Does psychological vulnerability determine health-care utilization in fibromyalgia?

P. L. Dobkin1,2, M. De Civita2, S. Bernatsky1, H. Kang3 and M. Baron3

Objectives. Patients with fibromyalgia (FM) undergo multiple testing and referral to specialists, and often use complementary/alternative medicine (CAM) services. The objectives of the study were: (i) to document health service utilization, and (ii) to examine whether psychological vulnerability was associated with visits to physicians and CAM providers.

Methods. Women (N = 178) with a diagnosis of primary FM completed a psychosocial test measuring pain, perceived stress, global psychological distress, sexual abuse history, co-morbidity and disability due to FM. Subjects also completed a health services questionnaire, documenting visits to physicians and CAM providers during the previous 6 months. Psychological vulnerability was operationalized as obtaining high scores on psychological distress, perceived stress and reporting at least one abusive event.

Results. The average number of visits was 7.2 to physicians and 11.3 to CAM providers.

Conclusions. The number of physician visits was significantly associated with more co-morbidity. Psychologically vulnerable subjects were more likely to use CAM services than those not so classified.

KEY WORDS: Psychological vulnerability, Fibromyalgia, Health services, Complementary/alternative medicine.

Fibromyalgia (FM), a disorder whose prevalence is estimated at 3.4% for women and 0.5% for men [1] is characterized by symptoms of widespread musculoskeletal pain and multiple tender points at specific anatomical sites. Cross-sectional and population studies conducted in Europe, South America, the United States and Canada collectively indicate that FM is a major cause of morbidity [2]. Longitudinal studies indicate FM symptoms remain stable over years, with a few studies showing minor improvements over time [3–5].

Researchers have begun to distinguish characteristics of patients with FM who use health services from those who do not [6]. For example, Aaron et al. [7] followed 40 non-patients (i.e. those with FM symptoms who did not seek medical care) for 30 months; the 10 individuals who subsequently became patients reported a lifetime history of psychiatric diagnoses, more work-related stress and were more likely to have taken a prescription drug at study entry. In other research, the presence of co-morbid disorders [8] and a history of physical and/or sexual abuse [9] contributed to health-care utilization in FM patients. In addition to seeking conventional medical care, patients with FM often use numerous types of complementary/alternative medicine (CAM) including massage therapy, chiropractic treatment, physiotherapy and acupuncture [10, 11]. While few studies have examined the benefit of CAM in FM, physiotherapy and cognitive-behavioural therapy may modulate FM symptoms and improve quality of life [12–14]; thus a multidisciplinary treatment approach to FM [15–17] has been advocated.

In the general literature concerning use of medical services, Barsky and Borus [18] suggest that stress lowers the threshold for medical help seeking. Since FM patients often identify stress as a trigger for symptoms [19, 20],...
Health-care utilization in FM

1325

stressed individuals may contribute to their help-seeking behaviours. Moreover, FM patients have elevated levels of depression, anxiety and somatization (reviewed in Ford [21]), which may also contribute to their search for symptom relief [22–24]. An American study found that FM patients who had been sexually or physically abused reported more daily stress, pain, fatigue and functional disability and used more health-care resources and pain medications [9]. Together, this work suggests that some FM patients are ‘psychologically vulnerable’; perhaps a combination of risk factors contributes to the high end use of various health services. Grzesiak [25] refers to a ‘matrix of vulnerability’; he points out that there are ‘predisposing risk factors’ (e.g. autonomic lability or neuroticism), ‘triggers’ (e.g. life stress) and ‘buffers’ which contribute to chronic pain. The importance of adverse childhood experiences or trauma and psychological vulnerability to stress has previously been examined in FM [26–28].

