Correlation of fatigue with pain and disability in rheumatoid arthritis and osteoarthritis, respectively

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ABSTRACT

Objectives: To investigate the correlation of fatigue with pain in rheumatoid arthritis patients and with disability in osteoarthritis patients. **Methods:** Twenty patients with rheumatoid arthritis and 20 patients with osteoarthritis were evaluated. The degree of fatigue was evaluated with a visual analogue scale and the Multidimensional Assessment of Fatigue. Pain was evaluated with a visual analogue scale as well as Patient Global Assessment. For disability evaluation, the Health Assessment Questionnaire was performed. Age, gender, disease duration, education, income, antirheumatic drugs used and comorbidity were also obtained. Statistical analysis included Fisher exact, Shapiro-Wilk, Kruskal-Wallis and Spearman tests. The significance level was 0.05. **Results:** Fatigue was more significantly increased in patients with osteoarthritis than in patients with rheumatoid arthritis when evaluated with Multidimensional Assessment of Fatigue ($P < 0.05$). Pain was found to correlate with fatigue evaluated with visual analogue scale or Multidimensional Assessment of Fatigue in patients with rheumatoid arthritis ($r = 0.46$; $P < 0.05$). Health Assessment Questionnaire was associated with fatigue visual analogue scale in patients with osteoarthritis ($r = 0.54$; $P < 0.05$). Patient Global Assessment correlates with fatigue visual analogue scale ($r = 0.44$; $P < 0.003$). Patients were similar in both groups: all females, similar mean age, with long disease duration and low income. **Conclusions:** Our results corroborate that fatigue in rheumatoid arthritis patients correlates with the degree of pain, while in osteoarthritis patients it is associated with disability. Therefore, we found that fatigue has different correlates in osteoarthritis and rheumatoid arthritis, and we suggest that disability, not pain, is a correlate of fatigue in osteoarthritis patients.

Keywords: rheumatoid arthritis, osteoarthritis, fatigue, pain, disability assessment.

INTRODUCTION

Fatigue is a subjective symptom of low vitality experienced by patients as tiredness, exhaustion, weariness, weakness, and depleted energy followed by a decreased capacity for physical and mental work. Fatigue measured by visual analogue scale (VAS) was present in 88%-98% of rheumatic patients.[1] Clinically relevant levels of fatigue were present in roughly 40%-80% of patients with rheumatoid arthritis (RA) or osteoarthritis (OA).[1,2]

In RA patients, more than 80% have fatigue (≥ 2 cm VAS), and more than 50% have high levels of fatigue (≥ 5 cm VAS).[2] Forty percent of RA patients experience persistent fatigue, that is mainly predicted by general health and disability.[2] Fatigue decreases with disease-modifying antirheumatic drugs (DMARDs) and with anti-TNF therapy.[3,4] This improvement is mainly related to improvement in pain.[3]

Fatigue was less studied in OA patients than in RA patients, although high levels of fatigue were also experienced by OA

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patients and it seems to have a substantial impact in their lives.[1,5] In one study, higher levels of fatigue were reported in OA patients than in RA patients.[6] Fatigue in OA patients was much more probably related to physical activity when measured by daily life activities than to momentary pain,[7] and was considered one of the strongest predictors of functional impairment in OA.[8]

Fatigue in RA patients has been associated with female gender, pain, depression or history of affective disorder, functional disability, poor sleep, comorbid conditions, and duration of disease.[1,9-13] The relation with inflammation, disease activity, or anemia was not found.[1,2,9] Meanwhile, fatigue in OA patients was described as associated with the same correlates, such as pain, sleep disturbance, depression, physical disability and lower physical activity level.[1,6-8,14]

More information about fatigue correlates in OA and RA patients is needed to gain further insight into the experience of fatigue in RA and OA as well as to support and help patients with these diseases in their self-management strategies, pharmacotherapy, physiotherapy and other treatments of fatigue in RA and OA patients. Therefore, we investigated the possible interrelationship of pain, fatigue and disability among patients with RA and OA.

