chronic fatigue, and irritable bowel all score significantly higher on the neuroticism scale compared to healthy controls. These findings may be biased by health seeking behaviour as it itself has also been linked to neuroticism [12]. There also have been a number of other studies that suggest a causal effect between neuroticism and health. Pain mechanisms are heighted by neuroticism reflecting that psychosocial factors influence biological mechanisms [12]. Furthermore, both neuroticism and extraversion have been associated with the regulation of the autonomic nervous system and pain responses [13]. Neuroticism will also influence recall and in turn memory and is an issue pertinent to patients with FM [14].

Limited and inconsistent [13] studies have investigated the role of personality in the development, maintenance, and exacerbation of symptoms associated with FM. Previous studies focussed on personality using scales based on levels of psychopathology, such as the Minnesota Multiphasic Personality Inventory [MMPI I/2], or take a psychobiological/ biological relevance approach using scales such as the Temperament and Character Inventory (TCI) or Karolinska scale of personality [15]. It has been shown that high levels of neuroticism link to increased perception of pain and other symptoms associated with FM [16, 17]. This may occur through the effect of personality on the type of coping techniques used to deal with pain rather than a direct effect on the pain itself [12, 17].

The key domains contributing to the clinical phenotype of FM, namely, pain, poor sleep, fatigue, cognitive dysfunction (confusion), emotional distress (anxiety and depression), and stress are well defined within the American College of Rheumatology [ACR] 1990 classification [18] and the 2010 diagnostic [19] criteria for FM. We aimed to explore whether personality traits influence these characteristic symptoms of FM. We surveyed young women with FM in order to minimize long-term secondary and adaptive effects of the condition on these FM outcomes. We specifically wished to see if the characteristic FM symptoms of pain, sleep, confusion, depression, anxiety, and stress associate with personality traits and if so how these factors might interlink.

2. Methods

2.1. Ethics. Ethics approval was obtained through relevant committees of Monash University and Monash Medical Centre, Melbourne, Australia.

2.2. Subjects. The participants in this study consisted of volunteer women who were sourced from a variety of areas including a FM self-management program, notices in local news-papers, a fibromyalgia treatment clinic, and local rheumatologists. Twenty-five female FM patients fulfilling ACR 1990 classification criteria and 27 female HCs, all healthy individuals with no pain condition and recruited by word of mouth were identified. All were under age of 39 years of age.

2.3. Procedures. All participants were sent written information regarding the study along with a consent form which,

when signed, was followed by a series of questionnaires. These included the Fibromyalgia Impact Questionnaire [20], the Profile of Mood States [21], and the Perceived Stress Scale [22]. Participating FM women were also contacted 12 months later to complete the same battery of questionnaires, with a response rate of 56%.

2.4. Instruments. The following instruments were applied to all FM and HC subjects at time zero and to 56% of FM patients 12 months later.

(1) The Big 5 Personality Inventory (BFI) [11]: a validated 44-item personality scale, scored as 1 (disagree strongly) through 5 (agree strongly) to indicate the extent of agreement with the items. The 44 items comprise 5 subscales of extraversion, agreeableness, conscientiousness, neuroticism, and openness.

(2) Fibromyalgia Impact Questionnaire (FIQ) [20]: a validated 20-item functional ability questionnaire, which measures how an individual's symptom characteristics impact their daily functioning for the preceding week. Individual subscales include sleep, depression, anxiety, and pain and use a 0 to 10 cm visual analogue scale (VAS), measuring left of line for "no impact of subscale" through to the far right, "worst possible impact".

(3) Perceived Stress Scale (PSS) [22]: a validated scale that assesses the degree an individual experiences feelings of being overwhelmed by stressful life events over the past month. The scale is a 10-item, 5-point likert scale ranging from 0 (never) to 4 (very often) with scores ranging from 0 to 40.

(4) Profile of Mood States (POMS) [21] confusion subscale: a validated scale that measures individual aspects of mood as well as a total overall mood score. The POMS identifies adjective words that describe feelings that are indicative of mood states. The questionnaire asks individuals to rate on a scale from zero (not at all) to four (extremely) which best describes how they have felt over the past week. The scale includes a total of 65 definitions that represent the 6 subscales that include Tension-Anxiety, Depression-Dejection, Anger-Hostility, Vigour, Fatigue, and Confusion. A total mood score is obtained by summing all subscale scores with vigour inversed. The subscale of confusion was used to represent the cognitive dysfunction seen in FM. The single word items that reflect confusion include bewil-dered, confused, unable to concentrate, forgetful, uncertain, and efficient (score reversed).

2.5. Statistical Analysis. Initial descriptive analysis was conducted, along with normality checks, using SPSS (PASW version). Chi-squared test was used to test for differences in group demographics. *t*-Tests, means and standard deviations were used to explore the differences between groups in symptom characteristics and stability of personality traits. ANOVAs were performed to compare the differences be-