

To Check the Awareness about the Role of Physiotherapy in Patients with Ankylosing Spondylitis: A Survey Study

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ABSTRACT

Ankylosing Spondylitis belongs to the seronegative group of chronic inflammatory conditions, which predominantly affect the spine, sacroiliac joints, spinal posture, and mobility, it also affects the cardiorespiratory system thus Physical Therapy plays an important role in maintaining good posture and flexibility of the muscles and mobility of the joints. The objective behind the study is to check the awareness about the role of Physiotherapy in Ankylosing spondylitis patients based on a validated self-constructed questionnaire which included closed-ended questions and one open-ended question that were of three different languages (English, Hindi, Marathi) the type of questions was related to symptoms, QoL (Quality of Life), the role of physiotherapy. This was a survey study that included 142 patients diagnosed with Ankylosing Spondylitis, where patients had to fill out online google forms. The responses were then statistically analysed using descriptive statistics. The result was given in percentage, frequency, LCL (lower confidence level), and UCL (upper confidence level) method for each question. The mean percentage of all the correct answers was calculated and the study concluded that 61.72% were aware of their condition and were aware about the role of physiotherapy, but there was uncertainty and myths related to physiotherapy which need to be addressed and clarified.

Keywords: self-made questionnaire, Physiotherapy Awareness, HLA-B27 Positive.

INTRODUCTION

Ankylosing spondylitis (AS) is a chronic inflammatory rheumatic disease that belongs to the group of diseases known as spondyloarthropathies as well as spondylarthritis. This group of disorders constitutes a family of related but heterogeneous conditions, rather than a single disease with different clinical features. Radiographic sacroiliitis is well thought out as the hallmark of AS.

Inflammation of the sacroiliac (SI) joints and the spine ultimately may lead to bony ankylosis. Spinal ankylosis tends to appear in the late stages of the disease and sometimes it's rare to occur in mild disease.^[1] Ankylosing Spondylitis has a strong association with a well-known genetic marker HLA-B27. It also supports the view that the disease is due to a genetically determined immune response to environmental factors in susceptible

individuals. It accounts for only 16 percent of the total genetic risk of the disease.^[2]

The mean prevalence of Ankylosing Spondylitis within Asia was 16.7 per 10,000 (weighted 18.0 per 10,000). South Asian countries = Mean 8.5, weighted mean 7.8 per 10 000. East Asian countries = Mean 25.5, weighted mean 26.4 per 10,000.^[1] Low back pain and stiffness are the leading symptoms in Ankylosing Spondylitis next to chronic spinal inflammation, new bone formation results in ossification and progressive ankylosing of adjoining vertebral bodies, which leads to slow but sure limitation of spinal mobility, loss of functional status, and reduced quality of life. Spinal mobility impairment in AS is involved irreversibly by spinal deterioration and reversibly by spinal inflammation.^[4] Chest Pain and Upper Girdle and Lower Girdle (Shoulder and Hip joints are the most involved extra-axial joints in AS and pain in these joints are the most common symptoms that occur in 15% of patients. Shoulder involvement especially Hip involvement may cause considerable physical disability.^[1] AS holds back an individual's physical capacity and thus consequence in reduced enthusiasm in physical activity in their daily living due to restricted respiratory functions, pain, limitation of joints, and spinal motion. Regular physical activity can delay the progression of the disease and improve musculoskeletal health hence it's important to encourage AS patients to avoid getting into this vicious cycle.^[5]

In AS, the characteristics of the diseases and the clinical features are not recognized in the early phase of the condition and often lead to delayed diagnosis. Physical activity has been a great help to patients which also reduces the risk of cardiovascular diseases, obesity, colon and breast cancer. Also improves musculoskeletal health and reduces symptoms of depression too. The awareness about physical activity in patients like A.S is the key objection encountered by wellness care professionals and policymakers even