METHODS

Study population

Data was obtained from 20 patients with RA according to the American Rheumatism Association 1987 revised criteria for the classification of RA[15] and from 20 patients with OA.[16] All study participants were recruited consecutively from the out-patient clinic of the Rheumatology Division, Hospital de Sorocaba, at the Pontifícia Universidade Católica de São Paulo – PUC-SP. Patients were in regular follow-up and signed the informed consent to participate in this study.

Measurement of fatigue, pain, disability, and patient global assessment

Patients' fatigue was evaluated on a 10 cm anchored VAS where 0 was considered "no fatigue" and 10 as "worst possible fatigue". Fatigue was present with VAS ≥ 2 cm, and high levels of fatigue was considered when VAS ≥ 5 cm. Fatigue was also evaluated by the Multidimensional Assessment of Fatigue (MAF) Scale questionnaire.[10,12] The MAF scale consists of 16 items that assess subjective aspects of fatigue including quantity, degree, distress, impact, and timing. The subscales are combined to create a global fatigue index, which ranges from 1 (no fatigue) to 50 (extreme fatigue). Fatigue was considered when fatigue index was ≥ 10 in a scale 1 to 50. Pain was evaluated on a 10 cm VAS score where 0 would mean "no pain" and 10 would mean "worst possible pain", and disability was evaluated by a Portuguese version of the Health Assessment Questionnaire (HAQ).[17] Patient global assessment (PGA) was measured on a 10 cm VAS where 0 was considered the best assessment of disease (doing very well) and 10 the worst (doing very poor).

Socioeconomic-demographic and clinical variables

Age, gender, disease duration (years), education (years), monthly income, antirheumatic drugs used, and comorbidity were obtained at study visit.

Statistical analyses

First, the variables data distribution was analyzed. The Shapiro-Wilk test was employed for quantitative variables to confirm non-parametric data distribution. Proportion, means, and standard deviation were described. To compare RA and OA groups, Fisher exact (categorical variables) or Kruskal-Wallis (quantitative variables) tests were employed. Correlation between quantitative variables was studied by Spearman test. The significance level considered was 0.05.

RESULTS

Fatigue evaluated by VAS was observed in 17 (85%) of RA patients and 19 (95%) of OA patients. High levels of fatigue were noticed in 10 (50%) of RA patients and 18 (90%) of OA patients. When evaluated by MAF scale, 20 (100%) of RA patients and 19 (95%) of OA patients showed fatigue. Fatigue measured by MAF scale was significantly higher in OA patients when compared with RA patients ($P < 0.05$).

Table 1 shows the analysis of socioeconomic-demographic and clinical features. In general, patients were similar in both

Table 1
Analysis of socioeconomic-demographic and clinical features

	RA (n = 20)	OA (n = 20)
Age, years	53.4 ± 10.6	54 ± 6.2
Gender: female, %	100.0	100.0
Disease duration, years	9.40 ± 6.22*	4.55 ± 3.10
Education, years	3.90 ± 2.78	4.03 ± 3.44
Month wage, US$	596 ± 325	493 ± 264
Comorbidities, % patients	85.0	100.0

Values are expressed as mean ± SD. *P < 0.05
RA: rheumatoid arthritis; OA: osteoarthritis.

