-term stress, such as life changes, affects a person's ability to adapt<sup>17</sup>. Despite remarkable distress that is associated with a cancer diagnosis and its treatment, many cancer patients manifest substantial resilience<sup>18,19</sup>. Resilience refers to a person's ability to adapt to illness, pain, and suffering caused by abuse and stressful factors that are important in life<sup>20</sup>. Previous literature has shown that overcoming cancer can be an opportunity for personal growth, perseverance and endurance, enhanced mental and emotional well-being that could potentially be linked to better coping with disease-related demands<sup>21-24</sup>. Therefore, many patients can handle this stressful experience with minimal effect on their daily functioning and may even experience positive emotional and personal growth<sup>25,26,27</sup>.

The experience of pain leads to intolerance and reduced resilience to cancer in patients. Pain is a stressful experience that leads to a lack of satisfaction with life and, as a result, causes discomfort and suffering, reduced quality of life, impaired daily functioning, and disruption of living conditions<sup>28</sup>. The intervention of physiotherapy in cancer care back to 1960<sup>29</sup>. Today, the involvement of physiotherapists in oncology is diverse. A study concluded that physiotherapy helps significantly maintain patient independence, patient satisfaction, and quality of life<sup>28</sup>. In general, physiotherapy is a set of medical treatments that use all physical and mechanical factors, including heat and cold, electromagnetic waves, electric currents, laser sound, etc., in the form of special treatment methods and techniques to treat diseases<sup>29</sup>. Due to the need for improve the quality of life of cancer patients, the present study aimed to determine the effect of physiotherapy on

resilience and perceived stress in patients with colorectal cancer.

## METHODS

This clinical trial study was performed by observing ethical considerations in patients with colorectal cancer referred to the oncology department of Imam Khomeini Hospital in Ahvaz in 2017. This study included all cancer patients with colorectal cancer. The study units were selected based on entry and exit criteria and then randomly divided into two groups of intervention and control. Criteria for entering the study include the diagnosis of colorectal cancer in the final stages by the relevant physician, having informed written consent to enter the study and not doing rehabilitation exercises and participating in hopeful therapy sessions or other similar sessions and exit criteria including unwillingness to continue physiotherapy and insufficient completion of questionnaires. The following tools were used to collect data: perceived stress questionnaire; perceived stress scale (PSS) measures two subscales of negative stress perception and positive stress perception. The main scale consists of 14 questions, the questions of which are based on the thoughts and feelings that a person had during the last month. Each of these questions has 5 options, half of which are scored directly and the other half are scored in reverse. The minimum perceived stress score is 14 and the maximum is 70<sup>30</sup>. A higher score indicates more perceived stress. Connor and Davidson resilience questionnaire; this questionnaire has 25 questions and its purpose is to measure resilience in different people. The response range is a 5-option Likert. This score will range from 0 to 100. A higher score will indicate a higher resilience of the respondent<sup>31</sup>.

Patients were randomly allocated in two groups (43 people) of intervention and control, and demographic information form as well as questionnaire of resilience and perceived stress was taken after providing explanations about the design and research steps and pre-test. The intervention group underwent physiotherapy. Physiotherapy includes electrotherapy, sports and massage therapy and with the aim of reducing pain and improving motor activities during 12 sessions of 30 minutes and for one month 3 sessions per week by a physiotherapist at Imam Khomeini Hospital. After the end of the treatment, a test was taken from both intervention and control groups. At the end, in

order to observe ethical issues, the control group was given the necessary training and educational booklets.

**Statistical analysis:** Quantitative variables will be reported as mean, standard deviation, minimum and maximum, and qualitative variables will be reported as number (percentage). The normality of quantitative variables will be examined using the Shapiro-Wilk test. Chi-square test used to investigate the relationship between qualitative variables and to compare quantitative variables between the two groups, an independent t-test or its non-parametric equivalent (Mann-Whitney test) will be used. Data analysis performed using SPSS version 22. The significance level was considered to be 0.05.

## RESULTS

In Table 1, the demographic variables were compared in the two control and intervention groups. Age and weight variables were measured using independent t-test and other features were measured using chi-square test. In all cases, no significant relationship was observed between the two variables. The results of the Shapiro Wilk test indicated that the assumption that the sample distribution of data was normal in the variables of the resilience and perceived stress questionnaire was established (Table 2).

