

Sasan Fallahi (MD) ^{*1,2}
Ahmad Reza Jamshidi (MD) ²
Mahdi Mahmoudi (MD) ²
Mostafa Qorbani (MD) ^{3,4}

1. Internal Medicine Division, Baharloo Hospital, Tehran University of Medical Sciences, International Campus (TUMS-IC), Tehran, Iran.
2. Rheumatology Research Center, Shariati Hospital, Tehran University of Medical Sciences, Tehran, Iran.
3. Department of Public Health, Alborz University of Medical Sciences, Karaj, Iran.
4. Non-Communicable Diseases Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran.

*** Correspondence:**

Sasan Fallahi, Internal Medicine Division, Baharloo Hospital, Tehran University of Medical Sciences, Behdari Street, South Karegar Street, Tehran, Iran

E-mail: drsfallahi@gmail.com
Tel: 0098 21 55669300
Fax: 0098 21 55648189

Received: 7 Aug 2013
Revised: 14 Jan 2014
Accepted: 1 Feb 2014

Are clinical measures influenced by various ethnic origins in Iranian patients with ankylosing spondylitis? A pilot study

Abstract

Background: Ankylosing spondylitis (AS) may manifest with heterogeneous patterns according to ethnic origins. The purpose of this study was to describe the influence of various Iranian ethnic origins on clinical measures in patients with AS.

Methods: One hundred sixty-three AS patients diagnosed by modified New York 1984 criteria were enrolled consecutively. The patients were classified into Fars, Turk, Kord, Lor and other ethnic origins. Several clinical measures were described and compared between the ethnic origins.

Results: The highest and the lowest finger to floor distance was observed for Fars ethnicity (20.4±14.8) and other ethnicities (5.9±8.1), respectively (P=0.04). The frequency of severe decrease in cervical slope was significantly different between various ethnicities (P=0.025). The most and the least frequency of severe decrease in cervical slope was observed in Fars patients (61.3%) and other ethnicities (20%), respectively. The frequency of severe thoracic kyphosis was significantly dissimilar between various ethnicities (P=0.006). The most and the least frequency of severe increase in thoracic kyphosis was observed in Fars (68.8%) and Lor patients (25%), respectively. A significant relationship was seen only between other ethnicities and finger to floor distance, lateral lumbar flexion, chest expansion and BASDAI (P<0.05).

Conclusion: Clinical expression variations in AS disease might be influenced by various Iranian ethnic origins. A larger sample size with other Iranian ethnicities (Baluch, Arab, etc) is required to clear the definite relationship between Iranian ethnicities and clinical expression.

Keywords: Ankylosing spondylitis, Clinical features, Ethnicity, Iranian

Citation:

Fallahi S, Jamshidi AR, Mahmoudi M, Qorbani M. Are clinical measures influenced by various ethnic origins in Iranian patients with ankylosing spondylitis? A pilot study. *Caspian J Intern Med* 2014; 5(2): 59-64.

Caspian J Intern Med 2014; 5(2): 59-64

Ankylosing spondylitis (AS) as a member of the group of spondyloarthropathies is a chronic rheumatic disease with well-known articular and extra-articular manifestations, morbidities and complications (1-3). Spinal mobility restriction is one of the major complications in this disease which may lead to poor functional status, disability, withdrawal from work and increasing healthcare and non-health care costs (4). This complication can be assessed by Metrology indices including Bath AS Metrology Index (BASMI), finger to floor distance, chest expansion, Schober test, etc (5). Some factors such as HLA-B*27, smoking and educational level which influence clinical features have been widely studied in AS (6-10).

Blacks, whites and mixed-race people have been compared in previous studies and some differences have been found between them regarding clinical features (11). However, to our knowledge, the influence of various Iranian ethnicities on clinical patterns has not been studied. The aim of this study was to assess whether clinical measures in AS disease are influenced by various Iranian ethnicities including Fars, Turk, Kord, Lor, etc.