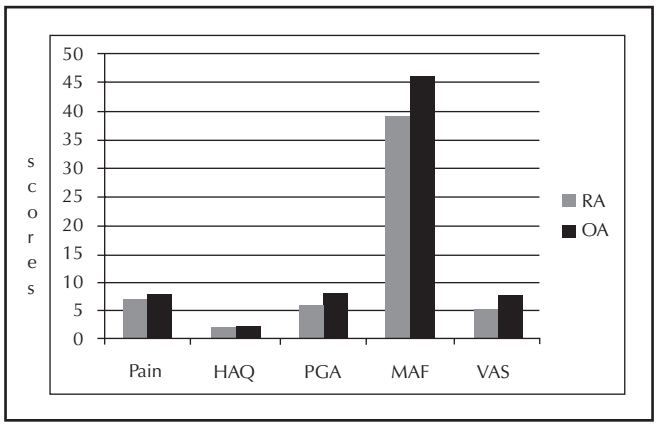

Figure 1
Association of fatigue and correlates in RA and OA.
Pain scores were associated with fatigue measured by VAS and MAF scores in RA patients. HAQ score was correlated with fatigue measured by MAF scale in OA patients. PGA correlates with fatigue measured by VAS in RA patients.
*P < 0.05. HAQ: health assessment questionnaire; PGA: patient global assessment; MAF: multidimensional assessment of fatigue; VAS: visual analogic scale; VAS: fatigue visual analogue scale; RA: rheumatoid arthritis; OA: osteoarthritis.

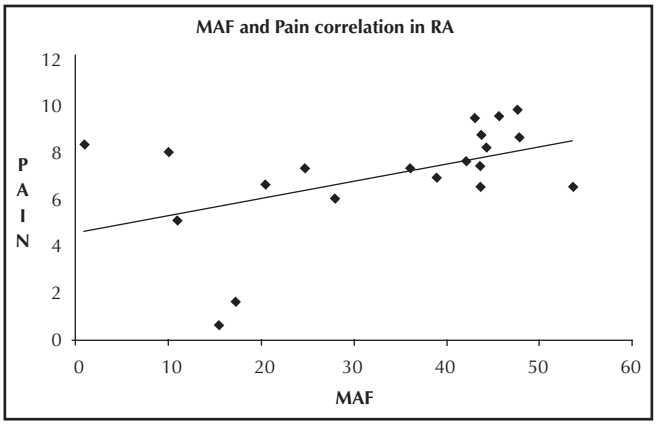

Figure 2
Correlation between pain and MAF scores in RA patients (r = 0.46).
MAF: multidimensional assessment of fatigue; RA: rheumatoid arthritis.

groups, all female, with long disease duration and low income. Patients with RA had long disease duration and less comorbidity when compared with patients with OA. The most frequent comorbidity observed in both groups were arterial hypertension (35% on RA patients and 50% on OA), diabetes mellitus (15% on RA and 5% on OA), and gastropathy (10% on RA and 15% on OA).

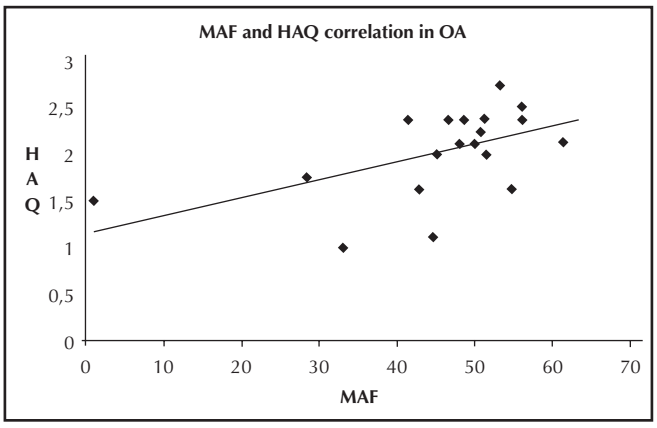

Figure 3
Correlation between HAQ and MAF scores in OA patients (r = 0.54).
MAF: multidimensional assessment questionnaire; HAQ: health assessment questionnaire; OA: osteoarthritis.

There was no association between fatigue measured by VAS or MAF scale and education, income categories, antirheumatic drugs used and comorbidity. Figure 1 shows the analysis of fatigue and correlates. Pain score was significantly correlated with fatigue measured by VAS and MAF in RA patients ($P < 0.05$; $r = 0.46$). HAQ score was significantly correlated with fatigue measured by MAF scale in OA patients ($P < 0.05$; $r = 0.54$). PGA correlates with fatigue measured by VAS in RA patients ($P < 0.003$; $r = 0.44$). No correlation between PGA and fatigue in OA patients was observed. Figures 2 and 3 show the correlation between pain and MAF in RA patients ($r = 0.46$), and HAQ scores and MAF in OA patients ($r = 0.54$).

