

Original Article

The Impact of Pain on the Functionality and Mobility of Patients with Ankylosing Spondylitis and the Role of Physiotherapy in their Rehabilitation

Melpomeni Botsolou, Physiotherapist, MSc

Department of Medical Psychology, School of Medicine, University of Ioannina, Ioannina, Greece

Niki Tsifetaki, MD

Consultant Rheumatologist, Department of Rheumatology, General Hospital of Ioannina "G. Hatzikosta", Ioannina, Greece

Correspondence: Botsolou Melpomeni, Dexamenis 26, PC 45333, Ioannina, Greece
E-mail: mel_botsolou@hotmail.com

Abstract

Introduction: Ankylosing spondylitis (AS) belongs to spondyloarthropathies and physiotherapy is an important part of its treatment.

Purpose: It was to investigate the contribution of physiotherapy (combined or not with medication) to the ankylosing spondylitis pain relief and patients' functionality.

Methodology: Forty- five AS outpatients aged 19-85 years old were enrolled in the study. All participants were outpatients, attending the general hospital of Ioannina, Greece or other private clinical settings. The EQ-5D-3L, the BASDAI and BASFI questionnaires were used. The BASDAI refers to pain and fatigue, while the BASFI questionnaire is used to estimate the functionality level of the patients, both on a 10 point Likert scale.

Results: The 77.8% of patients stated that they have attended physiotherapy sessions in the past, while 48.9% reported that they underwent physiotherapy during symptoms exacerbation. The mean value of functionality without medication and no physiotherapy appears lower in comparison with physiotherapy plus medication. Nevertheless, differences were not statistically significant. ($F=1,804$, $p=0,177$). The same applies to BASFI index ($F=1,128$, $p=0,333$). Regarding anxiety, 3 out of the symptoms-free 14 individuals (21.4%) underwent physiotherapy with medication, while 14 out of 24 individuals with moderate anxiety/depression did so. Difference was statistically significant [$\chi^2=10,285$ ($df=4$), $p=0.036$]. Absence of anxiety/depression was associated with low rates of physiotherapy/medication combination.

Conclusion: According to the findings of this study, patients with ankylosing spondylitis often resort to medication in combination with physical therapy when experiencing even mild mobility problem. Physical therapy seems to help improve the quality of life of these patients, but questions remain about the frequency and duration necessary to maintain its effect.

Key words: physiotherapy, ankylosing spondylitis, quality of life

Introduction

The term "spondylitis" was first used in 1960 by Wright, in order to describe a set of rheumatological disorders are not only serological, clinical and radiological similarities and common familial and genetic background. The contribution of physiotherapy in the treatment of rheumatological disorders has been demonstrated by many researchers, and its utility makes it a necessary treatment and a prevention tool. More specifically, Al-Qubaeissy et al, (2013) indicate the positive effects of

hydrotherapy in rheumatoid arthritis and underline the improvement of both functionality and patients' quality of life. Mascarin et al, (2012) reported that physiotherapy resulted in pain reduction and mobility improvement in patients suffering from knee osteoarthritis, using electrotherapy, ultrasound and physiotherapy. Also, Poddubnyy in their 2013 study indicated that medical treatment of spondyloarthropathies should be combined with the use of physiotherapy.

Ankylosing spondylitis (AS) belongs to spondyloarthropathies. It usually occurs at an early age (19-40 years), while the etiology has not yet been determined. The existence of the HLA-B27 gene appears to be associated with the disease, but this is not an evidence of its existence. Depending on the stage of the disease, the symptoms are either exacerbated or not. Symptoms include pain in the lower lumbar spine, pain in hip joints and buttocks. The pain gradually spreads to the entire axial skeleton. As for peripheral joints, the pain is located at the hips, shoulders and knees. Pain can be unilateral or bilateral. Strong stiffness occurs mainly in the morning hours, which lasts up to 30 minutes. Stiffness and pain intensify after prolonged immobility while improve with exercise. Apart from musculoskeletal symptoms, the disease also affects other systems causing iridocyclitis, respiratory difficulties due to decreased thoracic expansion mainly in inhalation, cardiopulmonary complications. (Baaj et al., 2010; Ozkan 2016) Symptoms are treated either with medication or with alternative therapies such as physiotherapy or a combination of both.