Methods

From May 2010 to March 2011, a total of 163 Iranian cases with AS aged 16 and older were consecutively enrolled in this study from three sources: 1) Iran AS Association (an association in which the members are AS patients with heterogeneous Iranian ethnic origins), 2) Iran Rheumatology Center and 3) Rheumatology Clinic in Shariati Hospital. Modified New-York criteria 1984 was used for diagnosis (12). The study protocol was compatible with Helsinki declaration (revised 2008) and approved by the Research Ethics Committee of Tehran University of Medical Sciences. A structured questionnaire was applied for gathering information. For providing uniformity, all metrology indices were measured by the same rheumatologist. The metrology indices included: BASMI score (from 0 -the best mobility to 10 -the worst mobility), finger to floor distance (cm), chest expansion (cm), modified Schober (cm), cervical rotation (degree), tragus to wall distance (cm), decrease in cervical slope, increase in thoracic kyphosis, decrease in lumbar lordosis. The Persian version of Bath AS disease activity index (BASDAI), Bath AS functional index (BASFI) and AS quality of life (ASQoL) questionnaires were used for assessing disease activity, functional status and quality of life, respectively (13-17). HLA-B*27 was evaluated by polymerase chain reaction with sequence specific primer (PCR-SSP).

For presenting continuous and categorical variables, mean \pm standard deviation (SD) and frequency (%) were used, respectively. For comparing continuous variables between ethnic origins, Kruskal-Wallis test was used. Chi-square where appropriate and Fisher's exact tests were used for comparing categorical variables. Simple linear regressions models were used for evaluating the relationship between Iranian ethnic origins (as independent variable) and each of the clinical measures (as dependent variable). Fars ethnic origin was considered as reference point. Dummy

variable was constructed for each of the Turk, Kord, Lor and other ethnic origins and all regressions were estimated regarding Fars ethnicity as reference point. P-value < 0.05 was considered significant.

Results

The ethnic origins of the 163 studied patients included: Fars 80 (49.1%), Turk 49 (30.1%), Kord 12 (7.4%), Lor 12 (7.4%) and other ethnicities, 10 (6.1%) individuals. Male to female ratio was 3.79. The age of patients was 37.74 ± 9.88 (range: 18-65) years and disease duration was 14.49 ± 8.47 (range: 1-44) years. The details of demographic and clinical features in all ethnic origins were shown and compared in tables 1 and 2. Finger to floor distance was significantly different between various ethnicities ($P=0.043$). The highest and the lowest finger to floor distance was observed for Fars ethnicity (20.438 ± 14.784) and other ethnicities (5.90 ± 8.0478), respectively (table 1).

A significant relationship was not seen between the ethnicities and tragus to wall distance or cervical rotation ($P>0.05$). However, the frequency of severe decrease in cervical slope was significantly different between various ethnicities ($P=0.025$). The most and the least frequency of severe decrease in cervical slope was observed in Fars patients (61.3%) and other ethnicities (20%), respectively (table 2). The frequency of total increase in thoracic kyphosis was not significantly different between the ethnicities ($P>0.05$). However, the frequency of severe thoracic kyphosis was significantly dissimilar between various ethnicities ($P=0.006$).

The most and the least frequency of severe increase in thoracic kyphosis was observed in Fars (68.8%) and Lor patients (25%), respectively. After Lor ethnicity, the other ethnicities had the lowest frequency for severe thoracic kyphosis (30%) (table 2). The results of relationship between various Iranian ethnic origins and some clinical measures were summarized in tables 3 and 4. A significant relationship was observed only between other ethnicities and finger to floor distance ($P=0.003$), lateral lumbar flexion ($P=0.03$), chest expansion ($P=0.03$) and BASDAI ($P=0.03$). No significant correlation was seen between Iranian ethnic origins and other clinical measures including intermalleolar distance, cervical rotation, tragus to wall distance, nocturnal back-pain, total back-pain, modified Schober and ASQoL ($P>0.05$).

Table 1. Comparing continuous clinical and demographic parameters between various Iranian ethnic origins

