A cross-sectional research on female workers examining the loss of productivity caused by mild, moderate and severe fibromyalgia

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Abstract

Objective

To assess (a) the impacts of fibromyalgia (FM) symptoms on patients' ability to work and (b) the relationship between FM severity states and lost productivity from the perspective of patients.

Methods

FM female patients were retrospectively evaluated for this cross-sectional study. FM severity was determined using the revised Fibromyalgia Impact Questionnaire (FIQR). Work Productivity and Activity Impairment-Fibromyalgia (WPAI-FM) was used to evaluate patients' employment status. Differences across FM severity states were evaluated using the one-way analysis of variance (ANOVA) and chi-square or Fisher's exact test. The Pearson's r test was performed for the correlation analysis.

Results

The study included 209 subjects, 64 (30.6%) had mild, 64 (30.6%) had moderate, and 81 (38.8%) had severe FM; 57.9% were working full-time, and 42.1% were working part-time. According to WPAI-FM the work productivity and activity impairment resulted: absenteeism 7.03%; presenteeism 44.35%; activity impairment 47.24%; overall work productivity loss 58.23%. Disease severity was associated with decreased work productivity. Presenteeism, overall work productivity loss, and activity impairment demonstrated significant correlations with FIQR and PainDETECT Questionnaire.

Conclusion

FM severity is associated to a reduced job productivity. Early identification and treatment of FM may provide a window of opportunity for job preservation.

Key words

fibromyalgia, disease severity, work ability, absenteeism, presenteeism

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Introduction

Patients suffering from fibromyalgia (FM) are challenged by symptoms such as chronic pain, fatigue, sleep disturbance and emotional distress (1). These symptoms lead to a physical capacity impairment, and FM patients report consequences on their activities of daily life and difficulties in fulfilling their work roles, resulting in reduced work capacity, presenteeism (coming to work despite health or personal issues, often resulting in a loss of productivity), absenteeism, and inability to work (2, 3). Changes in ability to work are crucial to comprehend since they provide a more objective sign of function than other self-reported measures (4). Continued employment has also been linked to better health outcomes in FM sufferers. Patients with FM, for example, had better health outcomes if they remained working (5, 6). In a cross-sectional study, working women with FM had better scores for pain severity, exhaustion, stiffness, depression, and physical-related quality of life than non-working women with FM (6). Aside from the huge financial consequences, there is also tremendous harm to the individual. Loss of job is associated to lower levels of social connectivity, self-worth, and psychological and physical health in general (7-9). All these aspects have a negative impact on society as a whole (3). More than half (55.8%) of working-age (<65 years old) US adults with FM reported being unable to work because of their health (vs only 5.8% of those without FM) (10). Patients with FM, chronic fatigue syndrome, or various chemical sensitivities examined at the Environmental Health Clinic at Women's College Hospital in Toronto were found to have to stop working in 68.8% of cases due to their clinical condition (11). A survey of members of the Fibromyalgia Support Network of Western Australia revealed that employment status altered over the course of the condition (12). These effects on work productivity can differ by severity, which has implications for indirect costs. For example, more than half (60%) of US adults with severe FM reported work disruptions, due to their condition, compared to 45% and 15% of those with moderate or mild FM, respectively (13). Similarly, those with severe FM missed an average of 3 days of work per month (39 days annually), whereas adults with moderate (1 day per month, 13 days annually) or mild (0.4 days per month, 5 days annually) FM missed substantially less work. US adults with severe FM had significantly greater 3-month direct ($2,329) and indirect ($8,285) costs than those with either moderate ($1,415 direct and $5,139 indirect) or mild ($1,213 direct and $1,341 indirect) FM. However, regardless of severity of FM, indirect costs accounted for the majority of these patients' total costs (3).

As far as we know, no study in Italy has looked into work-related musculoskeletal problems in FM working female patients. As a result, the goal of this study was to investigate (a) the influence of FM symptoms on patients' ability to work and (b) the relationship between FM severity and lost productivity from the patients' perspective.

Methods

Patients

This cross-sectional study evaluated retrospectively FM female patients aged 18-65 years, in paid full- or part-time employment at the time of the assessment. The study protocol did not require any medical intervention. The protocol and the patient information sheet and consent form were approved by the Ethics Committee of the Università Politecnica delle Marche, Ancona, Italy (Comitato Unico Regionale – ASUR Marche, No. 1970/AV2). All the patients signed a written informed consent to participate in this study.

