

CHAPTER
CHRONIC FATIGUE AND FIBROMYALGIA
SYNDROME
(7 CONTACT HOURS)

Learning objectives

- ▶ Identify and define chronic fatigue and fibromyalgia syndrome.
- ▶ Identify and discuss the symptomatology of chronic fatigue and fibromyalgia syndrome.
- ▶ Identify the prevalence of chronic fatigue and fibromyalgia syndrome in the United States.
- ▶ Describe the pathophysiology of chronic fatigue and fibromyalgia syndrome.
- ▶ Describe the nurse's role in assessing for chronic fatigue and fibromyalgia syndrome.
- ▶ Describe the differential diagnosis of chronic fatigue and fibromyalgia syndrome.
- ▶ Identify and discuss the treatment modalities for chronic fatigue and fibromyalgia syndrome.
- ▶ Describe the complexity of chronic fatigue and fibromyalgia syndrome.

Introduction

Any individual who has experienced debilitating fatigue, malaise, chronic pain and other somatic complaints has probably endured years of frustration from the health care system prior to being diagnosed with chronic fatigue syndrome (CFS), fibromyalgia (FMS) or myalgic encephalomyelitis (ME). CFS, FMS and ME are typically used interchangeably in most literature and textbooks; however there are minuscule differences that will be explored. For the sake of this continuing education course, the terms fibromyalgia and chronic fatigue syndrome will be used.

Fibromyalgia and chronic fatigue syndrome are among the most complex and misdiagnosed syndromes seen in clinical practice. The majority of the literature implies that the conditions remain poorly understood, despite an abundance of scientific research. However, according to the U.S. Department of Health and Human Services and the National Institute of Health (NIH) (2009), chronic fatigue and fibromyalgia when compared to other major disorders has had the least amount of money spent on researching the syndromes. Since 2005, an average of \$4 million per year has been spent on chronic fatigue syndrome, whereas from \$9 million to 12 million is spent on fibromyalgia per year [47]. To put it into perspective, \$246 million to \$289 million has been spent on asthma, \$443 million to \$512 million on alcoholism, \$700 million to \$729 million on breast cancer and billions on heart disease, diabetes and cancer per year [47].

It has been estimated that the average patient with fibromyalgia has been seen by approximately 15 physicians and has had the syndrome for five years before properly being diagnosed [22]. Typically, most patients are misdiagnosed, enduring costly treatments with little benefit or being informed that there is nothing medically wrong with them and that it is "all in their head." Therefore, many patients and families become

frustrated and skeptical with their provider. To this day, some health care professionals do not believe fibromyalgia truly exists [4]. Although most patients are relieved when a correct diagnosis is finally made, the patient may need to be convinced that the provider actually knows what is wrong, and that a treatment plan has been formulated to alleviate his/her symptoms [22].

Defining chronic fatigue syndrome and fibromyalgia

Based upon the known criteria of each condition, pain is the major feature of fibromyalgia, whereas post-exertional malaise and fatigue are the major symptoms of chronic fatigue syndrome. Pain and fatigue are the most prevalent complaints seen in primary care. However, both chronic fatigue and fibromyalgia syndromes remain poorly understood because both complaints may occur synonymously and can be a sign of a plethora of other medical conditions. To add to the complexity, there is a significant amount of overlap in the complex symptomatology between chronic fatigue and fibromyalgia. At this time, the majority of patients with chronic fatigue meet the criteria for fibromyalgia and at least 70 percent of patients with fibromyalgia meet the criteria for chronic fatigue syndrome [5, 18]. Due to the significant complexity and overlapping presentation of chronic fatigue syndrome and fibromyalgia, it is important to define each of the syndromes.

Chronic fatigue syndrome

Chronic fatigue syndrome is a debilitating syndrome that involves multiple body systems. It is characterized by profound fatigue that is not improved by bed rest and may be exacerbated or re-kindled by physical or mental activity. Patients with chronic fatigue syndrome function at substantially lower level of activity than they were capable of doing prior to the onset of their illness. Over the years, a great deal of debate has surrounded the issue of how best to define the syndrome, so the Department of Human Health and Services and the NIH have outlined the history to hopefully alleviate the confusion in the definition, uncertainties and overlapping symptoms with fibromyalgia [15]:

In the early 1980s, patients with symptoms including fatigue, muscle pain and depression were often diagnosed with chronic Epstein-Barr virus syndrome or chronic mononucleosis syndrome. These patients had symptoms that suggested infection, such as low-grade fever, recurrent sore throat and tender lymph nodes. Epstein-Barr virus (EBV), which causes acute mononucleosis, was considered a likely source. However, at the time, researchers could not isolate EBV as the cause of the syndrome and, as yet, have not definitively identified any other infectious agents.

