Accuracy of the Diagnosis of Fibromyalgia by Family Physicians: Is the Pendulum Shifting?

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ABSTRACT. ***Objective.*** We evaluated the accuracy of diagnosis of fibromyalgia (FM) by family physicians.

Methods. We performed a retrospective cohort analysis of 646 consecutive patients newly referred to the outpatient rheumatology clinic of Soroka University Medical Center from January 1, 2005, until December 31, 2007. The kappa statistic was used to measure agreement between family-physician and rheumatologist diagnoses for FM in the total patient cohort as well as in groups stratified by ethnicity. Sensitivity and specificity of family-physician diagnosis of FM were calculated using rheumatologist diagnosis as the gold standard. There were no exclusion criteria.

Results. During the time period of the study, 646 new patients were seen in the rheumatology clinic. Of 196 patients referred with an initial diagnosis of FM, the consultant rheumatologist confirmed this diagnosis in 71% of cases. The overall kappa for FM diagnosis between family physicians and rheumatologists was 0.70 ($p < 0.001$), indicating a good level of agreement. Agreement was substantially lower among Bedouin patients ($\kappa = 0.35$, $p = 0.003$). All other patients in our study were Jewish Israelis. Using rheumatologist diagnosis as the gold standard, overall sensitivity and specificity of FM diagnosis by family physicians were 87.4% and 88.3%, respectively.

Conclusion. Family physicians in our region are able to accurately diagnose FM. Future studies might focus on evaluating the factors and biases accounting for differences in level of diagnostic accuracy for FM among various ethnic groups. (First Release Dec 1 2008; J Rheumatol 2009;36:170–3; doi:10.3899/jrheum.080468)

Key Indexing Terms:
FIBROMYALGIA REFERRAL FAMILY PHYSICIAN MISDIAGNOSIS

The American College of Rheumatology defines fibromyalgia (FM) as a chronic disorder characterized by the presence of widespread pain accompanied by tenderness upon palpation of at least 11 out of 18 predefined tender points throughout the musculoskeletal system[1]. Epidemiological studies estimate that 2% to 5% of the population has this debilitating illness, with women affected almost 10 times more than men[2]. Although pain is the dominant clinical feature of FM, patients may also experience sleep disorders[3], headaches[4], and gastrointestinal disturbances[5]. Various etiologies for the disease have been suggested, among them infectious[6], hormonal[7], and genetic causes[8], but its precise pathogenesis is not fully understood.

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Accepted for publication August 25, 2008.

As most patients with symptoms suggestive of FM are first seen by their primary-care doctors, it is imperative that these physicians be familiar with diagnosis and initial management of the disease. A previous study[9] suggests that primary-care physicians are not familiar with the diagnostic criteria for FM, possibly contributing to its misdiagnosis. The study reports that although 96% of surveyed primary-care physicians claimed to be familiar with FM, only 25% understood its point-count diagnostic criterion[9]. Further investigation revealed a statistically significant difference in knowledge of FM diagnosis and treatment among physicians who trained in Beer Sheva, Israel, and those who did not. The authors[9] suggest that this difference may be due to the high level of FM exposure clinicians received during their education in Beer Sheva, a center highly active in the research and management of FM.

Overdiagnosis of FM has been described in a number of studies[10,11]. Fitzcharles, *et al*[10] report that in only 34% of the 76 patients included in their study was the referring physician's diagnosis relating to FM correct. A total of 59% of patients referred to rheumatologists for FM were subsequently diagnosed with a different disorder accounting for their FM-like symptoms.

Although familiarity with management of the highly prevalent FM is essential, the supposed inability of primary-

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care clinicians to accurately diagnose FM is particularly concerning because of their role as referring physicians. Moreover, in light of the adequate accuracy and reliability of the FM diagnostic criteria when tested using rheumatologists[1], diagnostic accuracy of primary-care physicians might be raised through better training in and exposure to these criteria.

We assessed the accuracy of diagnosis of FM made by primary-care physicians. Measures of reliability and validity using rheumatologist diagnosis as the gold standard were utilized to draw conclusions about precision of initial diagnosis of FM.

MATERIALS AND METHODS

From January 1, 2005, until December 31, 2007, data were collected on all new referrals to the outpatient rheumatology clinic of Soroka University Hospital located in Beer Sheva, Israel. Demographic data were entered into a database, as were family-physician and consultant-rheumatologist diagnoses. The study was approved by the local ethics institutional review board.