The revised 2016 American College of Rheumatology (ACR) FM diagnostic criteria were used to diagnose FM in the participants (14). These criteria consist of two parts. In the first part, the patient is asked to mark areas of pain in the following 19 different body areas in five regions: (i) jaw (left), shoulder girdle (left), upper arm (left), and lower arm (left) in the upper left region; (ii) jaw (right), shoulder girdle (right), upper arm (right), and lower arm (right) in the upper right region; (iii) hip (left), upper leg (left), and lower leg (left) in the lower left region; (iv) hip (right), upper leg (right), and lower leg (right) in the lower right region; and (v) neck, upper back, lower back, chest, and abdomen in the axial region. The Widespread Pain Index (WPI) is calculated as the number of painful areas. In the revised criteria, a patient must have pain in at least four of the five regions to be diagnosed with FM. In the second part, the severity of fatigue, waking unrefreshed, and cognitive symptoms are scored from 0 to 3 over the past seven days, and headache, abdominal cramps, and depression in the past six months are rated to calculate a Symptom Severity Scale (SSS). FM is diagnosed if WPI ≥7 and SSS ≥5 or if WPI is between 4-6 and SSS≥ 9. The fibromyalgia severity scale (FSS), also known as the polysymptomatic distress scale (PDS) is calculated as the sum of the WPI and SSS scores (14).

Questionnaires

The clinical evaluation used three questionnaires: (i) the revised Fibromyalgia Impact Questionnaire (FIQR), an assessment and evaluation instrument developed to measure FM patient status, progress, and outcomes (15); (ii) the PainDETECT Questionnaire (PDQ), which was used to assess neuropathic pain features (16); and (iii) the Work Productivity and Activity Impairment questionnaire-Fibromyalgia (WPAI-FM) (17).

Revised Fibromyalgia Impact Questionnaire (FIQR)

The FIQR is the updated version of the FIQ (18). It consists of 21 items, 11-point numerical rating scales (0-10) that investigate three main domains in relation to the previous week: symptoms (10 items), physical function (9 items), and overall impact (2 items). The final score may range from 0 to 100 (higher scores indicate more severe disease) and is calculated as the algebraic sum of the symptom's domain divided by two, plus the physical function domain divided by three, plus the two items of the overall impact domain (15). The severity states for FIQR were determined by combining the mean 75th and 25th percentiles of adjacent categories: 0–23 for remission, 24–40 for mild disease, 41–63 for moderate disease, 64–82 for severe disease, and 83-100 for very severe disease (19). For the purposes of this study, patients were grouped into three categories of disease severity according to FIQR: mild 0–40, moderate 41–63, and severe 64–100.

PainDETECT Questionnaire (PDQ)

The PDQ is a wholly self-administered questionnaire that does not need to be evaluated objectively and is used to evaluate the neuropathic pain features. The PDQ contains four items in which the patient must describe the temporal pattern of pain (score -1 or +1 depending on the indicated temporal pattern), a mannequin in which pain irradiation can be represented (irradiated pain +2 points), and seven 5-point scales in which the patient can report characteristic symptoms of neuropathic pain (sudden pain, allodynia, hyperalgesia, dysesthesia). The final score (which ranges from -1 to 38) should be evaluated in terms of the likelihood of neuropathic pain presence: 12 is low, 19 is high, and between 13 and 18 is defined as ambiguous result (16).

Work Productivity and Activity Impairment questionnaire-Fibro myalgia (WPAI-FM)

The WPAI-FM consists of six questions to assess patients' employment status, number of hours missed at work due to FM, number of hours missed at work due to other reasons, number of hours actually worked, the degree to which FM affected work productivity while at work and the degree to which FM affected the activities outside of work during the past seven days (17). Based on the six questions, four outcomes (all range 0%-100%) can be calculated: absenteeism (absence from paid work), presenteeism (at-work productivity loss), work productivity loss (combination of absenteeism and presenteeism, *i.e.* reduced overall productivity), and activity impairment (reduced leisure activities) (20).

Statistical analysis

The study was primarily designed to assess how FM impacts on work productivity and, also, to analyse association with exposure variables. Thus, sample size was calculated, before recruitment of the participants, based on assumptions of potential differences between FM patients and controls from published data (21-23). Considering α= 0.05 and a power of 0.80 and adopting a conservative approach, the higher estimated sample size was select (n=210) assuring that the study would have power to detect the smallest difference.