Many physicians assume that psychological problems not only underlie the disorder but contribute to FM patients’ use of health-care services [29]. We addressed this belief by examining whether psychological vulnerability contributed to patients seeking services, after controlling for known correlates of service use. The data pertaining to physician use are of interest because they include women with FM who have access to universal health care. Thus, socio-economic status and insurance coverage are not barriers to seeking these services. Use of CAM services, in contrast, is generally not covered by the Canadian medical system and therefore our findings may be comparable with previous reports [30].

Subjects and methods

Subjects and procedures

Two approaches were used in the recruitment of subjects. First, 10 rheumatologists working in hospitals and private practice settings were asked to identify subjects with FM who were scheduled for an appointment, and to invite them to participate in the study. Second, advertisements were run in English and French newspapers seeking women with widespread body pain scheduled for an appointment, and to invite them to participate. 10 rheumatologists working in hospitals and private practice were included. This definition fits what Silenzio [35] refers to as health-care resources belonging to the professional (rather than popular or folk) sector of society.

Putative determinants. Sociodemographic variables included age, marital status, education, mother tongue (English or French) and annual family income.

Disability. The Fibromyalgia Impact Questionnaire (FIQ) is a reliable [36], validated, self-administered instrument that measures physical functioning, work status, psychological distress, pain, stiffness, fatigue and well-being within the past week. The first 10 items record the respondent’s ability to carry out daily tasks (e.g. grocery shop); two items pertain to ability to work; and seven visual analogue scale (VAS) items pertain to FM symptoms (e.g. morning stiffness). A total score was calculated which ranged from 0 to 100, with higher scores indicative of greater disability.

Pain intensity. The McGill Pain Questionnaire (MPQ) [37] includes a single measure of present pain intensity. Patients were asked to describe their pain at the present moment by selecting a score that ranged from 0 (no pain) to 5 (excruciating).

Co-morbidity. Subjects were asked to indicate whether they had any other concurrent medical conditions. In total, we coded 44 distinct medical conditions. We calculated a total co-morbidity score by summing the number of conditions endorsed. Scores ranged from 0 (no other conditions) to 5 (five or more conditions). In the analyses, this variable was treated as a quantitative variable, assuming linear effects across the six values.

Psychological vulnerability. To be classified as vulnerable, a subject had to have a positive score on all of the following three indicators: (i) psychological distress standardized T-score ≥63, as measured by the Symptom Checklist 90-R (SCL-90-R); (ii) perceived stress score ≥14, as measured by the Perceived Stress Scale; and (iii) a history of sexual abuse. Vulnerability status was coded as ‘1’ for vulnerable and ‘0’ for not vulnerable. We created this factor as a means of distinguishing women who were undoubtedly compromised by psychosocial characteristics and to address the high positive intercorrelations among these variables.

Psychological distress. Psychological distress was measured with the Symptom Checklist-90-R, a widely used and validated 90-item self-report measure that assesses symptoms experienced during the past week [38]. Nine symptom clusters are assessed: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism. The items are summed to create a Global Severity Index (GSI). As indicated in the manual, clinically important distress corresponds to T-scores of ≥63 [38].

Service utilization. It has been validated by ourselves [31–33] and others [34] for various rheumatic diseases. It enquires about health service use during the preceding 6 months without having the respondent attribute it to any one disease or condition. Patients reported on out-patient clinic visits, laboratory tests, imaging, medications (prescription and non-prescription), emergency room visits, out-patient surgery and hospitalizations.

Reports on the number of visits made to medical and CAM professionals were used to compute our two outcome variables: (i) use of physician service was operationalized as the number of visits made to any physician (general practitioner or specialist), and (ii) use of CAM service was operationalized as the total number of visits made to the following CAM professionals: psychologists, chiropractors, ergonomists, physiotherapists, occupational therapists, podiatrists, acupuncturists, massage therapists, naturopaths, osteopaths, homeopaths and dietitians.

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The psychometric properties of the various measures are briefly described below.

