**Perfectionism, Depression and Anxiety in Chronic Fatigue Syndrome: A Systematic Review**

**(Running Head: Perfectionism and Distress in Chronic Fatigue Syndrome)**

Amelia Wright MA,1 Peter L. Fisher PhD, DClinPsy,1,2 Nita Baker DClinPsy,3  Louise O’Rourke MSc1 & Mary Gemma Cherry PhD, DClinPsy.1,2

1. Department of Primary Care and Mental Health, University of Liverpool, Whelan Building, Quadrangle, Brownlow Hill, Liverpool, L69 3GB

2. Clinical Health Psychology Service, Linda McCartney Centre, Royal Liverpool University Hospital, Prescot Street, Liverpool, L7 8XP

3. Midlands Partnership NHS Foundation Trust, Physical Health Psychology Department, Tamworth, UK.

Correspondence to: Gemma Cherry, Department of Primary Care and Mental Health, University of Liverpool, Whelan Building, Quadrangle, Brownlow Hill, Liverpool, L69 3GB. T: 0151 7955364. E: gcherry@liv.ac.uk

**Introduction**

Chronic Fatigue Syndrome (CFS) is a disabling long-term condition, characterized by medically unexplained, persistent fatigue which is new in onset, unalleviated by rest and exacerbated by physical or mental activity [1,2]. Historically, and across cultures, many terms describe CFS, including Myalgic Encephalomyelitis (ME) [3]. Controversy surrounds whether CFS and ME are discrete or hybrid diagnoses [4, 5], as criteria for ME specify greater disability and more severe post-exertional malaise [6]. However, this review uses the term ‘CFS/ME’, acknowledging the lack of universal case definition. This reflects National Institute for Health and Care Excellence (NICE) guidelines [7] and current treatment pathways in the United Kingdom.

There is no objective test or consistent bio-marker for CFS/ME [8] and consistent organic explanations remain elusive [8 - 11]. Average worldwide prevalence for adults is estimated to be 0.65%, rising to 0.89% when the most commonly used case definition is used [2, 12]. Approximately three quarters of patients are female [13], with peak incidence occurring between the ages of 40-49 [14]. Symptom severity varies both between patients and over time [7, 15]. Between 82% and 95% of people experience life-long symptoms [16, 17] and increased health care needs [18, 19].

Onset can be triggered by acute physical and/or psychosocial stressors [20], suggesting the utility of a bio-psychosocial model [21]. This model has been criticised for its emphasis on psychological factors [22] and subsequent influence on research directions [23]. However, psychoneuroimmunology research indicates reciprocity between physiological functioning and depression or anxiety in several health conditions [24], which could apply to CFS/ME [25]. There is a subsequent drive towards integrating physical and mental health services for adults with CFS/ME [26]

Irrespective of aetiological debate, adults with CFS/ME frequently experience co-morbid depression and/or anxiety [27]. Around 36% to 70% of patients experience clinical levels of depression [28,29] and 32% to 57% experience clinical levels of anxiety [30,31]. These lead to poorer prognosis [32] and potential exacerbation of physical impairment [33]. Understanding modifiable psychological processes linked to anxiety and depression in CFS/ME is necessary to develop more effective interventions. Perfectionism, a transdiagnostic risk factor for a range of physical [34] and mental health conditions [35 – 42] could be an important determinant.

Perfectionism is a multifactorial construct [34, 37, 41] which has been conceptualised and measured in different ways [37, 44-46]. Hewitt and Flett’s Multidimensional Perfectionism Scale (MPS-H [44]) differentiates between self-oriented, other-orientated and socially prescribed perfectionism; the former two describe high expectations of oneself and others respectively, whilst the latter refers to the perceived expectation of perfection by others. Frost and colleagues’ Multidimensional Perfectionism Scale (MPS-F [45]) differentiates between organisation (a preference for orderliness and organisation), parental expectations and parental criticism (both as perceived by the individual), personal standards (also conceptualized as ‘adaptive’ perfectionism), concern over mistakes, and doubts about actions. The Almost Perfect Scale-Revised (APS-R [46]) differentiates between high standards, order, and discrepancy. Whilst the former two subscales overlap with factors measured by the MPS-H and MPS-F, the unique factor of discrepancy refers to the disparity between standards and the degree to which these are perceived to be achieved [46].

Despite differing conceptualisations, there is general consensus regarding the relative stability of perfectionistic traits. However, longitudinal research identifies perfectionistic cognitions (which can be targeted therapeutically) as potential mediators between trait perfectionism and distress [47]. Furthermore, approaches such as schema therapy [48] suggest trait perfectionism is amenable to therapeutic intervention.

The dual-process model, an attempt to identify similarities between conceptualisations of perfectionism, differentiates between ‘adaptive’ and ‘maladaptive’ or ‘positive’ and ‘negative’ perfectionism [41, 42]. Adaptive perfectionism is seen as a ‘healthy’ form of perfectionism, motivated by a desire to achieve goals. By contrast, maladaptive perfectionism is seen as driven by a need to avoid failure [41, 42]. In psychometric measures, the former is operationalised by factors such as personal standards, and the latter by factors such as concern over mistakes and doubts about one’s actions [45]. Adaptive and maladaptive perfectionism relate differentially to health and wellbeing [34]. Within the general population, depression and anxiety are positively correlated with maladaptive perfectionism [41], whilst links with adaptive perfectionism are inconsistent [49].

Maladaptive perfectionism manifests in cognitive, emotional, behavioural, and physiological responses [50], potentially leading to emotional and physical exhaustion, as well as physical symptoms through overburdening the stress response system [50-54]. Behavioural components are motivated by a fear of failing to meet standards, resulting in either anxiety-driven over-work [50] or procrastination where standards are impossible to meet [36, 55]. Perceived failure to meet the standards of an ideal self could increase vulnerability to depression, through overemphasizing productivity and accomplishment in assessing self-worth [56, 57]. The ensuing distress maintains vulnerability to physical symptoms via prolonged autonomic arousal [20]. Once physically unwell, bursts of activity to meet unrealistic, pre-morbid standards are punctuated by post-exertional malaise and the need to recuperate [58].

Higher levels of maladaptive perfectionism occur in people with CFS/ME compared to healthy controls [60]. Maladaptive perfectionism has been positively associated with self-critical coping strategies and adjustment difficulties in this patient group [61]. Perfectionism is a shared risk factor for depression, anxiety [62] and CFS/ME [63,64], suggesting the prudence of investigating associations between perfectionism and both depression and anxiety within a CFS/ME population. To date, however, research has primarily focussed on the relationship between perfectionism and fatigue [62, 64] and perfectionism as a predisposing factor to CFS/ME [63].

Greater understanding of the relationship between perfectionism and both depression and anxiety in the CFS/ME population may inform a ‘living well with chronic illness’ approach. This would seek to reduce comorbid depression and/or anxiety, promote adjustment to physical illness and facilitate the development of adaptive coping strategies. The aim of this systematic review, therefore, is to investigate the association between perfectionism and both depression and anxiety in people living with CFS/ME.

**Methods**

**Conduct and Reporting**

Conduct and reporting adheres to recommendations by the Centre for Reviews and Dissemination (CRD) [65] and Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidance [66]. A protocol can be accessed at: <https://www.crd.york.ac.uk/PROSPERO>, ID: CRD42019124833.

**Search Strategy**

Four electronic databases (CINAHL, MEDLINE, Scopus, PsycINFO) were systematically searched via Ebsco Host for relevant peer-reviewed articles from their inception until December 2019, using the following search terms: chronic fatigue\* OR myalgic encephalomyelitis OR CFS OR M.E. OR post viral\* OR post-viral\* OR PVFS OR chronic fatigue and immune dysfunction\* OR CFIDS OR neuromyasthenia OR benign myalgic encephalomyelitis OR akureyri disease AND depress\* OR anxi\* OR distress\* OR affective\* OR nervous\* OR psychiatric\* OR mood\* OR emotion\* OR mental\* AND perfectionis\*. To ensure results were not limited to particular study designs, methodological filters were not applied. Although we did not use subject headings or seek peer review of the search strategy, its development broadly followed PRESS guidelines [67]. Additional literature was sought through citation chaining; references of selected articles were examined, and forward searches were completed via Google Scholar. References of relevant systematic reviews identified were explored. Searches were updated on April 1st 2020.