	Fars	Turk	Kord	Lor	Other ethnicities	P-value*
Age (year)	39.14±9.68	39.69±10.88	34.58±6.04	38.50±9.60	34.60±9.82	0.42
Age at symptom onset (year)	24.43±6.64	21.90±7.64	23.17±5.95	24.67±9.23	21.20±5.29	0.28
Age at diagnosis (year)	33.08±9.45	29.02±10.42	29.33±6.76	33.08±9.90	28.10±8.20	0.13
Disease duration (year)	14.83±8.66	14.82±9.18	12.50±6.86	13.83±6.03	13.40±8.53	0.98
Chest expansion (cm)	4.08±2.02	4.27±1.83	4.33±1.87	4.04±1.54	5.50±2.07	0.22
Finger to floor distance (cm)	20.44±14.78	17.88±13.59	15.17±17.11	16.67±13.93	5.90±8.05	0.04
Modified Schober (cm)	3.21±2.07	3.59±2.00	4.00±2.22	3.42±1.95	4.15±1.47	0.36
Tragus to wall (cm)	18.37±6.78	17.18±5.42	18.50±6.97	17.98±7.65	17.05±6.31	0.74
Cervical rotation (degree)	59.63±23.31	63.08±19.58	68.33±16.83	61.25±20.41	71.25±10.69	0.43
Intermalleolar distance (cm)	95.63±27.14	92.08±23.86	96.92±16.30	102.17±9.03	100.3±20.49	0.62
ASQoL (0-18)	7.95±5.27	8.14±5.33	8.50±5.73	8.75±4.58	6.60±6.02	0.87
BASMI (0-10)	4.22±1.89	3.85±1.87	3.43±2.10	3.78±1.78	3.08±1.63	0.18
BASDAI (0-10)	4.58±2.24	4.76±2.30	4.71±2.69	4.45±2.37	3.12±2.13	0.34
BASFI (0-10)	4.08±2.73	4.28±2.75	4.93±3.18	3.91±2.18	2.10±2.24	0.15
Pack-years of smoking	2.83±6.37	1.15±2.76	2.36±5.83	7.75±18.46	3.00±9.49	0.80
Lateral lumbar flexion (cm)	10.18±6.24	11.20±6.37	13.35±5.73	9.88±5.60	14.65±4.64	0.07

* All p-values were calculated by Kruskal-Wallis test.

Table 2. Frequency distribution of clinical and demographic parameters in various Iranian ethnic origins

	Fars N (%)	Turk N (%)	Kord N (%)	Lor N (%)	Others N (%)	P-value*
Female/male	15/65 (23)	12/37 (32)	4/8 (50)	2/10 (20)	1/9 (11)	> 0.05
IBD**	6 (7.5)	4 (8.2)	1 (8.3)	0	0	> 0.05
Uveitis	13 (16.3)	6 (12.2)	1 (8.3)	1 (8.3)	2 (20)	> 0.05
Arthritis	43 (53.8)	29 (59.2)	5 (41.7)	3 (25)	3 (30)	> 0.05
Family history of AS	21 (26.3)	20 (40.8)	2 (16.7)	4 (33.3)	3 (30)	> 0.05
Associated autoimmune disease	10 (12.5)	4 (8.2)	1 (8.3)	0	1 (10)	> 0.05
Enthesitis	53 (66.3)	31 (63.3)	10 (83.3)	10 (83.3)	5 (50)	> 0.05
Psoriasis	5 (6.3)	1 (2)	0	1 (8.3)	0	> 0.05
Non-steroidal Anti-inflammatory drugs	76 (95)	47 (95.9)	11 (91.7)	11 (91.7)	9 (90)	> 0.05
Number of DMARDs***	0	19 (28.3)	10 (20.4)	1 (8.3)	3 (30)	> 0.05
	1	42 (52.5)	20 (40.8)	5 (41.7)	4 (40)	
	2	19 (23.8)	19 (38.8)	6 (50)	4 (33.3)	
Infliximab, Ethanercept or both	12 (15)	4 (8.2)	2 (16.7)	1 (8.3)	0	> 0.05
	2	24 (30)	15 (30.6)	4 (33.3)	5 (41.7)	5 (50)
Sacroiliitis grading	3	35 (43.8)	23 (46.9)	8 (66.7)	6 (50)	> 0.05
	4	21 (26.2)	11 (22.4)	0	1 (8.3)	
	1	1 (10)	1 (10)	1 (8.3)	1 (10)	
Loss of lumbar lordosis	Severe	48 (60)	30 (61.2)	8 (66.7)	9 (75)	> 0.05
	Non-severe	32 (40)	19 (38.8)	4 (33.3)	3 (25)	
Thoracic Kyphosis	Severe	55 (68.8)	23 (46.9)	6 (50)	3 (25)	0.006
	Non-severe	25 (31.2)	26 (53.1)	6 (50)	9 (75)	
Decrease cervical slope	Severe	49 (61.3)	22 (44.9)	6 (50)	3 (25)	0.025
	Non-severe	31 (38.8)	27 (55.1)	6 (50)	9 (75)	
Educational level	Illiterate	0	1(2)	0	0	> 0.05
	Primary school	14 (17.5)	13 (26.5)	2 (16.7)	2 (16.7)	
	Secondary school	1 (1.3)	0	0	1 (8.3)	
	High school	29 (36.3)	21 (42.9)	5 (41.7)	4 (33.3)	
	University	36 (45)	14 (28.6)	5 (41.7)	5 (41.7)	
HLA-B27 positive	60 (75)	38 (77.6)	10 (83.3)	7 (58.3)	7 (70)	> 0.05

* All p-values were calculated by chi-square and needed Fisher's exact.