Descriptive statistics (means, medians, frequencies, and percentages) were generated for baseline demographic characteristics and clinical diagnosis. The kappa statistic was used to measure agreement between family-physician and rheumatologist diagnoses for FM in the total patient cohort as well as in groups stratified by ethnicity. Sensitivity and specificity of family-physician diagnosis of FM were calculated using rheumatologist diagnosis as the gold standard. There were no exclusion criteria in our study.

RESULTS

During the time period of the study, 646 new patients were seen in the rheumatology clinic. As shown in Table 1, 76% were female and mean age was 45.9 years. The majority of patients were Jews of Middle Eastern descent (38%).

The most common referring diagnosis was FM (30%), followed by generalized arthralgia (14%) and rheumatoid arthritis (11%).

Of the 196 patients referred with an initial diagnosis of FM, the consultant rheumatologist confirmed this diagnosis in 71% of cases. As shown in Table 2, in patients initially referred for FM evaluation who did not receive a final diagnosis of FM, the most common diagnosis was arthralgia. Of the 159 patients diagnosed with FM by the consultant rheumatologist, the family physician agreed in 87% of cases. As shown in Table 3, in patients with a final diagnosis of FM who were not initially referred with this diagnosis, the most common referring diagnosis was arthralgia.

Overall, the kappa statistic between family physician and rheumatologist for diagnosis of FM was 0.70 ($p < 0.001$; Table 4). Level of agreement varied between ethnic groups, being lowest for Bedouins ($\kappa = 0.35$, $p = 0.003$) and highest for Ashkenazi Jews ($\kappa = 0.87$, $p < 0.001$).

Using rheumatologist's diagnosis as the gold standard, sensitivity and specificity of FM diagnosis by family physicians were calculated (Table 5). Overall sensitivity and specificity were 87.4% and 88.3%, respectively.

Table 1. Baseline characteristics of patients.

Characteristics	N = 646
Age, mean (SD) yrs	45.9 (16.8)
Women, n (%)	491 (76)
Ethnicity, n (%)	
Ashkenazi Jews	244 (37.8)
Middle Eastern Jews	340 (52.6)
Ethiopian Jews	2 (0.3)
Indian Jews	1 (0.2)
Bedouins	59 (9.1)

Table 2. Rheumatologist's diagnosis for patients initially diagnosed with fibromyalgia (FM) by a family physician.

Diagnosis	No. of patients, N = 196 (%)
Polymyalgia rheumatica	1 (0.5)
Sjögren's syndrome	1 (0.5)
Osteoarthritis	10 (5.1)
FM	139 (70.9)
Nondefined arthritis	1 (0.5)
Arthralgia	27 (13.8)
Localized periarticular disorders	13 (6.6)
Other symptoms	4 (2)

Table 3. Family-physician diagnosis for patients finally diagnosed with fibromyalgia (FM) by a rheumatologist.

Diagnosis	No. of patients, N = 159 (%)
Rheumatoid arthritis	1 (0.6)
Polymyalgia rheumatica	1 (0.6)
Osteoarthritis	1 (0.6)
FM	139 (87.4)
Nondefined arthritis	1 (0.6)
Arthralgia	10 (6.3)
Periarticular disorders of extremities	1 (0.6)
Abnormal laboratory findings	1 (0.6)
Raynaud's syndrome	1 (0.6)
Pain in extremity	1 (0.6)
Other symptoms	2 (1.3)

Table 4. Agreement for fibromyalgia diagnosis between family physician and rheumatologist.

Ethnicity	Kappa	p
Overall	0.70	< 0.001
Ashkenazi Jews	0.78	< 0.001
Middle Eastern Jews	0.66	< 0.001
Bedouins	0.35	0.003

DISCUSSION

We observed a relatively high level of agreement in diagnosis of FM between family physicians and rheumatologists, reaching a kappa of 0.78 ($p < 0.001$) in certain subgroups.

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Table 5. Sensitivity and specificity of fibromyalgia diagnosis by family physicians using rheumatologist diagnosis as the gold standard.