the guidelines among with rheumatic conditions are low and the efficacy of population-based approaches to physical activity (PA) promotion in reaching individuals with AS is doubtful.^[6,7] The awareness regarding physiotherapy will lead the patient to adopt correct habits, increase knowledge, self-efficacy, and also make them aware of the importance of approaching physiotherapists, and how exercises with help them reduce pain, improve spinal mobility, functional ability, maintain adequate positioning with alternating periods of rest and activity or work, postural re-education, improve quality of life and overall health status.^[8] The aim of the study was to check the awareness in Ankylosing Spondylitis patients regarding the role of a Physiotherapist. The frequency of patients with Ankylosing Spondylitis to Physiotherapy department is less. To know the reason behind less consultation and follows up in patients with Ankylosing Spondylitis to Physiotherapeutic intervention. To conduct educational programs regarding the importance of physiotherapy, the present study is going to be helpful to assess the knowledge about their health status.

MATERIAL AND METHODOLOGY

This survey study comprised of a formulated questionnaire which consisted of questions regarding the symptoms, QoL (Quality of Life), awareness about role of Physiotherapy. The sample size was calculated by statistical method by assuming 50% prevalence of awareness about role of physiotherapy in ankylosing spondylitis patients, with acceptable difference of 8.5 percent at 95% confidence level, the minimum required sample size calculated was 133. The sample size was calculated using WinPepi Version 11.65. The sample collected were 142. The patients included in the study were HLA-B27 antigen test positive between the age group of 18-70, both genders of which 133 males and 9 females participated. A purposive sample study design was used while selecting the

patients. The patients excluded were individuals with other major systemic conditions and those that were unwilling to participate. Patients were explained the aim and purpose of the study, online informed consent was taken from the individuals fulfilling inclusion criteria. After receiving clearance from the ethical committee of Dr. D.Y. Patil College of Physiotherapy. A Validated self-made questionnaire was formulated, which was composed of 20 closed-ended and the one open-ended question was related to consulting a physiotherapist and for assessing and the reason for not consulting a physiotherapist in patients with Ankylosing Spondylitis, then, Online Google Forms were circulated among the patients through social media platform in English, Hindi, and Marathi language. The questionnaire included questions regarding awareness about the

role of physiotherapy. The individuals were instructed to submit the forms. Then individual google forms were screened by us.

Statistical Analysis

The spreadsheet containing the data was exported to Microsoft Excel from Online Google Forms and was analysed using descriptive statistics. Then data of 142 samples were used to calculate the frequency by using Epi Info™ Version 7.2.5.0 (statistical software) for each question. We also calculated Exact 95% Upper Confidence Level and Exact 95% Lower Confidence Level. The questionnaire included a closed-ended question in No, Not Sure, Yes format, and one open-ended question. Open-ended responses were analysed manually.

RESULT

TABLE NO.1

T1	Frequency	Percent	Cum. Percent	Exact 95% LCL	Exact 95% UCL
No	4	2.82%	2.82%	0.77%	7.06%
Not Sure	3	2.11%	4.93%	0.44%	6.05%
Yes	135	95.07%	100.00%	90.11%	98.00%
TOTAL	142	100.00%	100.00%		
T2	Frequency	Percent	Cum. Percent	Exact 95% LCL	Exact 95% UCL
No	55	38.73%	38.73%	30.68%	47.26%
Not Sure	24	16.90%	55.63%	11.14%	24.10%
Yes	63	44.37%	100.00%	36.04%	52.93%
TOTAL	142	100.00%	100.00%		
T3	Frequency	Percent	Cum. Percent	Exact 95% LCL	Exact 95% UCL
No	35	24.65%	24.65%	17.81%	32.58%
Not Sure	7	4.93%	29.58%	2.00%	9.89%
Yes	100	70.42%	100.00%	62.19%	77.78%
TOTAL	142	100.00%	100.00%		
T4	Frequency	Percent	Cum. Percent	Exact 95% LCL	Exact 95% UCL
No	33	23.24%	23.24%	16.57%	31.06%
Not Sure	7	4.93%	28.17%	2.00%	9.89%
Yes	102	71.83%	100.00%	63.67%	79.05%
TOTAL	142	100.00%	100.00%		
T5	Frequency	Percent	Cum. Percent	Exact 95% LCL	Exact 95% UCL
No	6	4.23%	4.23%	1.57%	8.97%
Not Sure	7	4.93%	9.15%	2.00%	9.89%
Yes	129	90.85%	100.00%	84.85%	95.03%
TOTAL	142	100.00%	100.00%		
T6	Frequency	Percent	Cum. Percent	Exact 95% LCL	Exact 95% UCL
No	56	39.44%	39.44%	31.35%	47.98%
Not Sure	6	4.23%	43.66%	1.57%	8.97%
Yes	80	56.34%	100.00%	47.77%	64.64%
TOTAL	142	100.00%	100.00%		
T7	Frequency	Percent	Cum. Percent	Exact 95% LCL	Exact 95% UCL
No	7	4.93%	4.93%	2.00%	9.89%
Not Sure	6	4.23%	9.15%	1.57%	8.97%
Yes	129	90.85%	100.00%	84.85%	95.03%
TOTAL	142	100.00%	100.00%		