**Inflammatory bowel disease

***Disease modifying anti-rheumatic drugs

Table 3. Simple linear regressions with various Iranian ethnic origins as independent variable and BASFI, BASDAI, BASMI as dependent variables

	BASFI			BASDAI			BASMI		
	B	SE	P-value	B	SE	P-value	B	SE	P-value
Turk	0.18	0.42	0.66	0.21	0.49	0.68	-0.38	0.34	0.27
Kord	0.13	0.71	0.85	0.86	0.84	0.31	-0.79	0.58	0.18
Lor	-0.13	0.71	0.86	-0.17	0.84	0.84	-0.44	0.58	0.45
Others	-1.46	0.77	0.06	-1.98	0.91	0.03	-1.14	0.63	0.07

Fars ethnic origin was considered as reference point. Dummy variable was constructed for each of the Turk, Kord, Lor and other ethnic origins. All regression coefficients were estimated regarding Fars ethnicity as the reference point.

BASFI: Bath AS functional index, BASDAI: Bath AS disease activity index, BASMI: Bath AS metrology index, B: regression coefficient, SE: standard error

Table 4. Simple linear regressions with various Iranian ethnic origins as independent variable and chest expansion, finger to floor distance, lateral lumbar flexion as dependent variables

	Chest expansion			Finger to floor distance			Lateral lumbar flexion		
	B	SE	P-value	B	SE	P-value	B	SE	P-value
Turk	0.18	0.35	0.60	-2.55	2.59	0.33	1.02	1.11	0.36
Kord	0.25	0.60	0.67	-5.27	4.41	0.23	3.17	1.90	0.10
Lor	-0.04	0.60	0.95	-3.77	4.41	0.39	-0.31	1.90	0.87
Others	1.42	0.65	0.03	-14.54	4.78	0.003	4.47	2.05	0.03

Fars ethnic origin was considered as the reference point. Dummy variable was constructed for each of the Turk, Kord, Lor and other ethnic origins. All regression coefficients were estimated regarding Fars ethnicity as the reference point. B: regression coefficient, SE: standard error

Discussion

The results show that severe increase in thoracic kyphosis and severe decrease in cervical slope are most common in Fars and least common in other ethnic origins. The most and the least important limitations in lumbar flexion as revealed by finger to floor distance were observed in Fars and other ethnic origins, respectively. A significant relationship between other ethnicities and finger to floor distance, lateral lumbar flexion, chest expansion and BASDAI revealed that these measures are also probably influenced by Iranian ethnic origins (tables 3 and 4).

For those clinical measures in which the significant differences were not observed between various ethnicities, a trend toward more severe disease was seen in Fars patients compared with others. For instance, a trend towards poorer functional status (measured by BASFI) and worse spinal mobility (measured by BASMI) was observed in Fars ethnic origin versus other ethnic origins (table 3).

Direct comparisons between different ethnic groups in AS patients are not widely available. A nationwide study on Brazilian patients has revealed the association of ethnic background with clinical features of spondyloarthropathies. The African Brazilians had higher decrease in lateral lumbar flexion while the whites had higher occiput to wall distance. Their results showed poorer quality of life and worse disease for the African Brazilian patients compared to the white patients (11). A comparison between the Middle East Arabs (MEA) and South Asians (SA) has been carried out in a small study in Kuwait by Uppal et al. Family history was more common and peripheral arthritis was less common in MEA compared to SA. However, the clinical and functional measures were not reported in their survey (18). As an advantage, the current study is the first study to assess the effect of various Iranian ethnic origins on clinical measures in patients with AS. The small sample size may be the

limitation of our study. However, this survey was noted as a pilot study.

In conclusion, clinical measures might be influenced by various Iranian ethnic origins in AS patients. Therefore, an extended nationwide survey is suggested with inclusion of patients from all Iranian ethnic origins (Fars, Turk, Kurd, Lor, Baluch, Arab, etc) to demonstrate the definite variations in clinical expression for various Iranian ethnic origins.

Acknowledgments

The authors thank the Iran Rheumatology Center and Iran AS Association for their utmost cooperation.

Funding: This study was a part of project, supported and funded by Rheumatology Research Center, Tehran University of Medical Sciences (grant number: 89-03-41-11076).

Conflict of interest: The authors declare no conflict of interest.