Health service utilization. A slightly modified version of the economic portion of the Stanford Health Assessment Questionnaire (HAQ) was used to collect data on health service utilization. It has been validated by ourselves [31–33] and others [34] for various rheumatic diseases. It enquires about health service use during the preceding 6 months without having the respondent attribute it to any one disease or condition. Patients reported on out-patient clinic visits, laboratory tests, imaging, medications (prescription and non-prescription), emergency room visits, out-patient surgery and hospitalizations.

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**Perceived stress.** The Perceived Stress Scale, a 10-item instrument, was used to assess the degree to which patients felt overwhelmed by stressful life situations occurring during the past month. Items are scored on a 5-point scale from 0 (never) to 4 (very often). Total scores range from 0 to 40. Normative data indicate a mean score of 13.7 for women between the ages of 45 and 54 [39].

**Sexual abuse.** A history of sexual abuse was assessed through a validated [40] self-report questionnaire developed for population-based surveys of sexual and physical abuse [41].

**Statistical analyses**

Descriptive statistics (e.g. means, medians, standard deviations, ranges) and Pearson product moment correlations were computed for selected study variables and examined for the assumptions required for multivariate analysis. To control for multiple correlations, alpha was set at 0.01. Correlations associated with P values above 0.01, but below 0.10 were described as marginally significant. To satisfy the requirements of a normal distribution for all variables, transformations were applied when variables departed significantly from a normal distribution. Skewness and kurtosis values did not deviate from normality for most correlates, with only minor deviations from normality observed for disability and number of co-morbid conditions. These variables were not transformed as skewness and kurtosis did not deviate enough to make a substantive difference in analysis (skewness values were −0.62 and 0.57 and kurtosis values were 0.79 and −0.40 for disability and co-morbidity, respectively), given our sample size of greater than 160. Both outcome variables were, however, significantly skewed and transformations were applied, accordingly. For the physician visits data, a square root transformation was applied as the distribution was moderately skewed to the right. With a substantially positive skewness for CAM visits data, a logarithmic transformation was applied. Because the smallest value on this variable was '0', a '1' was added to each score as the transformation was performed. Skewness was reduced from 2.23 to 0.29 and kurtosis was reduced from 5.25 to −1.29 after transformation. For descriptive purposes, the means and standard deviations (median and ranges) for health care utilization data, before transformations, are reported. However, Pearson correlation coefficients were computed with outcomes transformed.

To address our hypothesis regarding the independent and significant contribution of vulnerability status in understanding health care utilization (number of physician and CAM visits) over and above what could be explained by individual differences in sociodemographic and clinical variables, separate hierarchical multiple linear regression analyses were conducted for the two outcomes: number of physician visits and number of CAM visits. The order of entry of putative determinants was as follows: age and co-morbidity were entered as a block in step 1; disability and pain intensity were entered as a block in step 2; and the binary indicator for psychological vulnerability status (with 0 serving as the reference group) was entered in step 3. In the hierarchical model predicting number of CAM visits, family income was entered in Step 1 because this may influence the use of CAM services, as patients must pay for these themselves.

**Results**

**Subjects**

Among the community subsample who screened positive with the telephone interview, about one-third failed to show for their medical examination to confirm diagnosis of FM. Among those examined (n = 104), 95% (n = 99) received a diagnosis of FM. Among the tertiary subsample (n = 106), 85.8% (n = 91) agreed to participate after being informed about the study. From this initial sample of 190 participants, 4.2% (n = 8) dropped out at baseline. At the 2-week follow-up period, 1% (n = 2) failed to return the questionnaire package, leaving a working sample of 180. Two subjects were also excluded because data were missing on either the clinical or psychosocial variables. Hence, analyses reported herein were conducted with a final sample of 178 subjects.

We compared subjects retained in the study with those not retained owing to missing data on selected study variables, applying a Bonferroni correction to control for multiple comparisons. Independent t-tests and χ²-tests revealed no statistically significant differences on outcomes (number of physician visits and CAM visits) and independent variables (i.e. age, co-morbidity, disability, pain intensity and vulnerability status) (data not shown).