In 1988, in an effort to standardize research definitions, a group of experts led by the CDC proposed a new name for Epstein-Barr virus syndrome that more accurately described it as chronic fatigue syndrome. The new definition outlined two major criteria:

- ♦ Persistent or relapsing, debilitating fatigue, lasting at least six months, in a person who has no previous history of similar symptoms.
- ♦ Exclusion of other clinical conditions that may produce similar symptoms (such as, malignancy, autoimmune disease, chronic psychiatric disease, and chronic inflammatory disease, among others).

The definition also included the occurrence of at least eight symptoms including mild fever, sore throat, painful lymph nodes, prolonged fatigue after exercise, joint or muscle pain, unexplained muscle weakness, headaches and sleep disturbance.

Concurrently, while the CDC in the United States (U.S.) was defining the syndrome, researchers in Australia developed their own definition. The Australian definition captured the CDC's major criteria, and added the symptom of "neuropsychiatric dysfunction," which included impairment of concentration and short-term memory.

In 1990, a consensus meeting of researchers in Great Britain found neither of these definitions satisfactory in clinical practice. Therefore, the resulting guidelines included a glossary describing in detail the principal symptoms of fatigue, disability, mood disturbance, myalgia (muscle pain) and sleep disturbance. The "Oxford criteria," as they came to be known, also defined it as post-infectious fatigue syndrome (PIFS), a subtype of chronic fatigue syndrome that either followed an infection or is associated with a current infection.

In 1990, although there was no consensus about the etiology of chronic fatigue syndrome, which is needed to accurately classify a condition in the International Classification of Diseases (ICD-9), it needed a definitive billing code. ICD codes are required to properly bill insurance companies for payment reimbursements for the services rendered by physicians, nurse practitioners and clinics. Initially, the only entry in the alphabetic index of the ICD-9 was "Syndrome, fatigue," code 300. The ICD-9 then changed it to include code 323.09 "benign myalgic encephalomyelitis." However the 323.9 code did not reference the condition to include it as a postviral syndrome. Later, on October 1, 1991, the term "postviral syndrome" was classified to code 780.7, Malaise and fatigue [12].

In 1992, the World Health Organization (WHO) published ICD-10 codes that included many modifications. The WHO created a new category G93 that involved "other disorders of the brain" and created a new code G93.3 to include postviral fatigue syndrome, a condition which was previously mentioned in the ICD-9 code. The WHO also moved "benign myalgic encephalomyelitis" to the new code G93.3. In keeping with the placement in the ICD-10, chronic fatigue syndromes (and its synonymous terms) were to remain at G93.3 in ICD-10. However, the WHO was not content with the ICD-9 and ICD-10 coding because [12]:

- ♦ It appeared that while chronic fatigue syndrome was classified as heterogeneous group of disorders, not all were neurological in nature.
- ♦ Likewise, not all patients with chronic fatigue experienced a viral infection prior to being diagnosed with the syndrome.
- ♦ Also of potential concern is the similarity between the type of neurological findings in chronic fatigue syndrome and in depression, which is a psychiatric disorder.

In 2007, to avoid any confusion, the WHO updated its codes and recommended that all practitioners treating chronic fatigue syndrome code it as G93.3 (post-viral fatigue syndrome) and R 53 (malaise and fatigue). R is a newer chapter that includes symptoms, signs, abnormal results of clinical or other investigative procedures, and ill-defined conditions that no diagnosis is able to classify elsewhere [52]. Because of confusion and criticism that chronic fatigue syndrome diagnosis was too ambiguous and over-exclusive, and to facilitate a more systematic collection of data internationally, the International Chronic Fatigue Syndrome Study Group was created in 1994. The group, headed by the CDC and including representatives from Australia and Great Britain, proposed a revised definition of chronic fatigue syndrome. The revised definition was known as the Fukuda or research definition and was based on the presence of the following [12]:

- ♦ Clinically evaluated, unexplained, persistent or relapsing chronic fatigue that is of new or definite onset (has not been lifelong); is not the result of ongoing exertion; is not substantially alleviated by rest; and results in substantial reduction in previous levels of occupational, educational, social, or personal activities.
- ♦ The concurrent occurrence of four or more of the following symptoms, all of which must have persisted or recurred during six or more consecutive months of illness and must not have predated the fatigue:
 - ♦ Self-reported impairment in short-term memory or concentration severe enough to cause substantial reduction in previous levels of occupational, educational, social or personal activities.
 - ♦ Tender cervical or axillary lymph nodes.
 - ♦ Muscle pain, multijoint pain without joint swelling or redness.
 - ♦ Headaches of a new type, pattern or severity.
 - ♦ Unrefreshing sleep.

In 2001, an expert consensus panel convened in Canada to develop a case definition of myalgic encephalomyelitis designed for clinical diagnoses, rather than for research purposes as was the 1994 definition of chronic fatigue syndrome. The panel outlined criteria for the symptom categories including:

- ♦ Fatigue; post-exertional malaise or fatigue.
- ♦ Sleep dysfunction.
- ♦ Pain.
- ♦ Body system manifestations including

neurological/cognitive (i.e., difficulties with memory or concentration), autonomic (i.e., vertigo), neuroendocrine (i.e., heat or cold intolerance) and immunity (i.e., sore throat).

In 2003, the international group formed in 1994 revisited its research. The original definition offered examples of conditions that would preclude a diagnosis of chronic fatigue syndrome. The study group elaborated on these exclusionary criteria and recommended the use of several specific standardized instruments in assessing fatigue and accompanying symptoms.

Patients and patient advocates often prefer to call chronic fatigue syndrome “chronic fatigue and immune dysfunction syndrome” (CFIDS) to convey the complexity of the illness and its profound impact on people’s lives. The 2003 study group addressed the name “chronic fatigue syndrome,” expressing sympathy with those concerned that the name might trivialize the illness. “However,” the report stated, “we believe that changing the name without adequate scientific justification will lead to confusion and will substantially undermine the progress that has been made in focusing public, clinical and research attention on this illness.” [15].

After all of the debating to define chronic fatigue syndrome, physicians and practitioners may safely diagnose the condition if the patient satisfies the following criteria [8]:

- ♦ Has severe chronic fatigue of six months or longer duration with other known medical conditions excluded by clinical diagnosis.
- ♦ Concurrently has four or more of the following symptoms: substantial impairment in short-term memory or concentration; sore throat; tender lymph nodes; muscle pain; multijoint pain without swelling or redness; headaches of a new type, pattern or severity; unrefreshing sleep; and post-exertional malaise lasting more than 24 hours.

In the review of literature, there is limited data available in regards to chronic fatigue and fibromyalgia syndrome in children and adolescents. Children are diagnosed with chronic fatigue syndrome if any of the following symptoms last more than three months, as opposed to a minimum of four symptoms persistent for at least six months in adults [5, 33]:

- ♦ Incapacitating fatigue.
- ♦ Impaired short-term memory and concentration problems.
- ♦ Exercise intolerance.
- ♦ Sleep intolerance.
- ♦ Severe, generalized pain.
- ♦ Dyslexic.
- ♦ Tearful and/or profound mood changes.
- ♦ Sore throat, muscle and joint pain, headaches, allergies.
- ♦ Nausea, irritable bowel syndrome, cyclic vomiting.
- ♦ Lightheadedness, low blood pressure, racing heart, shakiness, sweating, blurred vision, nausea, worsened fatigue and pain, difficulty speaking and possibly fainting when sitting or standing still.

It is apparent that it has been a struggle over the years to definitively define chronic fatigue in a consensual, professional manner. Unfortunately, that has not alleviated the difficult task for practitioners to recognize and diagnose the syndrome promptly and accurately, leading to a delay in appropriate treatment.

Fibromyalgia

Fibromyalgia derived its name from “fibro-” which is tissue like ligaments and tendons, “my-” meaning muscle and “algia” indicating pain. Previously, fibromyalgia was called fibrositis, which was defined as diffuse noninflammatory nature muscular rheumatism. However, the name was later changed because fibromyalgia is no longer seen as an inflammatory disorder but as a chronic pain syndrome [27].