Table 3 shows a significant difference in the variables of individual and social capabilities and social support, family cohesion, personality structure, resilience and total resilience in the intervention group, before and after the intervention. There was no significant difference in the control group before and after the intervention. Also, there is no significant difference between the intervention and control groups before the intervention. But after the intervention, there is a significant difference between the control group and the intervention. Physiotherapy affects individual and social abilities, social support, family cohesion, personality structure, and resilience in patients with colorectal cancer.

In Table 4, it can be said that the stress variable in the intervention group shows a significant difference before and after the intervention. Also, in the control group before and after the intervention, there was no significant difference. There is no significant difference between the intervention and control groups before the intervention. And after the intervention, there is a significant difference between the control group and the intervention.

**Table 1:** Demographic characteristics of experimental and control groups

Demographic variables	Intervention		Control	p-value
	Mean ± SD			
Age (year)	34.68±9.10		34.62±11.38	0.171
Weight	72.22±15.41		77.37±15.71	0.818
	N (%)			
Awareness level	Very much	9 (25.7)	12 (34.3)	0.348
	Medium	14 (40)	10 (28.6)	
	Low	9 (25.7)	6 (17.1)	
	Uninformed	3 (8.6)	7 (20)	
Marital status	Single	12(34.3)	13 (37.1)	0.96
	Married	23 (65.7)	22(64.9)	
Gender	Male	15 (42.9)	20 (57.1)	0.23
	Female	20 (57.1)	15(42.9)	

Table 2: Normal distribution of variables in the resilience and perceived stress questionnaire

Items	Significance level	Shapiro Wilk's statistics
Individual capabilities	0.12	0.97
Social capabilities	0.65	0.95
Social support	0.33	0.94
Family cohesion	0.17	0.93
Personality structure	0.23	0.98
Resilience	0.11	0.97
Weight	0.39	0.98
Total Resilience	0.707	0.987

Table 3: Effect of physiotherapy on resilience aspects in patients with colorectal cancer

Resilience aspects		Intervention	Control	p-value
Individual capabilities	Before	12.0±3.66	12.31±3.8	0.75
	After	21.76±3.13	12.14±3.78	0.40
	p-value	<0.001	0.852	-
Social capabilities	Before	-	-	0.612
	After	-	-	0.03
	p-value	<0.001	0.538	-
Social support	Before	3.38±1.27	3.65±1.58	0.44
	After	5.91±1.16	3.14±1.43	0.01
	p-value	<0.001	0.16	-
Family cohesion	Before	3.41±1.27	3.37±1.16	0.35
	After	6.09±1.26	3.40±1.06	0.01
	p-value	<0.001	0.51	-
Personality structure	Before	25.47±2.27	25.22±2.59	0.25
	After	31.82±2.19	24.80±2.80	0.02
	p-value	<0.001	0.51	-
Resilience	Before	8.33±2.94	8.17±2.43	0.32
	After	14.82±2.59	8.40±2.79	0.03
	p-value	<0.001	0.72	-
Total Resilience	Before	43.44±4.27	42.65±3.47	0.78
	After	49.20±2.71	42.79±7.11	0.04
	p-value	<0.001	0.45	-

Table 4: Effect of physiotherapy on perceived stress in patients with colorectal cancer

Total stress		Intervention	Control	p-value
Total stress	Before	42.44±4.27	40.45±3.47	0.75
	After	36.20±2.71	41.77±7.11	0.01
	p-value	0.04	0.33	-

## DISCUSSION

Colorectal cancer is one of the most common cancers of the gastrointestinal tract, caused by lifestyle factors and aging, and in a small number of cases (up to 20%) due to genetic and inherited disorders<sup>32</sup>. Although the incidence of this cancer is higher in Western countries, but due to the change in lifestyle, the incidence of this cancer is also increasing in developing countries<sup>33,34</sup>. The evaluation of well-being in cancer has emphasized that symptom burden and functionality constraints are negatively associated with quality of life<sup>35</sup>. However, social and family support is positively related to quality of life in the end of life<sup>36</sup>. Although physical activity has many positive effects on health in patients with colorectal cancer, often report a low level of physical activity. So far, few studies have been conducted on the stress and resilience of patients with colorectal cancer, and according to our literature review, no study has been conducted to investigate the effect of physiotherapy on resilience and perceived stress. Therefore, this study has been designed and implemented to evaluate the impact of physiotherapy on resilience and

perceived stress in patients with colorectal cancer. The results showed that the use of physiotherapy affected resilience as well as perceived stress in patients with colorectal cancer. The findings of this study are directly and indirectly consistent with the studies of<sup>37,38</sup>.