Rheumatologists recruited 81 (45.5%) of the subjects, constituting the tertiary care subsample. We examined the possibility that this subsample might differ from their counterparts recruited from the community (54.5%, n = 97) on outcomes and predictors. Independent t-tests and χ²-tests revealed no statistically significant differences between the two subsamples in terms of outcomes and predictor variables, when controlling for multiple comparisons. Data were, thus, collapsed across the subsamples for all subsequent analyses.

The majority of subjects were French speaking (57.3%), Caucasian (88.2%) and married (56.7%). Table 1 summarizes standard statistics for outcome and predictor variables. Median age was 51 yr (range 21 to

<table>
<thead>
<tr>
<th>Variable</th>
<th>n (%) or mean ± s.d. (range)</th>
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<tbody>
<tr>
<td><strong>Outcomes</strong></td>
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<tr>
<td>Number of physician visits</td>
<td>7.17 ± 4.72 (0, 30)</td>
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<tr>
<td>Number of CAM visits</td>
<td>11.32 ± 17.61 (0, 91)</td>
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<tr>
<td><strong>Putative determinants</strong></td>
<td></td>
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<tr>
<td>Age</td>
<td>50.59 ± 10.05 (20.60, 73.40)</td>
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<tr>
<td>Co-morbidity</td>
<td>2.10 ± 1.37 (0, 5)</td>
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<tr>
<td>Family income</td>
<td>3.89 ± 1.89 (1, 6)</td>
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<tr>
<td>Disability (FIQ)</td>
<td>57.74 ± 16.50 (0.50, 92.51)</td>
</tr>
<tr>
<td>Pain intensity</td>
<td>2.84 ± 1.21 (0, 5)</td>
</tr>
<tr>
<td>Vulnerability status n (%)</td>
<td></td>
</tr>
<tr>
<td>Vulnerable</td>
<td>79 (44.4)</td>
</tr>
<tr>
<td>Not vulnerable</td>
<td>99 (55.6)</td>
</tr>
<tr>
<td><strong>Components of vulnerability status</strong></td>
<td></td>
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<tr>
<td>Psychological distress (SCL-90-R)</td>
<td>66.81 ± 8.64 (30, 81)</td>
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<tr>
<td>Perceived stress</td>
<td>21.68 ± 7.08 (2, 36)</td>
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<tr>
<td>Sexual abuse n (%)</td>
<td></td>
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<tr>
<td>No history</td>
<td>76 (42.7)</td>
</tr>
<tr>
<td>1–2 events</td>
<td>40 (22.5)</td>
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<tr>
<td>3–5 events</td>
<td>62 (34.8)</td>
</tr>
</tbody>
</table>

| Note | Means (s.d.) of square of physician visit and log of CAM visits were 2.53 (0.87) and 1.55 (1.44), respectively. |
|      | Data available on 168 subjects. Median family income = 4, representing income bracket CN$30 000 to 40 000. |
Median family income was in the CN$30 000 to 40 000 range. On average, patients reported two co-morbid conditions (median = 2). The median value for FM-related disability was 58.46, indicating significant impairment among half of our sample. Almost half (44.4%) were classified as psychologically vulnerable. Standard statistics for the three measures contributing to vulnerability status are found in Table 1.

**Health service utilization**

Subjects reported, on average, 7.17 visits to physicians during the preceding 6 months, (median = 7). The average number of visits to CAM professionals was 11.32 (median = 4). Sixty-seven (37.6%) subjects reported not visiting a CAM professional during the preceding 6 months. Interestingly, 109 subjects reported visits to both physicians and CAM professionals in the preceding 6 months; only two subjects reported only CAM services.