References

1. Tayel MY, Soliman E, El Baz WF, et al. Registry of the clinical characteristics of spondyloarthritis in a cohort of Egyptian population. *Rheumatol Int* 2012; 32: 2837-42.
2. Nazarinia MA, Ghaffarpasand F, Heiran HR, Habibagahi Z. Pattern of ankylosing spondylitis in an Iranian population of 98 patients. *Mod Rheumatol* 2009; 19: 309-15.
3. Fallahi S, Jamshidi AR, Gharibdoost F, et al. Urolithiasis in ankylosing spondylitis: Correlation with Bath ankylosing spondylitis disease activity index (BASDAI), Bath ankylosing spondylitis functional index (BASFI) and Bath ankylosing spondylitis metrology index (BASMI). *Caspian J Intern Med* 2012; 3: 508-13.
4. Boonen A. Socioeconomic consequences of ankylosing spondylitis. *Clin Exp Rheumatol* 2002; 20: S23-6.
5. van der Heijde D, Landewé R, Feldtkeller E. Proposal of a linear definition of the Bath Ankylosing Spondylitis Metrology Index (BASMI) and comparison with the 2-step and 10-step definitions. *Ann Rheum Dis* 2008; 67: 489-93.
6. Ward MM, Kuzis S. Risk factors for work disability in patients with ankylosing spondylitis. *J Rheumatol* 2001; 28: 315-21.
7. Chen CH, Chen HA, Lu CL, et al. Association of cigarette smoking with Chinese ankylosing spondylitis patients in Taiwan: a poor disease outcome in systemic inflammation, functional ability, and physical mobility. *Clin Rheumatol* 2013; 32: 659-63.
8. Matthey DL, Dawson SR, Healey EL, Packham JC. Relationship between smoking and patient-reported measures of disease outcome in ankylosing spondylitis. *J Rheumatol* 2011; 38: 2608-15.
9. Fallahi S, Jamshidi AR, Gharbdoost F, et al. Correlation of the pack-years of smoking with disease activity, quality of life, spinal mobility and sacroiliitis grading in patients with ankylosing spondylitis. *Turk J Rheumatol* 2013; 28: 181-8.
10. Fallahi S, Mahmoudi M, Nicknam MH, et al. Effect of HLA-B*27 and its Subtypes on Clinical Manifestations and Severity of Ankylosing Spondylitis in Iranian patients. *Iran J Allergy Asthma Immunol* 2013; 28; 12: 321-30.
11. Skare TL, Bortoluzzo AB, Gonçalves CR, et al. Ethnic influence in clinical and functional measures of Brazilian patients with spondyloarthritis. *J Rheumatol* 2012; 39: 141-7.
12. van der Linden S, Valkenburg HA, Cats A. Evaluation of diagnostic criteria for ankylosing spondylitis. A proposal for modification of the New York criteria. *Arthritis Rheum* 1984; 27: 361-8.
13. Bidad K, Fallahi S, Mahmoudi M, et al. Evaluation of the Iranian versions of the bath ankylosing spondylitis disease activity index (BASDAI), the bath ankylosing spondylitis functional index (BASFI) and the patient acceptable symptom state (PASS) in patients with ankylosing spondylitis. *Rheumatol Int* 2012; 32: 3613-8.
14. Garrett S, Jenkinson T, Kennedy LG, et al. A new approach to defining disease status in ankylosing spondylitis: the Bath Ankylosing Spondylitis Disease Activity Index. *J Rheumatol* 1994; 21: 2286-91.
15. Calin A, Garrett S, Whitelock H, et al. A new approach to defining functional ability in ankylosing spondylitis: the development of the Bath Ankylosing Spondylitis Functional Index. *J Rheumatol* 1994; 21: 2281-5.
16. Doward LC, Spoorenberg A, Cook SA, et al. Development of the ASQoL: a quality of life instrument specific to ankylosing spondylitis. *Ann Rheum Dis* 2003; 62: 20-6.

17. Fallahi S, Jamshidi AR, Bidad K, Qorbani M, Mahmoudi M. Evaluating the reliability of Persian version of ankylosing spondylitis quality of life (ASQoL) questionnaire and related clinical and demographic parameters in patients with ankylosing spondylitis. *Rheumatol Int* 2013 [Epub ahead of print]
18. Uppal SS, Abraham M, Chowdhury RI, et al. Ankylosing spondylitis and undifferentiated spondyloarthritis in Kuwait: a comparison between Arabs and South Asians. *Clin Rheumatol* 2006; 25: 219-24.