Personal resilience is a construct correlated with the ability to adapt when challenged by stressors or adversities<sup>39</sup>. The concept of resilience is not a consensus among researchers. A study state that resilience is variably regarded as a personality trait, a dynamic developmental process or a mixed of the above<sup>40</sup>. Another research reports that resilience is the process of negotiating, managing and adapting to significant sources of stress<sup>41</sup>. In a study in order to evaluation the effect of physiotherapy on shoulder function in patients surgically treated for breast cancer, using 139 patients reported that team instructed physiotherapy improves the shoulder function in patients surgically treated for breast cancer<sup>37</sup>. Nafissi et al. (2014) by evaluate the effects of complex decongestive physical therapy on pain severity and life quality in patients with secondary upper extremity lymphedema after breast

cancer treatments concluded utilization of complex decongestive physical therapy is a useful method for pain relief and increment of quality of life<sup>42</sup>. A study by Tajikzadeh et al. (2016) was conducted to comparison of resilience and pain catastrophizing behavior between cancer patients and normal people. They included that cancer can make difference between patients and normal people in resilience and coping style. Therefore, authors suggest making comprehensive care plan in patients with cancer for reinforcing resilience and coping style with decreasing pain catastrophizing<sup>38</sup>. In a study on metastatic colorectal cancer patients, resilience was positively correlated with hope, indicating that resilience may improve hope, thereby emphasizing the need for resilience-fostering interventions in palliative care<sup>43</sup>.

In previous studies by examining epidemiological cases Lee (2003) concludes that physical activity has been shown to reduce the risk of some cancers, especially colon cancer<sup>44</sup>. Physical activity reduces the risk of cancer by improving the functioning of the immune system. On the other hand, physical activity leads to reduces material transfer time; As a result, the risk of contact of carcinogens with intestinal mucosa is reduced<sup>45</sup>. Literature review shows the promote of resilience due to interventions for achieving new coping skills, and increasing personal competence, family coherence and social support<sup>46-48</sup>. Cohen et al (2014) to assess the mediating effect of resilience on the associations between age and emotional distress in patients with colorectal cancer conducted a study entitled "The association of resilience and age in individuals with colorectal cancer..." They concluded that older age, male gender, and less cancer-related problems were associated with higher resilience and lower emotional distress<sup>46</sup>. Due to the lack of extensive, adequate and valuable studies on the effect of physiotherapy on resilience and perceived stress criteria in patients with colorectal cancer, it is recommended that more extensive studies be performed with larger sample sizes.

## CONCLUSION

Physiotherapy is effective on the variables of resilience and perceived stress in patients with colorectal cancer. The use of physiotherapy for 1 month (12 sessions of 30 minute) increased resilience as well as reduced perceived stress in the patients under study. Because of the lack of studies in this field, more studies are needed.

**Acknowledgments:** We would like to thank all the participants in the research, the staff of Imam Khomeini Hospital in Ahvaz, as well as all the friends who helped us in this research.