With regard to Ankylosing Spondylitis, physiotherapy is an important part of its treatment, as has been observed in many studies. (van der Linden et al., 2002; Dagfinrud et al., 2010; Gyurcsik et al., 2012; Kjekken et al., 2013). The purpose of physiotherapeutic intervention at the acute stage is to relieve pain, reduce inflammation and resolve muscle spasms, maintain the functionality and range of motion of the joints and muscle elasticity. At the chronic stage, the goal is to maintain mobility of the spine, hip, chest, shoulder, increase in muscle strength and strength, increase tissue elasticity, increase articular motion, maintain breathing capacity and strengthen respiratory Muscles, maintaining normal posture, avoiding deformities and preventing complications. The aim of physiotherapy is also to educate the patient to perform a specific exercise and his / her family environment to participate in it whenever necessary. It is also important to inform the patient about the development of the disease, its psychological recovery and the improvement of its quality life.

The purpose of the present study was to investigate the contribution of physiotherapy (combined or not with medication) to the

ankylosing spondylitis pain relief and patients' functionality.

Materials and methods

Forty-eight ankylosing spondylitis patients were the population of the present study. They were interviewed and 45 patients aged 19-85 years old were finally enrolled in the study, as three patients refused participation. All participants were outpatients, attending the general hospital of Ioannina, Greece or other private clinical settings. The 45 patients suffered from AS and other medical diseases such as diabetes mellitus and cardiovascular diseases. Patients participated in the research after telephone communication and explanation of the study process. They all gave their informed consent for participation. Three questionnaires were the research tools. They filled in the questionnaires within 2-3 days after administration (per person or by mail). The questionnaires were filled in according to the instructions given in each questionnaire, while there was the possibility of communication with the researcher for clarification of questions. The EQ-5D-3L descriptive system comprises the following five dimensions: mobility, self-care, usual activities, pain/discomfort and anxiety/depression. Each dimension has 3 levels: no problems, some problems, and extreme problems. The patient is asked to indicate his/her health state by ticking the box next to the most appropriate statement in each of the five dimensions.

The BASDAI and BASFI questionnaires were used. The BASDAI comprises 6 sets of questions referring to pain and fatigue [graded from 0(lowest)-10(highest) on a Likert scale]. The BASFI questionnaire is used to estimate the functionality level of the patients on a 10 point [0(lowest)-10 (highest)] Likert scale for everyday living activities. Statistics was performed with χ^2 test and SPSS 22.0 Software.

Results

Eighty percent were men and 20% women, while 66.7% were of Epirus origin, 13.3% of Thessaly, 11.1% of Macedonia and 2 patients came from Peloponnese and Ionian islands. Regarding the labor characteristics of the sample, 37.8% were retired, 24.4% were civil servants, 15.6% freelancers, 8.9% unemployed, 6.7% household workers, 4.4% private employees and 1 student. (Table 1)

Table 1. Demographic and labor characteristics

	N	%
Gender		
Man	36	80.0
Woman	9	20.0
Total	45	100.0
Perfecture		
Epirus	30	66.7
Macedonia	5	11.1
Thessaly	6	13.3
Peloponnese	1	2.2
Ionian islands	1	2.2
Other	2	4.4
Total	45	100.0
Profession		
Employee	2	4.4
Civil servant	11	24.4
Freelancer	7	15.6
Pensioner	17	37.8
Household	3	6.7
Unemployed	4	8.9
Student	1	2.2
Total	45	100.0

Table 2. BASDAI index depending on physiotherapy use

BASDAI						
	N	Mean	SD	Std. Error	95% CI	
					Lower bound	Upper bound
No	3	3,87	2,56	1,48	-2,49	10,22
Yes, plus medication	23	5,05	2,76	0,58	3,85	6,25
Yes, without medication	19	3,59	2,14	0,49	2,56	4,63
Total	45	4,36	2,56	0,38	3,59	5,12
SD: Standard deviation CI: Confidence Interval						

Table 3. BASFI index depending on physiotherapy use

BASFI						
	N	Mean	SD	Std. Error	95% CI	
					Lower bound	Upper bound
No	3	3,80	2,76	1,59	-3,06	10,66
Yes, plus medication	23	5,46	2,79	0,58	4,25	6,66
Yes, without medication	19	4,15	3,35	0,77	2,54	5,77
Total	45	4,80	3,05	0,45	3,88	5,71
SD: Standard deviation CI: Confidence Interval						

