

# Do Employment and Family Work Affect the Health Status of Women with Fibromyalgia?

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**ABSTRACT. Objective.** To assess health status differences of women with fibromyalgia syndrome (FM) who are employed and not employed, and to evaluate whether employment and family work influence the health status of women with FM as it does for women in community studies.

**Methods.** Participants were 287 women recruited from 118 randomly selected rheumatology practices. They completed telephone interviews that collected data on demographic characteristics, health status, symptoms, family work, and social support. One hundred thirty-seven were employed and 150 were not employed. Formal statistical analysis, including estimation and testing, focused on the relationship between employment and 4 health status measures: Modified Health Assessment Questionnaire (MHAQ), visual analog scale (VAS) for pain on the interview day, number of painful areas, and VAS for fatigue on the interview day. The relationship between employment and these measures was evaluated using analysis of variance, chi-square, linear regression, and ordinal logistic regression.

**Results.** The majority of participants reported high levels of symptoms and poor health status. In the bivariate analyses, employed women reported significantly less pain, less fatigue, and better functional status than those who were not employed. In the multivariate analyses, employment remained a significant factor in explaining number of painful areas, functional status (MHAQ), and fatigue, with employed women reporting better health status than those not employed. Employment was not associated with pain on the day of the interview when other factors were considered in the analysis. The psychological demands of family work were consistently related to all dependent measures of health status, as those with greater psychological demands reported worse health status.

**Conclusion.** As in community studies, employed women with FM report better health status than women who are not employed. The demands of family work exert a serious and significant effect on every dimension of health status and should be the focus of greater clinical attention. Further followup will assess whether employment has a protective effect for women with FM as in community studies or whether women with less severe FM tend to remain in the workforce. (J Rheumatol 2003;30:2045–53)

## Key Indexing Terms:

FIBROMYALGIA

EMPLOYMENT

HEALTH STATUS

Fibromyalgia syndrome (FM) is a highly prevalent rheumatic disorder primarily among women and affects 2% to 6% of the US population<sup>1-3</sup>. It is characterized by widespread pain accompanied by 11 or more of 18 specific tender point sites<sup>4</sup>. Characteristic (or accompanying) symptoms include disturbed sleep patterns and psychological

distress. Although initially thought to be primarily a syndrome of young women, the prevalence of FM increases with age, with the highest prevalence found after age 60. The majority of patients with FM have chronic symptoms and the severity of the symptoms varies over time. The etiology of FM is not known. Several theories of onset, course, and severity include FM as a pain amplification disorder<sup>5,6</sup>, immune function disorder, hormone<sup>7</sup> or neurotransmitter<sup>8</sup> dysfunction, the result of physical trauma<sup>9</sup>, non-rapid eye movement sleep deprivation<sup>10</sup>, or life stress<sup>11,12</sup>.

Although studies of FM pain, functional disability, and psychological status have documented the serious psychosocial influence of FM<sup>1-3,13-22</sup>, relatively few have analyzed FM and employment. Studies of employment show that rates of work disability or loss of employment vary considerably, from 6% to 29% to 70%<sup>23</sup> of populations studied. Patients with FM also report limitations in ability to perform work duties<sup>23,24</sup> and a higher than expected number of work-loss days. People with FM often have difficulty qualifying for Social Security compensation<sup>25</sup>, although one study of

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FM among patients in university outpatient facilities showed that from 4% to 25% of patients were receiving some form of disability payments<sup>26</sup>. A recent qualitative study of FM and employment in Sweden<sup>27</sup> with a small sample of FM patients (n = 39) reported that ability to remain at work was related not only to individual work capacity but also to structure of the workplace and the demands of family work. Further, participants reported that they highly value their paid work roles and that the work role is "important for their identity and self-esteem." None of these studies addressed the effects of employment on disease course or severity.

Community studies of health and well being among women consistently demonstrate that employed women are healthier than women who are not employed outside the home<sup>28-36</sup>. However, because most of these studies are cross-sectional surveys, the causal relationships between employment status and health status remain unclear. Several hypotheses have been proposed, including: (1) the social isolation of being a fulltime homemaker contributes to higher levels of illness; (2) psychosocial and economic benefits of paid work contribute to better health; or (3) illness and disability prevent women from participating fully in the labor force. Some studies also suggest that role overload associated with the dual demands of employment and family work may be more important than simply employment status in explaining health status differences among women<sup>37,38</sup>. There currently is no consensus on the adverse health effects of being a fulltime homemaker, or the health benefits of full or part-time employment for women<sup>39</sup>, although several recent community studies<sup>32,34,40</sup> show that fulltime employment predicts slower declines in perceived health and physical functioning among women in the general population. These studies<sup>32,34,40</sup>, which have methodological problems in both their research designs and the health status measures being studied, only represent an initial base for further investigation of this issue.

There is a complex interplay between the demands of paid work and unpaid work of the family and how these competing demands affect health status. Although men are taking on greater responsibility for family work, women remain the primary caretakers in most American families. Therefore, family work must be considered along with paid work in assessing the effects of employment on health status.

