

Comorbidity and physician use in fibromyalgia

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Summary

Objective: To describe comorbidity in women with FM, and to examine the effects of different types of comorbidity on physician use.

Methods: Women (n = 180) with primary FM were evaluated at baseline and 6 months later for self-reported health resource use and covariates. Reported comorbidity was classified into 4 categories: medical, psychiatric, “functional”, and unknown. The category for “functional” conditions included disorders that have been classified by previous authors as medically unexplained symptoms such as the irritable bowel and chronic fatigue syndromes. Logistic regression models were developed to examine associations between types of comorbidity and physician use.

Results: Comorbid conditions were reported

by over 90% of the sample. Total number of comorbid complaints was associated with high number of physician visits. In logistic regression models (controlling for age, ethnicity, education, disability, pain, and psychological vulnerability) medical comorbidity was a much stronger determinant of high number of physician visits than was “functional” comorbidity.

Conclusions: Comorbidity with other disorders, both functional and medical, was high in this sample. Medical and psychiatric comorbidity were stronger determinants of high physician use than “functional” comorbidity.

Key words: fibromyalgia; comorbidity; health service use

Introduction

Fibromyalgia (FM) is a chronic syndrome of pain and fatigue, whose pathophysiology remains far from clear. Recent work points toward disordered pain perception [41], whereas others consider the roots of the disorder to be psychological, rather than medical based on the overlap between FM and other “functional” syndromes [1, 2].

FM is associated with considerable morbidity and high health care costs [3–5]. For example, a recent study found that cost estimates for patients with FM were over twice that of patients with ankylosing spondylitis [4]. Several studies, including one recently published from our centre, demonstrate that women with FM are high consumers of health services use [3].

Use of health services in FM is associated with various clinical and psychosocial variables. Some of the psychosocial variables include a past history of abuse and psychological distress; FM symptom severity and disability have also been found to be determinants of high costs [6–10]. In our recent work, the number of comorbid conditions was the main determinant of total direct costs; this has been noted in several other studies [3, 9, 10]. However, to date, the association between comorbidity in FM and physician use has not been thoroughly evaluated. Our objectives therefore were to systematically assess comorbid conditions in women with FM, and examine the effect of different types of comorbidity upon physician use.

Patients and methods

Procedures followed in our study were in accordance with the ethical standards of our institutional review board and with the Helsinki Declaration. Female adult subjects (n = 180) with primary FM fulfilling ACR criteria [11],

were recruited from 10 rheumatology clinics and from the community. For the latter, we used methods developed by White [12], whereby newspaper advertisements were placed seeking women with widespread body pain and

fatigue. Respondents to the advertisement were examined by a rheumatologist to confirm the diagnosis of FM.

All participants underwent examination by a rheumatologist. The rheumatologist (one of ten who were involved in the study) ensured not only that patients fulfilled ACR criteria for FM, but that there were no other underlying causes for the patients' widespread muscle pain and fatigue.

Subjects completed baseline questionnaires on demographic, clinical, and psychosocial variables, as well as on health care use in the preceding 6 months. At the 6-month follow-up, repeat assessments of health service use were obtained. The Cost Assessment Questionnaire (CAQ), a modified version of the economic portion of the Stanford Health Questionnaire, was used to collect data on physician use for each 6-month period. The CAQ inquires about the use of all health services without asking the respondent to make attributions to any one disease or condition. It has been validated for various rheumatic diseases [13-15]. To produce an annualised figure for physician use for each subject, we summed the reported number of physician visits for each two 6-month periods, one done at baseline, and one done at follow-up.

At baseline, subjects were asked to indicate the presence of other health problems or conditions; 44 distinct conditions were reported. These conditions were classified by a medical panel (2 internists and 2 rheumatologists) as: (1) organic disease ("medical"), (2) unexplained clinical conditions ("functional"), (3) mental health disorders ("psychiatric"), (4) unknown. We constructed dichotomous variables, representing whether or not a subject had >1 comorbid condition in the relevant category. The class for "functional" conditions included disorders that have been classified by previous authors as medically unexplained symptoms [16, 17] such as the irritable bowel and chronic fatigue syndromes.