**Study Selection**

Screening and selection were completed independently by two authors. Relevance was assessed through simultaneous screening of titles and abstracts. Potentially relevant papers were examined in full. Where necessary, views of the wider research team were sought to establish consensus. Studies were included if they: a) reported data from adults (aged 18 to 65 years) with a clinical diagnosis of either CFS, ME, Chronic Fatigue and Immune Dysfunction Syndrome (CFIDS), Post Viral Fatigue Syndrome or Post Viral Syndrome (assessed using any standardised diagnostic criteria); b) used validated psychometric measures (or subscales of validated measures) to assess perfectionism and depression and/or anxiety; c) reported quantitative, cross-sectional data pertaining to the relationship(s) between perfectionism and depression and/or anxiety; and d) were published in English in a peer-reviewed journal. Intervention or longitudinal studies were included if they reported bivariate and/or multivariate analyses of variables pre-intervention or at baseline; post-intervention data were excluded, as were retrospective reports.

**Assessment of Risk of Bias**

Included papers were assessed independently by two authors for risk of bias using a tool adapted from the Agency for Healthcare Research and Quality [68, 69]. This assesses risk of bias in studies across a range of domains relevant to research with physical health populations, including selection bias, sample size and power, representativeness of the cohort and assessor bias. Resolution of uncertainty was reached through consensus or consultation with the wider research team. In line with CRD guidance [65], studies were not excluded where risk of bias was indicated; however, this was considered when interpreting results. Reviewers were not blinded to the authors, institutions, or journals of included studies.

**Data Extraction and Analysis**

Relevant clinical, demographic and methodological data (including study design, location, sampling method, participant number and characteristics, measurement approaches and association between perfectionism and depression and/or anxiety) were extracted and checked for accuracy by a second author. Where studies included control groups, only data for the CFS/ME population were extracted. Data extracted from linked studies were reported as a single study, listing all relevant publications, unless reporting different outcomes. Where multiple analyses were reported, data from the following were extracted: a) bivariate analyses examining associations between measures of perfectionism and depression and/or anxiety; and/or b) multivariate analyses, in which the effects of potential confounders on the aforementioned correlations were controlled for. Where necessary, authors were contacted to obtain missing data. Due to the range of psychometric measures and subscales used across a relatively small number of studies, meta-analysis was not possible; data were instead tabularised and summarised narratively.

Additional records identified through other sources

(*n* = 0)

Total records identified through database searching

(*n* = 86)

PsycINFO: (*n* = 33)

CINAHL Plus: (*n* = 11)

Medline: (*n* = 29)

Scopus: (*n* = 13)

## Identification

Records excluded
(*n* = 27)

## Screening

Records screened after duplicates removed

(*n* = 50)

## Eligibility

Full-text articles assessed for eligibility

(*n* = 23)

Full-text articles excluded
(*n* = 15)

## Included

Studies included in qualitative synthesis

(*n* = 7, reported in 8 articles)

Additional relevant articles included following review update

(*n* = 0)

Figure 1.

*PRISMA Diagram Summarising the Screening Process for Included Studies*

**Results**

Searches identified 86 records, resulting in 50 records once duplicates were removed. Examination of 23 full-texts resulted in the inclusion of seven studies, reported in eight papers (Figure 1). Characteristics of included studies [70-77] are detailed in Table 1. An overall sample of 702 participants was reported upon. All studies were conducted in Europe. Two used a longitudinal design [73, 75]; the remainder were cross-sectional. All studies used the Centre for Disease Control (CDC) diagnostic criteria [2]. Four studies specified additional criteria to increase diagnostic rigour [70, 74,76,77]. Four studies, reported in five papers [70, 71, 72, 74, 75], reported mean time since illness onset, which ranged from 36 to 72 months.

Six studies, reported in seven papers, reported on educational attainment [70, 71, 72 73, 74, 76, 77]. Approximately half of the overall sample had completed either secondary or tertiary education, and approximately one third had completed higher education.

Four papers reported mean depression severity [73,74, 76, 77]; all exceeded minimum thresholds for clinical caseness as measured by either the Beck Depression Inventory (BDI [78]; > 9) or the Hospital Anxiety and Depression Scale (HADS [79]; > 8). Two papers [70,72] reported proportion of participants meeting at least minimum clinical cut-offs for depression, ranging between 33-40%. A single study [70] reported on the percentage participants meeting clinical cut of scores for anxiety (43%).

|  |
| --- |
| **Table 1***Characteristics of Studies (n = 7)* |
| **Study Characteristics** | **Participant Characteristics**  |  |
| **Author** | **Design**  | **Location**  | **Sampling method** | **n** | **Female** **(%)** | **Age, mean (SD) *Range*** | **Highest educational attainment****(percentage)** | **Exclusion of co-morbid psychiatric diagnoses?** | **Diagnostic /assessment criteria specified** | **Depression and/or Anxiety****Score****(SD)*****Measure*** | **Time since onset in months mean**  |
| Blenkiron et al. [70] | Cross-sectional | UK | Purposive | 40 | 60 | 49 (median)*21-66* | *Median years in education since aged 16*: 5  | No  | CDCa | 33% met criteria for depression *HADS-D*(>8)43%.met criteria for anxiety *HADS-A*(>8)Depression | 36 |
| Kempke et al. [71, 72] | Cross-sectional  | Belgium | Purposive | 192 | 85.4 | 40.17 (9.43) *19–66* | Secondary/ Tertiary: 49.2Higher Education: 45.5 | n/s | CDCa | n/s*BDIc*40.1% met depression criteria. *HADS-D*b | 57 |
| Kempke et al. [73] | Longitudinal | Belgium | Purposive | 40 | 100 | 41.93 (7.99) *28—58* | Secondary/Tertiary:51Higher Education: 43.6 | Yes.Exclusions: ‘psychiatric diagnoses which may explain fatigue’ | CDCaMedical evaluation | Depression8.72(3.86)*HADS-D* | n/s |
| **Table 1:** continued |  |
| Luyten et al. [74] | Cross-sectional  | Belgium | Purposive | 43 | 86 | 39.1 (7.91) *22-58*  | Mean: 1.09 c (SD .89) | n/s | CDCaBiological & Psychological Assessment. | Depression11.88 (7.95) *BDIc* | 39 |
| Luyton et al. [75] | Longitudinal | Belgium | Purposive | 57 | 93 | 42.19 (8.33) *18-59* | n/s | n/s | CDCa  | Depressionn/s *BDIc* | 72 |
| Valero et al. [76] | Cross-sectional  | Spain | Purposive | 229 | 91.3 | 48.21 (8.93) *22-73* | Secondary/ Tertiary: 41.4 Higher Education: 20.2  | Yes.Exclusions:‘severe unstable psychiatric disorders’ d  | CDCaMedical evaluation.Psychiatric/ Psychological assessment. | Depression10.35 (4.95) *HADS-D* | n/s |
| Wood & Wessely [77] | Cross-sectional  | UK | Purposive | 101 | 60.4 | 36.6 (10.5) | Secondary/ Tertiary: 58.41 Higher Education: 28.71  | n/s  | CDCaUKocPsychiatric assessment | 15.3 BDI13.6 BDIc | e |
| *Note.* BDI = Beck Depression Inventory [78]; BDIc = Beck Depression Inventory corrected (items 15, 16 & 17 removed due to symptomatic overlap); CDC = Centre for Disease Control criteria for CFS [2]; HADS-A = Anxiety subscale of Hospital Depression and Anxiety Scale [79]; HADS-D = Depression subscale of Hospital Anxiety and Depression Scale [79]; n/s = not specified; UKoc = UK operational criteria [80]. a Centre for Disease Control criteria for CFS [2] specifies the following as exclusions of diagnosis: ‘Any past or current diagnosis of major depressive disorder with psychotic or melancholic features; bipolar affective disorders; schizophrenia of any subtype; delusional disorders of any subtype; dementias of any subtype; anorexia nervosa; bulimia nervosa’; b Clinical cut off not specified; c *5-point scale:* 1=primary; 0=lower secondary; 1=higher secondary; 2=undergraduate; 3=university; d ‘Severe unstable psychiatric disorders’ specified: ‘a psychotic episode, a major depressive episode, maniac episode, substance use disorders and anorexia nervosa’; e Authors state a median number of months: 3621-58. |