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Table no 1 Continued...

T8	Frequency	Percent	Cum. Percent	Exact 95% LCL	Exact 95% UCL
No	37	26.06%	26.06%	19.06%	34.08%
Not Sure	15	10.56%	36.62%	6.03%	16.82%
Yes	90	63.38%	100.00%	54.89%	71.30%
T9	Frequency	Percent	Cum. Percent	Exact 95% LCL	Exact 95% UCL
No	47	33.10%	33.10%	25.44%	41.48%
Not Sure	45	31.69%	64.79%	24.14%	40.02%
Yes	50	35.21%	100.00%	27.39%	43.66%
TOTAL	142	100.00%	100.00%		
T10	Frequency	Percent	Cum. Percent	Exact 95% LCL	Exact 95% UCL
No	16	11.27%	11.27%	6.58%	17.65%
Not Sure	33	23.24%	34.51%	16.57%	31.06%
Yes	93	65.49%	100.00%	57.06%	73.26%
TOTAL	142	100.00%	100.00%		

TABLE NO.2

T11	Frequency	Percent	Cum. Percent	Exact 95% LCL	Exact 95% UCL
No	26	18.31%	18.31%	12.32%	25.67%
Not Sure	28	19.72%	38.03%	13.52%	27.22%
Yes	88	61.97%	100.00%	53.45%	69.98%
TOTAL	142	100.00%	100.00%		
T12	Frequency	Percent	Cum. Percent	Exact 95% LCL	Exact 95% UCL
No	14	9.86%	9.86%	5.50%	15.99%
Not Sure	28	19.72%	29.58%	13.52%	27.22%
Yes	100	70.42%	100.00%	62.19%	77.78%
TOTAL	142	100.00%	100.00%		
T13	Frequency	Percent	Cum. Percent	Exact 95% LCL	Exact 95% UCL
No	10	7.04%	7.04%	3.43%	12.57%
Not Sure	20	14.08%	21.13%	8.82%	20.91%
Yes	112	78.87%	100.00%	71.23%	85.27%
TOTAL	142	100.00%	100.00%		
T14	Frequency	Percent	Cum. Percent	Exact 95% LCL	Exact 95% UCL
No	23	16.20%	16.20%	10.55%	23.31%
Not Sure	32	22.54%	38.73%	15.95%	30.30%
Yes	87	61.27%	100.00%	52.74%	69.32%
TOTAL	142	100.00%	100.00%		
T15	Frequency	Percent	Cum. Percent	Exact 95% LCL	Exact 95% UCL
No	51	35.92%	35.92%	28.04%	44.39%
Not Sure	31	21.83%	57.75%	15.34%	29.53%
Yes	60	42.25%	100.00%	34.02%	50.82%
TOTAL	142	100.00%	100.00%		
T16	Frequency	Percent	Cum. Percent	Exact 95% LCL	Exact 95% UCL
No	28	19.72%	19.72%	13.52%	27.22%
Not Sure	51	35.92%	55.63%	28.04%	44.39%
Yes	63	44.37%	100.00%	36.04%	52.93%
TOTAL	142	100.00%	100.00%		
T17	Frequency	Percent	Cum. Percent	Exact 95% LCL	Exact 95% UCL
No	29	20.42%	20.42%	14.12%	28.00%
Not Sure	19	13.38%	33.80%	8.25%	20.10%
Yes	94	66.20%	100.00%	57.79%	73.91%
TOTAL	142	100.00%	100.00%		
T18	Frequency	Percent	Cum. Percent	Exact 95% LCL	Exact 95% UCL
No	5	3.52%	3.52%	1.15%	8.03%
Not Sure	13	9.15%	12.68%	4.97%	15.15%
Yes	124	87.32%	100.00%	80.71%	92.31%
TOTAL	142	100.00%	100.00%		
T19	Frequency	Percent	Cum. Percent	Exact 95% LCL	Exact 95% UCL
No	67	47.18%	47.18%	38.76%	55.73%
Not Sure	29	20.42%	67.61%	14.12%	28.00%
Yes	46	32.39%	100.00%	24.79%	40.75%
TOTAL	142	100.00%	100.00%		
T20	Frequency	Percent	Cum. Percent	Exact 95% LCL	Exact 95% UCL
No	18	12.68%	12.68%	7.69%	19.29%
Not Sure	29	20.42%	33.10%	14.12%	28.00%
Yes	95	66.90%	100.00%	58.52%	74.56%
TOTAL	142	100.00%	100.00%		