Logistic regression models were developed to examine associations between types of comorbidity and physician use. Analyses were performed using SAS statistical programming software version 8.02. We included in our model variables to adjust for important demographic and clinical covariates [18-23]. Ethnicity was categorized as Caucasian versus non-Caucasian, due to small numbers in specific non-Caucasian ethnic groups. In separate models, age was considered both as continuous and categorically (age older than 60). Because the regression coefficient estimates for comorbidities were similar regardless of how age was treated, the results presented here treat age categorically.

The clinical covariates included disability (measured by the Fibromyalgia Impact Questionnaire [24]), and pain (assessed by the McGill Pain Questionnaire index for present pain intensity [25]). In order to minimise study costs and to preserve statistical power individuals were classified dichotomously according to whether or not pain was worsening from baseline to follow-up.

As certain psychosocial factors have shown to affect

both symptoms and medical help seeking in patients with FM, "psychological vulnerability", a construct reflecting a combination of risk factors (i.e. psychological distress in the presence of both high perceived stress and a history of abuse), was tested in our analyses [20-23]. Specifically, we included in our regression models a dichotomous variable denoting psychological vulnerability. This minimised study costs and statistical power, as we were examining a number of independent variables concurrently. Individuals scoring positive for all 3 risk factors were thus classified as psychologically vulnerable, as has been done previously [23]. The presence of psychological distress was determined by the Symptom Checklist-90-R [26], where a Global Severity Index (GSI) score of >63 represents clinically important distress. High perceived stress was defined as scoring above the normative average (>14) of the Perceived Stress Scale [27]. A history of sexual abuse was assessed through a validated questionnaire [28, 29].

To discriminate between high and low end users of physicians, high use was defined as more frequent use than the median value for annual physician visits. This definition included visits to both general practitioners and specialists. This variable was modelled as a function of the comorbidity categories, adjusting for age, ethnicity, education (years), disability, pain, and psychological vulnerability, as well as for whether a subject had been recruited from the community or from a tertiary care center.

We performed two sets of sensitivity analyses. One set of sensitivity analyses was to look for robustness with respect to choice of covariates. For example, we modelled pain in alternate ways from our primary analyses (where 'worsening pain' was used), considering instead 'degree of pain at baseline'. We also considered a model where in place of 'Disability' we used the covariate 'Duration of FM', defined categorically as recent-onset (2 years or less) versus longer duration. We performed these sensitivity analyses to see if the changes in the model covariates led to changes in estimates of the association between physician use and the three types of comorbidity.

In the second set of sensitivity analyses, we investigated potential causal links among covariates in our model. For example, we considered the possibility that medical comorbidity (such as osteoarthritis) might lead to pain, which in turn could increase physician visits. Possibly, adjusting for pain in our model might remove some of the association between medical comorbidity and physician use. Another example might be the relationship between psychological vulnerability and psychiatric comorbidity; for example, if a pathway exists where psychiatric comorbidity predisposed to psychological vulnerability, adjusting for psychological vulnerability might lessen the observed relationship between psychiatric comorbidity and physician use. In sensitivity analyses for these two scenarios, therefore, we dropped the covariate (pain in the first case, and psychological vulnerability in the second) from the model, and then re-assessed the influence of comorbidity type on the outcome (high use of physicians).

Results

Among the community sub-sample who screened positive with the telephone interview, about one-third failed to show for their medical exam to confirm diagnosis of FM. Of those who were examined (n = 104), 95% (n = 99) were confirmed by a rheumatologist to have a diagnosis of primary FM. Of the five who were judged not to have diagnosis of primary FM, one was excluded from the study because

she clearly had another reason for her widespread muscle pain and fatigue (polymyalgia rheumatic), and the others did not fulfill ACR criteria for FM.

Rheumatologists also recruited subjects from their clinics, constituting the tertiary care sub-sample. Among the tertiary care centre sub-sample (n = 106), 85.8% (n = 91) agreed to participate after being informed about the study.