Our previous studies on the relationship between paid work, family work, and health status among women with rheumatoid arthritis (RA) are consistent with the general literature, in that women who remain in the workforce report the best health status<sup>41</sup>, although we do not find a protective health benefit over time as was described in some community studies<sup>32,34,40</sup>. Additionally, the psychological demands of family work have a greater effect than the psychological demands of paid work on psychological distress<sup>42</sup> among

employed women with RA. Greater autonomy over family work mediates the adverse effects of psychological demands on well being, in that women who have greater control over family work have less distress regardless of the psychological demands of the family. Despite the growing workforce participation among women, especially those with young children, the importance of family demands on workplace performance and health status has not been well studied. These relationships are rarely studied in the context of a chronic and debilitating health condition such as FM.

We assessed health status differences of women with FM who are employed and not employed in the context of unpaid family work, and investigated whether the health status findings regarding employment status for women in the community remain consistent for women with FM. We describe the baseline findings of a longitudinal study now under way that will address whether employment provides a health benefit to women with FM. We propose the following hypotheses:

1. Women with FM who are employed for pay outside the home will have better health status compared to women who are not employed, controlling for the effects of age, socioeconomic status, social support, and disease duration.
2. Family work and family demands will have a significant effect on health status, in that greater family demands will be associated with worse health status.
3. Women who report more autonomy in controlling the pace of family work will have better health status than those who report less autonomy.

## MATERIALS AND METHODS

**Sample.** Participants were recruited in 2 stages. First, rheumatologists were recruited from the membership of the American College of Rheumatology (ACR). Physician recruitment was limited to members who were Fellows and whose primary activity was patient care as listed in the membership directory. Letters explaining the study and requesting participation were mailed to 427 physicians, and 118 (28%) physicians were enrolled in the study. According to replies from physicians and their office assistants, the relatively high refusal rate reflected participation in clinical trials being conducted by pharmaceutical companies and numerous other requests to participate in research studies. Physicians were reimbursed \$25 for each patient referred to cover expenses associated with recruitment efforts.

Physicians or staff then asked patients with a diagnosis of FM if they were interested in the study. If so, the patient returned a postcard to the study. The research study staff then contacted patients by telephone. Inclusion criteria were that participants be age 18 years or older and have a diagnosis of FM using the ACR criteria<sup>4</sup>, which we provided to participating rheumatologists. Inclusion criteria also stipulated that the patient have no other serious or life-threatening conditions that would account for functional limitations or that would make it difficult to complete the interview.

Three hundred sixty-five patients were referred to the study. Of those, 41 were ineligible for participation and 37 individuals withdrew prior to completing the interview. All participants were mailed a consent form that they signed and returned in a prestamped envelope. Two hundred eighty-seven patients completed interviews (89% response rate of those eligible). Patients received \$25 for completing the interview as a token of appreciation.

Eligible patients completed a computer assisted phone interview with a

trained interviewer. The interview was a structured questionnaire that assessed demographic characteristics, health status, symptoms, employment characteristics, family work, and social support. The project coordinator monitored 10% of the interviews to assure quality control.

**Variables. Employment.** Employment was measured by self-report by asking participants if they were employed for pay outside the home. Respondents could answer yes or no. Additional information was obtained about total amount of hours worked and whether they worked full- or part-time.

**Demographic characteristics.** Demographic characteristics included age, marital status, education level, race, and total family income. Age was measured in years; education by years completed; marital status as married, single, living with someone, separated, widowed, divorced; race as white, African American, Asian, other; total family income by US census categories.

**Health status.** Health status, a multidimensional concept, was indicated by disease duration and symptom reports as well as physical functioning. Each was assessed using several validated and reliable existing questionnaires.

**Duration of disease.** Data were obtained during the medical history portion of the questionnaire on the date of initial diagnosis of FM.

**Symptoms. Pain.** First, pain was measured by asking patients, "On a scale of 0 to 100, with 0 being no pain and 100 being the most pain possible, how much pain do you feel today?" This visual analog type scale (VAS) has been used in many studies of FM and has been shown to be a valid and reliable measure of pain<sup>43</sup>. Second, in addition to this global rating of pain, Affleck and colleagues<sup>44</sup> suggest that for FM patients, pain varies in intensity and location. Using their method, each region used in the ACR classification of FM was assessed for presence or absence of pain: the right and left sides of the body above and below the waist, the upper spine and neck, and the lower spine and lower back. Patients were mailed a copy of Figure 1 to use as a reference during the interview and asked whether pain was present or absent in those areas. Affleck's measure has demonstrated discriminant validity, in that pain both predicted and was affected by poor sleep quality<sup>44</sup>, and poorer sleepers reported more pain with this measure.

**Fatigue.** Fatigue was measured by asking patients, "On a scale of 0 to 100, with 0 being no fatigue and 100 being the most fatigue possible, how much

fatigue do you feel today?" This VAS has been used in many studies of FM and has been shown to be valid and reliable.

**Physical functioning.** Physical functioning was assessed by measuring ability to perform activities. The Vancouver Fibromyalgia Consensus Group (VFCCG) has recommended using the MHAQ to assess physical abilities<sup>45</sup>. The MHAQ is a modified version of the Stanford Health Assessment Questionnaire.