Summary statistics, means and standard deviations (SDs) for continuous variables, and frequency distributions for categorical variables were calculated. The homogeneity of the distribution was determined by Kolmogorov-Smirnov test. Differences across severity levels were evaluated using the one-way analysis of variance (ANOVA) test (continuous measures) with the Scheffé test for all pairwise comparisons, and chi-square or Fisher's exact test for categorical variables. The Pearson correlation test was performed to correlate the clinical variables and WPAI-FM subscales.

$p<0.05$ was accepted as statistically significant. All the data were entered into a Microsoft Excel data management database, and were analysed using 64-bit MedCalc®, v. 19.0.1.0 (MedCalc Software, Mariakerke, Belgium).

Results

A total of 209 people with FM were enrolled for this cross-sectional assessment. The subjects' mean age was 54.43 (SD 13.46) years, with a disease duration of 5.87 (SD 6.51) years, with symptoms ranging from 1 to 20 years. Forty-nine (23.4%) patients were in treatment with duloxetine, while 59 (28.2%) patients were in treatment with a combination of duloxetine+pregabalin. All the patients were invited to follow a regular programme of homemade physical exercise. Regarding the main comorbidities, 70 (33.5%) patients were diagnosed with a coexisting depression or anxiety syndrome, and 20 (9.6%) patients were suffering from hypo- or hypertyroidism.

Of the 209 subjects, 64 (30.6%) had mild, 64 (30.6%) had moderate, and 81 (38.8%) had severe FM.

Table I. Scores for each FIQR domains, PDQ and WPAI-FM subscales.

	Mean	Median	SD	IQR
Age (years)	54.43	54.00	13.46	45.00 - 64.00
Disease duration (years)	5.87	3.00	6.51	1.00 - 7.00
BMI (Kg/m^2)	26.51	26.60	2.87	25.35 - 27.90
FIQR physical function	16.22	17.00	12.99	9.22 - 21.00
FIQR overall impact	9.42	10.00	5.98	4.00 - 14.00
FIQR symptoms	28.60	29.50	10.77	20.00 - 37.12
FIQR total score	53.22	55.20	22.44	36.00 - 72.70
PDQ	17.49	17.00	7.54	12.00 - 23.00
WPAI-FM				
Absenteeism (%)	7.03	0.00	15.50	0.00 - 5.10
Presenteeism (%)	44.35	40.00	28.68	20.000 - 70.00
Activity impairment (%)	47.24	50.00	29.18	20.0 - 72.85
Overall work productivity loss (%)	58.23	60.00	27.56	30.00 - 80.00

SD: standard deviation; IQR: interquartile range; FIQR: revised Fibromyalgia Impact Questionnaire; PDQ: PainDetect Questionnaire; WPAI-FM: Work Productivity and Activity Impairment questionnaire-Fibromyalgia.

Table II. Comparisons (ANOVA test with Scheffé test for all pairwise comparisons) among FM disease severity states according to FIQR and WPAI-FM subscales.

Absenteeism (%)

Factor	Number of patients	Mean	SD	Significant differences ($p<0.05$) from factors*
(1) Mild	64	3.58	10.77	(3)
(2) Moderate	64	6.64	13.68	
(3) Severe	81	10.06	19.16	(1)

Presenteeism %

Factor	Number of patients	Mean	SD	Significant differences ($p<0.05$) from factors*
(1) Mild	64	28.75	22.57	(2)(3)
(2) Moderate	64	46.56	25.21	(1)
(3) Severe	81	54.93	30.41	(1)

Activity impairment (%)

Factor	Number of patients	Mean	SD	Significant differences ($p<0.05$) from factors*
(1) Mild	64	34.68	23.02	(2)(3)
(2) Moderate	64	59.53	21.18	(1)(3)
(3) Severe	81	75.80	21.14	(1)(2)

Overall work productivity loss (%)

Factor	Number of patients	Mean	SD	Significant differences ($p<0.05$) from factors*
(1) Mild	64	31.05	25.17	(2)(3)
(2) Moderate	64	50.70	25.50	(1)
(3) Severe	81	57.31	29.67	(1)

*Scheffé test. SD: standard deviation.

At the time of the assessment, 57.9% were working full-time, and 42.1% were working part-time. The WPAI-FM four subscales resulted: absenteeism 7.03% (SD 15.50), presenteeism 44.35% (SD 28.68), activity impairment 47.24% (SD 29.18), and overall work productivity loss 58.23% (SD 27.56) (Table I).