**Assessment of Risk of Bias**

Included studies were generally of comparable quality (Table 2). The main limitations related to sample size justification and selection, choice of measurement tool to assess depression and/or anxiety, and control of potential confounders. All studies used the CDC criteria [2]; whilst frequently used in research and clinical diagnosis, this arguably captures a larger, more heterogeneous group, with a broader range of symptom severity than captured by more stringent criteria [80]. Studies recruited from specialist CFS health services, with most sampling consecutive patients [71 - 73, 75 - 77]. Whilst increasing rigour regarding diagnosis confirmation, this introduces selection bias; samples reflect a subset of patients, willing and able to access mainstream health services at a particular time. Four studies, reported in five papers, recruited from the same hospital-based CFS centre [71- 75]. Only one study randomly selected participants from a waiting list [70]. Subsequently, generalizability of findings to the wider CFS/ME population is questionable. No study reported a sample size calculation, rendering consideration of statistical power problematic and suggesting potential Type I errors. Descriptions of demographics were partial. Four studies [71, 74, 75, 77] used a corrected form of the BDI with items 15, 16 and 17 removed due to symptomatic overlap (BDIc [78]). However, this may insufficiently address overlap between somatic symptoms of depression and symptoms of CFS; a version for use in primary care settings (BDI-PC) is reduced to seven items to account for this [82, 83]. The HADS, however, is designed to this end and is validated in CFS/ME populations [84]. Subsequently, greater weighting was given to studies using the HADS [70, 72, 73, 76] which is less likely to over-estimate depression. Greater weighting was also given to studies with a large sample size [72, 76]. Two papers partially controlled for cross-sectional confounders when analysing the relationship between perfectionism and depression [72, 74]; however, time since CFS/ME onset, physical and cognitive symptom severity were not accounted for.

|  |
| --- |
| **Table 2***Assessment of Risk of Bias* |
| **Author** | **Unbiased selection of cohort?** | **Sample size calculation** | **Adequate description of cohort** | **Validated measure of perfectionism** | **Validated measure of depression and/ anxiety** | **Recognised diagnostic criteria / medical assessment for CFS** | **Cross****-sectional confounders****Controlled for?**  | **Appropriate analyses** |
| Blenkiron et al. [70] | Partially  | n/s | Partially | Yes.  | Yes. | Yes | No  | Partially3 |
| Kempke et al. [71]1 | Partially | n/s | Partially | Yes | Partially2 | Yes | No  | Partially3 |
| Kempke et al. [72]1 | Partially | n/s | Partially | Yes | Yes | Yes | Partially | Partially3 |
| Kempke et al. [73] | Partially | n/s | Partially | Yes | Yes | Yes | No | Partially3 |
| Luyten et al. [74] | Partially | n/s | Partially | Yes.  | Partially2 | Yes | Partially | Partially3 |
| Luyton et al. [75] | Partially | n/s | Partially | Yes | Partially2 | Yes | No | Partially3 |
| Valero et al. [76] | Partially  | n/s | Partially | Yes | Yes | Yes | No  | Partially3 |
| Wood & Wessely [77] | Partially  | n/s | Partially | Yes | Partially2 | Yes | No | Partially3 |

*Note.* n/s = not specified.

1 linked studies [71&72]

2 somatic overlap between symptoms of depression and CFS may be insufficiently addressed.

3Sample size justification / power calculation not stipulated.

**Adaptive and Maladaptive Perfectionism**

Mixed support was found for the association between depression and personal standards (‘adaptive perfectionism’). Two studies [71, 74] reported significant moderate associations (*r* =.33, *p* <.001; *r* = .32, p <.05) whilst one [77] did not (*r* = .15, *p* = .10).

Statistically significant positive associations were evidenced between depression and both concern over mistakes and doubts about actions, as well as the latent variable maladaptive perfectionism [71, 72, 74, 76, 77]. Associations between depression and concern over mistakes ranged from .35 to .60 (*p* < .001), indicative of a medium to large effect size [71, 72, 74, 77]. Associations between depression and doubts about actions ranged from .46 to .60 (*p* < .001), again indicative of a medium to large effect size [71, 72, 74, 77].

When controlling for all perfectionism subscales using the MPS-F, Luyton et al. [74] found doubts about actions were significantly moderately associated with depression severity (β = .47, *p* < .04). Kempke and colleagues [72] found maladaptive perfectionism was significantly associated with depression (β = .34, *p <* .001); however, this association was no longer significant when controlling for self-esteem (β = .8, ns), which fully mediated the relationship between perfectionism and depression.

**Organisation**

Two studies examined associations between depression and organisation: one found a significant moderate positive correlation [74] (*r* =.41, *p<* .01), whilst the other found no relationship (*r* =*.*02, *p* = .99) [77]. When controlling for all other factors of perfectionism, one study [74] found organisation was a significant and positive statistical predictor of depression severity (β = .43, *p<* .01).

**Parental Factors of Perfectionism**

Small, non-significant associations were found between depression and parental expectations (*r* = .12, ns; *r* = .12, *p* = .19) [74, 77]. However, the small significant association between depression and parental criticism (*r* = .18, *p*= .05) reported by Wood and Wessely [77] was not found by Luyton and colleagues (*r* = .20, ns) [74].

**Self-Critical Perfectionism**

Findings regarding the association between depression and self-critical perfectionism were mixed. A small, non-significant association (*r* =.22, ns) was reported by Kempke and colleagues [73]. However, Luyton and colleagues, [75] found a significant, moderate correlation (*r*= .48 *p*< .001).

**Self-Orientated; Other-Orientated and Socially Prescribed Perfectionism**

The single study [70] assessing anxiety found no significant associations with self-orientated; other-orientated or socially prescribed perfectionism.

**Total Perfectionism**

Two studies reported a composite perfectionism score: one using the MPS-H [70] and one using the MPS-F [77]. The former reported no significant association between total perfectionism and either depression (*r* = .07, ns) or anxiety (*r* = -.01, ns) [70]. The latter [77] reported a significant moderate association with depression (*r* =.37, *p* < .001), but excluded the organisation subscale.

|  |
| --- |
|  **Table 3.** |
| *Main Findings – Associations Between Perfectionism and Depression and Anxiety.* |
| **Perfectionism Type** | **Authors** | **Psychometric measure** **Perfectionism (Subscales)****Depression and/or Anxiety** | **Statistical Analyses** | **Effect Size: Depression*****(p)*** | **Effect Size: Anxiety*****(p)*** |
| ‘Maladaptive’ | Kempke et al. [72]1Valero et al. [76] | MPS-F (CM, DA)HADSMPS-F (CM, DA)HADS | Pearson’s correlation | *r* =*.48\*\*\** *(p<.001)**r* = .42\*\* *(NR)* | N/AN/A |
| ‘Self-critical’ | Luyton et al. [72]Kempke et al., [73] | DEQ (SC-P)BDIcDEQ (SC-P)HADS |  | *r* = .48\*\*\* *(p<.001)**r* =.22 *(ns, NR)*   | N/AN/A |
| Total  | Blenkiron et al. [70]Wood & Wessely [77] | MPS-HHADSMPS-F (CM, DA, PS, PE, PC)BDIc |  | *r* = .07 *(ns, NR)**r* =.37\*\*\**(p<.001)*  | *r* = -.01*(ns, NR)*N/A |
| Self-orientated  | Blenkiron et al. [70] | MPS-H (SO)HADS | Spearman’s correlation | *r* = -.06 *(ns, NR)*  | *r* = -.*(ns, NR)* |
| Other-orientated  |  | MPS-H (OO)HADS |  | *r* = -.13*(ns, NR)*   | *r* = -.22*(ns, NR)* |
| Socially prescribed  |  | MPS-H (SP)HADS |  | *r* = .23 *(ns, NR)*    | *r* = .06*(ns, NR)* |
| ‘Adaptive’Personal Standards | Kempke et al. [71] 1Luyton et al. [74]Wood & Wessely [77] | MPS-F (PS)BDIcMPS-F (PS)BDIcMPS-F (PS)BDIc | Pearson’s correlation | *r* =.33\*\*\* *(p<.001)**r* = .32\* *(NR)*  *r* = .15 *(p = .10)*  | N/AN/AN/A |
| Concern over Mistakes | Kempke et al. [71] 1Kempke et al. [72] 1Luyton et al. [74]Wood & Wessely [77] | MPS-F (CM)BDIcMPS-F (CM)HADSMPS-F (CM)BDIcMPS-F (CM)BDIc |  | *r* = .60\*\*\* *(p<.001)* *r* = .40\*\*\**(p<.001)* *r* = .43\*\* *(NR)**r* = .35\*\*\**(p<.001)* | N/AN/AN/AN/A |
| Doubts about Actions | Kempke et al. [71]1Kempke et al. [72]1Luyton et al. [74]Wood & Wessely [77] | MPS-F (DA)BDIcMPS-F (DA)HADSMPS-F (DA)BDIcMPS-F (DA)BDIc |  | *r* =.60\*\*\* *(p<.001)* *r* =.53\*\*\**(p<.001)* *r* =.51\*\*\**(p<.001)* *r* = .46\*\*\**(p<.001)*  | N/AN/AN/AN/A |
| Organisation | Luyton et al. [71]Wood & Wessely [77] | MPS-F (O)BDIcMPS-F (O)BDIc |  | *r =.41\*\** *(NR)**r = .02* *(p = .99)*  | N/AN/A |
| Parental Expectations | Luyton et al. [71]Wood & Wessely [77] | MPS-F (PE)BDIcMPS-F (PE)BDIc |   | *r* = .18 *(ns, NR)*  *r* = .12 *(p = .19)*  | N/AN/A |
| Parental Criticism | Luyton et al. [71]Wood & Wessely [77] | MPS-F (PC)BDIcMPS-F (PC)BDIc |   | *r= .20* *(ns, NR)* *r* = .18\* *(p = .05)*  | N/AN/A |
| *Note*. BDIc = Beck Depression Inventory [78] corrected (items 15, 16 & 17 removed due to symptomatic overlap); CM = concern over mistakes; DA =doubts about actions; DEQ =Depressive Experiences Questionnaire [43]; HADS = Hospital Anxiety and Depression Scale [79]; MPS-H = Multidimensional Perfectionism Scale [44]; MPS-F= Frost Multidimensional Perfectionism Scale [45]; N/A = not applicable to study; NR = not reported; ns = non-significant; O = organisation; OO = other-orientated; PC = parental criticism; PE = parental expectations; PS = personal standards; S-CP = self-critical perfectionism; SEM = structured equation modelling; SO = self-orientated; SP= socially prescribed. \* *p* < .05; \*\**p* < .01; \*\*\**p* < .001. Exact *p* values reported where stated in publication.1Linked studies [71&72].2MPS-F minus ‘organisation’ subscale. |