**Family work characteristics.** These variables included the Psychological Housework Demands Scale (PHDS), a measure of perceived control in the home and number of hours spent in instrumental and nurturing family responsibilities in the past week. The scale consisted of 13 items measuring time constraints, difficulty, and benefits of family work<sup>40</sup>. Scores ranged from 13 to 52 (the higher the score, the more demanding) and the scale had a Cronbach's alpha of 0.83. A measure of perceived autonomy included 2 items on decision latitude at home, including who decides when family work is done and whether work can be delayed<sup>46</sup>.

**Social support.** Social support was evaluated by the Qualitative Social Support Scale designed to measure how supportive the social network is perceived to be. It contains 20 Likert-type items scored on a scale of 1 (never true) to 4 (always true) asking about perceptions of social support received from important others, such as feedback, task assistance, and ego support. Four items assessed relationship strain (e.g., the extent to which a relationship is stressful) and were reverse-scored<sup>47</sup> (Cronbach's alpha = 0.82).

**Data analysis.** Summary statistics were generated to describe the study sample in terms of demographic, employment, family work, and health status characteristics. Differences between employed and not employed were assessed using analysis of variance and chi-square techniques. Formal statistical analysis, i.e., estimation and testing, focused on the relationship between employment and 4 health status measures (MHAQ, pain VAS on the interview day, number of painful areas, and fatigue VAS on the interview day).

The random error structures for the MHAQ and pain measures were approximately normally distributed. Thus, the relationship between employment and these measures was evaluated using linear regression models. Initially, a model was fit using employment as the sole independent variable and MHAQ or pain as the dependent variable. Subsequently, the potential confounding effects of demographic and family work characteristics were studied using multivariate models. In these latter models, employment was included as the primary factor of interest, and a backwards, stepwise variable selection strategy was used to identify other covariates that were related to the dependent variable and that might alter inferences for the effect of employment. Diagnostics were performed prior to modeling to investigate potential outliers, collinearity, and skewness in the covariates. When necessary, covariates were transformed to reduce skewness. Diagnostics were also performed after model selection to assess goodness of fit, to identify overly influential observations, and to evaluate linearity assumptions. A 5% significance level was applied in all statistical tests. All p values and confidence intervals were calculated using robust standard error estimates that account for cluster sampling of subjects within rheumatology practices<sup>48</sup>. Standardized regression coefficients were determined for each "best" fitting model to determine the relative importance of each covariate.

Due to the extreme skewness of the number of painful areas and fatigue measures, ordinal logistic regression was used. Both measures were converted to 4-category ordinal scales. Specifically, the number of painful areas was categorized as low/moderate (0–10), high (11–14), very high (15–17), or extreme (18). Similarly, the fatigue scale was converted to low/moderate (0–60), high (61–80), very high (81–90), or extreme (91–100). As with the linear regression models described above, initial ordinal logistic regression models included only employment as an independent variable and either number of painful areas or fatigue as the dependent variable. Subsequent models were developed to evaluate whether the estimated effect of employment might be distorted via confounding by

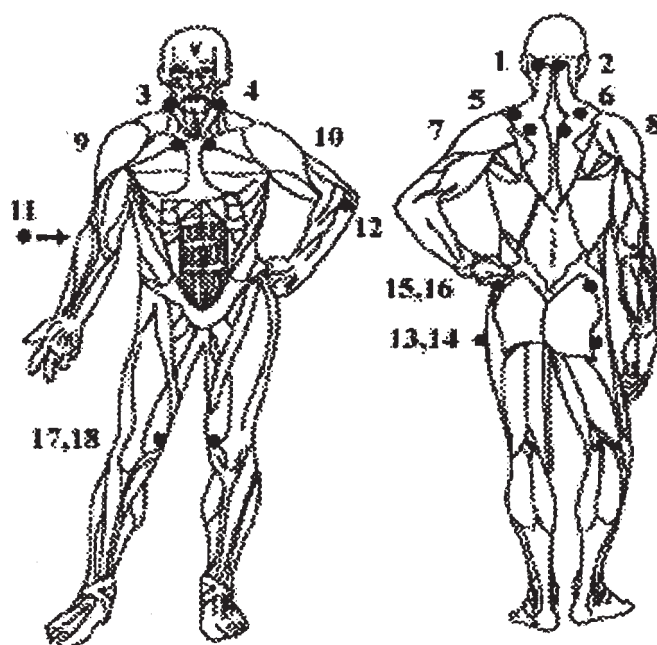


Figure 1. Location of tender areas at which participants indicated their pain.

other covariates. These multivariate ordinal logistic models were fit using the same variable selection approach as for the linear regression models described above. Similar diagnostic techniques were employed and were augmented with procedures specific to ordinal regression. Statistical analyses were performed using the JMP, Stata, and SPSS software packages.

## RESULTS

*Descriptive characteristics of the sample.* Table 1 presents the descriptive characteristics for the whole sample and separately for those who were employed and not employed. The mean age was 47 years (SD 11) and average educational attainment was 14 years (SD 3). Eighty-eight percent were white, 60% were married, and 44% had household incomes  $\geq$  \$50,000. The average duration of FM was 5 years (SD 4). Participants typically reported moderate to high levels of

social support, with a mean of 59 on a scale that ranged from 35 to 75 in the study sample.