Subjects had significantly different WPAI-FM scores across FM severity states (Table II and Fig. 1). The mean number of days missed from work during the past four weeks increased with FM severity with mild subjects reporting missing 0.7 days, moderate reporting 1.2 day, and severe reporting 3.5 days ($p=0.024$); corresponding to an annual mean of 8, 14, and 42 days of worked missed per year respectively. Additionally, mild severity subjects reported working with symptoms over the past 4 weeks for a mean of 7.4 days, moderate 16.4 days, and severe 21.1 days ($p=0.001$), corresponding to a mean of 89, 197, and 253 days worked with symptoms annually, respectively. On average, mild, moderate, and severe subjects reported being 88%, 75%, and 60% effective while working with FM symptoms, respectively ($p=0.001$).

In the correlation analysis, FIQR total score and PDQ showed moderate relationships with presenteeism, overall job productivity loss, and activity impairment ($p<0.0001$) (Table III).

Discussion

FM is a chronic pain disorder characterised by persistent widespread pain, increased pain sensitivity, and tenderness that affects millions of individuals worldwide, primarily women. Female-specific disorders are becoming more relevant in the current period since they can influence women's productivity in the workplace (24). Work is also a significant component of many patients' lives, and having a job boosts self-esteem, feeling of purpose, and financial independence (4). This is the first study to evaluate productivity loss of FM by severity level from an Italian patient-centric perspective. Consistently with previously published studies (4, 25-29), our investigation demonstrated that FM has a substantial negative impact on productivity. This study, also, demonstrated that intensification of disease severity was associated with decreased work productivity. Retrospective analyses of administrative claims estimated that patients with FM undergo an average of 12–18 physician office visits per year, with annual average all-cause direct medical costs of $4,393 to $9,573 per patient (30-32). These analyses, on the other hand, were confined to all-cause expenditures, did not account for all patient out-of-pocket expenses, and did not account for severity level. Work-related musculoskeletal disorders are a primary cause of multisite musculoskeletal pain (33, 34). The economic productivity of a workplace is referred to as work productivity. It has to do