Fibromyalgia is a disorder of unknown etiology characterized by widespread pain, abnormal pain processing, sleep disturbance, fatigue and often psychological distress. Adults with fibromyalgia may also have other symptoms; such as [6]:

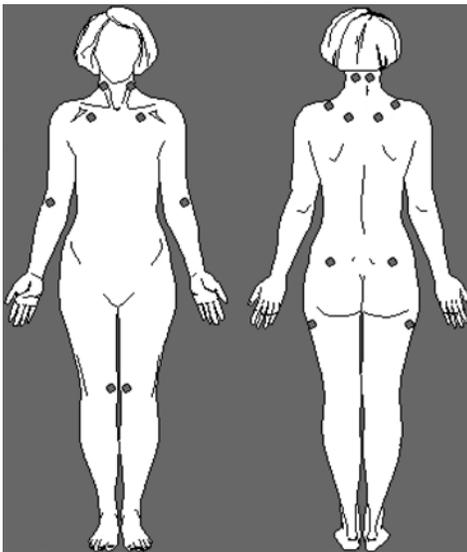
- ♦ Morning stiffness.
- ♦ Tingling or numbness in hands and feet.
- ♦ Headaches, including migraines.
- ♦ Irritable bowel syndrome.
- ♦ Problems with thinking and memory (sometimes called “fibro fog”).
- ♦ Painful menstrual periods and other pain syndromes.

Children and adolescents with fibromyalgia, which is known as juvenile fibromyalgia, typically have the same symptoms as adults, except they have experienced sleep disturbances, morning fatigue, swelling of the extremities and less ability to tolerate exercise [33].

In 1990, the American College of Rheumatology (ACR) developed specific criteria used for clinical diagnosis and classification of fibromyalgia. Diagnosis is based on the presence of widespread pain (at least three months duration) and tenderness on 11 of 18 pressure points in adults, and five of 18 pressure points in children [6, 33, 35]. The ACR’s criteria are as follows [6, 35]:

- ♦ The patient has at least a three-month complaint of widespread pain in any of the following body regions:
 - ♦ Pain in both sides of the body.
 - ♦ Pain above and below the waist level.
- ♦ In addition, axial skeletal pain (cervical spine, anterior chest, thoracic spine or low back pain) must be present. Low back pain is considered lower segment pain.

Table 1-Fibromyalgia tender points and symptoms [2]



Condition	Percentage of FMS symptoms
Muscular pain	100
Fatigue	96
Insomnia	86
Joint pains	72
Headaches	60
Restless legs	56
Numbness and tingling	52
Impaired memory	46
Leg cramps	42
Impaired concentration	41
Nervousness	32
Depression (major depression)	20

- ♦ In addition to widespread pain, there must be tender points in 11 of 18 specific areas, including at least 11 of the following areas [35]:(See Table 1):
 - ♦ Occiput (2) – at the suboccipital muscle insertions.
 - ♦ Low cervical (2) – at the anterior aspects of the intertransverse spaces at cervical (C); C5-C7.
 - ♦ Trapezius (2) – at the midpoint of the upper border.
 - ♦ Supraspinatus (2) – at origins, above the scapula spine near the medial border.
 - ♦ Second rib (2) – upper lateral to the second costochondral junction.
 - ♦ Lateral epicondyle (2) – 2 centimeters (cm) distal to the epicondyles.
 - ♦ Gluteal (2) – in upper outer quadrants of buttocks in anterior fold of muscle.
 - ♦ Greater trochanter (2) – posterior to the trochanteric prominence.
 - ♦ Knee (2) – at the medial fat pad proximal to the joint line.

According to coding rules provided by the CDC (2008), fibromyalgia is coded to 729.1, which is labeled “myositis and myalgia, unspecified”

and can include other conditions. In addition, the WHO (2007) recommends practitioners code fibromyalgia under M 79.0 (rheumatism, unspecified) and M 79.7 (fibromyalgia). M is a coding system for diseases of the musculoskeletal system and connective tissue [12, 53]. Ironically, although chronic fatigue and fibromyalgia are very similar in their presentation and typically overlap, both are coded differently, which intensifies the complexity of the disorders and the possibility of misdiagnosing the syndromes.