Subjects reported high levels of symptoms. The mean MHAQ score was 0.61 (SD 0.30). Mean pain on a 100 point VAS on the day of the interview was 58 (SD 23). The average subject reported 15 painful areas (SD 3) among the 18 areas used in diagnosis of FM and fully 32% of subjects reported pain at all 18 locations. The mean fatigue score was 75 (SD 22) on a 100 point VAS, and 21% responded with values between 91 and 100.

There was a considerable amount of time spent in family work, with 25 hours (SD 18) allocated to instrumental activities such as cooking, cleaning, etc., and 26 hours (SD 32) on nurturing activities such as spending time with the family, giving advice, etc. Participants felt the psychological

Table 1. Characteristics of the total sample of patients with FM (n = 287) and a comparison of those who were employed and not employed.

Characteristics	Total Sample, mean (SD) or %	Employed, n = 137	Not Employed, n = 150
<b>Demographic</b>			
Age, yrs	47 (11)	44 (9)	50 (12)
Education, yrs	14 (3)	14.9 (3)	13.9 (3)
Ethnicity, white, %	88	90	87
Marital status, married*, %	60	54	65
Household income***, %			
< \$20,000	16	7	23
\$20,000–49,999	41	41	41
\$50,000–100,000	31	37	25
$\geq$ \$100,000	13	15	11
<b>Other</b>			
Disease duration, yrs	5 (4)	5 (4)	5 (4)
Social support scale, 35–75	59 (8)	58 (8)	57 (8)
<b>Health status</b>			
MHAQ, 0–3***	0.61 (0.30)	0.52 (0.30)	0.68 (0.30)
Pain on day of interview, 0–100*	58 (23)	54 (23)	60 (23)
No. of painful areas, 0–18*	15 (3)	14 (3)	15 (3)
Ordinal categorization of number of painful areas, %			
Low/moderate, 0–10	13	15	11
High, 11–14	33	42	25
Very high, 15–17	22	20	23
Extreme, 18	32	23	40
Fatigue, 0–100*	75 (22)	72 (21)	77 (21)
Ordinal categorization of fatigue, %			
Low/moderate, 0–60	28	35	21
High, 61–80	32	34	31
Very high, 81–90	19	12	25
Extreme, 91–100	21	19	23
<b>Family work</b>			
Hours of instrumental, per week	25 (18)	24 (14)	26 (21)
Hours of nurturant, per week*	26 (32)	23 (21)	29 (39)
Psychological Housework Demands Scale, 13–52	30 (6)	30 (6)	30 (6)
Who decides when to schedule household work, %			
Self	58	62	54
Self and family member	30	29	30
Other family member/no response	13	9	16
Ability to take a day off from household work, %			
Very easily	43	40	45
Easily	29	30	29
With some or great difficulty	28	30	27

\* p < 0.05; \*\* p < 0.01; \*\*\* p < 0.001 FM Employed different from Not Employed.



demands of housework were moderate, with a mean scale value of 30 (SD 6) out of a possible range of 13 to 52. Most participants reported flexibility in family work, as the majority decided by themselves when to do work (58%) and most could take a day off from family work easily or very easily (72%).

A total of 137 patients with FM in the study sample were employed for pay outside the home and 150 were not employed. Preliminary bivariate analyses shown in Table 1 (columns 2 and 3) indicate that, compared to those not employed, employed women were significantly younger, more highly educated, less likely to be married, had higher family incomes, and generally reported better health status. Employed women also spent less time in nurturant family work compared to those not employed, although both groups experienced similar psychological demands and autonomy in carrying out family work.

Of the women who were not employed, most (59%) reported some kind of work disability. Specifically, 36% reported receiving disability benefits, 23% reported being disabled but not receiving benefits, 13% were retired, and 14% considered themselves homemakers. Almost all unemployed subjects (98%) had worked outside the home at some point in their lives. Most (59%) stopped working after diagnosis of FM.

*Regression analysis of the effects of employment on health status indicators.* When used alone as an independent variable in the regression analysis, employment was associated with a statistically significant decrease in MHAQ ( $p = 0.001$ ). On average, MHAQ scores were 0.15 points lower in employed subjects than in unemployed ones (95% CI  $-0.23, -0.07$ ). Adjustment for other covariates (Table 2a) reduced this difference to 0.12 points, but it remained statistically significant ( $p = 0.004$ ). The final multivariate model also showed that higher values of MHAQ were associated with higher scores on the PHDS, lower educational attainment, and less control over when housework will be performed. Among the significant covariates, standardized coefficients showed that the PHDS had the strongest relationship to MHAQ.

Employment was again a significant predictor in the initial model of pain on the day of the interview. The model indicated that, on average, pain in employed subjects was 7.3 points lower on the VAS (95% CI  $-13.1, -1.5$ ;  $p = 0.02$ )\*. However, adjustment for other covariates reduced the estimated effect of employment to a 4.1-point decrease (Table 2b) and the effect of employment on pain was no longer significant ( $p = 0.16$ ). Specifically, employment was

dropped from the model when education entered the model. In the final multivariate model, greater pain was significantly related to higher scores on the PHDS, less control over the scheduling of household work, less education, and longer duration of disease.

Among these significant covariates, the PHDS had the standardized coefficient of greatest magnitude.