Table 1

Demographic and clinical variables in the subjects with primary fibromyalgia (n = 180).^a

| Demographic variables | mean/proportion (SD) |
|-------------------------------|----------------------|
| Age | 50.8 (10.2) |
| Education(years) | 13 (3.3) |
| Disabled due to FM | 0.16 (0.36) |
| Health status variables | mean/proportion (SD) |
| Number co-morbid conditions | 2.1 (1.4) |
| Disability Score (FIQ) | 57.7 (16.5) |
| High pain intensity | 0.29 (0.46) |
| Clinically important distress | 0.72 (0.45) |
| Medications | percent |
| Antidepressant | 57.5 |
| Anxiolytic | 26.8 |
| Acetaminophen | 54.3 |
| NSAID | 55.9 |
| Hormonalb | 47.2 |
| Gastroenterologic | 37.0 |
| Vitamins | 40.6 |
| Alternative Medications | 25.2 |
| Other | 65.4 |

^a All patients fit American College of Rheumatology criteria for fibromyalgia [11] and had at least 11 tender points positive on entry into the study.

^b Includes thyroid supplementation and estrogen/progesterone replacements.

Table 2

Baseline comorbidity in the sample of women (n = 180) with fibromyalgia.

| Comorbidity | N | % |
|--------------------------|-----|------|
| Medical | 120 | 66.7 |
| Osteoarthritis | 72 | 40.0 |
| Osteoporosis | 4 | 2.2 |
| Hypertension/Vascular | 18 | 10.0 |
| Thyroid | 9 | 5.0 |
| Diabetes | 6 | 3.3 |
| Hypercholesterolemia | 4 | 2.2 |
| Anaemia/haematological | 6 | 3.3 |
| Psychiatric | 10 | 5.6 |
| Depression | 9 | 5.0 |
| Anxiety | 1 | 1.0 |
| Functional | 70 | 38.9 |
| Irritable bowel | 65 | 36.1 |
| Chronic fatigue syndrome | 4 | 2.2 |
| Irritable bladder | 1 | 1.0 |
| Other | 7 | 3.9 |

Some subjects had more than 1 comorbid condition. Other medical conditions included 4 with cardiac valve disease; 7 with allergies; 4 with gastrointestinal reflux disease, and 2 with cirrhosis; 1 each reported a sinus problem, a vision disability, a hearing disability, diverticulitis, a pituitary problem, skin cancer, psoriasis, Pagets disease, Carnitile transferase deficiency, hypophosphatemia, hypoglycemia, bladder incontinence, and obesity.

From the initial combined sample of 190 enrolled participants (99 from the community and 91 from tertiary care clinics), eight dropped out at baseline. At the two-week follow-up period, two individuals failed to return their questionnaire package, leaving a working sample of 180.

The majority of subjects were French-speaking (57.3%), Caucasian (88.2%), and married

(56.7%). The mean age was 50.8 years and the mean duration of FM was 3.9 years. Table 1 summarizes standard statistics for demographic and clinical variables. Forty-two percent of study subjects worked in the previous year, and 25 percent were on disability assistance or retired because of FM. The mean and median FIQ scores for the sample (57.74 and 58.46 respectively) indicated significant FM-related disability. When asked to rate their present pain intensity, 14 patients (7.9%) reported no or mild pain; 59 (33.1%) described their pain as discomforting, 54 (30.3%) as distressing; and 51 (28.7%) as horrible or excruciating.

The mean number of comorbid conditions reported at baseline was 2.1; comorbidity is presented in table 2. The total number of comorbid conditions at baseline was itself predictive of high number of doctor visits, when controlling for the demographical, clinical, and psychological variables; the odds of being a high user of physicians increased by 34% for each comorbid condition (OR 1.34, 95% confidence interval 1.09, 1.65).

Subjects reported a median of 11 visits to physicians during the 12-month period. The total number of comorbid conditions was itself predictive of high physician use, when controlling for the demographical, clinical, and psychological variables; the odds of being a high user of physicians increased by 34% for each comorbid condition (OR 1.34, 95% confidence interval 1.09, 1.65). The effects of the different types of comorbidity are presented in table 3. Interestingly, medical comorbidity was a stronger predictor of physician visits than was functional comorbidity. Psychiatric comorbidity was also independently and positively associated with high use of physicians. There were no obvious differences between patients recruited from the community and those recruited from tertiary care centres (data not shown).