In the population of 142 who were included in the study, (TABLE NO.1) is based on the distribution of responses from T1-T10. (Table no. 1.T1) 95.07% (n=135)

had knowledge about their on-going condition, 2.82% (n=4) were unaware and 2.11% (n=3) were not sure. (Table no.1.T.2) 44.37% (n=63) of population thinks medical management only is helpful in Ankylosing Spondylitis, 38.73% (n=55) population were unwitting about the adjunct therapies with medical management and 16.90% (n=24) were doubtful. (Table no.1.T3) 70.42% (n=100) were frustrated because of their condition, 24.65% (n=35) were not experiencing any discomfort and 4.93% (n=7) were uncertain.(Table no.1.T4) 71.83% (n=102) of population experienced morning stiffness, 23.24% (n=33) did not and 4.93% (n=7) were neutral. (Table no.1.T5) 90.85% (n=129) of populations thinks checking posture from time to time is important, 4.23 (n=6) thinks its not important and 4.93% (n=7) were not clear. (Table no.1.T6) 56.34% (n=80) of population thinks essential to exercise on daily basis, 39.44%(n=56) thinks it's insignificant and 4.23% (n=6) were unsure. (Table no.1.T7) 90.85% (n=129) of the population thinks it's necessary to maintain daily exercise capacity, 4.93% (n=7) thinks its not needful and 4.23% (n=6) were unclear. (Table no.1.T8) 63.38% (n=90) of the population knows that when they should exercise and when they should not, 26.06% (n=37) is unknown and 10.56% (n=15) is unsure.(Table no.1.T9) 35.21% (n=50) thinks home exercise solitary is enough, 33.10% (n=47) disregard this and 31.69% (n=45) are not sure. (Table no.1.T10) 65.49% (n=93) of the population knows that physiotherapist helps them cope up with their movement and flexibility, 11.27% (n=16) disagree and 23.24% (n =33) is not sure .

(TABLE NO. 2) signifies distribution of responses form T11-T20. (Table no.2.T11) 61.97% (n=88) thinks stretching only once is enough in their condition, 18.31% (n=26) of the population thinks its important to do stretching repeatedly and frequently and 19.72% (n=28) is unsure. (Table no.2.T12) 70.42% (n=100) of the population know that muscle

