

Short communication

Publication trends in chronic fatigue syndrome: Comparisons with fibromyalgia and fatigue: 1995–2004

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Abstract

Objective: In order to identify publishing patterns in chronic fatigue syndrome (CFS), we compared the annual number of peer review articles for CFS, fibromyalgia (FM), and non-CFS fatigue over a recent decade (1995–2004). **Method:** Citations were drawn from Ovid/Medline, PsychInfo, and the *Journal of Chronic Fatigue Syndrome* for peer review articles focusing on CFS, FM, and fatigue for each year of the decade ending in 2004. Statistics included chi-square, tests for differences in proportions, and regression-based curve estimation. **Results:** The frequency of CFS peer review articles did not significantly change from the first half to the second half of the decade (1995–2004). By comparison, the output of both FM and fatigue articles significantly increased ($P<.0001$). A quadratic model (inverted U shape; $P<.02$) best fit the data for CFS

annual publication frequency. By comparison, exponential models best fit the data for both FM ($P<.0001$) and fatigue ($P<.0001$) citations. The highest percentage of citations (15–16%) for both CFS and FM fell within the domains of diagnosis, physiopathology, and psychology. For fatigue, almost one third (31.4%) of the citations were focused on etiology, while psychology (11.5%) and physiopathology (10.4%) articles were the next most cited. Based on first-author affiliation, CFS articles were most likely to originate in the United States (37.7%), England (31.4%), and the Netherlands (4.9%). **Conclusion:** The output of CFS peer review articles has not increased over the past decade, while the number of FM and fatigue articles has increased substantially.

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Keywords: Publication trends; Chronic fatigue syndrome; Fibromyalgia; Fatigue

Introduction

Although population-based prevalence studies [1,2] have identified chronic fatigue syndrome (CFS) as a common and debilitating condition, relatively few research scientists appear to be interested in studying the illness. Specifically, only a single modestly sized professional organization (about 300 members), the International Association for Chronic Fatigue Syndrome, represents the interests of CFS researchers and clinicians worldwide. This low level of interest in CFS may be due in part to the delegitimizing

effects of its name [3], the absence of a definitive diagnostic test, and the perception of high levels of psychiatric comorbidity [4,5].

In addition, relatively little (U.S.) federal funding of CFS research has been documented. In the years 2004 and 2005, funding for CFS research by the National Institutes of Health (NIH) ranked 201 (US\$10 million) among 210 various diseases, conditions, and research areas [6]. By comparison, fibromyalgia (FM) funding ranked 190/210 with US\$19 million spent in 2004–2005. Furthermore, an independent review of NIH-sponsored CFS grants [7] for two reporting periods (1999–2003 and 2000–2005) concluded that funding declined 18% from 1999 to 2003 and showed further declines through 2005.

On a more favorable note, the NIH recently issued a renewed program announcement to solicit grant applications

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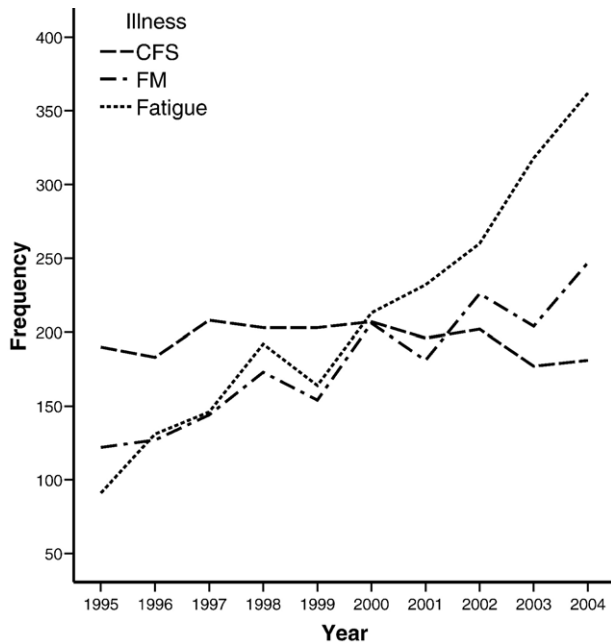


Fig. 1. Annual frequency of CFS, FM, and fatigue peer review publications (1995–2004).

for CFS research focusing on pathophysiology and treatment [8]. In addition, the NIH published in 2005 a request for proposals focusing on neuroimmune mechanisms in CFS [9].

