

Exercise in Ankylosing Spondylitis: the Cornerstone Necessitating Further Reinforcement

Mingqiang Guan, Zhihan Li, Jian Wang, Zhigang Zhu, Liang Zhao, Jun Xiao, Zhanjun Shi

Department of Orthopedic Surgery, Nanfang Hospital, Southern Medical University, Guangzhou, Guangdong 510515, China. hipknee66@163.com

Background: Non-pharmacotherapy is essential in the management of ankylosing spondylitis (AS) while regular exercise is recommended as the cornerstone of non-pharmacotherapy. This study aimed to assess the current status of exercise in AS patients' daily life and to analyze the patients' perception to exercise. **Methods:** Questionnaires regarding exercise in AS management, Bath Ankylosing Spondylitis Disease Activity Index (BASDAI), Bath Ankylosing Spondylitis Functional Index (BASFI), total back pain score (TBPS) and the Exercise Benefits and Barriers Scale (EBBS) were administered to AS patients. Data were then collected and analyzed. **Results:** 140 patients participated in this study. 31.4% had not got exercise recommendations. 20.7% had just got unspecific recommendations without exercise type in detail. Swimming was the most commonly recommended exercise by clinicians (23.6%) while the most common exercise actually performed by AS patients were home stretching (12.1%) and walking (5.9%). Only 27.9% insisted on exercise at least 3 times per week. "Higher levels of physical fitness" (53.0%) was most frequently reported benefit while the most frequently reported barrier to exercise was "it took me too much time" (50.7%). Patients insisting on exercise at least 3 times per week showed better functional status than patients with less frequency of exercise (BASFI; $P=0.009$). No statistical differences were detected in BASDAI and TBPS between the two groups. **Conclusions:** Significantly high percentage of AS patients had not got appropriate exercise recommendations and most of the patients failed to insist on exercise sufficiently. AS patients insisting on exercise at least 3 times each week have better functional status than patients with less frequency of exercise.

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1. Introduction

AS is a chronic inflammatory disease which may not only lead to significant impairment on physical function but also on psychological status and comprehensive quality of life. Despite substantial progress in pharmacotherapy, the recommendations developed under the collaboration of the Assessment in SpondyloArthritis international Society (ASAS) and the European League Against Rheumatism (EULAR) have consistently stressed that exercise is the indispensable component in comprehensive AS management (Zochling, 2006; Braun, 2011). Substantial evidence in current literature has confirmed the effect of exercise in relieving physical symptom and improving physical function, psychological status and quality of life for AS patients (Karapolat, 2008; Durmus, 2009; Gyurcsik, 2012; Yigit, 2013). In addition, the combination of exercise and pharmacotherapy may be helpful to decrease drug consumption and thus reduce related adverse effects (Tishler, 1995). Home-based exercise, supervised exercise, group exercise and spa-based exercise are all frequently reported with certain benefit. Although there has been no consensus on which specific type of exercise with

what frequency is optimal, adherence is thought to be the most important factor for AS patients to benefit from exercise (Santos, 1998; Aytekin, 2012). So far, most reports mainly focused on the effect of certain exercise for AS patients who had insisted on the clinicians' prescription. Studies investigating the real status of exercise in AS patients' daily life remain scarce.

In the present study, we aimed to investigate the current status of exercise in AS patients' daily life and to analyze AS patients' perception to regular exercise.

2. Material and Methods

AS Patients

Patients attending the AS outpatient of our hospital were recruited during the study period. All of the patients were at least 18 years old and should have a confirmed diagnosis of AS according to modified New York classification criteria (van der Linden, 1984). The local ethics committee approved the study and informed consent was obtained from all participants.

Demographic and disease characteristics

A number of demographic variables were collected, such as age, sex, level of education and status of employment. Disease characteristics of the study participants were also examined. These included disease duration, BASDAI (Garrett, 1994), BASFI (Calin, 1994) and TBPS (assessed using a VAS scale).

Questionnaire about exercise

This questionnaire was designed on the basis of exercise interventions in the literature to assess the experience of exercise during the whole course of the AS disease and included: (1) types of exercise recommended by clinicians, (2) types of exercise actually performed in daily life, (3) the frequency of participation (times per week).

Exercise Benefits/Barriers Scale (EBBS)

EBBS is a validated tool developed by Sechrist and colleagues concerning the benefits of exercise and barriers to exercise (Sechrist, 1987). There are 29 benefits items in 5 categories: physical performance, preventive health, psychological outlook, social interaction, and life enhancement. It also contains 14 barriers items in 3 categories: physical exertion, time expenditure, and exercise milieu.

Statistical analysis

Statistical analyses were performed with SPSS 16.0 for Windows. Chi-squared test was used to compare the adherence rate of exercise. Mann-Whitney U-test was used to compare the continuous variables in respect of disease characteristics. The level of significance was set at $P < 0.05$.