Epidemiology of chronic fatigue and fibromyalgia syndrome

According to the CDC (2009), chronic fatigue and fibromyalgia are debilitating syndromes. At least a quarter of all patients with chronic fatigue and fibromyalgia are unemployed or on disability due to the extreme fatigue and/or pain [7]. At this time, 16 percent are receiving Social Security benefits compared to 2.2 percent of the general population [18]. In June 2008, the CDC reported the prevalence of fibromyalgia was approximately 2 percent, affecting an estimated 5 million adults in 2005 [1].The CDC estimated that between 1 million and 4 million Americans suffer from chronic fatigue syndrome [7]. Additional statistical information on chronic fatigue syndrome is limited because fatigue is such a common complaint and the data is not differentiated.

According to the American College of Rheumatology (ACR) and the CDC, men have a 0.5 percent prevalence of being affected with fibromyalgia while women have a 3.4 percent risk. Therefore, most people with fibromyalgia are women (female to male ratio is 7:1) [1, 18, 50]. Women are also more likely to be affected with chronic fatigue syndrome. According to the Department of Health and Human Services and the NIH, chronic fatigue syndrome occurs three to four times more frequently among women than men and 10 times more often in white Americans than in Americans of other racial/ethnic groups. A more recent study disputes these numbers and would narrow the gap between the sexes, as well as among racial/ethnic population subgroups [15].

Fibromyalgia and chronic fatigue syndromes are typically diagnosed in individuals between the ages of 20 to 50 years; however, it may occur in children and older adults, especially among women. In 2008, it was estimated that most children diagnosed with juvenile fibromyalgia are prepubertal or adolescent girls aged 13-15 years with a mean onset at age 12 [21]. Juvenile fibromyalgia is more common in white, adolescent girls, although 35 percent boys of the same age or younger have also been diagnosed [21]. As women age, especially over the age of 70, there is a 7.4 percent risk of being affected by fibromyalgia [18, 50].

Fibromyalgia is the second-most common musculoskeletal disorder and causes over 20 percent of all visits to a rheumatologist [18]. Numerous research studies have demonstrated that over 50 percent of fibromyalgia patients have

a history of eating disorders or physical or sexual abuse. Up to 30 percent of patients fall into a psychiatric diagnosis category of depression, somatization and hypochondriasis, with anxiety being the most common. Many disagree as to whether psychiatric problems develop in patients before chronic fatigue and fibromyalgia or if it occurs as a result of the syndrome [18].

As of January 2009, epidemiologists recognized that the social, emotional, economic and functional effects of fibromyalgia on an individual’s life have been compared with those of rheumatoid arthritis (RA). Research indicates that the socioeconomic impact of fibromyalgia includes the following estimates [6,22]:

- ♦ Overall, fibromyalgia costs the American economy more than \$9 billion annually.
- ♦ Average yearly service utilization cost per person is \$2,274.
- ♦ Total annual cost (direct and indirect) per person is \$5,945.

According to the CDC (2008), in 1997, 7,440 hospitalizations listed ICD9-CM code 729.1 as the principal diagnosis. People with fibromyalgia have approximately one hospitalization every three years [6]. They also have:

- ♦ 2.2 million ambulatory care visits.
- ♦ 1.8 million physician office visits.
- ♦ 187,000 outpatient department visits.
- ♦ 266,000 emergency department visits.

Pathophysiology of chronic fatigue and fibromyalgia syndrome

The pathophysiology of fibromyalgia and chronic fatigue syndrome is complex because there are so many aspects to consider and other overlapping conditions. The unique features of fibromyalgia are manifested primarily with chronic pain, dysregulation of neuroendocrine function and alterations in the sleep pattern [39]. At this time, the pathophysiology of fibromyalgia and chronic fatigue syndrome remains unclear, but it has been hypothesized that fibromyalgia is a disorder that may arise from a muscle energy metabolism, generalized disorder of pain perception, neuroendocrine disturbance, sleep disturbance, stress and trauma from accidents or surgery, infections, inflammatory or immunopathologic disease of the muscle, dysregulated serotonin secretion, genetics or as a result of a sexual abuse or domestic violence [18, 22,49]. However, there is limited data available relating chronic fatigue syndrome to most of the proposed etiologies and a stronger suggestion that it may arise due to a viral illness or be psychological in nature. It has also been speculated that fibromyalgia may be a rare complication of hypothyroidism, rheumatoid arthritis or, in men, sleep apnea [32].