training is important to maintain posture, 9.86% (n=14) don't think it's necessary and 19.72% (n=28) is uncertain .(Table no.2.T13) 78.87% (n=112) of the population knows back muscle strengthening is important for their condition, 7.04% (n=10) thinks its not necessary and 14.08% (n=20) is not sure .(Table no.2.T14) 61.27% (n=87) of the population knows that physiotherapy treats and improves breathing capacity, 16.20% (n=23) don't consider the same and 22.54% (n=32) is not sure. (Table no.2.T15) 42.25% (n=60) of the population is aware that pool therapy is helpful in their condition, 35.92% (n=51) don't think it's helpful and 21.83% (n=31) are uncertain. (Table no.2.T16) 43.37% (n=63) of the population thinks that it's okay to use a rotational chair while working on the desk, 19.72% (n=28) of the population thinks that they should not use rotational and 35.92% (n=51) are not sure. (Table no.2.T17) 66.20% (n=94) of the population thinks sleeping habits also plays important role in preventing deformities, 20.42% (n=29) don't think the same and 13.38% (n=19) is not sure. (Table no. 2.T18) 87.32% (n=124) of the population knows swimming and cycling are helpful in their condition, 3.52% (n=5) don't think the same and 9.15% (n=13) are unsure. (Table no.2.T19) 32.39% (n=46) of the population thinks that physiotherapy makes no difference in their condition and helps to maintain their joint mobility, 47.18% (n=67) thinks it does make a difference and 20.42% (n=29) are not sure. (Table no.2.T20) 66.90% (n=95) thinks that they will consult a physiotherapist, 12.68% (n=18) disagree with this and 20.42% (n=29) are not sure.

DISCUSSION

A Physical Therapist can show a person living with Ankylosing Spondylitis how to cope with the condition by incorporating physical activity and fitness exercises with a clinical approach into their daily life, Physical Therapy offers a clinical pathway for people with ankylosing spondylitis to stay active and learn

appropriate exercise techniques. An essential role of Physiotherapy is learning to follow up exercises at home regularly.

In the given questions we concluded that the majority of the smartphone-using population know about their condition, which shows a positive trend that the patient is aware of the condition they have (Table no.1.T1). In conditions like Ankylosing Spondylitis, exercise plays an important role thus Medication along with Physiotherapy yields greater benefit. According to a study in 2008 by Mazen Elyan et.al which also supports that regardless of the new approaches in medical management Physical Therapy plays a key role in the management of the patients with Ankylosing Spondylitis.^[9] And as it is a lifelong condition maintaining physical activity, joint mobility is important, this is proved in the study done in November 2015 by Tom O Dwyer et.al.^[6] Yet, only 38.73% population thinks that medication alone is not a solution (Table no. 1.T2). The majority of patients think it's important to regularly check the posture (Table no.1.T5), and this is true because the change in their postures like thoracic kyphosis, loss of lumbar lordosis, forward head, and protuberant abdomen occurs in the patient in later stages.^[1,10] Exercising on daily basis is important to maintain physical activity and only 53.64% population is aware of this (Table no.1.T6). Orientation and educating the remaining population about the importance of physiotherapy and exercise are necessary. 26.06% population is unaware and 10.56% population is not able to differentiate when to exercise and when it's necessary to take a rest (Table no.1.T8). Proper consultation by a Physiotherapist should be done before starting or doing exercise during the inflammatory stage. The patient may have inflammation and pain during this period therefore selecting the appropriate type of exercise and adequate rest is essential and important for them to know. Thus the 'need', to create awareness.

In later stages, the patient with ankylosing spondylitis may develop

restrictive chest wall movement which moderately reduces vital capacity and total lung capacity. 16.20% population is not known that physiotherapy treats them to improve their breathing capacity and 22.54% were confused. So, it's beneficial to do breathing exercises in the initial stage as a preventive measure.^[11] (Table no.2.T14)

Only 44.37% of the population are aware that Aqua/ Hydrotherapy- pool therapy is helpful (Table no.2.T15). Pool therapy helps to reduce pain and most significantly it improves mobility and helps to stay active.^[13] Thus, awareness is must be needed in patients regarding pool therapy.

19.72% of the population is aware that ergonomic corrections and implications are mandatory to be followed in daily life activities (Table no.2.T16). In terms of the usage of in-office mobile revolving chairs, should not be used as it limits the rotation of the spine, which decreases the movement of the spine which may lead to early ankylosis of the spine.^[10] Hence we conclude that ergonomic advice is important and more focus should be given on awareness related to ergonomic advice in patients with ankylosing spondylitis.