**Bivariate associations among independent and dependent variables**

The correlation matrix in Table 2 revealed significant bivariate associations between independent variables and outcome variables, with relations in the expected directions. Moderate and positive statistically significant associations were found between physician visits and co-morbidity and disability. Vulnerability status was significantly associated with both more physician and CAM visits. The presence of several moderate to strong correlations between determinants underscores the importance of using multivariate modelling to identify independent determinants of health care utilization. None the less, none of these correlations exceeded 0.70, indicating the absence of potential collinearity problems in any one model.

**Determinants of (square root of) number of physician visits**

Table 3 shows the results from each step of the regression analysis predicting (square root of) physician visits. Patient age and co-morbidity entered in Step 1 made a significant contribution to the model. Within this block, higher co-morbidity and younger age were significant determinants of more physician visits, each controlling for the influence of the other. With the addition of disability and pain intensity in Step 2, the increase in \( R^2 \) was significant. In this step, higher co-morbidity, higher

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**Table 2. Pearson correlations among putative determinants and outcomes (N=178)**

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<tbody>
<tr>
<td>1. No. of physician visits(^a)</td>
<td>—</td>
<td>0.24(^{***})</td>
<td>-0.11</td>
<td>0.01</td>
<td>0.24(^{**})</td>
<td>0.08</td>
<td>0.22(^*)</td>
<td>0.22(^*)</td>
</tr>
<tr>
<td>2. No. of CAM visits(^b)</td>
<td>—</td>
<td>-0.10</td>
<td>0.10</td>
<td>0.08</td>
<td>0.10</td>
<td>0.04</td>
<td>0.25(^{***})</td>
<td>—</td>
</tr>
<tr>
<td>3. Age</td>
<td>—</td>
<td>0.01</td>
<td>0.15(^*)</td>
<td>0.06</td>
<td>0.08</td>
<td>—</td>
<td>-0.18(^*)</td>
<td>—</td>
</tr>
<tr>
<td>4. Family income(^c)</td>
<td>—</td>
<td>-0.15(^*)</td>
<td>-0.24(^{**})</td>
<td>-0.25(^{***})</td>
<td>-0.17(^*)</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>5. Co-morbidity</td>
<td>—</td>
<td>0.20(^{**})</td>
<td>0.26(^{**})</td>
<td>0.20(^{**})</td>
<td>—</td>
<td>—</td>
<td>—</td>
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<tr>
<td>6. Pain intensity</td>
<td>—</td>
<td>—</td>
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<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
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<tr>
<td>7. Disability (FIQ)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
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<tr>
<td>8. Vulnerability status(^d)</td>
<td>—</td>
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\(^a\)Square of physician visits.  
\(^b\)Log of CAM visits.  
\(^c\)Sample size reduced to 168 for associations with income.  
\(^d\)Binary variable with 1 representing vulnerable and 0 not vulnerable, serving as the reference group.  
\(^*\)P < 0.10, \(^{**}\)P < 0.01, \(^{***}\)P < 0.001.

**Table 3. Summary of hierarchical multiple linear regression analyses of (square root of) number of physician visits (N=178)**

<table>
<thead>
<tr>
<th>Determinants</th>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unstandardized coefficients (95% CI)</strong></td>
<td><strong>Unstandardized coefficients (95% CI)</strong></td>
<td><strong>Unstandardized coefficients (95% CI)</strong></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-0.01** (-0.026, -0.001)</td>
<td>-0.01** (-0.026, -0.001)</td>
<td>-0.01* (-0.025, 0.001)</td>
</tr>
<tr>
<td>Co-morbidity</td>
<td>0.16*** (0.07, 0.26)</td>
<td>0.14*** (0.04, 0.23)</td>
<td>0.13*** (0.04, 0.22)</td>
</tr>
<tr>
<td>Disability (FIQ)</td>
<td>0.01** (0.00, 0.02)</td>
<td>0.01* (0.00, 0.02)</td>
<td>—</td>
</tr>
<tr>
<td>Pain intensity (MPQ)</td>
<td>-0.06 (-0.18, 0.07)</td>
<td>-0.05 (-0.18, 0.07)</td>
<td>—</td>
</tr>
<tr>
<td>Vulnerability status</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Multiple ( R )</td>
<td>0.280***</td>
<td>0.336***</td>
<td>0.345***</td>
</tr>
<tr>
<td>( R^2 )</td>
<td>0.078***</td>
<td>0.113***</td>
<td>0.119***</td>
</tr>
<tr>
<td>Adjusted ( R^2 )</td>
<td>0.068***</td>
<td>0.092***</td>
<td>0.094***</td>
</tr>
<tr>
<td>( R^2 ) change</td>
<td>0.078***</td>
<td>0.035**</td>
<td>0.006</td>
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</table>