The first ordinal regression model for the relationship between employment and number of painful areas yielded a significant odds ratio of 0.46 (95% CI 0.30, 0.70;  $p < 0.001$ ). The estimate implies that employed women were almost half as likely to report a higher number of painful areas compared to women who were not employed. The data were consistent with the proportional odds assumption, namely, that the same odds ratio estimate applies regardless of the reference level on the ordinal scale.

Assessment of the relationship between employment and number of painful areas while adjusting for other covariates resulted in little change in the estimated effect of employment (Table 3a). In the final model, the adjusted odds ratio for employed versus unemployed FM patients was 0.47, with an associated  $p$  value of 0.001. The final model also included significant effects related to covariates for housework demands and education. A 1-point increase on the PHDS increased the odds of falling higher on the ordinal scale for number of painful areas by 8%. Each additional year of education decreased the odds of having a larger number of painful areas by 9%. Comparison of standardized coefficients across the 3 covariates in the final model showed that the housework-demands variable was the one most strongly related to the number of painful areas.

A significant association between employment and fatigue on the interview day was also found, both before and after adjustment for other covariates. The estimated odds ratio from an ordinal regression model with employment as the only independent variable and fatigue as the dependent variable was 0.52 (95% CI 0.34, 0.80;  $p = 0.003$ ). This indicates that employed women were about half as likely to experience a higher level of fatigue compared to women who were not employed. Once again, the data were consistent with the proportional odds assumption. In addition, adjustment for potential confounding by other patient characteristics did not substantially alter the estimated effect of employment on fatigue or its significance (Table 3b). The final multivariate model for fatigue also included significant effects for the PHDS, age, and income. The odds of greater fatigue were increased by 7% for every 1-point increase in housework demands and were reduced by 3% for every one-year increase in age. The parameter estimates for the effects of income on fatigue pointed to a threshold effect, in that subjects with annual incomes over \$50,000 were less likely to fall high on the fatigue scale than those with incomes below \$50,000. As with the other dependent variables, the final model of fatigue showed that the PHDS had the standardized coefficient of greatest magnitude.

\*The estimate for the difference in mean pain levels derived from the initial linear regression model reflects omission of a number of outlying observations identified via regression diagnostics. Thus, it is not identical to the crude estimated difference in means that can be calculated using the summary statistics in Table 1.

Table 2. Associations between employment and health status measures among patients with FM after using multivariate linear regression to control for the effects of demographic and family work variables.

Table 2a. Mean HAQ as the Dependent Variable

Independent Variables in Final Model	Parameter Estimate*	95% CI	Standardized Coefficient (SE)	p
Employment (yes vs no)	−0.12	−0.20, −0.04	−0.060 (0.020)	0.004
Psychological Housework Demands Scale	+0.01	+0.007, +0.02	+0.068 (0.013)	< 0.001
Education, yrs	−0.02	−0.03, −0.01	−0.056 (0.015)	< 0.001
Decision on when to do household work				0.01 <sup>†</sup>
Joint vs self	+0.09	+0.01, +0.17	+0.043 (0.018)	
Other/no response vs self	+0.12	+0.02, +0.22	+0.039 (0.017)	

Table 2b. Pain on the Interview Day as the Dependent Variable

Independent Variables in Final Model	Parameter Estimate*	95% CI	Standardized Coefficient (SE)	p
Employment (yes vs no)	−4.1	−9.8, +1.7	−2.0 (1.4)	0.16
Psychological Housework Demands Scale	+0.85	+0.49, +1.22	+4.9 (1.0)	< 0.001
Decision on when to do household work				< 0.001 <sup>†</sup>
Joint vs self	+3.5	−0.9, +8.0	+1.6 (1.0)	
Other/no response vs self	+14.0	+7.4, +20.6	+4.6 (1.1)	
Education, yrs	−1.8	−2.8, −0.8	−4.4 (1.2)	0.001
Duration of FM <sup>††</sup>	+3.1	+1.4, +4.8	+3.2 (0.9)	0.001

\* Parameter estimates are differences in means for categorical independent variables and slopes for continuous ones. <sup>†</sup> p value from a simultaneous test on the effects of all levels of this categorical variable. <sup>††</sup> Duration was measured in years, but this variable was transformed using a square root function to adjust for skewness.

Table 3. Associations between employment and health status measures among patients with FM after using ordinal logistic regression to control for effects of demographic and family work variables.

Table 3a. Number of Painful Areas as the Dependent Variable

Independent Variables in Final Model	Parameter Estimate*	95% CI	Standardized Coefficient (SE)	p
Employment (yes vs no)	0.47	0.30, 0.74	−0.37 (0.11)	< 0.001
Psychological Housework Demands Scale	1.08	1.05, 1.13	+0.51 (0.12)	< 0.001
Education, yrs	0.91	0.83, 0.99	−0.25 (0.12)	0.03

Table 3b. Fatigue on Interview Day as the Dependent Variable

Independent Variables in Final Model	Parameter Estimate*	95% CI	Standardized Coefficient (SE)	p
Employment (yes vs no)	0.50	0.32, 0.80	−0.35 (0.12)	0.004
Psychological Housework Demands Scale	1.07	1.03, 1.11	+0.41 (0.11)	< 0.001
Age, yrs	0.97	0.95, 0.99	−0.31 (0.12)	0.01
Income				0.001 <sup>†</sup>
< \$20,000	1.00			
\$20,000–49,999	1.63	0.85, 3.11	+0.24 (0.16)	
\$50,000–99,999	0.68	0.34, 1.38	−0.18 (0.17)	
≥ \$100,000	0.45	0.12, 1.03	−0.27 (0.14)	

\* Parameter estimates are odds ratios for categorical independent variables and incremental changes in odds for continuous ones. <sup>†</sup> p value from a simultaneous test on the effects of all levels of this categorical variable.