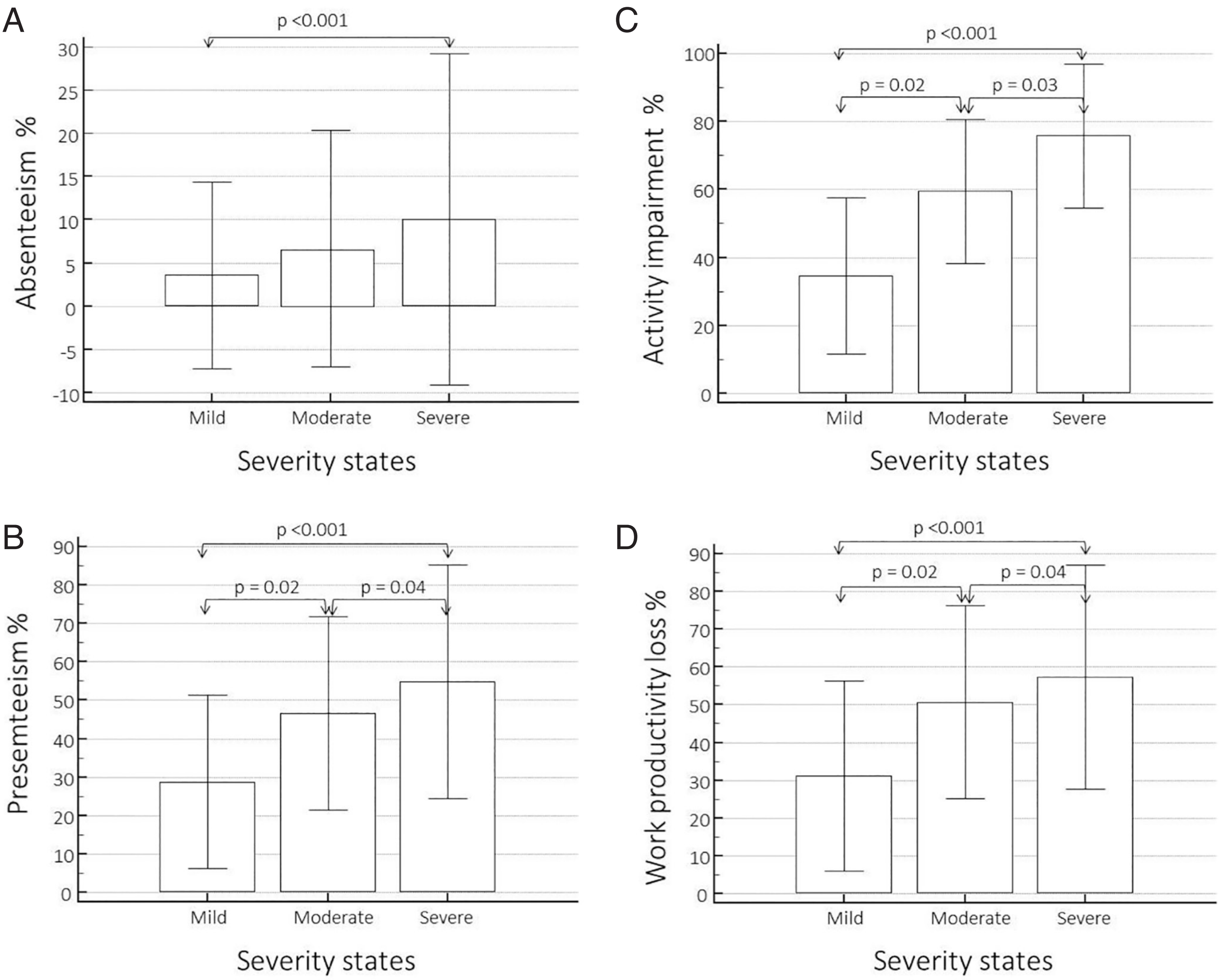

Fig. 1. WPAI-FM scores (**A**, absenteeism; **B**, presenteeism; **C**, activity impairment; **D**, work productivity loss) across FM severity states.

with inputs, costs, outputs, and profits, but it also has to do with the quality, quantity, and efficacy of each individual employee (worker productivity). As a result of absenteeism and presenteeism, workers who have not been lost to the workforce can be less productive. Absenteeism, presenteeism, and job loss are all linked and dependent on one other. Presenteeism is characterised as a loss of productivity at work owing to illness. In the workplace, patients with FM may alternate between presenteeism, short-term absenteeism, and no productivity loss (25).

The degree of employment in FM has been found to vary geographically, with estimates ranging from 34% to 77% in various studies, with the huge variety owing to variances in social welfare systems and labour markets, as well as diverse definitions of work (24). In a recent epidemiological investigation of people with FM in Spain, it was discovered that 11% were on sick leave and 23% had a permanent disability pension due to FM (35). In a community survey of Australians with FM, it was discovered that 35% got financial assistance due to employment incapacity caused by FM (12). In line with this, recent studies of work disability in North America have found disability rates of 30% in Canadian patients with FM (36), and 35% in patients with FM in the USA (26). An analysis of 8.446 respondents to the United States 2012 National Health Interview Survey identified that 55.8% people under 65 years of age with FM were unable to work now because of their health, compared to 5.8% without FM (10). In several previous investigations, employees with FM have been shown to miss significantly more days of work during the year than employees without FM (37). A multinational survey of 800 FM patients revealed 22% were unable to work and 25% were only able to work sometimes because of their FM (38).

Symptom severity was found to influence work ability in people with FM. The results of a recent review imply that more severe symptoms compromise the ability to work (39). This picture of significant detriment to work ability linked to the symptoms of FM is consistent with previously published data. In the United States, a survey found 50% of 203 subjects had some level of disruption in their employment due to FM, with the extent of this disruption linked to symptom severity (40).

Table III. Association between disease severity, demographic and anthropometric variables and WPAI-FM subscales.

	Disease duration	Age	FIQR total score	PDQ	Overall work productivity loss	Absenteeism	Activity impairment	Presenteeism
BMI	-0.036^ 0.608*	0.034^ 0.622*	0.055^ 0.426*	0.015 0.827*	-0.047^ 0.499*	0.015^ 0.828*	0.020^ 0.770*	-0.079^ 0.255*
Disease duration		0.091^ 0.190*	0.093^ 0.180*	0.043^ 0.538*	-0.031^ 0.660*	0.004^ 0.951*	0.094^ 0.176*	0.033^ 0.639*
Age			0.090^ 0.195*	0.091^ 0.189*	0.021^ 0.765*	0.058^ 0.407*	0.041^ 0.560*	0.000^ 0.998*
FIQR total score				0.577^ <0.0001*	0.443^ <0.0001*	0.235^ 0.0006*	0.671^ <0.0001*	0.462^ <0.0001*
PDQ					0.417^ <0.0001*	0.242^ 0.0004*	0.462^ <0.0001*	0.406^ <0.0001*
Overall work productivity loss						0.442^ <0.0001*	0.640^ <0.0001*	0.892^ <0.0001*
Absenteeism							0.267^ 0.0001*	0.398^ <0.0001*
Activity impairment								0.649^ <0.0001*

FIQR: revised Fibromyalgia Impact Questionnaire; PDQ: PainDetect Questionnaire; BMI: body mass index.
^Pearson correlation coefficients; **p* values.