**Discussion**

This systematic review examined the relationship between perfectionism and depression and/or anxiety in people with CFS/ME. Systematic searches revealed a paucity of data regarding anxiety and heterogeneity in measures of both depression and perfectionism. Results therefore focus on associations between depression and specific aspects of perfectionism in people with CFS/ME.

When treated as a unidimensional construct, perfectionism was not consistently associated with depression in people with CFS/ME. However, maladaptive perfectionism, and the composite subscales of doubts about actions and concern over mistakes, were consistently associated with depression in this patient group [71, 72, 74, 76, 77]. Both studies reporting maladaptive perfectionism [72, 73] used the HADS, indicating robust findings which are unlikely to overestimate depression. In the case of concern over mistakes and doubts about actions, the study using the HADS [72] reported moderate correlations (*r* = .40, *p* < .001 and *r* = .53, *p* < .001 respectively).

Only two studies [72, 74] controlled for cross-sectional confounders; one of these being other factors of perfectionism [74]. Subsequently, it is not known whether the relationship between maladaptive perfectionism and depression in CFS/ME would hold once other variables are controlled for. A single study [72] found maladaptive perfectionism was no longer a significant statistical predictor of depression severity, when controlling for self-esteem. However, greater consideration of the relationships between distress and both pre-and post-morbid perfectionism and self-esteem is needed.

Findings regarding the association between depression and other factors of perfectionism were mixed. This likely reflects the smaller number of studies eligible for inclusion in this review. This, in addition to the paucity of relevant data regarding anxiety, may be impacted by barriers to psychological enquiry in CFS/ME [85-87]. These centre around aetiological debate and patient concerns regarding the relevance of psychological research.

In the case of adaptive perfectionism, mixed findings are consistent with psychological theory and existing literature [49, 87]; adaptive perfectionism may confer some psychological benefits [88, 89]. However, adaptive perfectionism may cease to be adaptive in people with CFS/ME, due to its correlation with maladaptive perfectionism [62]; striving to achieve standards may in fact trigger self-doubt, self-criticism and worry [62, 83, 90].

**Methodological Limitations**

Whilst the hypothesized causal role of maladaptive perfectionism is grounded in theory and previous research [35, 37, 56, 88], firm conclusions cannot be drawn from cross-sectional findings regarding generalisability or causality. Divergent findings have resulted in part, from differential measurements of perfectionism, anxiety and depression. At the same time, all models of trait perfectionism were not represented in selected studies. Notably absent was the discrepancy subscale of the APS-R [46]. Disparity between standards and the degree to which these are perceived to be met is likely to be relevant; people with CFS/ME may be vulnerable due to the physical inability to meet pre-morbid standards. Measures encompassing multiple subscales [91] would enable a broader focus, whilst maintaining methodological consistency.

Included studies did not adequately consider or test a range of mechanisms through which perfectionism and anxiety and/or depression may be linked. Again, this could reflect comparably limited psychological research in CFS/ME [85-87], reflective of controversies surrounding its relevance and the potential to detract from biomedical research [23]. Similarly, the search identified studies measuring perfectionism at the trait level only. Further research is needed regarding the potential mediating role of perfectionistic cognitions [92-95].

We did not seek peer-review for our search, nor did we use subject headings or adapt searches to fit specific databases. These decisions were made pragmatically, and, although we supplemented our search strategy with hand searches, it is possible a more sensitive search may have identified additional relevant papers.

The inclusion of peer reviewed articles only sought to ensure quality. However, this may have introduced a publication bias [96]. Language, selection or cultural bias may have been introduced by the inclusion of only articles published in English. Similarly, as all studies were conducted in Europe, findings may not translate worldwide; cross-cultural variations in symptomatology and experiences of both CFS/ME and perfectionism have been reported [97-100].

Participants were predominantly females in their thirties and forties, reflecting what is known about the demographics of CFS/ME [13, 14]. Generalisability is nevertheless unclear, as the sample consisted solely of people in receipt of services and diagnosed using the CDC criteria. Whilst the single diagnostic criteria facilitated direct comparison, this arguably captured a heterogeneous group [81]. Examination of the relationship between perfectionism and depression and anxiety within different categories of CFS/ME symptom severity is required.

**Implications for Future Research**

 Researching the interplay between maladaptive perfectionism, fatigue and both depression and anxiety would enhance clinical understanding. Further insight could be gained through examining psychological mechanisms through which perfectionism may exert influence. Longitudinal designs would increase confidence in concluding causality. Prospective studies could track patient groups at risk of developing CFS/ME, such as those experiencing glandular fever [63]. This would enable analysis of pre- and post-morbid perfectionism and depression and anxiety. Samples including patients both engaged and no longer engaged in mainstream health services would give a more representative sample. Consistency of measures would further enable development of the evidence base. In researching ‘concern over mistakes’ and ‘doubts about actions’, methodological rigour would be enhanced through statistically controlling for cognitive symptoms of CFS/ME [101], which may interact with these factors of perfectionism.

**Theoretical and Clinical Implications**

Findings varied regarding the relationship between depression and different aspects of perfectionism. This corroborated its utility as a multifactorial construct [34]. Treatment as a unidimensional concept would risk masking the differential impact of adaptive and maladaptive factors upon depression and/or anxiety.

A single study found self-esteem mediated the relationship between maladaptive perfectionism and depression. Whilst corroboration is required, this is consistent with psychological theory; perceived failure to meet standards of an ideal self may increase depression vulnerability, via self-esteem being overly dependent upon productivity and accomplishment [54]. This is consistent with evidence of low self-esteem in people with CFS/ME [59], indicating the potential relevance of discrepancy [46] as a factor of perfectionism.

Maladaptive perfectionism was consistently associated with depression in CFS/ME. Clinical recommendations are based on findings from cross-sectional research, which require corroboration from further studies. Rather than targeting high personal standards per se, therapeutic techniques addressing concern over mistakes and doubts about actions may be efficacious in reducing depression. Examples include behavioural experiments to reduce checking and reassurance seeking, identifying and challenging cognitive biases, and interrupting perfectionistic rumination [102]. At a deeper level, core beliefs [102] or schema [48] underpinning these perfectionistic concerns could be addressed.

Perfectionist concerns may be exacerbated by the cognitive symptoms of CFS/ME, including difficulties with memory, concentration and attention [101]. This could subsequently drive checking behaviours, pushing energy expenditure beyond individual capacity [103]. Individual assessment of cognitive symptoms should therefore inform appropriate psychological intervention.