The Psychological Housework Demands Scale was the covariate most strongly associated with all 4 health status measures in this sample of women with FM. The correlation coefficients between housework demands and the health status measures were +0.24 for MHAQ ( $p < 0.001$ ), +0.25 for pain ( $p < 0.001$ ), +0.25 for number of painful areas ( $p <$

0.001), and +0.25 for fatigue ( $p < 0.001$ ). The distribution of painful areas and the fatigue variables was highly skewed, precluding the use of parametric testing. To reduce the effects of skewness on correlation estimates, Spearman rank correlation coefficients were calculated. The nonparametric coefficients between housework demands and the painful

areas and fatigue variables were +0.21 ( $p < 0.001$ ) and +0.22 ( $p < 0.001$ ), respectively.

## DISCUSSION

Our primary purpose was to analyze differences in health status between women with FM who were employed and those not employed in the context of unpaid family work. Consonant with findings in community studies, we expected that employed women would have better health status than those not employed. Family work and family demands would significantly affect health status in that greater family demands would be associated with worse health status. Women who reported more autonomy in controlling the pace of family work would have better health status than those with less autonomy.

*Bivariate analysis of health status differences between employed and not employed.* Generally, all participants reported high levels of symptoms and poor health status. Women in this study were similar to FM patients in other studies<sup>49,50</sup>, with high levels of pain, fatigue, impaired functional status, and work disability.

As hypothesized, we observed numerous health status differences between women who were employed and those not employed, with an overall advantage going to those who were employed. Despite having similar disease duration, employed women had less self-reported pain, less fatigue, and better functional status measured by MHAQ than those who were not employed. These findings are consistent with studies of healthy women in the community and our previous studies of arthritis patients confirming that employed women are generally healthier than women who are not employed outside the home. Other characteristics associated with employment could have accounted for the observed health status differences. Employed women in this sample were significantly better educated, more affluent, and younger and were less likely to be married.

*Multivariate analyses of health status differences between employed and not employed.* As we continue to follow women over the next 4 years, we will assess how employment influences health status over time. This cross-sectional analysis provides insights into baseline assessments, controlling for other confounding factors, and establishes the methodology to assess these changes. The cross-sectional multivariate analyses focused on 3 dimensions of health outcomes that are hallmarks of FM — pain, fatigue, and functional disability. Employment status remained an important explanatory factor in health status differences for 3 of 4 of the indicators studied when adjusting for demographic and family work covariates. Employed women had fewer painful areas, less fatigue, and better functional status compared to women who were not employed after adjustment for socioeconomic status, family demands, disease duration, and age. Although consistent with community studies of healthy women, the underlying mechanism for

this finding is not entirely clear. The psychosocial benefits associated with employment may contribute to better perceived health status, or healthier women may be more likely to be in the workforce, i.e., the healthy worker effect. Psychological factors that are independent of the symptoms of FM also might affect whether women are employed, the job performance of those who are employed, and adaptation to disease. Fischler and Booth<sup>51</sup> suggest that motivation, interpersonal skills, and stress tolerance, among other factors, may be important. As we continue to follow these women over the next few years, our goal is to determine whether this is the “healthy worker” effect or whether employment provides a health benefit for women with FM.

The magnitude of the effect of employment on health outcomes was clinically meaningful, as well<sup>52</sup>. On average, MHAQ scores were 0.15 points lower in employed women than in those who were unemployed (95% CI −0.23, −0.07), and adjustment for other covariates reduced this difference only slightly to 0.12 points. Similarly, for fatigue and number of painful areas, employed women have about half the likelihood of unemployed women of reporting higher fatigue scores or higher number of painful areas, even when adjusting for other factors. Developing a better understanding of why employed women with FM report better health status would contribute to better disease management, particularly because there are few effective therapies for FM.

*Family work and health status.* Participants reported major time commitments for unpaid family work, stating that they spend on average 25 (SD 18) and 26 (SD 32) hours per week on instrumental and nurturant tasks, respectively. Employed women spent less time on nurturant activities compared to those who were not employed (23 vs 29 hours), but there were no significant differences between employed and not employed on instrumental activities. However, total time spent in family work was not significantly associated with health status indicators. Rather, as hypothesized, perceived psychological demands of the family exerted a significant and strong effect on health status among our participants. The psychological demands of family work consistently affected all health status indicators and had the highest standardized coefficient in all 4 regression models. In contrast, our studies of employed women with RA have shown the importance of family demands in explaining psychological distress, but family demands did not have a significant effect on physical symptoms in RA. The relative importance of high family demands across outcome measures suggests that more attention should be paid to understanding the perception of psychological demands of family work.