Ethnicity	n	Sensitivity, %	Specificity, %
Overall	646	87.4	88.3
Ashkenazi Jews	244	89.6	93.4
Middle Eastern Jews	340	87.0	83.2
Bedouins	59	66.7	91.1

Similar studies have not demonstrated such a high level of agreement[10,12]. Gamez-Nava, *et al*[12] reported a kappa value of 0.49, a lower level of agreement between family physicians and rheumatologists in comparison to our study. Fitzcharles, *et al*[10] describe a rheumatologist's confirmation of a referring physician's positive diagnosis of FM (n = 63) in only 41% of cases. In contrast, our study reveals that, overall, 71% of patients referred by family physicians for FM evaluation (n = 196) were indeed diagnosed with FM by rheumatologists.

Using the rheumatologist diagnosis as the gold standard, we demonstrated an overall sensitivity of 87.4% for FM diagnosis made by family physicians. This value is significantly higher than the sensitivity of 48% reported in a previous study[12]. Consideration of sensitivity is critical when assessing initial diagnostic testing such as FM evaluation by referring physicians. Although other measures of validity are important as well, adequate sensitivity ensures that most patients with FM are diagnosed, enabling them to receive proper medical care.

In addition to considerations regarding FM diagnostic sensitivity, diagnostic accuracy must be addressed. Overdiagnosis of FM by primary-care physicians could result in cases of myeloma or polymyalgia rheumatica being misclassified as FM. Out of the 196 patients referred to rheumatolgists with an initial diagnosis of FM, only 1 (0.5%) patient was given a final diagnosis of polymyalgia rheumatica (Table 2), suggesting that primary-care physicians in our area are rarely misdiagnosing life-threatening rheumatologic diseases such as myeloma.

It is unclear why our measures of validity and reliability regarding FM diagnosis by primary-care physicians are generally higher than those reported in other studies[10,12]. Our level of agreement between referring physicians and rheumatologists is similar to values reported for FM interrater reliability tested using only rheumatologists or experienced pain clinic physicians ($\kappa = 0.69–0.74$)[13,14], suggesting that family physicians included in our study are aware of and able to correctly utilize diagnostic criteria for FM. A number of factors could account for the marked differences in accuracy of FM diagnosis between previous studies and the present one. Our family doctors may be more exposed to diagnostic criteria for FM due to the influence of FM research occurring in the area. Alternatively, awareness in all family physicians may have gone up since previous studies[10,12], conducted in 1994 and 1997. Indeed, FM classification criteria were defined only a few years before Fitzcharles, *et al*[10] and Gamez-Nava, *et al*[12] carried out their research.

In Buskila's study on awareness of FM among Israeli family physicians[9], primary-care doctors who trained in Beer Sheva had better knowledge of FM diagnosis, treatment, and management than clinicians who did not train in Beer Sheva ($p = 0.006$). Soroka University Hospital houses our rheumatology referral center and is highly active in FM research and management; although not all referring physicians trained in the city, they may have a higher than average level of exposure to and awareness of FM diagnostic criteria.

While our overall level of agreement is quite high, kappa values broken down by ethnic group were markedly different from each other. Agreement in Ashkenazi Jews, Middle Eastern Jews, and Bedouins were $\kappa = 0.780$ ($p < 0.001$), 0.661 ($p < 0.001$), and 0.354 ($p = 0.003$), respectively. These differences may be due to caregiver bias, where family physicians or rheumatologists might be more likely to incorrectly diagnose FM in Middle Eastern Jews or Bedouins, or to changes in the clinical presentation of FM dependent on ethnicity. In the second case, FM classification criteria may need to be reevaluated in certain populations such as the Bedouin. Accuracy of FM diagnosis in the Bedouin population is of utmost importance, especially taking into account recent research describing its exceedingly great influence on the quality of life of women in this population[15].

The strengths of our study include a relatively large sample size and stratification of results according to ethnicity. It is limited in that rheumatologists were not blind to referring diagnosis, potentially biasing results to higher estimates of agreement and validity. However, previous studies[10,12] to which our results were compared also did not blind rheumatologists.

We have demonstrated a good agreement on FM diagnosis between family physicians and rheumatologists, as well as higher sensitivity of FM diagnosis by family physicians in comparison to previous studies[10,12]. Our results suggest that primary-care doctors can accurately evaluate patients for FM. However, level of agreement was not identical across various ethnicities, and future studies should focus on determining the factors and biases that might account for these differences.

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