The data on health and care is useful in identifying places where there is a gap in service. To begin with, the increasing impact of FM on the workplace – and the critical role of pain, exhaustion, and mental health in having to leave a job. A meta-analysis of 2757 persons in four pregabalin studies in FM found that fewer days away from work were significantly related to pain relief (27), while in a study of 301 patients with FM in clinics throughout Spain, high levels of fatigue were an independent predictor of temporary work disability (28). Our survey found that subjects with worse FM severity reported significantly increased productivity loss.

Across FM severity levels, Schaefer *et al*. discovered differences in (a) FM-related health resource use (HRU), such as physician office visits and the proportion of subjects receiving medications, and (b) productivity loss, such as absenteeism, presenteeism, changes in employment status, and unpaid informal care (40). Based on 3-month physician office records, it was calculated that research participants with mild, moderate, and severe FM saw physicians 9.7, 11.6, and 19.9 times each year, respectively. Patients reported missing 0.4, 1.0, and 3.0 days of work during the previous four weeks, as well as receiving 3.6, 22.8, and 35.4 hours of unpaid informal care, such as childcare, housekeeping, yard work, or other daily duties that they were unable to perform due to FM.

Our study showed that FM has a substantial negative impact on productivity, with the overall sample reporting an average of more than 23 days missed from work per year. A meta-analysis of FM burden reviewed studies that reported that FM patients missed between 11 and 31 days of work per year (41). In our study, 38% of patients reported they were disabled due to FM. This is consistent with literature reporting 31% of FM patients in a sample were disabled due to FM (29).

This study is the first in the Italy to comprehensively report the impact of FM on presenteeism and absenteeism by disease severity levels. Investigations of the impact of FM severity on productivity loss and health economic costs in France and Germany found that FM severity was significantly associated with productivity loss and that FM meant substantial costs related to loss of productivity, which increased with the severity of FM symptoms, and that FM meant substantial costs related to loss of productivity, which increased with the severity of FM symptoms (42). Women with FM described their reduced physical ability and increased need for rest as hindrances to managing physical work demands and, as a result, to keeping their work position in a Swedish qualitative focus group study (43). In line with this, a qualitative study published recently in Sweden on the work experiences of women with FM showed how women with FM saw their bodies as impediments to working, citing symptoms of pain, exhaustion, and lack of energy as examples. Worry over an uncertain future working life, dread of not being able to continue working, and regret over losing an important part of their lives when they were unable to work as previously were also expressed by the women (44). Work ability has no clear definition and can be interpreted in a variety of ways. It is described as a balance between personal resources and job obligations, and it is considered related (45).

Qualitative and questionnaire research have been published in the literature on job and workplace concerns for FM sufferers. Even though they provide less proof, summarising their findings might help drive optimal practice by providing ideas. Subjects' attitudes, feelings, and opinions on the components of FM that interfere with their ability to work have been studied in qualitative studies, as well as the way they cope with their symptoms at work. Questionnaire studies have added to our understanding of how FM symptoms have impacted employment for FM patients, such as identifying the elements that patients believe contribute to their ability or incapacity to work. Perceived impairment, productivity, performance, efficiency, and quantity and quality are all part of a measure's content. The WPAI questionnaire is a tool for assessing both paid and unpaid work impairments. Although the WPAI-FM has previously been determined to have high validity and reliability (17), the measure utilised to determine presenteeism may not be a sensitive instrument for measuring this multi-dimensional notion. Additionally, because of the overlap in symptoms, separating work-related musculoskeletal problems from FM, particularly in working females, may be problematic for doctors in everyday practice. Finally, the study was cross-sectional and based on a retrospective review of medical records to identify work impairments. Physician attributions of productivity loss due to FM were not verified and could have been over- or underestimated.

In conclusion, this community survey, which is the first to investigate employment ability in Italian FM female patients, reveals that symptom severity has an impact on work ability in persons with FM. More research is needed to properly clarify these findings and evaluate whether early diagnosis and therapy can give Italians with FM a window of opportunity to avert job loss.

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