We hypothesized that autonomy in family work would be significantly associated with health status and that women who experienced greater autonomy or control over family work would have better health status. Participants generally controlled when housework would be done and could take a

day off from household duties with little difficulty. There were no differences between employed and not employed. As expected, autonomy, specifically control over the scheduling of household work, was significantly associated with functional status (MHAQ) and pain on the day of the interview. Those with less control over the scheduling of household work reported higher MHAQ scores and more pain. Interestingly, the absolute number of hours in household work is not the important factor in the cross-sectional analyses; rather, control over scheduling is associated with worse health status. Although we cannot determine causality, we propose that it is more likely that family structure and family relations would determine control over scheduling, which would then affect health status. This inference suggests that women with FM and their families should work together to reduce the burden of housework through greater flexibility in scheduling.

*Other factors influencing health status.* Education and income also were significantly related to health status. Those with less education had significantly higher pain and MHAQ scores. Those with higher incomes, greater than \$50,000, also experienced less fatigue. These effects are consistent with the health disparities literature, in that those of lower social status have worse health status, and it is important to recognize that these effects are independent of employment and disease duration. Finally, age has a significant effect on fatigue, but not in the expected direction. Those who are older are more likely to report lower fatigue scores. This finding does agree with other reports in the literature<sup>53</sup>.

In summary, employment is an important factor in explaining differences in health status among women with FM. However, the causal pathways cannot be determined from these analyses, as they are based on cross-sectional data. Further followup of this cohort should shed light on whether employment influences health status over time and/or whether health status influences ability to remain in the workforce. Family responsibilities are an important factor in health status, as well. More attention should be focused on managing stress associated with the psychological demands of family work and the ability to control the pace of family work. It also is noteworthy that the absolute number of hours devoted to family work is not the critical element, but rather, the perceived demands associated with family work and ability to control the pace of family work. Finally, health outcomes among patients with FM reflect the broader health disparities apparent in American society, in that those of lower socioeconomic status have worse health status.

## REFERENCES

1. Vancouver Fibromyalgia Consensus Group and the Physical Medicine Research Foundation. The fibromyalgia syndrome: A consensus report on fibromyalgia and disability. *J Rheumatol* 1996;23:534-9.

2. Waylonis GW, Ronan PG, Gordon C. A profile of fibromyalgia in occupational environments. *Am J Phys Med Rehabil* 1994;73:112-5.
3. Winfield J. Psychological determinants of fibromyalgia and related syndromes. *Curr Rev Pain* 2000;4:276-86.
4. Wolfe F, Smythe H, Yunus J, et al. The American College of Rheumatology 1990 criteria for the classification of fibromyalgia. *Arthritis Rheum* 1990;33:160-72.
5. Perry F, Heller P, Levine J. Differing correlations between pain measures in syndromes without explicable organic pathology. *Pain* 1988;34:185-9.
6. Smythe H. "Fibrositis" as a disorder of pain modulation. *Clin Rheum Dis* 1989;5:823-32.
7. McCain G, Tilbe K. Diurnal hormone variation in fibromyalgia syndrome: a comparison with rheumatoid arthritis. *J Rheumatol* 1989;16:154-7.
8. Russell I, Vaeroy H, Javors T, Nyberg F. Cerebrospinal fluid biogenic amine metabolites in fibromyalgia/fibrositis syndrome and rheumatoid arthritis. *Arthritis Rheum* 1992;35:550-6.
9. Greenfield S, Fitzcharles M, Esdale J. Reactive fibromyalgia syndrome. *Arthritis Rheum* 1992;35:678-81.
10. Moldofsky H. Sleep and fibrositis syndrome. *Rheum Dis Clin North Am* 1989;5:91-103.
11. Uveges J, Parker J, Smarr K, et al. Psychological symptoms in primary fibromyalgia syndrome: relationship to pain, life stress, and sleep disturbance. *Arthritis Rheum* 1990;33:1279-83.
12. Urrows S, Affleck G, Tennen H, Higgins P. Unique clinical and psychosocial correlates of fibromyalgia tender points and joint tenderness in rheumatoid arthritis. *Arthritis Rheum* 1994;37:1513-20.
13. Cathey MA, Wolfe F, Kleinheksel SM, Hawley DJ. Socioeconomic impact of fibrositis. A study of 81 patients with primary fibrositis. *Am J Med* 1986;81 Suppl 3A:78-84.
14. Felson DT, Goldenberg DL. The natural history of fibromyalgia. *Arthritis Rheum* 1986;29:1522-6.
15. Hawley KJ, Wolfe F, Cathey MA. Pain, functional disability, and psychological status. A 12 month study of severity in fibromyalgia. *J Rheumatol* 1988;15:1551-6.
16. Ledingham J, Doherty S, Doherty M. Primary fibromyalgia syndrome. An outcome study. *BMJ* 1993;32:139-42.
17. Burckhardt CS, Clark SR, Bennett RM. Fibromyalgia and quality of life: A comparative analysis. *J Rheumatol* 1993;20:475-9.
18. Henriksson CM. Long-term effects of fibromyalgia on everyday life. A study of 56 patients. *Scand J Rheumatol* 1994;23:36-41.
19. Boissevain M, McCain G. Toward an integrated understanding of fibromyalgia syndrome. II: Psychological and phenomenological aspects. *Pain* 1990;45:239-48.
20. Freundlich B, Leventhal L. The fibromyalgia syndrome. In: Schumacher HR, Klippel JH, Koopman WJ, editors. *Primer on the rheumatic diseases*. 10th ed. Atlanta: The Arthritis Foundation; 1993:247-9.
21. Wolfe F, Anderson J, Harkness D, et al. Health status and disease severity in fibromyalgia. *Arthritis Rheum* 1997;40:1571-9.
22. White KP, Speechley M, Harth M, Ostbye T. Comparing self-reported function and work disability in 100 community cases of fibromyalgia syndrome versus controls in London, Ontario. *Arthritis Rheum* 1999;42:76-83.
23. Wolfe F, Anderson J, Harkness RM, et al. Work and disability of persons with fibromyalgia. *J Rheumatol* 1997;24:1171-8.
24. Henriksson C, Liedberg G. Factors of importance for work disability in women with fibromyalgia. *J Rheumatol* 2000; 27:1271-6.
25. White KP, Harth M, Teasell RW. Work disability evaluation and the fibromyalgia syndrome. *Semin Arthritis Rheum* 1995;24:371-81.
26. Wolfe F, Potter J. Fibromyalgia and work disability. *Rheum Dis*