66.20% of people are aware that sleeping habits and lying positions also play an important role in the prevention of the degenerative prospects of their condition (Table no.2.T17). Traylor crafted lying and sleeping positions based on the spinal assessments aiming to correct or unload and provide relaxation to the ankylosing segments is done by the Physiotherapist.^[10]

The majority of the population is knowledgeable that cycling, swimming are excellent means of full-body exercise that have an impact on the cardiovascular, respiratory and musculoskeletal system^[10] According to the study done in August 2006 by Gonca Ince et.al showed, Physiotherapy offers multimodal exercise programs which include aerobic, stretching and pulmonary exercises which improve spinal mobility, work capacity, and chest-expansion.^[14]

Approximately 32.39% of the population thinks physiotherapy has no

impact on their ongoing condition. This population needs proper guidance and education about Physiotherapy and its part in the management of their condition. 20.42% of the population that is not sure needs appropriate counselling to clarify their doubts and wrong beliefs regarding Physiotherapy (Table no. 2.T19).

A response regarding the subjects to consult a physiotherapist was taken as opinion feedback in which out of 142 only (n= 30) responded, 23.33% said that it's not beneficial, 23% of the population had interaction with a physiotherapist and they felt that yoga or gym and self-assisted exercise are enough, 23.3% said it's was expensive, 10% had time-related limitations, 20% populations had misconceptions Physiotherapist (Table no.2).

Patients need to understand that consulting a Physiotherapist does not mean they should be going to them on daily basis but having an occasional visit and doing the advised exercises is important. Using social media for exercise is a good option but before that patient should have a piece of proper knowledge about their posture and strength and capacity.

The patients who don't consult a physiotherapist due to economic issues, time limitations, unable to reach a physiotherapist, and personal preference need to be explained that doing gym and yoga is good but doing that with the consultation of the physiotherapist is important. Patients should understand that ankylosing spondylitis is a lifelong condition as there are phases of this condition the duration, type, and protocol are changed by a Physiotherapist by their ongoing phase and that should be followed by the patient.

The study was limited to online survey so it did not reach out to the uneducated and only Techno-savvy population was able to participate. Future scope of the study is, study can be done to create awareness in the Ankylosing Spondylitis support groups through the use of media, articles, health camps, and taking

lectures in specific support groups should be regularly carried out, to spread knowledge about the importance of physiotherapy in ankylosing spondylitis patients.

CONCLUSION

Thus from the study we came to a conclusion that 61.73% of the population was aware of their ongoing condition and they know about prospects of Physiotherapy. 38.27% of the population was partially aware regarding the role of physiotherapy for their condition - Ankylosing Spondylitis. After reviewing the responses we also concluded that ,though the importance of exercise is acknowledged by the patients there is a need to emphasize on guided and customized exercises to be done in their individualistic condition and there are misconceptions and myths in the patient community which needs to be clarified, cancelled and oriented. There is also a need to study in future related to this myths and misconceptions related to Physiotherapy.

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REFERENCES

1. Firestein GS, Budd RC, Gabriel SE, McInnes IB, O'Dell JR. Kelley and Firestein's textbook of rheumatology e-book. Elsevier Health Sciences;2016 Jun 21.
2. J. Larry Jameson, Anthony S. Fauci, Dennis L. Kasper, Stephen L. Hauser, J. Larry Jameson, Dan Longo, Joseph Loscalzo. Harrison's Principles of Internal Medicine. Vol 2. 20th Edition. McGraw-Hill Professional; 2018.
3. Dean LE, Jones GT, MacDonald AG, Downham C, Sturrock RD, Macfarlane GJ. Global prevalence of ankylosing