Targeting maladaptive perfectionism could increase adaptive coping strategies and adjustment to living with chronic illness. This could reduce ‘boom and bust’ activity patterns [104] and checking behaviours, triggered by a desire to meet unrealistic, self-imposed and possibly pre-morbid standards. This is relevant to relapse prevention, regarding both CFS and co-morbid depression. Psychoeducation regarding the advantages and disadvantages of perfectionism would give a focus for change. This is particularly important for those either retaining or returning to employment or educational activities; perfectionistic concerns are likely to be triggered more easily in these environments.

**Conclusions**

To our knowledge, this is the first systematic review to examine the relationship between different aspects of perfectionism and depression and anxiety in people with CFS/ME. Findings suggest the association between perfectionism and anxiety is under-researched in this patient group. However, consistent associations were found between depression and both concern over mistakes and doubts about actions, as well as the latent variable maladaptive perfectionism. Moderate to strong correlations were reported between depression and concern over mistakes (*r* = .40, *p* < .001 to *r* = .60, *p* < .001) and between depression and doubts about actions (*r* = .51, *p* < .001 to *r* = .60, *p* < .001). Moderate correlations were reported between depression and maladaptive perfectionism (*r* = .42, *p* < .01 to *r* = .48, *p* < .001). These provisional, cross-sectional findings suggest it would be clinically meaningful to establish whether there are links between maladaptive perfectionism, the physical and cognitive symptoms of CFS/ME, and both depression and anxiety. Understanding the dynamic relationships between these variables could ultimately contribute to the development of efficacious therapeutic interventions, as part of a living well with chronic illness approach.

**Funding**: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

**References**

[1] Y. Christley, T. Duffy, C.R. Martin, A review of the definitional criteria for chronic fatigue syndrome, *J. Eval. Clin. Pract.* 2012; 18(1): 25–31. Available from: https://doi.org/10.1111/j.1365-2753.2010.01512.x.

[2] K. Fukuda, S.E. Straus, I. Hickie, M.C. Sharpe, M. Psych, J.G. Dobbins, A. Komaroff, The chronic fatigue syndrome: a comprehensive approach to its definition and study, *Ann. Intern. Med.* 1994; 121(12): 953-959. Available from: https://doi.org/[10.7326/0003-4819-121-12-199412150-00009](https://doi.org/10.7326/0003-4819-121-12-199412150-00009)

[3] P.D. White, A perspective on causation of the chronic fatigue syndrome by considering its nosology, *J. Eval. Clin. Pract.* 2019; 25(6): 991–996. Available from: https://doi.org/10.1111/jep.13240.

[4] L.A. Jason, M. Sunnquist, A. Brown, M. Evans, S.D. Vernon, J.D. Furst, V. Simonis, Examining case definition criteria for chronic fatigue syndrome and myalgic encephalomyelitis, *Fatigue Biomed. Heal. Behav.* 2014; *2*(1): 40–56. Available from: https://doi.org/10.1080/21641846.2013.862993.

[5] E.W. Clayton, Beyond myalgic encephalomyelitis/chronic fatigue syndrome: an IOM report on redefining an illness, *JAMA - J. Am. Med. Assoc.* 2015; 313(11): 1101–1102. Avaliable from: https://doi.org/10.1001/jama.2015.1346.

[6] L.A. Jason, M. Evans, A. Brown, M. Sunnquist, J.L. Newton, Chronic fatigue syndrome versus sudden onset myalgic encephalomyelitis. ***J. Prev. Interv. Community***2015 Jan 2;43(1):62-77.

[7] National Institute for Health and Clinical Excellence (NICE), Chronic Fatigue Syndrome/Myalgic Encephalomyelitis (or Encephalopathy): Diagnosis and Management of CFS/ME in Adults and Children Clinical Guideline [CG53]. 2007. Available from: <https://www.nice.org.uk/guidance/cg53> [accessed 18th October 2019]

[8] B. Poeschla, E. Strachan, E. Dansie, D.S. Buchwald, N. Afari, Chronic fatigue and personality: A twin study of causal pathways and shared liabilities, *Ann. Behav. Med.* 2013; 45(3): 289-98. Available from: https://doi.org/10.1007/s12160-012-9463-5.

[9] L.A. Jason, M. Sunnquist, A. Brown, M. Evans, S.D. Vernon, J.D. Furst, V. Simonis, Examining case definition criteria for chronic fatigue syndrome and myalgic encephalomyelitis, *Fatigue Biomed. Heal. Behav.* 2014; 2(1): 40–56. Available from: https://doi.org/10.1080/21641846.2013.862993.

[10] B.M. Carruthers, A. Kumar Jain, K.L. De Meirleir, D.L. Peterson, N.G. Klimas, A.M. Lerner, A.C. Bested, P. Flor-Henry, A. Dpm, P. Joshi, A.C. Peter, Myalgic encephalomyelitis/ chronic fatigue syndrome: a clinical working case definition, diagnostic and treatment protocols, *J. Chronic Fatigue Synd.* 2003; 11(1): 7-115. Available from: https://doi.org/10.1300/J092v11n01\_02.

[11] L.A. Jason, M. Evans, N. Porter, M. Brown, A. Brown, J. Hunnell, V. Anderson, A. Lerch, K. De Meirleir, F. Friedberg, The development of a revised canadian myalgic encephalomyelitis chronic fatigue syndrome case definition, Am. J. *Biochem. Biotechnol.* 2010; 6(2): 120–135.

[12] E.J. Lim,Y.C. Ahn, E.S. Jang, S.W. Lee, S.H.Lee, C.G.Son, Systematic review and meta-analysis of the prevalence of chronic fatigue syndrome/myalgic encephalomyelitis (CFS/ME). J. Transl. Med. 2020 Dec;18(1):1-5.

[13] M. Faro, N. Sàez-Francás, J. Castro-Marrero, L. Aliste, T. Fernández De Sevilla, J. Alegre, Gender differences in chronic fatigue syndrome, *Reumatol. Clin.* (English edition). 2016; 12(2):72-7. Available from: <https://doi.org/10.1016/j.reumae.2015.05.009>

[14] S.M. Collin, I.J. Bakken, I. Nazareth, E. Crawley, P.D. White, Trends in the incidence of chronic fatigue syndrome and fibromyalgia in the UK, 2001–2013: a clinical practice research datalink study, *J. R. Soc. Med.* 2017; 110(6): 231–244. Available from: https://doi.org/10.1177/0141076817702530.

[15] 2020 Health, Chronic Fatigue Syndrome/Myalgic Encephalomyelitis: Counting the cost, 2017. Available from: <https://www.meassociation.org.uk/wp-content/uploads/2020Health-Counting-the-Cost-Sept-2017.pdf> [accessed 18th October 2019].

[16] R. Cairns, M. Hotopf, A systematic review describing the prognosis of chronic fatigue syndrome, *Occup. Med.* 2005; 55: 20-31. Available from: https://doi.org/10.1093/occmed/kqi013.

[17] A.M. Pheley, D. Melby, C. Schenck, J. Mandel, P.K. Peterson, Can we predict recovery in chronic fatigue syndrome?, *Minn. Med.* 1999: 82(11):52-6.

[18] A. Blazquez, J. Alegre, Family and partner facing a chronic disease: chronic fatigue syndrome, *Am. J. Fam. Ther.* 2013; 41(1): 46–62. Available from: https://doi.org/10.1080/01926187.2011.642651.

[19] S.M. Collin, I.J. Bakken, I. Nazareth, E. Crawley, P.D. White, Health care resource use by patients before and after a diagnosis of chronic fatigue syndrome (CFS/ME): a clinical practice research datalink study, *BMC Fam. Pract.* 2017; 18(1): 60. Available from: https://doi.org/10.1186/s12875-017-0635-z

[20] S. Kempke, B. Van Houdenhove, S. Claes, P. Luyten, The role of perfectionism in chronic fatigue syndrome, in F.M.Sirois & D.S.Molnar (eds.) *Perfect. Heal. Well-Being,* Springer International Publishing, 2015: p. 101–118. Available from: https://doi.org/10.1007/978-3-319-18582-8\_5

[21] S.K. Johnson, The biopsychosocial model and chronic fatigue syndrome, *Am. Psychol.* 1998; 53: 1080–1081.