Table 4. EQ5D questionnaire

		N
Mobility	I have no problems in walking about	17
	I have some problems in walking about	27
	I am confined to bed	1
Self- care	I have no problems with self-care	27
	I have some problems washing or dressing myself	16
	I am unable to wash or dress myself	2
Usual Activities	I have no problems with performing my usual activities	17
	I have some problems with performing my usual activities	26
	I am unable to perform my usual activities	2
Pain/Discomfort	I have no pain or discomfort	8
	I have moderate pain or discomfort	28
	I have extreme pain or discomfort	9
Anxiety/Depression	I am not anxious or depressed	14
	I am moderately anxious or depressed	24
	I am extremely anxious or depressed	7

Fig 1. Physiotherapy/medication and BASDAI

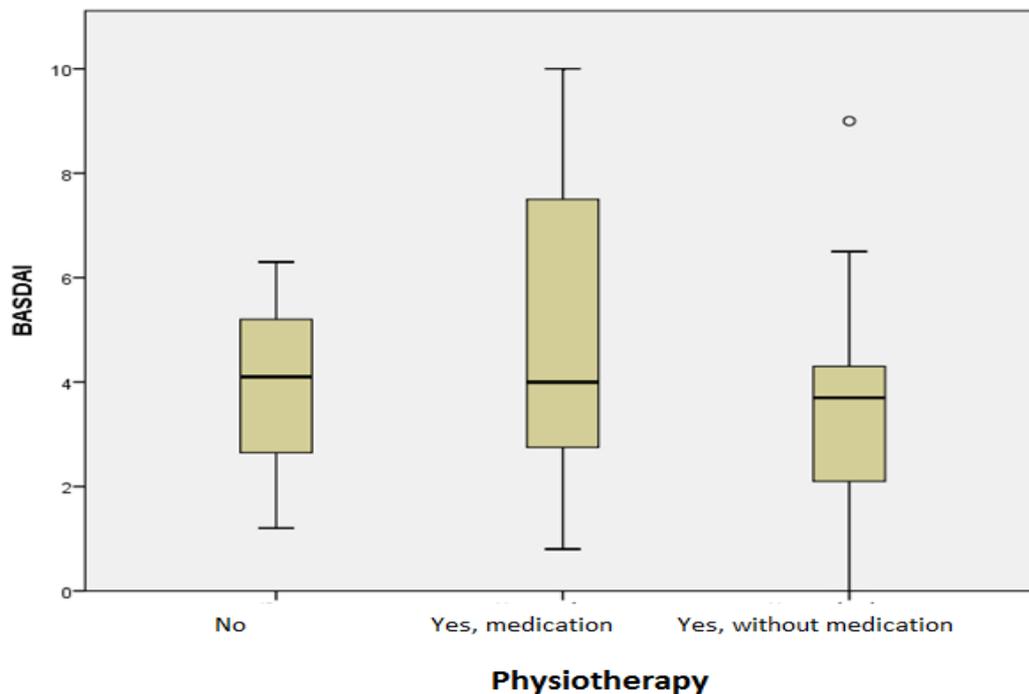
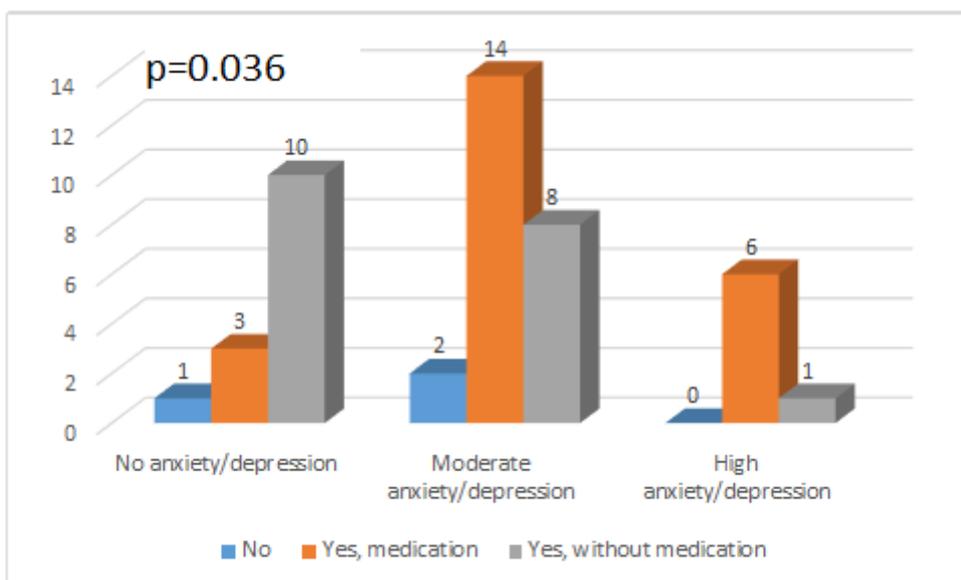