Multiple \( R \), \( R^2 \) and adjusted \( R^2 \) are indicated along with the significance of the overall inferential \( F \) test. \( R^2 \) change is indicated along with the significance of the increment \( F \) test.  
\(^*\)P < 0.10, \(^{**}\)P < 0.05, \(^{***}\)P < 0.01, \(^{****}\)P < 0.001.
disability and younger age were statistically associated with more physician visits. As shown in Table 3, there was no significant increase in \( R^2 \) by the addition of vulnerability status when differences in age, co-morbidity, disability and pain intensity were already accounted for. The final model, with the set of predictors together, explained about 12% of the total variance in physician visits [overall \( F(5, 172) = 4.66, P < 0.001 \)].

**Determinants of (log of) number of CAM visits**

Ten subjects failed to provide family income data. A test of mean differences in CAM services between subjects with and without income data showed no significant difference. We therefore used the sample of 168 subjects with income data for the analysis of CAM visits.

Table 4 shows the results from each step of the regression analysis predicting (log of) CAM visits. Subject age, co-morbidity and family income entered in Step 1 made a marginally significant contribution to the model. Within this block, younger age was marginally associated with more CAM visits, controlling for income and co-morbidity. When we added disability and pain intensity in Step 2, the increase in \( R^2 \) was not significant. In Step 3, vulnerability status added significantly to the model. Women in the vulnerable group reported more disability and pain intensity [overall \( F(5, 172) = 4.66, P < 0.001 \)]. The final model explained about 11% of the total variance of CAM visits.

**Discussion**

Many physicians assume that psychological factors not only underlie the disorder but contribute to FM patients’ use of health care services [29]. We addressed this belief by examining whether psychological vulnerability contributed to patients seeking services, after controlling for known correlates (e.g. age, co-morbidity) of service use.

Interestingly, we found that psychological vulnerability was associated with CAM but not physician service use.

Use of physician and CAM services has been related to sociodemographic, clinical and psychosocial variables in a piecemeal fashion; some researchers have focused on physical and sexual abuse [9], others on psychological distress [42] and psychiatric history [22, 43]. We employed a theory-driven approach to determine if psychological vulnerability added to our understanding above and beyond previously documented associations between sociodemographics, clinical variables and health service utilization. The regression analysis showed that more co-morbid conditions and higher disability (clinical variables) were associated with more physician visits, after controlling for pain intensity and psychological vulnerability. It should be noted that disability became marginally significant after the psychological vulnerability variable was entered into the model, reflecting the covariation among these variables. In general, our findings are consistent with Wolfe et al. [8].