[22] K.J. Geraghty, A. Esmail, Chronic fatigue syndrome: Is the biopsychosocial model responsible for patient dissatisfaction and harm?, *Br. J. Gen. Pract.* 2016; 66(649): 437–438. Available from: https://doi.org/10.3399/bjgp16X686473

[23] Action for ME, Recognition, research and respect: An agenda for change in ME Executive summary, Available from: https://www.actionforme.org.uk/uploads/images/2018/12/IAFME-recognition-research-respect-041218.pdf

[24] J.K. Kiecolt-Glaser, L. McGuire, T.F. Robles, R. Glaser, Emotions, morbidity, and mortality: new perspectives from psychoneuroimmunology, *Annu. Rev. Psychol.* 2002; 53: 83–107. Available from: https://doi.org/10.1146/annurev.psych.53.100901.135217.

[25] N. Klimas, R. Morgan, F. Salvato, F. Van Riel, C. Millon, M.A. Fletcher, Chronic fatigue syndrome and psychoneuroimmunology, in: N.Schneiderman, P.Mccabe & A.Baum (eds.) *Stress Dis. Process. Perspect. Behav. Med.* New York: Taylor and Francis; 2018. p.121–137.

[26] C.Naylor, P.Das, S.Ross, M.Honeyman, J.Thompson, H.Gilburt. *Bringing together physical and mental health.* King's Fund. 2016 Mar. Available from: https://s16878.pcdn.co/wp-content/uploads/2016/04/Bringing-together-Kings-Fund-March-2016\_1-1.pdf

[27] T.J. Lane, P. Manu, D.A. Matthews, Depression and somatization in the chronic fatigue syndrome, *Am. J. Med.* 1991; 91(4): 35–344. Available from: https://doi.org/10.1016/0002-9343(91)90150-V.

[28] E. Fuller-Thomson, & J. Nimigon, Factors associated with depression among individuals with chronic fatigue syndrome: findings from a nationally representative survey. *Fam. Pract.* 2008; *25*(6): 414-422. Available from: https://doi.org/[10.1093/fampra/cmn064](https://doi.org/10.1093/fampra/cmn064)

[29] M. Iwase, S. Okajima, R. Takahashi, T. Mogami, N. Kusaka, H. Kuratsune, M. Takeda, A. Shimizu, Psychiatric assessment and treatment for chronic fatigue syndrome in Japan, in: Y.Watanabe., B.Evengård., B.H. Natelson., L.A.Jason., & H.Kuratsune (eds.) *Fatigue Sci. Hum. Heal.* Springer Japan, 2008; p. 103–117. Available from: https://doi.org/10.1007/978-4-431-73464-2\_8.

[30] P.D. White, K. Goldsmith, A.L. Johnson, L. Potts, R. Walwyn, J.C. Decesare, H.L. Baber, M. Burgess, L. V. Clark, D.L. Cox, J. Bavinton, B.J. Angus, G. Murphy, M. Murphy, H. O’Dowd, D. Wilks, P. McCrone, T. Chalder, M. Sharpe, Comparison of adaptive pacing therapy, cognitive behaviour therapy, graded exercise therapy, and specialist medical care for chronic fatigue syndrome (PACE): A randomised trial, *Lancet.* 2011; 377(9768): 823–836. https://doi.org/10.1016/S0140-6736(11)60096-2.

[31] B. Fischler, R. Cluydts, V. De Gucht, L. Kaufman, K. De Meirleir, Generalized anxiety disorder in chronic fatigue syndrome, *Acta Psychiatr. Scand.* 1997; 95(5): 405–413. Available from: https://doi.org/10.1111/j.1600-0447.1997.tb09653.x.

[32] J. Joyce, M. Hotopf, S. Wessely, The prognosis of chronic fatigue and chronic fatigue syndrome: a systematic review, QJM - Mon. *J. Assoc. Physicians.* 1997; 90(3): 223–233. Available from: https://doi.org/10.1093/qjmed/90.3.223.

[33] K. Hadlandsmyth, K.E. Vowles, Does depression mediate the relation between fatigue severity and disability in chronic fatigue syndrome sufferers?, *J. Psychosom. Res.* 2009; 66(1):31-5. Available from: https://doi.org/10.1016/j.jpsychores.2008.08.002.

[34] F.M. Sirois, D.S. Molnar, Conceptualizations of perfectionism, health, and well-being: an introductory overview, in F.M.Sirois & D.S.Molnar (eds.) *Perfect. Heal. Well-Being,* Springer International Publishing, 2015: p. 1–21. Available from: https://doi.org/10.1007/978-3-319-18582-8\_1.

[35] S.J. Egan, T.D. Wade, R. Shafran, Perfectionism as a transdiagnostic process: a clinical review, *Clin. Psychol. Rev.* 2011;31(2): 203-12. Available from: https://doi.org/10.1016/j.cpr.2010.04.009.

[36] R. Shafran, W. Mansell, Perfectionism and psychopathology: a review of research and treatment, *Clin. Psychol. Rev.* 2001; 21(6): 879–906. Available from: https://doi.org/10.1016/s0272-7358(00)00072-6.

[37] M.W. Enns, B.J. Cox, The nature and assessment of perfectionism: a critical analysis, in G. L. Flett & P. L. Hewitt (eds.) *Perfect. Theory, Res. Treat,* American Psychological Association, 2002: p. 33–62. Available from: https://doi.org/10.1037/10458-002.

[38] M.M. Antony, C.L. Purdon, V. Huta, P.S. Richard, Dimensions of perfectionism across the anxiety disorders, *Behav. Res. Ther.* 36 (1998) 1143–1154. https://doi.org/10.1016/S0005-7967(98)00083-7.

[39] P.L. Hewitt, G.L. Flett, E. Ediger, Perfectionism and depression: longitudinal assessment of a specific vulnerability hypothesis, *J. Abnorm. Psychol.* 1996; 36(12):1143-54. Available from: https://doi.org/10.1037/0021-843X.105.2.276.

[40] L.P, Maricuțoiu, S. Măgurean, B.T,Tulbure, Perfectionism in a transdiagnostic context: an investigation of the criterion validity of the almost perfect scale-revised. *Eur. J. Psychol.* Assess. 2019. https://doi.org/10.1027/1015-5759/a000541.

[41] Y. Wang, B. Zhang, The dual model of perfectionism and depression among Chinese university students, *South African J. Psychiatry.* 2017; 23(1): 1-7. Available from: https://doi.org/10.4102/sajpsychiatry.v23i0.1025.

[42] P.D. Slade, R.G. Owens, A dual process model of perfectionism based on reinforcement theory, *Behav. Modif.* 1998; 22(3): 372–90. Available from: https://doi.org/10.1177/01454455980223010.

[43] S.J. Blatt, J.P. D’Affitti, D.M. Quinlan, Experiences of depression in normal young adults, *J. Abnorm. Psychol*. 1976; 85(4): 383–389. Available from: https://doi.org/10.1037/0021-843X.85.4.383.

[44] P.L. Hewitt, G.L. Flett, Perfectionism in the self and social contexts: conceptualization, assessment, and association with psychopathology. *J. Pers. Soc. Psychol.* 1991, 60(3): 456–470. Available from: [https://doi.org/10.1037/0022-3514.60.3.456](https://psycnet.apa.org/doi/10.1037/0022-3514.60.3.456)

[45] R.O. Frost, P. Marten, C. Lahart, R. Rosenblate, The dimensions of perfectionism, *Cognit. Ther. Res.* 1990; 14(5): 449-468. Available from: https://doi.org/10.1007/BF01172967.

[46] R.B. Slaney, K.G. Rice, M. Mobley, J. Trippi, J.S. Ashby. The revised almost perfect scale. *Meas. Eval. Counc. Dev.* 2001; 34(3):130-45. Available from: https://doi.org/10.1080/07481756.2002.12069030

[47] T.E. Wimberley, M.J. Stasio, Perfectionistic thoughts, personal standards, and evaluative concerns: Further investigating relationships to psychological distress. *Cognit. Ther. Res.* 2013, 37(2):277-83.Available from:

https://doi.org/10.1007/s10608-012-9462-7

[48] J.E. Young, J.S. Klosko, M.E. Weishaar. *Schema therapy: A practitioner's guide.*

Guilford Press; 2006.

[49] D.M. Dunkley, S. Solomon-Krakus, M. Moroz, Personal standards and self-critical perfectionism and distress: stress, coping, and perceived social support as mediators and moderators, in F.M.Sirois & D.S.Molnar (eds.) *Perfect. Heal. Well-Being,* Springer International Publishing, 2015: p. 157–176. Available from: https://doi.org/10.1007/978-3-319-18582-8\_7.