3. Results

One hundred and forty patients with AS completed the questionnaires. The mean age was 28.6 years, 72.1% were men, and mean disease duration was 9.8 years. Table 1 provides further detail of the

Characteristics	Mean (SD) or n (%)
Mean age, yrs (SD)	28.6(6.9)
Male, n (%)	101(72.1)
Mean AS duration, yrs (SD)	9.8(7.4)
Education ≥ 9 yrs, n (%)	110(78.6)
Employed, n (%)	102(72.9)
BASDAI(SD)	4.3(1.8)
BASFI(SD)	3.9(3.4)
TBPS(SD)	4.6(2.3)

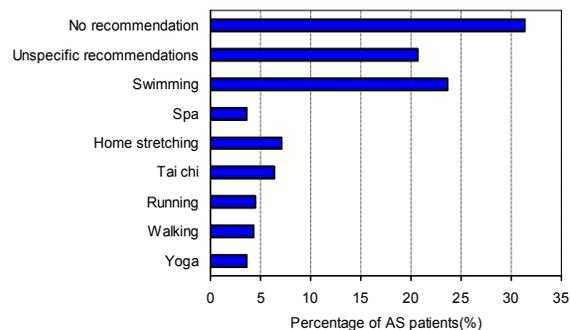
demographic and disease characteristics of the study participants.

Profiles of exercise recommendations

31.4% of the patients reported that they had not got exercise recommendations from the clinicians. 20.7% of the patients had only got unspecific recommendations without exercise type in

detail. Swimming was the most commonly recommended type of exercise by clinicians and was reported in 23.6% (Figure 1).

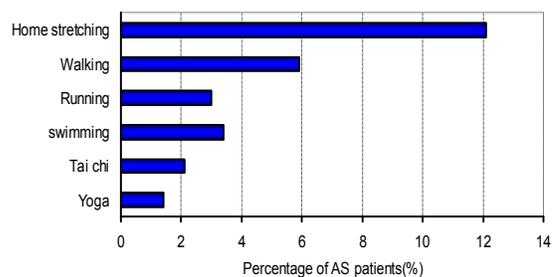
Figure 1. Status of exercise recommendations for AS patients.



Profiles of exercise actually performed in daily life

Only 27.9% of the patients had insisted on the exercise at least 3 times per week in daily life. The most common exercise actually performed by AS patients were home stretching (12.1%) followed by walking (5.9%) as shown in Figure 2.

Figure 2. Distribution of exercise actually performed by AS patients in daily life.



Adherence rate of exercise in three groups of AS patients, namely patients with specific recommendations of exercise type, patients with unspecific recommendations without exercise type in detail and patients without any recommendations were 35.8%, 17.2% and 22.7% respectively. Patients with specific recommendations of exercise type were more likely to insist on exercise (35.8%) although the difference had not reached statistical level ($P = 0.116$).

Perceived benefits of exercise

Overall, the most frequently reported benefits of exercise were "Higher levels of physical fitness" (53.0%) and "Improved overall body functioning" (50.7%). The least perceived benefits were "Exercising will keep me from having high

blood pressure” (3.7%) and “Exercise improves cardiovascular functioning” (3.2%)

Comparison in disease characteristics

Patients insisting on exercise at least 3 times per week showed better functional status than patients with less frequency of exercise (BASFI; $P=0.009$). No statistical differences were detected in BASDAI ($p=0.786$) and TBPS ($p=0.175$) between the two groups.

Perceived barriers to exercise

The most frequently reported barriers to exercise were “it took me too much time” (50.7%), “exercise is tiring (48.6%) and “exercise is hard work” (45.7%) as shown in Figure 3.

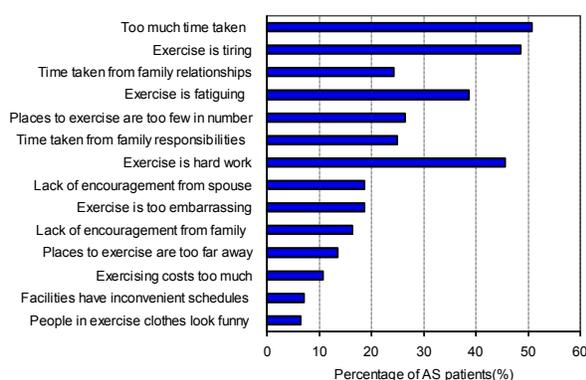


Figure 3. Distribution of barriers to exercise.