Figure 2. Physiotherapy and anxiety/depression



The BASDAI mean values depending on physiotherapy and the use (or not) of medication are presented in table 2 and Fig.1. The mean value of functionality without medication and no physiotherapy appears lower in comparison with physiotherapy plus medication. Nevertheless, differences were not statistically significant. ($F=1,804$, $p=0,177$). The same applies to BASFI index ($F=1,128$, $p=0,333$) (table 3).

In particular, for everyday activities of particular interest, 17 of the 45 participants have no problem with them, 26 of them have some problems, and only 2 were unable to carry out their normal activities. The picture is proportional to all categories that express the quality of life from the EQ5D questionnaires, noting that exaggerated pain, but also anxiety or depression, appear to be present in more people. At the same time, 10 of the 45 patients consider their present health status worse than that of the last ten months. (table 4)

Regarding anxiety, 3 out of the symptoms-free 14 individuals (21.4%) underwent physiotherapy with medication, while 14 out of 24 individuals with moderate anxiety/depression did so. Of those with levels of anxiety/depression (7 individuals), six (85.7%) underwent physiotherapy with medication. Difference was statistically significant [$\chi^2=10,285$ (df=4), $p=0.036$, Fig.2]. Absence of anxiety/depression was associated with low rates of physiotherapy/medication combination.

The 77.8% of patients stated that they have attended physiotherapy sessions in the past, while 48.9% reported that they underwent physiotherapy during symptoms exacerbation. Compared to the other parameters tested (self-care, day-to-day activities and pain / discomfort), there were no statistically significant differences between those who did only physiotherapy or a combination of physiotherapy and medication. However, the frequency is rather sparse, since in 70% of the patients, physiotherapy sessions occur once or twice a year. However, patients (62.8%) desire their frequent occurrence, while 68.9% of them feel that physiotherapy helps pain relief. (data not shown)

Discussion

According to the findings of this study, patients with ankylosing spondylitis (AS) often resort to medication in combination with physical therapy

when experiencing even mild mobility problem, while the absence of depression and anxiety is accompanied by low rates combining physiotherapy /medication. However, the functionality level without medication and physical therapy seems low compared with physical therapy with drugs. Therefore, physical therapy seems to help improve the quality of life of these patients, but questions remain about the frequency and duration necessary to maintain its effect.

Of note, most trials in patients with ankylosing spondylitis focus on the effect of physiotherapy in functionality and pain, but physiotherapy is not considered as monotherapy in some way in addressing the symptoms of the disease. Also, as was the case in the present study, the majority of patients in the different samples for study are males. Therefore, the applicability of any results for women are limited. Dagfinrud et al (2005) found a significant positive effect of exercise in pain for patients with AS, but this was not accompanied by any significant benefits in functionality. Kraag et al.(1990) measured mobility of the spine to the distance fingertip - floor and found a significant improvement for the intervention group. Another study (Hidding 1993) found significant improvement in lumbar-motility but not accompanied by significant improvements in motility of the rest of the vertebral column.

However, in the study of Analay et al (2003), the two groups did not differ in mobility sizes spine. In the Van Tubergen et al. (2001) study, improvement in spinal motility and function was significantly better in physiotherapy -treated patients (spa and exercise) than in those who did not receive the intervention ($p < 0.01$ for both the parameters). The conclusion was that physiotherapy combined with education is an effective intervention in patients with AS. Available data support positive effects of physiotherapy in AS management. However, further research is necessary to identify the most effective physiotherapy strategies and determine the exact role of physiotherapy interventions. In the studies of Kraag (1990) and Sweeney (2002) there were no significant differences between groups in pain reduction from baseline and up to four months. However, the rigidity, as included in the BASDAI score, differed favorably for the patients in the intervention group. In the study by Kraag et al (1990) and after the four month intervention period, the authors reported that the

intervention group had improved significantly compared to the control group ($p < 0.001$). However, there was also no high-quality evidence of a positive effect of a home exercise program on the mobility of the vertebral column.