[50] G.L. Flett, P.L. Hewitt, Reflections on perfection and the pressure to be perfect in athletes, dancers, and exercisers: a focus on perfectionistic reactivity in key situations and life contexts, in: P.Hill (ed.) *Psychol. Perfect. Sport. Danc. Exerc*. 2016. Routledge/Taylor & Francis Group. p. 296–319.

[51] M. Maes, F.N.M. Twisk, Treatment of myalgic encephalomyelitis/chronic fatigue syndrome (ME/CFS), a multisystem disease, should target the pathophysiological aberrations (inflammatory and oxidative and nitrosative stress pathways), not the psychosocial “ barriers” for a new equilibrium, *Patient Educ. Couns.* 2010; 80(1): 148–149. Available from: https://doi.org/10.1016/j.pec.2010.02.017.

[52] J.T. Spence, A.S. Robbins, Workaholism: definition, measurement, and preliminary results, *J. Pers. Assess.* 1992; 58(1);160-178. Available from: https://doi.org/10.1207/s15327752jpa5801\_15.

[53] B. Van Houdenhove, F. Van Den Eede, P. Luyten, Does hypothalamic-pituitary-adrenal axis hypofunction in chronic fatigue syndrome reflect a “crash” in the stress system?, *Med. Hypotheses.* 2009: 72(6): 701–705. Available from: https://doi.org/10.1016/j.mehy.2008.11.044.

[54] B. Van Houdenhove, P. Luyten, S. Kempke, Chronic fatigue syndrome/fibromyalgia: a “stress-adaptation” model, *Fatigue Biomed. Heal. Behav.* 2013; 1(3): 137–147. Available from: https://doi.org/10.1080/21641846.2013.795085.

[55] P.B. Organista, J. Miranda, Psychosomatic symptoms in medical outpatients: an investigation of self-handicapping theory, *Health Psychol.* 1991; 10(6): 427-431. Available from: https://doi.org/10.1037/0278-6133.10.6.427.

[56] D.D. Burns, The perfectionist script for self-defeat, *Psychol. Today.* 1980; 34–52.

[57] B.Sorotzkin, The quest for perfection: avoiding guilt or avoiding shame? *Psychother. Theor. Res. Pract. Train.*1985; 22(3):564-571. Available from: [https://doi.org/10.1037/h0085541](https://psycnet.apa.org/doi/10.1037/h0085541)

[58] M. Spence, R. Moss-Morris, T. Chalder, The behavioural responses to illness questionnaire (BRIQ): a new predictive measure of medically unexplained symptoms following acute infection, *Psychol. Med.* 2005; 35(4): 583–593. Available from: https://doi.org/10.1017/S0033291704003484.

[59] C. White, R. Schweitzer, The role of personality in the development and perpetuation of chronic fatigue syndrome, *J. Psychosom. Res.* 2000; 48(6): 515–524. Available from: https://doi.org/10.1016/S0022-3999(00)00087-8.

[60] F.M. Sirois, D.S. Molnar, Perfectionism and maladaptive coping styles in patients with chronic fatigue syndrome, irritable bowel syndrome and fibromyalgia/arthritis and in healthy controls, *Psychother. Psychosom.* 2014; 83(6): 384–385. Available from: https://doi.org/10.1159/000365174.

[61] P. Luyten, S.J. Blatt, B. Van Houdenhove, J. Corveleyn, Depression research and treatment: are we skating to where the puck is going to be?, *Clin. Psychol. Rev.* 2006; 26(8): 985–999. Available from: https://doi.org/10.1016/j.cpr.2005.12.003.

[62] V. Deary, T. Chalder, Personality and perfectionism in chronic fatigue syndrome: a closer look, *Psychol. Health.* 2010; 25(4): 465–475. Available from: https://doi.org/10.1080/08870440802403863.

[63] R. Moss-Morris, M.J. Spence, R. Hou, The pathway from glandular fever to chronic fatigue syndrome: can the cognitive behavioural model provide the map?, *Psychol. Med.* 2011; 41(5): 1099–1107. Available from: https://doi.org/10.1017/S003329171000139X.

[64] S. Kempke, P. Luyten, S. Claes, L. Goossens, P. Bekaert, P. Van Wambeke, B. Van Houdenhove, Self-critical perfectionism and its relationship to fatigue and pain in the daily flow of life in patients with chronic fatigue syndrome, *Psychol. Med.* 2013; 43(5): 995-1002. Available from: https://doi.org/10.1017/S0033291712001936.

[65] Centre for Reviews and Dissemination, Univesity of York, *CRD’s guidance on systematic reviews,* 2009. Available from: https://doi.org/10.1016/S1473-3099(10)70065-7.

[66] D. Moher, A. Liberati, J. Tetzlaff, D.G. Altman. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Ann. Intern. Med.* 2009;151(4): 264-9. Available from: https://doi.org/10.1371/journal.pmed.1000097

[67] J. McGowan, M. Sampson, D.M. Salzwedal, E. Cogo, V. Foerster, C. Lefebvre. PRESS peer review of electronic search strategies: 2015 guideline statement. *J. Clin. Epidemiol.* 2016; 75: 40-46. Available from: https://www.sciencedirect.com/science/article/pii/S0895435616000585

[68] P.J. Taylor, P. Hutton, L. Wood, Are people at risk of psychosis also at risk of suicide and self-harm? A systematic review and meta-analysis. *Psychol. Med.* 2014; 45(5): 911-926. Available from: https://doi.org/10.1017/S0033291714002074.

[69] J.W. Williams, B.L. Plassman, J. Burke, S. Benjamin, Preventing Alzheimer’s disease and cognitive decline, *Evid. Rep. Technol. Assess* (Full Rep). 2010; 193(1): 1–727.

[70] P. Blenkiron, R. Edwards, S. Lynch, Associations between perfectionism, mood, and fatigue in chronic fatigue syndrome: a pilot study, *J. Nerv. Ment. Dis.* 1999; 187(9): 566–570. Available from: https://doi.org/10.1097/00005053-199909000-00006.

[71] S. Kempke, B. Van Houdenhove, P. Luyten, L. Goossens, P. Bekaert, P. Van Wambeke, Unraveling the role of perfectionism in chronic fatigue syndrome: is there a distinction between adaptive and maladaptive perfectionism?, *Psychiatry Res.* 2011; 186(2-3) 373–377. Available from: https://doi.org/10.1016/j.psychres.2010.09.016.

[72] S. Kempke, P. Luyten, B. Van Houdenhove, L. Goossens, P. Bekaert, P. Van Wambeke, Self-esteem mediates the relationship between maladaptive perfectionism and depression in chronic fatigue syndrome, *Clin. Rheumatol.* 2011; 30(12): 1543–1548. Available from: https://doi.org/10.1007/s10067-011-1772-8.

[73] S. Kempke, P. Luyten, S. De Coninck, B. Van Houdenhove, L.C. Mayes, S. Claes, Effects of early childhood trauma on hypothalamic-pituitary-adrenal (HPA) axis function in patients with chronic fatigue syndrome, *Psychoneuroendocrinology.* 2015; 52: 14–21. Available from: https://doi.org/10.1016/j.psyneuen.2014.10.027.

[74] P. Luyten, B. Van Houdenhove, N. Cosyns, A.-L. Van den Broeck, Are patients with chronic fatigue syndrome perfectionistic - or were they? A case-control study, *Pers. Individ. Dif.* 2006; 40(7): Available from: 1473–1483. https://doi.org/10.1016/j.paid.2005.10.023.

[75] P. Luyten, S. Kempke, P. van Wambeke, S. Claes, S.J. Blatt, B. van Houdenhove, Self-critical perfectionism, stress generation, and stress sensitivity in patients with chronic fatigue syndrome: Relationship with severity of depression, *Psychiatry.* 2011; 74(1): 21–30. Available from: https://doi.org/10.1521/psyc.2011.74.1.21.

[76] S. Valero, N. Sáez-Francàs, N. Calvo, J. Alegre, M. Casas, The role of neuroticism, perfectionism and depression in chronic fatigue syndrome: a structural equation modeling approach, *Compr. Psychiatry*. 2013; 54(7): 1061–1067. Available from: https://doi.org/10.1016/j.comppsych.2013.04.015.

[77] B. Wood, S. Wessely, Personality and social attitudes in chronic fatigue syndrome, *J. Psychosom. Res.* 1999; 47(4): 385–397. Available from: https://doi.org/10.1016/S0022-3999(99)00025-2.

[78] A.T. Beck, C.H. Ward, M. Mendelson, J. Mock, J. Erbaugh, An inventory for measuring depression, *Arch. Gen. Psychiatry.* 1961; 4(6): 561-571. Available from: https://doi.org/10.1001/archpsyc.1961.01710120031004. .