Given the above impressions of relatively low levels of research interest and funding, peer review publications can provide an objective indication of research activity in the field of CFS. Comparisons with FM, an illness similar to CFS, but perhaps with more public credibility [10] and less stigma [5], may provide an instructive point of reference. In addition, a further comparison with non-CFS fatigue articles may help gauge scientific interest in fatigue in general.

This study identified the frequency of peer review publications in the areas of CFS, FM, and fatigue for the decade 1995–2004. In addition, publications were categorized by medical research domain and country of origin.

Method

Data were collected for the annual number of citations from 1995 to 2004 for CFS, FM, and fatigue by searches of (a) Ovid/Medline, using the “focus” option for each of these three (MeSH) terms; (b) the PsychInfo database; and (c) the *Journal of Chronic Fatigue Syndrome*, a non-Medline peer review publication. In the absence of FM- or fatigue-dedicated journals, inclusion of the *Journal of Chronic Fatigue Syndrome* may have somewhat inflated estimates of CFS publications and, thus, provided a more conservative test of the possibility that less scientific interest and less funding in CFS are associated with a lower publication frequency.

All duplicate citations among the data sets were identified and excluded. In addition, all letters to the editor

were excluded, as they were not subject to peer review. Although a number of other databases [e.g., Science Citation Index (SCI)] contain relevant publications as well, they were not used because (a) substantial overlap exists with the targeted data sources (e.g., a 92% overlap between SCI and Medline was found in the first 100 CFS citations; F. Friedberg, January 22, 2007) and (b) the import of this study was based on comparative rather than on total publication levels among these three research domains.

Medline defined the three search terms as follows: “chronic fatigue syndrome” [11] as 6 months of medically unexplained fatigue plus four out of eight additional symptoms; “fibromyalgia” [12] as a chronic musculoskeletal pain disorder characterized by widespread pain of at least 3 months duration and pain upon palpation at multiple sites called tender points; and “fatigue” as “The state of weariness following a period of exertion, mental or physical, characterized by a decreased capacity for work and reduced efficiency to respond to stimuli.” The vast majority of fatigue publications were focused on disease-related fatigue, of which cancer, multiple sclerosis, and arthritis were most often cited.

To identify specific areas of research interest, we chose eight Medline subheadings (diagnosis, drug therapy, epidemiology, etiology, immunology, physiopathology, psychology, and therapy) because they represented a large majority of the citations for CFS (81.7%), FM (79.8%), and fatigue (77.4%). Citations in PsychInfo and the *Journal of Chronic Fatigue Syndrome* were also classified in accordance to these Medline subheadings by Friedberg and Sohl who both agreed on all classification decisions. In addition, publications for CFS, FM, and fatigue were classified by country of origin of the first author.

Statistics

Statistics included chi-square, tests for differences in proportions, and regression-based curve estimation.

Results

The annual frequencies of CFS, FM, and fatigue publications from 1995 to 2004 are displayed in Fig. 1. An omnibus chi-square test of frequency-weighted illness categories (CFS, FM, and fatigue) \times half-decade (1995–1999 and 2000–2004) was significant ($\chi^2=112.26$, $df=2$; $P<.0001$). Post hoc comparisons revealed that the frequency of CFS articles did not significantly change from the first half to the second half of the decade ($z=-1.82$; $P=.07$). By comparison, the frequency of both FM ($z=16.00$; $P<.0001$) and fatigue ($z=31.00$; $P<.0001$) articles showed significant increases over the same period. Curve estimation regression procedures for annual publication frequency yielded a quadratic model (inverted U shape; $R^2=.66$; $P<.02$) for CFS. By comparison, exponential models best fit the

10 annual data points for both FM ($R^2=.88$; $P<.0001$) and fatigue ($R^2=.95$; $P<.0001$) citations.