## REFERENCES

1. Tedeschi RG, Calhoun LG. Trauma and transformation: Sage; 1995.
2. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA: a cancer journal for clinicians*. 2018;68(6):394-424.
3. Sood R, Rositch AF, Shakoor D, Ambinder E, Pool K-L, Pollack E, et al. Ultrasound for Breast Cancer Detection Globally: A Systematic Review and Meta-Analysis. *Journal of global oncology*. 2019;5:1-17.
4. Siegel R. Cancer statistics. *Ca Cancer J Clin*. 2013;63(1):11-30.
5. Meacham CE, Morrison SJ. Tumour heterogeneity and cancer cell plasticity. *Nature*. 2013;501(7467):328-37.
6. Fisher R, Puztai L, Swanton C. Cancer heterogeneity: implications for targeted therapeutics. *British journal of cancer*. 2013;108(3):479-85.
7. Hagggar FA, Boushey RP. Colorectal cancer epidemiology: incidence, mortality, survival, and risk factors. *Clinics in colon and rectal surgery*. 2009;22(04):191-7.
8. Dolatkah R, Somi MH, Bonyadi MJ, Asvadi Kermani I, Farassati F, Dastgiri S. Colorectal cancer in Iran: molecular epidemiology and screening strategies. *Journal of cancer epidemiology*. 2015;2015.
9. Zare-Bandamiri M, Khanjani N, Jahani Y, Mohammadianpanah M. Factors affecting survival in patients with colorectal cancer in Shiraz, Iran. *Asian Pac J Cancer Prev*. 2016;17(1):159-63.
10. Berkel AE, Bongers BC, van Kamp M-JS, Kotte H, Weltevreden P, de Jongh FH, et al. The effects of prehabilitation versus usual care to reduce postoperative complications in high-risk patients with colorectal cancer or dysplasia scheduled for elective colorectal resection: study protocol of a randomized controlled trial. *BMC gastroenterology*. 2018;18(1):29.
11. Jemal A, Bray F, Center MM, Ferlay J, Ward E, Forman D. Global cancer statistics. *CA: a cancer journal for clinicians*. 2011;61(2):69-90.
12. Bergerot CD, Clark KL, Nonino A, Waliyany S, Buso MM, Loscalzo M. Course of distress, anxiety, and depression in hematological cancer patients: Association between gender and grade of neoplasm. *Palliative & supportive care*. 2015;13(2):115-23.
13. Linden W, Vodermaier A, MacKenzie R, Greig D. Anxiety and depression after cancer diagnosis: prevalence rates by cancer type, gender, and age. *Journal of affective disorders*. 2012;141(2-3):343-51.
14. Saboonchi F, Petersson L-M, Wennman-Larsen A, Alexanderson K, Brännström R, Vaez M. Changes in caseness of anxiety and depression in breast cancer patients during the first year following surgery: patterns of transiency and severity of the distress response. *European Journal of Oncology Nursing*. 2014;18(6):598-604.
15. Rodin G, Lo C, Mikulincer M, Donner A, Gagliese L, Zimmermann C. Pathways to distress: the multiple determinants of depression, hopelessness, and the desire for hastened death in metastatic cancer patients. *Social science & medicine*. 2009;68(3):562-9.
16. Lo C, Hales S, Zimmermann C, Gagliese L, Rydall A, Rodin G. Measuring death-related anxiety in advanced cancer: preliminary psychometrics of the Death and Dying Distress Scale. *Journal of pediatric hematology/oncology*. 2011;33:S140-S5.
17. Schoon I. Risk and resilience: Adaptations in changing times: Cambridge University Press; 2006.
18. Carver CS. Resilience and thriving: Issues, models, and linkages. *Journal of social issues*. 1998;54(2):245-66.
19. Gouzman J, Cohen M, Ben-Zur H, Shacham-Shmueli E, Aderka D, Siegelmann-Danieli N, et al. Resilience and psychosocial adjustment in digestive system cancer. *Journal of clinical psychology in medical settings*. 2015;22(1):1-13.
20. HOSINI GT. Effectiveness of resilience training on stress of mothers whose children, who were suffer from cancer in Imam Khomeini hospital of Tehran. 2013.
21. Ruini C, Vescovelli F, Albieri E. Post-traumatic growth in breast cancer survivors: new insights into its relationships with well-being and distress. *Journal of clinical psychology in medical settings*. 2013;20(3):383-91.