The different results may indicate that mobilization exercises should be specific and a general effect of exercise on spinal mobility should not be expected. Interventions in the various studies are described so that the detailed content of the programs remains partly unclear and hardly comparable and reproducible. Another problem associated with the external validity are somewhat unusual interventions in some of the studies, as the spa-resort treatment programs. Despite the fact that the spa-exercise intervention shows favorable cost-effectiveness and cost-effectiveness in relation to self-exercise and exercise in groups (Van Tubergen 2002), these resorts are not readily available or accessible to many places the world and the possibility of generalization of the results can therefore be limited.

In this study, the small number of cases does not allow definite conclusions. This study was a self-report survey and cross a small sample and this limits the generalizability of results. However, comparing the different therapeutic approaches applied in clinical practice, allows a realistic perspective of physiotherapy effects and patient' preferences.

References

- Al-Qubaeissy KY, Fatoye FA, Goodwin PC, Yohannes AM. (2013) The effectiveness of hydrotherapy in the management of rheumatoid arthritis: a systematic review. *Musculoskeletal Care* 11:3-18.
- Analay Y, Ozcan E, Karan A, Diracoglu D, Aydin R. (2003) The effectiveness of intensive group exercise on patients with ankylosing spondylitis. *Clinical Rehabilitation* 17:631-6.
- Baaj AA, et al. (2010) Handbook of spine surgery. Thieme 180-2.
- Dagfinrud H, Kvien TK, Hagen KB. (2005) The Cochrane review of physiotherapy interventions for ankylosing spondylitis. *J Rheumatol* 32:1899-906.
- Geijer M, Göthlin GG, Göthlin JH. (2007) The clinical utility of computed tomography compared to conventional radiography in diagnosing sacroiliitis. A retrospective study on 910 patients and literature review. *J Rheumatol* 34:1561-5.
- Gyurcsik ZN, András A, Bodnár N, Szekanecz Z, Szántó S. (2012) Improvement in pain intensity, spine stiffness, and mobility during a controlled individualized physiotherapy program in ankylosing spondylitis. *Rheumatol Int* 32:3931-6.
- Hidding A, van der Linden S, Boers M, Gielen X, de Witte L, Kester A, Dijkmans B, Moolenburgh D. (1993) Is group physical therapy superior to individualized therapy in ankylosing spondylitis? A randomized controlled trial. *Arthritis Care and Research* 6:117-25.
- Kjeken I, Bø I, Rønningen A, Spada C, Mowinckel P, Hagen KB, Dagfinrud H. (2013) A three-week multidisciplinary in-patient rehabilitation programme had positive long-term effects in patients with ankylosing spondylitis: randomized controlled trial. *J Rehabil Med* 45:260-7.
- Kraag G, Stokes B, Groh J, Helewa A, Goldsmith C. (1990) The effects of comprehensive home physiotherapy and supervision on patients with ankylosing spondylitis--a randomized controlled trial. *The Journal of Rheumatology* 17:228-33.
- Ozkan Y. (2016) Cardiac Involvement in Ankylosing Spondylitis. *J Clin Med Res* 8:427-30.
- Sweeney S, Taylor G, Calin A. (2002) The effect of a home based exercise intervention package on outcome in ankylosing spondylitis: a randomized controlled trial. *The Journal of Rheumatology* 29:763-6.
- van der Linden S, van Tubergen A, Hidding A. (2002) Physiotherapy in ankylosing spondylitis: what is the evidence? *Clin Exp Rheumatol* 20:S60-4.
- Van Tubergen A, Boonen A, Landewe R, Rutten-van Molken M, van der HD, Hidding A, et al. (2002) Cost effectiveness of combined spa-exercise therapy in ankylosing spondylitis: a randomized controlled trial. *Arthritis and Rheumatism* 47:459-67.
- Van Tubergen A, Landewe R, van der HD, Hidding A, Wolter N, Asscher M, et al. (2001) Combined spa-exercise therapy is effective in patients with ankylosing spondylitis: a randomized controlled trial. *Arthritis and Rheumatism* 45:430-8.
- Mascarin NC, Vancini RL, Andrade ML, Magalhães Ede P, de Lira CA, Coimbra IB. (2012) Effects of kinesiotherapy, ultrasound and electrotherapy in management of bilateral knee osteoarthritis: prospective clinical trial. *BMC Musculoskeletal Disord* 13:182.
- Poddubnyy D. (2013) Axial spondyloarthritis: is there a treatment of choice? *Ther Adv Musculoskeletal Dis* 5:45-54.
- Black A, White B. (2007) Title of paper. *International Journal of Caring Sciences* 1:12-16.