Fibromyalgia syndrome causes

Muscle energy metabolism. For a long time it was believed that fibromyalgia was a disorder of muscle metabolism, possibly due to the result of chronic hypoxia of muscular tissue. Research studies have demonstrated an alteration in muscle metabolism, such as lower adenosine 5'-triphosphate (ATP) adenosine diphosphate (ADP), higher concentrations

of adenine monophosphate (AMP) and more alterations of capillaries and fiber areas [1, 26]. Studies involving post-exertional pain, muscle force and lactate levels have shown a similarity among sedentary controls and fibromyalgia patients. [18] Over the years, there has been a change documented in the muscle strength of fibromyalgia patients, but it is speculated that it may result from deconditioning. A few researchers believe deconditioning results from the repetitive microtrauma of daily living. The daily fatigue along with physical inactivity may lead to unfit muscles, making them even more susceptible to microtrauma.

Studies involving postexertional pain, muscle force and lactate levels have shown a similarity among sedentary controls and fibromyalgia patients. The inflammatory component of myalgias in fibromyalgia has never been exposed, which explains the reason nonsteroidal anti-inflammatory drug (NSAID) and steroid therapies efficacy are lacking as a treatment modality [18].

Generalized disorder of pain perception. Since 1979, the International Association for the Study of Pain (IASP) has defined pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage [28]. Normally, pain is the result of activation of nociceptors in the peripheral tissues [39]. The problem researchers face when trying to definitively provide a distinct cause of the chronic pain manifested in fibromyalgia is that pain is a subjective symptom. Therefore, the pathophysiological concept is speculated based upon biological, behavioral and self-report parameters associated with pain that indicate it is due to an abnormal central nervous system (CNS) exacerbated due to central sensitization, abnormalities of descending inhibitory pain pathways and abnormal levels of neurotransmitters [1].

Central sensitization, an abnormal processing of pain due to sensory or nociceptive stimuli.

Sensory impulse amplification begins at the level of the spinal cord and it is gated by changes occurring in the sensitivity of the dorsal horn neurons. In the dorsal horn of the spinal cord at the postsynaptic membrane there is a receptor N-methyl-D-aspartic acid (NMDA). These receptors are normally inactive and do not respond to initial acute stimuli. However, after repeated neuronal depolarization, the receptors undergo activation and are responsible for windup and central sensitization [1].

In patients with fibromyalgia, the NMDA receptor antagonist ketamine attenuates windup to “a painful stimulus” causing muscular hyperalgesia, referred pain and muscle pain at rest. Research has demonstrated that NMDA-receptor antagonist dextromethorphan (a common ingredient in cough medicine) has reduced the windup in patients with fibromyalgia and control participants [1].

It can occur directly or indirectly from the brainstem via descending pathways. During a

central sensitization, the nociceptors or peripheral pain nerves (such as those found in skeletal muscles) are stimulated by pressure or repetitive stretching. Once this process occurs, the nerves become sensitized, due an excess in the following excitatory neurotransmitters and a lower level of inhibitory neurotransmitters [39, 50]:

- ♦ Excitatory neurotransmitters include glutamate, aspartate, substance P and calcitonin gene-related peptide. According to the FDA (2009), the ACR also speculates that patients with fibromyalgia have an abnormal level of substance P in their spinal fluid. Substance P helps transmit and amplify pain signals to and from the brain. Researchers are looking at the role of substance P and other neurotransmitters and studying why people with fibromyalgia have an increased sensitivity to pain and whether there is a gene or genes that make a person more likely to have it [48].
- ♦ Inhibitory neurotransmitters include serotonin, dopamine and norepinephrine [50].
- ♦ Decreased serotonin in the central nervous system may lead to aberrant pain signaling.
- ♦ Decreased dopamine transmission in the brain may lead to chronic pain through unclear mechanisms [1].

The process allows the nerve impulses being carried to the central nervous system to reduce the pain threshold by central sensitization. Fibromyalgia patients have a generalized decrease in the pain perception threshold, reflecting discrimination in the quality and threshold of pain tolerance, such as allodynia (pain due to a stimulus that does not normally provoke pain) and hyperalgesia (an increased response to a stimulus that is normally painful) [28, 50].