In summary, fatigue in RA reflects pain and was associated with it, and disability was associated with fatigue in OA patients.

DISCUSSION

In this study of fatigue in RA and OA patients we registered fatigue in both groups of patients using VAS and MAF scales, and compared these measures with sociodemographic and clinical measures as education, disease duration, pain score, HAQ score and PGA. We found evidence for difference in RA and OA fatigue and assessment of pain and disability. Fatigue was significantly associated with pain in RA patients and was significantly correlated with disability in OA patients.

However, in one study, RA patients showed higher level of fatigue on VAS compared with OA patients.[18] In another study, it was reported that OA patients had higher levels of fatigue than RA patients.[6] We found the highest levels of fatigue in OA than RA patients when measured by MAF. Pain correlation with fatigue was extensively reported in RA patients, and generally pain, depression and fatigue were significantly and positively correlated.[1,3,4,10,12,19-22] Stebbing et al.[22] found that fatigue in RA patients had no significant association with pain, disease activity, disability or erosion, but was associated with depression and anxiety. They also found higher MAF scores in OA patients, and this was dependent on disability.[22] Our data corroborate the fact that fatigue in RA patients was strongly associated with pain, regardless of the scale used to assess fatigue. This fact is consistent with the perception that the improvement of fatigue with antirheumatic drugs seen in RA patients is dependent on pain improvement.[3,4]

Our results also point out that fatigue in OA patients was correlated with disability measured by MAF scale. Some evidence indicates that higher fatigue in OA patients is not related to increased pain, but to physical and psychological disability.[6,7,14] OA patients described fatigue as impacting physical function and their ability to participate in social and daily life activities.[5] In one study, younger woman with RA and multiple daily roles seemed to be most vulnerable to the negative impact of fatigue.[23] Our results implied that fatigue in OA patients will be better treated and solved with a strategy to overcome disability than pain. Activities of daily life represented by HAQ could be affected by comorbidities, but the extension and specific disease responsible for this compromise is not yet established. Further studies should be done to confirm our findings and improve the comprehension of fatigue in RA and OA patients.

In summary, our results corroborate that fatigue in RA patients is correlated with the degree of pain, and fatigue in OA patients is associated with disability. Therefore, fatigue has different correlates in OA and RA. We suggest that disability, not pain, is a correlate of fatigue in OA patients.