- spondylitis. *Rheumatology*. 2014 Apr 1;53(4):650-7.
4. Chen CH, Chen HA, Liao HT, et.al. The clinical usefulness of ESR, CRP, and disease duration in ankylosing spondylitis: the product of these acute-phase reactants and disease duration is associated with a patient's poor physical mobility. *Rheumatology international*. 2015 Jul 1;35(7):1263-7.
 5. Sweeney S, Taylor G, Calin A. The effect of a home-based exercise intervention package on outcome in ankylosing spondylitis: a randomized controlled trial. *The journal of Rheumatology*. 2002 Apr 1;29(4):763-6.
 6. O'Dwyer T, O'Shea F, Wilson F. Decreased physical activity and cardiorespiratory fitness in adults with ankylosing spondylitis: a cross-sectional controlled study. *Rheumatology international*. 2015 Nov; 35(11):1863-72.
 7. O'Dwyer T, Monaghan A, Moran J, O'Shea F, Wilson F. Behaviour change intervention increases physical activity, spinal mobility and quality of life in adults with ankylosing spondylitis: a randomized trial. *Journal of physiotherapy*. 2017 Jan 1;63(1):30-9.
 8. Nava T. Physiotherapy rehabilitation in patients with ankylosing spondylitis. *Beyond Rheumatology*. 2019 Dec 20;1(2):37-46.
 9. Elyan M, Khan MA. Does physical therapy still have a place in the treatment of ankylosing spondylitis?. *Current opinion in rheumatology*. 2008 May 1;20(3):282-6.
 10. Atkinson K, Coutts FJ, Hassenkamp AM, MCSP M. Physiotherapy in orthopaedics: a problem-solving approach. *Elsevier Health Sciences*; 2005 May 13.
 11. Berdal G, Halvorsen S, van der Heijde D, Mowe M, Dagfinrud H. Restrictive pulmonary function is more prevalent in patients with ankylosing spondylitis than in matched population controls and is associated with impaired spinal mobility: a comparative study. *Arthritis research & therapy*. 2012 Feb;14(1):1-0.
 12. Marques ML, Ferreira RJ, Machado PM, Marques A, da Silva JA, Ndosi M. Educational needs in people with ankylosing spondylitis and psoriatic arthritis: A cross-sectional study. *Clinical and experimental rheumatology*. 2019.
 13. Correia MS, Lopes AA, Silva F, Silva D, de Castro MP. Effect of an Aquatic Therapy Program on Pain and Spinal Mobility in Ankylosing Spondylitis. *The Journal of Aquatic Physical Therapy*. 2017 Dec 1;25(2):9-15.
 14. Ince G, Sarpel T, Durgun B, Erdogan S. Effects of a multimodal exercise program for people with ankylosing spondylitis. *Physical therapy*. 2006 Jul 1;86(7):924-35.
 15. Halvorsen S, Vøllestad NK, Fongen C, Provan SA, Semb AG, Hagen KB, Dagfinrud H. Physical fitness in patients with ankylosing spondylitis: comparison with population controls. *Physical therapy*. 2012 Feb 1;92(2):298-309.
 16. Zochling J. Measures of symptoms and disease status in ankylosing spondylitis: Ankylosing Spondylitis Disease Activity Score (ASDAS), Ankylosing Spondylitis Quality of Life Scale (ASQoL), Bath Ankylosing Spondylitis Disease Activity Index (BASDAI), Bath Ankylosing Spondylitis Functional Index (BASFI), Bath Ankylosing Spondylitis Global Score (BAS-G), Bath Ankylosing Spondylitis Metrology Index (BASMI), Dougados Functional Index (DFI), and Health Assessment Questionnaire for the Spondylarthropathies (HAQ-S). *Arthritis care & research*. 2011 Nov;63(S11): S47-58
 17. Khuman RP. Long-term effectiveness of physiotherapy in a case of ankylosing spondylitis. *Physiotherapy-The Journal of Indian Association of Physiotherapists*. 2018 Jul 1;12(2):88.
 18. Karapolat HA, Eyigor S, Zoghi ME, Akkoc YE, Kirazli YE, Keser GÖ. Are swimming or aerobic exercise better than conventional exercise in ankylosing spondylitis patients? A randomized controlled study. *Eur J Phys Rehabil Med*. 2009 Dec 1;45(4):449-57.
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