4. Discussions

Studies focusing on the real status of exercise in daily life of AS patients have been quite limited (Sundstrom, 2002; Dagfinrud, 2011). These limited available reports indicated that only quite small proportion of AS patients actually insisted on regular exercise (Dubey, 2008), even less than a quarter (Falkenbach, 2003). To date, the highest proportion had been reported in a Canadian study (Passalent, 2010). As high as 57.4% of the 61 AS patients had adhered to certain exercise at least 3 times per week. As the authors had pointed out, it might be due to their participants were representative of patients living in urban centers with more access to exercise programs, community centers, and expertise that might not be available in more rural and remote area. In the developing countries, AS patients may have much worse access to these factors mentioned above. Only 27.9% of patients in our cohort had actually insisted on exercise at least 3 times per week. The most frequently reported barrier to exercise was “it took me too much time” which was inconsistent with the Canadian report (Passalent, 2010) but consistent with a Turkish report (Yigit, 2013). One explanation may be that AS patients in

developing countries might need more time to work for survival. Another explanation may be the patients’ ignorance of exercise due to the insufficient patient education. It should be noted that as high as 31.4% of the patients had never got any exercise recommendations while 20.7% of the patients had just got unspecific recommendations without exercise type in detail. This result indicates that still more concern on the exercise is required from the clinicians, even though exercise has long been regarded as the cornerstone in AS management. An encouraging finding was that, although they had not got any recommendation or had just got unspecific recommendations without exercise type in detail, 22.7% and 17.2% of these patients still adhered to certain types of exercise respectively. Most of them reported that it was certain kind of AS-specific social networks that helped them in realizing the importance of exercise and providing them with certain exercise types. This indicated that patients associations, even just limited on internet, may be helpful in certain extent (Cooksey, 2012). Home-based exercise has been consistently reported to be effective in pain relief, functional improvement and even in quality of life and depression for AS patients (Lim, 2005; Durmus, 2009; Aytekin, 2012). It often gets higher adherence rate due to the characteristics of convenience and cost-effectiveness (Karapolat, 2008). Actually, all of the reported exercise was home-based in our cohort. No supervised exercise was reported by AS patients in the present study and this may represent a room for reinforcement in exercise for AS management. It has been suggested that the patient’s individual factors, for example disease characteristics, should be taken into consideration when we recommended exercise strategies to AS patients. Moreover, it is advisable to recommended evidence-based exercise types to AS patients, just like pharmacotherapy for AS. Swimming is the most often recommended exercise type in our cohort. However, the available reports about swimming in AS management is actually quite scarce (Karapolat, 2009). Spa is more commonly reported but includes far more strategies than swimming, such as balneotherapy (bathing in mineral water), hydrotherapy (immersion of the body in thermal water), massages and mud applications (van Tubergen, 2001; Van Tubergen, 2002; van Tubergen and Hidding, 2002; Ciprian, 2013). Accordingly, the treatment effect of spa is not only from exercise but also from combination of multiple factors, such as heat and mineral substance. As a matter of fact, no one in our cohort had ever participated in spa. Although swimming seems simpler and less expensive than spa, it may be still quite unfeasible for most of AS patients in china. As a temperate country,

the climate in most areas keeps too cold to swim in room temperature in most time of year. Constant temperature swimming pool may be helpful but it is unavailable even in urban centers at present. Actually, it is home stretching and walking but not swimming that had been most commonly performed by the AS patients in daily life. This discrepancy between recommendation and reality implies that not only the individual disease characteristics but also the individual living atmosphere should also be taken into account when we plan exercise recommendations for AS patients. Certain kinds of exercise video, exercise progress chart, patient education booklet might be helpful in improving the self-reported levels of exercise. In the present study, merely 3.6% of patients had ever got exercise progress charts or patient education booklets and this may also imply a room of reinforcement.

Probably because the patients in our cohort were relatively young, the least perceived benefits were "Exercising will keep me from having high blood pressure" (3.7%) and "Exercise improves cardiovascular functioning" (3.2%). The most commonly reported benefit by patients in present study were "Higher levels of physical fitness" (53.0%) and "Improved overall body functioning" (50.7%). It is in some extent consistent with the statistically analyzing results. Patients insisting on exercise at least 3 times per week showed better functional status than patients with less frequency of exercise (BASFI; $P=0.009$). This is inconsistent with a previous study which concluded that AS patients with more disability exercised more than patients with less disability (Falkenbach, 2003). However, our result may actually reflect a cause-and-effect dilemma: if patients with better BASFI are more likely to participate in exercise, or if BASFI is improved by exercise? Further study is warranted in this aspect. Probably due to the dramatic fluctuation in symptom between AS remission and AS flare, no statistical differences were detected in aspects of BASDAI and TBPS. Patients in this study were representative of AS patients who attended the AS outpatient of our hospital and AS flare is often the reason that urged them to come to hospital. So far, the effect of exercise in preventing AS flare remains unclear.

In conclusion, although regarded as cornerstone in AS management, the majority of AS patients did not adhere to exercise sufficiently in their daily life. It is advisable for the clinicians to try to recommend evidence-based exercise to AS patients while take individual disease characteristics as well as individual living atmosphere into consideration.

Corresponding Author:

Dr. Zhanjun Shi
Department of Orthopedic Surgery,
Nanfang Hospital,
Southern Medical University,
Guangzhou, Guangdong Province, 510515, China
E-mail: hipknee66@163.com

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