22. Tarno H, Qi H, Endoh R, Kobayashi M, Goto H, Futai K. Types of frass produced by the ambrosia beetle *Platypus quercivorus* during gallery construction, and host suitability of five tree species for the beetle. *Journal of Forest Research*. 2011;16(1):68-75.
23. Lelorain S, Bonnaud-Antignac A, Florin A. Long term posttraumatic growth after breast cancer: prevalence, predictors and relationships with psychological health. *Journal of clinical psychology in medical settings*. 2010;17(1):14-22.
24. Robinson KE, Gerhardt CA, Vannatta K, Noll RB. Parent and family factors associated with child adjustment to pediatric cancer. *Journal of pediatric psychology*. 2007;32(4):400-10.
25. Bonnano G. Loss, trauma and human resilience: Conceptual and empirical connections and separateness. *American Psychologist*. 2004;59(1):20-8.
26. Novick LF, Cibula DA, Sutphen SM. Adolescent suicide prevention. *American journal of preventive medicine*. 2003;24(4):150-6.
27. Seiler A, Jenewein J. Resilience in cancer patients. *Frontiers in psychiatry*. 2019;10:208.
28. Laakso L. The role of physiotherapy in palliative care. *Australian family physician*. 2006;35(10):781.
29. Strauss-Blasche G, Gnad E, Ekmekcioglu C, Hladschik B, Markt W. Combined inpatient rehabilitation and spa therapy for breast cancer patients: effects on quality of life and CA 15-3. *Cancer nursing*. 2005;28(5):390-8.
30. Safaei M, Shokri O. Assessing stress in cancer patients: Factorial validity of the perceived stress scale in Iran. 2014.
31. Connor KM, Davidson JR. Development of a new resilience scale: The Connor-Davidson resilience scale (CD-RISC). *Depression and anxiety*. 2003;18(2):76-82.
32. Bruckner HW, Pitrelli J, Merrick M. *Adenocarcinoma of the colon and rectum*. Holland-Frei Cancer Medicine 5th edition: BC Decker; 2000.
33. SAFAEI A, MOGHIMI DB, FATEMI SR, Maserat E, NEMATI MF, POURHOSSEIN GM, et al. Risk of colorectal cancer in relatives: a case control study. 2009.
34. Vakili M, Aghakoochak A, Pirdehghan A, Shiryazdy M, Saffarmoghadam A. The survival rate of patients with colorectal cancer in Yazd during 2001-2011. *SSU\_Journals*. 2014;22(3):1187-95.
35. Fangel LMV, Panobianco MS, Kebbe LM, Almeida AMd, Gozzo TdO. Quality of life and daily activities performance after breast cancer treatment. *Acta Paulista de Enfermagem*. 2013;26(1):93-100.
36. Crothers MK, Tomter HD, Garske JP. The relationships between satisfaction with social support, affect balance, and hope in cancer patients. *Journal of psychosocial oncology*. 2006;23(4):103-18.
37. Lauridsen MC, Christiansen P, Hessel I. The effect of physiotherapy on shoulder function in patients surgically treated for breast cancer: a randomized study. *Acta oncologica*. 2005;44(5):449-57.
38. TAJIKZADEH F, sadeghi r, RAEEKARIMIAN F. The comparison of resilience, coping style and pain catastrophizing behavior between cancer patients and normal people. 2016.
39. Luthar SS, Brown PJ. Maximizing resilience through diverse levels of inquiry: Prevailing paradigms, possibilities, and priorities for the future. *Development and psychopathology*. 2007;19(3):931-55.
40. Deshields TL, Heiland MF, Kracen AC, Dua P. Resilience in adults with cancer: development of a conceptual model. *Psycho-Oncology*. 2016;25(1):11-8.
41. Windle G. The contribution of resilience to healthy ageing. *Perspectives in public health*. 2012;132(4):159.
42. Nafissi S, Hadian MR, Bagheri H, Razavi F, Mousavi S, Jalaei S. The effectiveness of Complex Decongestive Physical Therapy on severity of pain and quality of life in patients with secondary lymphedema after breast cancer surgery. *Modern Rehabilitation*. 2014;7(4).
43. Boehmer S, Luszczynska A, Schwarzer R. Coping and quality of life after tumor surgery: Personal and social resources promote different domains of quality of life. *Anxiety, Stress, & Coping*. 2007;20(1):61-75.
44. Lee I-M. Physical activity and cancer prevention—data from epidemiologic studies. *Medicine & Science in Sports & Exercise*. 2003;35(11):1823-7.
45. Welk GJ, Meredith MD. FITNESSGRAM®/ACTIVITYGRAM®. THE ZHANG SAH CASE STUDY: DO RELATIONSHIPS EXIST BETWEEN FITNESS, SOCIO-EMOTIONAL LEARNING, AND ACADEMIC ACHIEVEMENT? 2017;1001:60.
46. Cohen M, Baziliansky S, Beny A. The association of resilience and age in individuals with colorectal cancer: an exploratory cross-sectional study. *Journal of geriatric oncology*. 2014;5(1):33-9.
47. Lapiere S, Erlangsen A, Waern M, De Leo D, Oyama H, Scocco P. & Quinnett, P.(2011). A systematic review of elderly suicide prevention programs. *Crisis*.32(2).
48. Solomon Z, Prager E. Elderly Israeli Holocaust survivors during the Persian Gulf War: a study of psychological distress. *The American Journal of Psychiatry*. 1992