REFERENCES

REFERÊNCIAS

1. Wolfe F, Hawley DJ, Wilson K. The prevalence and meaning of fatigue in rheumatic disease. J Rheumatol 1996; 23(8):1407-17.
2. Repping-Wuts H, Fransen J, van Achterberg T, Bleijenberg G, van Riel P. Persistent severe fatigue in patients with rheumatoid arthritis. J Clin Nurs 2007; 16(11C):377-83.
3. Pollard LC, Choy EH, Gonzalez J, Khoshaba B, Scott DL. Fatigue in rheumatoid arthritis reflects pain, not disease activity. Rheumatology (Oxford) 2006; 45(7):885-9.
4. Wolfe F, Michaud K. Fatigue, rheumatoid arthritis, and antitumor necrosis factor therapy: an investigation in 24,831 patients. J Rheumatol 2004; 31(11):2115-20.
5. Power JD, Badley EM, French MR, Wall AJ, Hawker GA. Fatigue in osteoarthritis: a qualitative study. BMC Musculoskelet Disord 2008; 9:63.
6. Zautra AJ, Fasman R, Parish BP, Davis MC. Daily fatigue in women with osteoarthritis, rheumatoid arthritis, and fibromyalgia. Pain 2007; 128(1-2):128-35.
7. Murphy SL, Smith DM, Clauw DJ, Alexander NB. The impact of momentary pain and fatigue on physical activity in women with osteoarthritis. Arthritis Rheum 2008; 59(6):849-56.
8. Wolfe F. Determinants of WOMAC function, pain and stiffness scores: evidence for the role of low back pain, symptom counts, fatigue and depression in osteoarthritis, rheumatoid arthritis and fibromyalgia. Rheumatology (Oxford) 1999; 38(4):355-61.
9. Bergman MJ, Shahouri SS, Shaver TS, Anderson JD, Weidensaul DN, Busch RE *et al.* Is fatigue an inflammatory variable in rheumatoid arthritis (RA)? Analyses of fatigue in RA, osteoarthritis, and fibromyalgia. J Rheumatol 2009; 36(12):2788-94.
10. Belza BL. Comparison of self-reported fatigue in rheumatoid arthritis and controls. J Rheumatol 1995; 22(4):639-43.
11. Stone AA, Broderick JE, Porter LS, Kaell AT. The experience of rheumatoid arthritis pain and fatigue: examining momentary reports and correlates over one week. Arthritis Care Res 1997; 10(3):185-93.
12. Belza BL, Henke CJ, Yelin EH, Epstein WV, Gilliss CL. Correlates of fatigue in older adults with rheumatoid arthritis. Nurs Res 1993; 42(2):93-9.
13. Jump RL, Fifield J, Tennen H, Reisine S, Giuliano AJ. History of affective disorder and the experience of fatigue in rheumatoid arthritis. Arthritis Rheum 2004; 51(2):239-45.
14. Sale JE, Gignac M, Hawker G. The relationship between disease symptoms, life events, coping and treatment, and depression among older adults with osteoarthritis. J Rheumatol 2008; 35(2):335-42.

15. Arnett FC, Edworthy SM, Bloch DA, McShane DJ, Fries JF, Cooper NS *et al.* The American Rheumatism Association 1987 revised criteria for the classification of rheumatoid arthritis. Arthritis Rheum 1988; 31(3):315-24.
16. Kellgren JH, Moore R. Generalized osteoarthritis and Heberden's nodes. Br Med J 1952; 1(4751):181-7.
17. Ferraz MB, Oliveira LM, Araujo PM, Atra E, Tugwell P. Crosscultural reliability of the physical ability dimension of the health assessment questionnaire. J Rheumatol 1990; 17(6):813-7.
18. Slatkowsky-Christensen B, Mowinckel P, Loge JH, Kylen TK. Health-related quality of life in women with symptomatic hand osteoarthritis: a comparison with rheumatoid arthritis patients, healthy controls, and normative data. Arthritis Rheum 2007; 57(8):1404-9.
19. Huyser BA, Parker JC, Thoreson R, Smarr KL, Johnson JC, Hoffman R. Predictors of subjective fatigue among individuals with rheumatoid arthritis. Arthritis Rheum 1998; 41(12):2230-7.
20. Fifield J, Tennen H, Reisine S, McQuillan J. Depression and the long-term risk of pain, fatigue, and disability in patients with rheumatoid arthritis. Arthritis Rheum 1998; 41(10):1851-7.
21. van Hoogmoed D, Fransen J, Bleijenberg G, van Riel P. Physical and psychosocial correlates of fatigue in rheumatoid arthritis. Rheumatology (Oxford) 2010; 49(7):1294-302.
22. Stebbings S, Herbison P, Doyle TC, Treharne GJ, Highton J. A comparison of fatigue correlates in rheumatoid arthritis and osteoarthritis: disparity in associations with disability, anxiety and sleep disturbance. Rheumatology (Oxford) 2010; 49(2):361-7.
23. Nikolaus S, Bode C, Taal E, van de Laar MA. New insights into the experience of fatigue among patients with rheumatoid arthritis: a qualitative study. Ann Rheum Dis 2010; 69(5):895-7.