Regarding the results from the first set of sensitivity analyses, we found robustness with respect to choice of covariates. For example, when we modelled pain in alternate ways from our primary analyses (considering 'degree of pain at baseline' instead of the 'worsening pain' variable), the adjusted estimates for the influence of different types of comorbidity on physician use changed very little (less than 10%). Similarly, in a model where in place of 'Disability' we used the covariate representing FM duration, we found the estimates for the influence of different types of comorbidity on physician use basically unchanged (for example, the adjusted OR for medical comorbidity was 2.4 (1.2, 4.8) and all other ORs in the new model were very similar to the ORs in the primary analyses). In that analysis, the adjusted OR for high physician use for subjects with more than 2 years of FM duration (compared to those whose FM was of lesser duration) was 1.1 (95% CI 0.6, 3.0).

In the second set of sensitivity analyses, when we considered that adjusting for pain in our model might have removed some of the association between 'medical comorbidity' and 'physician use',

Table 3

Predictors of high number of physician visits (>12 annually).

| | Odds Ratio estimates | 95% confidence limits |
|--|----------------------|-----------------------|
| Worsening Pain ^a | 1.2 | (0.6, 2.4) |
| Disability ^b | 2.3 | (1.2, 4.7) |
| Presence of medical comorbidity ^c | 2.3 | (1.1, 4.6) |
| Presence of psychiatric comorbidity ^d | 5.9 | (1.1, 33) |
| Presence of functional comorbidity ^e | 0.7 | (0.4, 1.5) |
| Psychological Vulnerability | 1.4 | (0.7, 2.7) |
| Caucasian Race | 4.6 | (1.4, 14.8) |
| Age >60 | 2.8 | (1.1, 6.8) |
| Education (Years) | 1.0 | (0.9, 1.1) |
| Patients recruited from community | 1.5 | (0.8, 3.0) |

^a Present pain score increasing from baseline to 6 months.

^b Fibromyalgia impact score >57.

^c Includes hypertension, diabetes mellitus, osteoarthritis, bursitis/tendonitis, osteoporosis, thyroid disorders, hypercholesterolemia, cardiac valve disease, allergies, gastrointestinal reflux disease, cirrhosis, anaemia or haematological problems.

^d Irritable bowel syndrome, irritable bladder, chronic fatigue syndrome.

^e Depression, anxiety.

we found in fact that dropping the pain variable produced very little change in the adjusted estimate for the influence of medical comorbidity on physician use (OR 2.4, 95% CI 1.2, 4.7). Similarly, when we dropped the psychological vulnerability variable from the model, there was very little change in the adjusted estimate for the influence of psychiatric comorbidity on high physician use (OR 6.0, 95% CI 1.1, 33).

Finally, given that some symptoms of major

depression can resemble the fatigue of FM, we did a repeat-analysis, leaving out the nine patients who had been diagnosed with a major affective disorder. The repeat analysis did not appreciably change the results of our estimates of the effect of medical comorbidity, or other covariates, on the outcome of physician use. The adjusted OR estimate for the effect of medical comorbidity on physician use in this repeat analysis was 2.3 (95% CI 1.1, 4.6).

Discussion

Our results confirm previous reports that showed that patients with FM are heavy users of physician services [3-5]. To put our findings in perspective, the per capita number of outpatient physician visits in 1991 in Quebec was 3 (standard deviation = 0.8) [30].

Using the same FM sample we recently demonstrated the association between calculated total direct costs and overall comorbidity [3]. The average 6-month direct cost was \$CDN 2298 (SD 2303). Medications (\$CDN 758; SD 654), alternative and allied care (\$CDN 398; SD 776), and diagnostic tests (\$CDN 356; SD 580) were important cost components. In our previous published analyses, comorbidity and FM disability were statistically significant contributors to direct costs in the multivariate analyses. Costs increased by approximately 20% with each additional comorbid condition. The high degree of variability for cost components precludes us from having statistical precision to examine the effect of different types of comorbidity on these various cost components.

The self-reported prevalence in our sample of many medical conditions, such as hypertension, was similar to women of a similar age range in the general Canadian population [31]. As many might

expect, the prevalence of "functional disorders" such as chronic fatigue syndrome was greater in our sample than data suggest for women in the general population [32]. Irritable bowel syndrome was also almost three times more common in our sample as the prevalence estimated in the general population [33].