[79] A.S. Zigmond, R.P. Snaith, The hospital anxiety and depression scale, *Acta Psychiatr. Scand*. 1983; 67(6): 361-370. Available from: https://doi.org/10.1111/j.1600-0447.1983.tb09716.x.

[80] M.C. Sharpe, A report - chronic fatigue syndrome: guidelines for research, J. R. *Soc. Med.* 1991; 84(2): 118–121. Available from: https://doi.org/10.1177/014107689108400224.

[81] L.A. Jason, A. Brown, E. Clyne, L. Bartgis, M. Evans, M. Brown, Contrasting case definitions for chronic fatigue syndrome, myalgic encephalomyelitis/chronic fatigue syndrome and myalgic encephalomyelitis, *Eval. Heal. Prof.* 2012; 35(3): 280–304. Available from: https://doi.org/10.1177/0163278711424281.

[82] A.T. Beck, D. Guth, R.A. Steer, R. Ball, Screening for major depression disorders in medical inpatients with the Beck Depression Inventory for Primary Care. *Behav. Res. Ther.* 1997:35(8):785-91. [https://doi.org/10.1016/S0005-7967(97)00025-9](https://doi.org/10.1016/S0005-7967%2897%2900025-9)

[83] M. Brown, C.Kaplan, L. Jason, Factor analysis of the Beck Depression Inventory-II with patients with chronic fatigue syndrome. *J. Health. Psychol.* 2012;17(6):799-808. https://doi.org/[10.1177/1359105311424470](https://dx.doi.org/10.1177/1359105311424470)

[84] P. McCue, T. Buchanan, C.R. Martin, Screening for psychological distress using internet administration of the Hospital Anxiety and Depression Scale (HADS) in individuals with chronic fatigue syndrome. *Br. J. Clin. Psychol.* 2006;45(4):483-98.

[85] K. Kelland, 2019, March 13, *Sick and tired: online activists are silencing us, scientists sa*y. <https://www.reuters.com/investigates/special-report/science-socialmedia/>

[86] S.Camarata,(2019) The Dark Side of Social Media Activism in Science, *Psychol. Today,* <https://www.psychologytoday.com/ie/blog/the-intuitive-parent/201907/the-dark-side-social-media-activism-in-science?page=1>

[87] N. Hawkes, N. Dangers of research into chronic fatigue syndrome. *BMJ,* 2011;19, 342.

Available from: doi: <https://doi.org/10.1136/bmj.d3780>

 [88] J. Stoeber, K. Otto, Positive conceptions of perfectionism: approaches, evidence,

 challenges, *Pers. Soc. Psychol. Rev.* 2006; 10(4): 295–319.

 Available from: https://doi.org/10.1207/s15327957pspr1004\_2.

[89] D.E. Hamachek. Psychodynamics of normal and neurotic perfectionism. *Psychol: J. Hum. Behav.* 1978;15(1), 27–33.

[90] G.L. Flett, T. Nepon, P.L. Hewitt. Perfectionism, worry, and rumination in health and mental health: a review and a conceptual framework for a cognitive theory of perfectionism, in: F.M.Sirois & D.S.Molnar (eds.) *Perfect. Heal. Well-Being,* Springer International Publishing, 2015: p. 121-155. Available from: https//:doi.org/[10.1007/978-3-319-18582-8\_6](https://www.researchgate.net/deref/http%3A//dx.doi.org/10.1007/978-3-319-18582-8_6?_sg%5B0%5D=evvICBXhq4xFEwYuRlm5vnczWHPcu8C8wQDTplV7FQX4Tk14SkMyOPQL4Lj-DY0HjtT1uKEyq8ZU8b8VhOpVhq_9NA.rIP_eaVbPQWZaVlFhwkN2utAkSl3nZtr5PCvEnclYiIQz7rim3Ehs3--lvyA654phFwYMyyOMfmunOpLWCF8fg)

[91] M.M. Smith, D.H. Saklofske, J. Stoeber, S.B. Sherry, The big three perfectionism scale: a new measure of perfectionism, *J. Psychoeduc. Assess.* 2016; 34(7): 670–687. Available from: https://doi.org/10.1177/073428291665153

[92] J. Stoeber, O. Kobori, Y. Tanno, The multidimensional perfectionism cognitions inventory–English (MPCI–E): reliability, validity, and relationships with positive and negative affect, *J. Pers. Assess.* 2010; 92(1):16–25. Available from: https://doi.org/10.1080/00223890903379159.

[93] G.L. Flett, P.L. Hewitt, T. Nepon, A. Besser, Perfectionism cognition theory: the cognitive side of perfectionism, in: J.Stoeber (ed.) *Psychol. Perfect. Theory, Res. Appl.,* New York, Routledge, 2017, p. 89-110. Available from: https://doi.org/10.4324/9781315536255.

[94] G.L. Flett, P.L. Hewitt, K.R. Blankstein, L. Gray, Psychological distress and the frequency of perfectionistic thinking, *J. Pers. Soc. Psychol.* 1998; 75(5): 1363–1381. Available from: https://doi.org/10.1037/0022-3514.75.5.1363.

[95] G.L. Flett, D. Madorsky, P.L. Hewitt, M.J. Heisel, Perfectionism cognitions, rumination, and psychological distress, *J. Ration. - Emotive Cogn. - Behav. Ther.* 2002; 20(1): 33–47. Available from: https://doi.org/10.1023/A:1015128904007.

[96] C.J. Ferguson, M.T. Brannick, Publication bias in psychological science: prevalence, methods for identifying and controlling, and implications for the use of meta-analyses, *Psychol. Methods.* 2012; 17(1): 120-128. Available from: https://doi.org/10.1037/a0024445

[97] M. Zdunek, L.A Jason, M. Evans, R. Jantke, J.L Newton, A cross cultural comparison of disability and symptomatology associated with CFS. *Intl J Phys Beh Res.* 2015;5(2):98. https://doi.org/[10.5923/j.ijpbs.20150502.07](https://dx.doi.org/10.5923/j.ijpbs.20150502.07)

[98] S. Bhatia, N.A. Olczyk, L.A. Jason, J. Alegre, J. Fuentes-Llanos, J. Castro-Marrero, A Cross-National Comparison of Myalgic Encephalomyelitis and Chronic Fatigue Syndrome at Tertiary Care Settings from the US and Spain. *Am. J. Soc. Sci. Humanit.* 2020;5:104-15. https://doi.org/[10.20448/801.51.104.115](https://www.researchgate.net/deref/http%3A//dx.doi.org/10.20448/801.51.104.115?_sg%5B0%5D=Py1pCLBjfsPXwoTHsHPBM91N_dgXWxpHqfdQbxaWbhgoxSHE8ihgJONkpcFhuarFsn8AL0jk-WffFhpO0mB6gkG2Jw.u18nAmSfDlzQJ1TV5RSGN8oaYdgSo0u0GefHS9O_tJa5WFjMQXhWw1AJkfeTiNSW61qU7rSF4cmdpQxPTPNBPA)

[99] M.M. Smith, D.H, Saklofske, G. Yan, S.B. Sherry. Cultural similarities in perfectionism: Perfectionistic strivings and concerns generalize across Chinese and Canadian groups. *Meas Eval Couns Dev.* 2016 Jan;49(1):63-76. <https://doi.org/10.1177/0748175615596785>

[100] P.M. DiBartolo, M.J,Rendón, A critical examination of the construct of perfectionism and its relationship to mental health in Asian and African Americans using a cross-cultural framework. *Clin. Psychol. Rev.* 2012 Apr 1;32(3):139-52.

[101] A.J. Ocon, Caught in the thickness of brain fog: exploring the cognitive symptoms of chronic fatigue syndrome, *Front. Physiol.* 2013; 4: 63. Available from: https://doi.org/10.3389/fphys.2013.00063

[102] S.J. Egan, T.D. Wade, R. Shafran, M.M. Antony, 2016, *Cognitive-behavioral*

 *treatment of perfectionism.* Guilford Publications

[103] L. Jason. The energy envelope theory and myalgic encephalomyelitis/chronic fatigue syndrome. *Aaohn Journal.* 2008;56(5):189-95. Available from: https://doi.org/10.1177/216507990805600502

[104] M. Burgess, *Overcoming Chronic Fatigue 2nd Edition:* *A self-help guide using cognitive behavioural techniques,* London, Robinson, 2019.