It should be noted, deficient serotonin levels affect other aspects correlated with fibromyalgia, such as sleep, headaches and mood disorders [22].

Another form of pain sometimes associated with fibromyalgia is another poorly understood syndrome, myofascial pain, which is a disorder of trigger points. Similar to tender points (seen in fibromyalgia), trigger points are discreet areas in muscle tissue or its associated fascia that are exquisitely tender to compression; however, pain occurs at the site of the applied pressure and also at a distant site (zone of pain referral) [22]. Trigger points are involuntary, transient contractions found in taut bands (firm, elongated bands) located in muscle fibers, elicited by snapping or pinching the band [22].

Chronic fatigue and fibromyalgia causes

Neuroendocrine disturbance. Multiple laboratory studies have suggested that the central nervous system may have an important role in the patient developing chronic fatigue and fibromyalgia syndrome [32]. There is some evidence to suggest that fibromyalgia and chronic fatigue patients may have a reduction in the secretion of adrenocorticotropin hormone (ACTH) and cortisol due to a dysfunction of

the hypothalamic-pituitary-adrenal (HPA) axis [18, 22]. The HPA axis is a critical component of the stress-adaptation response. In a normally functioning system, corticotropin-releasing hormone (CRH) stimulates the anterior pituitary to release ACTH. ACTH then stimulates the adrenal cortex to produce glucocorticoids, which are powerful mediators of the stress-adaptation response. However, in chronic fatigue and fibromyalgia, there are two proposed notions that may be precipitating a dysfunction in the HPA axis and thus lowering cortisol, CRH and ACTH, as follows:

- ♦ Physical or emotional stress, which is commonly reported as a pre-onset condition in chronic fatigue and fibromyalgia syndrome patients, activates the HPA axis, leading to increased release of cortisol and other hormones [9].
- ♦ Decreased amounts of circulating serotonin affect the circadian regulation and the stress-induced stimulation of the HPA axis [1, 22].

Possible events precipitating chronic fatigue and fibromyalgia.

Since the exact cause of chronic fatigue and fibromyalgia syndromes continues to remain unknown, it is speculated that certain events may precipitate a deficiency in the immune system or the central nervous system in some patients, thus triggering the syndrome. Prior to developing the syndromes, patients led healthy, full, active lifestyles. However, after an acute prodromal infection, varying from upper respiratory infections, bronchitis, sinusitis, gastroenteritis or an acute flu-like illness, the clinical symptoms supporting chronic fatigue or fibromyalgia developed in some of the patients [30]. The CDC (2007) has identified the following possible triggers [9]:

Genetics. There is increasing evidence that suggests genetics has been associated with fibromyalgia, especially a deficiency of serotonin. Some researchers speculate that the genetic predisposition manifests into symptoms after the individual is at a certain age because of environmental triggers or when the person sustains an external insult, such as trauma or illness [22].

Immunology. It has been proposed that chronic fatigue syndrome may be caused by an immunologic dysfunction, for example, inappropriate production of cytokines, such as interleukin-1, or altered capacity of certain immune functions. One thing is certain at this juncture: There are no immune disorders in chronic fatigue syndrome patients on the scale traditionally associated with disease. Some investigators have observed anti-self antibodies and immune complexes in many chronic fatigue patients, both of which are hallmarks of autoimmune disease. However, no associated tissue damage typical of autoimmune disease has been described in patients with chronic fatigue syndrome.

T-cell activation markers have also been reported to have differential expression in groups of chronic

fatigue syndrome patients compared with controls, but again, not all investigators have consistently observed these differences. One intriguing hypothesis is that various triggering events, such as stress or a viral infection, may lead to the chronic expression of cytokines and then to chronic fatigue syndrome. Administration of some cytokines in therapeutic doses is known to cause fatigue, but no characteristic pattern of chronic cytokine secretion has ever been identified in chronic fatigue syndrome patients. In addition, some investigators have noted clinical improvement in patients with continued high levels of circulating cytokines; if a causal relationship exists between cytokines and chronic fatigue syndrome, it is likely to be complex. Finally, several studies have shown that chronic fatigue patients are more likely to have a history of allergies than are healthy controls. Allergy could be one predisposing factor for chronic fatigue syndrome, but it cannot be the only one, because not all patients have it.