FM represents a major burden on limited health care resources. Medical and psychiatric conditions appear to be stronger determinants of health service use than non-organic or "functional" conditions. High medical and psychiatric comorbidity might naturally be expected to be associated with physician visits. However our study results could still be used to guide physicians in their contact with FM patients. That is, physicians could maintain a clinical focus aimed at efficiently addressing medical and psychiatric comorbidity. The implication is that further health resource use might be reduced if the focus of care is placed on identifying treatable medical and psychiatric comorbidity (ex. arthritis, depression) which may be contributing to poor health and thus to health service use.

In addition, careful evaluations of the types of complementary and alternative care treatments for

FM should be undertaken, to help health service providers direct their patients to potentially effective therapies, while avoiding costly and ineffective ones. Finally, the large burden on health care resources associated with FM highlights the need for better programmes for the treatment and rehabilitation of those who suffer from this syndrome.

We acknowledge that the accuracy of self-reported comorbidity may be questioned. To explore this, we examined medication use in a 50% convenience sub-sample of the subjects, to see if these were consistent with the reported comorbidity [34]. We also completed a chart review of 20 subjects whose records were accessible from the referring rheumatologists. In both exercises, acceptable accuracy of self-reported comorbidity was found; 82% of the patients whose medications we reviewed were on agents consistent with their self-reported comorbidities. The results of the chart-review yielded very similar results, with confirmation of the reported comorbidity in 80% of the patients. Also, as noted above, the self-reported prevalence in our sample of many medical conditions, such as hypertension, was similar to women of a similar age range in the general Canadian population [31]. Thus, although there was likely some error in the self-reported comorbidity of our sample, we think our results on the whole are valid and useful.

Self-reported psychiatric comorbidity, though of relatively low prevalence in our sample, was still an important predictor of physician visits, as has been suggested previously [8, 9]. We note that although only 5% of the sample reported having clinical depression, 68% of our subjects actually scored positive for depression symptoms, as measured by the Symptom Checklist-90-R (SCL-90R). Although one might conclude that clinical depression was either under-reported or under-diagnosed in this sample, there is an inherent difficulty since some of the symptoms that the SCL-90R measures (ex. fatigue) are themselves components of the FM syndrome.

It has been suggested [35] that FM patients report more medical conditions than patients with other rheumatic disorders, and assign more importance to them. One interpretation is that heightened awareness of physical symptoms leads to a high prevalence of "functional" conditions, without a clear medical basis. Thus, we were intrigued to find that high physician use in FM related less to "functional" disorders than to medical comorbidity.

Of course, patients with FM may also be more likely than persons without FM to take note of their health problems including conditions without specific symptoms, such as hypertension. This factor could potentially explain some of the observed associations in our study. However, heightened symptom awareness is likely not be the only factor affecting comorbidity in FM. Autonomic and endocrine pathways mediating depression, stress and psychological distress may predispose to medical disorders [36–38]. Alternatively, lifestyle factors (inactivity, poor adherence) [39] could also influence medical comorbidity. Regardless, comorbidity as a driving force behind health service use in FM cannot be ignored.

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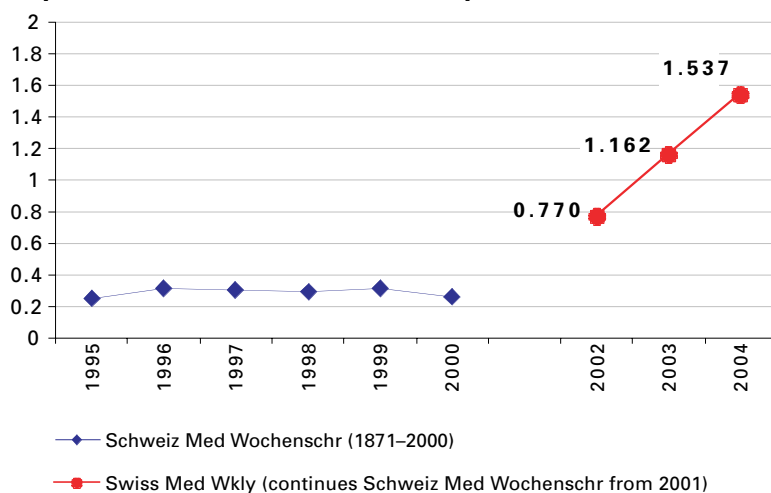
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