CAM use has been studied in rheumatology patients in several countries (USA [44], UK [45], Australia [46] and Canada [10]) but only a few studies have focused on FM [11, 47, 48]. We found that FM subjects who were psychologically vulnerable visited CAM professionals more often, above and beyond what could be explained by individual differences in age, income, co-morbidity, disability and pain intensity. These findings diverge from Nicassio et al. [11] who noted that age (younger), higher pain and more disability were associated with more CAM services in FM, but their definition of CAM was very broad. There is debate in the literature as to which services, products and behaviours to include in the definition of CAM [35]. We chose services that were provided by a professional on a fee-for-service basis, as these are regulated by professional corporations in Quebec, Canada but not covered by the universal health system. While this definition is less inclusive than that used by the (American) National Center for CAM of the National Institutes of Health, it is similar to the approach used by researchers working with national databases in both Canada and the United States [30].
The present study findings are in concert with previous reports [49] showing that patients with primary FM are heavy consumers of physician and CAM services. Our sample reported, on average, 7 visits to physicians during the preceding 6 months (or 14 per year). To put this finding in perspective, the mean number of ambulatory care physician visits in 1991 in Quebec during the year was 3 (s.d. = 0.8) [50]. Our results are similar to White et al.’s [51] community-based FM sample, who reported 12 physician visits in the previous year. Wolfe et al. [8] estimated that clinic-based FM patients (N = 538) in the United States averaged 10 physician visits per year; a figure somewhat lower than ours. Alexander et al. [9], in another American study (N = 75), found that patients made, on average, 11 out-patient visits to ‘health professionals’ in the preceding 6 months, but this rate included both physicians and other providers. Although one may hypothesize that patients with access to universal health care use more physician services than those in the USA, alternative explanations for the discrepancy could relate to the city size, the number of physicians available per citizen, or patient versus non-patient status. Most of our community-based subjects had been examined by a rheumatologist in the past and many others were being followed by their family doctors, thus most were already in the medical system.

Our subjects reported, on average, 11 (median = 4) visits to CAM professionals in the preceding 6 months. One hundred and nine women visited both physicians and other health-care providers; only two reported seeking CAM care exclusively. ‘Non-traditional’ medical services in the large Wolfe et al. [8] study consisted of massage, acupressure, acupuncture, herbal therapy and homeopathic treatments; their use varied considerably by site (six American cities), but the patients averaged 6 visits per 6-month period. Herein, subjects who were more psychologically vulnerable used CAM services more than those not so classified. Are these patients seeking treatment for unresolved psychosocial issues? According to Grzesiak’s [25] notion of a ‘matrix of vulnerability’, a combination of personal and social risk factors could perpetuate symptoms. The amount of time and attention provided by CAM health professionals may assuage the distress experienced by these patients. Massage or other ‘hands on’ therapies may provide comfort to those with interpersonal stressors (a common type of stress for individuals with FM [26]) in a ‘safe’ setting. CAM services, for the most part, manage ‘physical’ symptoms, which may match FM patients’ conviction that their disease has an organic basis. Thus, vulnerable patients may seek care indirectly for psychosocial problems that they tend to deny.

While our results cannot be generalized to the population of individuals who would meet criteria for FM but do not seek medical care (i.e. non-patients), they suggest that once individuals with FM become patients, they are indeed heavy consumers of both physician and CAM services. These findings are based on self-reported health service use, but such data have held up to scrutiny in other studies [32, 33, 52]. None the less, it is possible that regional differences in legislation and reimbursement policies limit the external validity of these findings [53]. Finally, these results are based on cross-sectional data and therefore cannot explain causality.

Despite these limitations, we believe there are several practical applications that might arise from these findings. First, physicians treating FM patients may consider focusing more on co-morbid conditions and disability [54]. Second, physicians treating a FM patient may find it useful to know if she was vulnerable, due to a combination of risk factors, indicating that she may benefit from a multidisciplinary intervention, for example inclusion of complementary care such as cognitive-behavioural therapy and/or physiotherapy. Third, it may be worthwhile for the physician to discuss the topic of CAM service use, since it is so common. Future work with this cohort will: (i) determine if this level of service use is maintained over time; (ii) document the costs associated with use of physician and non-physician care, as well as laboratory and hospital services [55]; and (iii) test whether extensive use of services has an impact on pain.

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Conflict of interest

The authors have declared no conflicts of interest.

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