- Clin North Am 1996;22:369-91.
27. Leideberg GM, Henriksson CM. Factors of importance for work disability in women with fibromyalgia: An interview study. *Arthritis Rheum* 2002;47:266-74.
  28. Verbrugge L, Maddens JH. Women's roles and health. *Am Demograph* 1985;7:36-9.
  29. Woods NF, Hulka BS. Symptoms reports and illness behavior among employed women and homemakers. *J Community Health* 1979;5:36-45.
  30. Nathanson CA. Social roles and health status among women: The significance of employment. *Soc Sci Med* 1980;14A:463-71.
  31. Verbrugge L. The twain meet: Empirical explanation of sex differences in health and mortality. *J Health Soc Behav* 1989;30:282-304.
  32. Noor NM. Work and family roles in relation to women's well-being: A longitudinal study. *Br J Soc Psychol* 1995;34:87-106.
  33. Verbrugge LM, Wingard DL. Sex differentials in health and mortality. *Women Health* 1987;12:103-45.
  34. Ross C, Mirowsky J. Does employment affect health? *J Health Soc Behav* 1995;36:230-43.
  35. Hibbard J, Pope C. Employment status, employment characteristics and women's health. *Woman Health* 1985;10:59-77.
  36. Gove WR, Tudor JF. Adult sex roles and mental illness. *Am J Sociol* 1973;78:812-35.
  37. Rosenfeld S. The effects of women's employment: Personal control and sex differences in mental health. *J Health Soc Behav* 1989;30:77-91.
  38. Bird CE. Gender, household labor, and psychological distress: The impact of the amount and division of housework. *J Health Soc Behav* 1999;40:32-45.
  39. Kotler P, Wingard D. The effect of occupational, marital and parental roles on mortality: The Alameda County Study. *Am J Public Health* 1989;79:607-12.
  40. Hibbard JH, Pope CR. Women's employment, social support, and mortality. *Women Health* 1992;18:119-33.
  41. Reisine S, Fifield J, Windkelman D. Employment patterns and their effect on health outcomes among women with rheumatoid arthritis followed for seven years. *J Rheumatol* 1998;25:1908-16.
  42. Reisine S, Fifield J. Family work demands, employment demands and depressive symptoms in women with rheumatoid arthritis. *Women Health* 1995;22:25-46.
  43. Meenan RF, Anderson JJ, Kazis LE, et al. Outcome assessment in clinical trials: evidence for the sensitivity of a health status measure. *Arthritis Rheum* 1984;27:1344-52.
  44. Affleck G, Urrows S, Tennen H, Higgins P, Abeles M. Sequential daily relations of sleep, pain intensity, and attention to pain among women with fibromyalgia. *Pain* 1996;68:363-8.
  45. Callahan LF, Smith WJ, Pincus T. Self-report questionnaires in five rheumatic diseases: Comparisons of health status constructs and associations with formal education level. *Arthritis Care Res* 1989;2:122-31.
  46. Reisine S, Fifield J, Walsh S, Feinn R. Factors associated with continued employment among rheumatoid arthritis patients: A survival model. *J Rheumatol* 2001;28:2400-8.
  47. Reisine S, Goodenow C, Grady KE. The impact of rheumatoid arthritis on the homemaker. *Soc Sci Med* 1987;25:89-95.
  48. Rogers WH. Regression standard errors in clustered samples. *Stata Technical Bulletin* 1993;13:19-23.
  49. Wolfe F, Anderson J, Harkness D, et al. Health status and disease severity in fibromyalgia. *Arthritis Rheum* 1997;40:1571-9.
  50. Kaplan RM, Schmidt SM, Cronan TA. Quality of well being in patients with fibromyalgia. *J Rheumatol* 2000;27:785-9.
  51. Fischler G, Booth N. Vocational impact of psychiatric disorders. New York: Aspen Publishing; 1999.
  52. Felson, DT, Anderson JJ, Boers M, et al. American College of Rheumatology preliminary definition of improvement in rheumatoid arthritis. *Arthritis Rheum* 1995;38:727-35.
  53. Cronan TA, Serber ER, Walen HR, Jaffe M. The influence of age on fibromyalgia symptoms. *J Aging Health* 2002;14:370-84.