For both CFS and FM, the highest percentage of citations (15–16%) by medical domain fell within the areas diagnosis, physiopathology, and psychology, while immunology and drug therapy were the least cited (1.5–4.8%). For fatigue, almost one third (31.4%) of the citations were focused on etiology, while psychology (11.5%) and physiopathology (10.4%) articles were the next most cited.

The highest percentages of CFS publications (1995–2004) originated from the United States (37.7%), England (31.4%), Netherlands (4.9%), Australia (3.2%), and Germany (3.0%). By comparison, FM citations were most often affiliated with the United States (33.5%), Canada (13.5%), England (12.8%), Germany (6.8%), and the Netherlands (3.8%). The highest percentages of fatigue citations originated in the United States (29.1%), England (21.2%), Germany (5.1%), the Netherlands (3.5%), and Japan (3.1%).

Discussion

This study examined peer review publication patterns in CFS, FM, and fatigue over the period 1995–2004. The findings indicated that CFS publication rates did not significantly change; however, the frequency of FM and fatigue publications showed significant and substantial increases. For both CFS and FM, the highest percentages of citations fell within the research domains of diagnosis, physiopathology, and psychology. For fatigue, citation levels were highest for etiology, psychology, and physiopathology. The majority of CFS and fatigue articles originated in the United States, England, and the Netherlands, while FM publications were highest for the United States, Canada, and England.

Although CFS and FM are similar with respect to symptoms, functional limitations, and theoretical formulations [13], the lower levels of CFS publishing may be due to several factors: (a) the highly restrictive case definition of CFS [11] with its consequences of (i) much lower illness prevalence as compared to FM [1,2,14] and (ii) increased difficulties in finding research subjects; (b) low credibility of the illness among physicians (e.g., Ref. [15]); (c) a potentially difficult research environment given the strong and often conflicting allegiances to mind–body dualism among many researchers, clinical physicians [16], and patient organizations (e.g., Ref. [17]); and (d) the absence of an objective diagnostic test that would more generally legitimize the illness.

By comparison, the rise in FM research may be due in part to increased interest in the concept of abnormal pain processing (e.g., Ref. [18]) and its relevance to medically unexplained pain conditions such as FM [19]. With respect to fatigue, research interest has grown since fatigue was identified as the most frequently reported symptom of cancer and its treatment [20].

The predominance of CFS publishing in the United States and England may be attributable to higher government funding [6,21] in comparison to other countries with ongoing CFS research, including the Netherlands (Gijs Bleijenbergh, Ph.D., personal communication, January 30, 2007) and Australia [22]. Given that CFS has been recognized as an important public health issue [8,21,23], more aggressive efforts to increase the relatively modest output of CFS research and publishing may be necessary. For instance, a research-based expansion of the narrow CFS case definition [11,24] to include additional comorbidities (e.g., postcancer fatigue) may lead to greater prevalence estimates and generate more scientific interest.

Furthermore, because CFS science has revealed important findings from the research areas of genomics, immunology, neuroendocrinology, psychiatry, and behavioral psychology [25,26], requests for proposals could address interdisciplinary collaboration across these fields in order to develop more sophisticated models of CFS that integrate these critical perspectives.

In sum, this investigation presented sobering data on the state of peer review publishing in the field of CFS. The apparent stagnation over the past decade suggests that if this domain of research is to survive, aggressive efforts may be required to promote a more inclusive case definition, a greater emphasis on interdisciplinary collaborations, and increased government funding.

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