Infections

Chronic fatigue. In the majority of literature that discusses chronic fatigue syndrome, many hypothesize that it is caused by an infection. However, after the CDC completed a four-city surveillance study, the results demonstrated that there is no association between chronic fatigue syndrome and infection by a wide variety of human pathogens, including EBV, human retroviruses, human herpesvirus 6, enteroviruses, rubella, *Candida albicans* and more recently bornaviruses and mycoplasma. Taken together, these studies suggested that among identified human pathogens, there appears to be no causal relationship for chronic fatigue syndrome as a whole. However, the possibility remains that chronic fatigue syndrome may have multiple causes leading to a common endpoint, in which case some viruses or other infectious agents might have a contributory role for a subset of chronic fatigue cases. Recently published research suggests that infection with EBV, Ross River virus and *Coxiella burnetii* will lead to a post-infective condition that meets the criteria for chronic fatigue syndrome in approximately 12 percent of cases. The severity of the acute illness was the only factor found to predict which individuals would have persistent symptoms characteristic of chronic fatigue syndrome at the six-month and one-year period following infection.

Fibromyalgia. There are studies that indicate that the development of fibromyalgia may be linked to the *Borrelia burgdorferi*, which causes Lyme disease, brucella and the parvovirus [18]. Research has also demonstrated that patients with hepatitis C and human immunodeficiency virus (HIV) have higher rates of fibromyalgia than the general population [1]. At this time, the exact mechanism is unknown, but it is speculated that cytokine is activated in the central nervous system via viral neurotropism and subsequent glial activation [1]. Although there is a link to previous infections, anti-viral agents have not demonstrated an improvement in the symptoms

for patients with chronic fatigue and fibromyalgia syndrome [32].

Neurally mediated hypotension (NMH). In 1995, Dr. Rowe and his coworkers at Johns Hopkins University conducted studies, *The Relationship Between Neurally Mediated Hypotension and Chronic Fatigue Syndrome*, published in the September 1995 issue of *Journal of American Medical Association (JAMA)* to determine whether disturbances in the autonomic regulation of blood pressure and pulse (neurally mediated hypotension, or NMH) were common in chronic fatigue syndrome patients. The investigators were alerted to this possibility when they noticed an overlap between their patients with chronic fatigue syndrome and those who had neurally mediated hypotension (NMH). NMH can be induced by using tilt table testing, which involves laying the patient horizontally on a table and then tilting the table upright to 70 degrees for 45 minutes while monitoring the blood pressure and heart rate. Persons with NMH will develop lowered blood pressure under these conditions as well as other characteristic symptoms, such as lightheadedness, visual dimming or a slow response to verbal stimuli. Many chronic fatigue syndrome patients experience lightheadedness or worsened fatigue when they stand for prolonged periods or when in warm places, such as in a hot shower. These conditions are also known to trigger NMH. One study observed that 96 percent of adults with a clinical diagnosis of chronic fatigue syndrome developed hypotension during tilt table testing, compared with 29 percent of healthy controls. Dr. Rowe later replicated the study in fibromyalgia patients with the same results [9].

Physical trauma. Fibromyalgia patients typically endure more excruciating pain in the cervical neck region. Research has demonstrated that 22 percent of patients who have endured whiplash from motor vehicle accidents have developed fibromyalgia [1].

Pre-existing conditions. Fibromyalgia has increased prevalence among patients with autoimmune disorders and rheumatic diseases (20 to 65 percent), such as rheumatoid arthritis (RA), systemic lupus erythematosus (SLE), ankylosing spondylitis (AS), Sjogren's syndrome, osteoarthritis and Behcet's disease. In addition, the prevalence of the disease is increased in chronic diseases, such as diabetes mellitus [6, 34]. Although fibromyalgia patients have an increased risk of being affected if they have a pre-existing autoimmune disorder, there is no increased risk of developing an autoimmune disorder if the patient has fibromyalgia and no prior history of an autoimmune disorder.

Psychiatric aspects. Over the years, researchers have been debating whether psychiatric disorders are a premonition to the development of chronic fatigue and fibromyalgia syndrome or coincidental. In primary care practices, more than one half of all patients with depression present with pain, one of the most common complaints associated with fibromyalgia. In addition, patients with chronic fatigue and fibromyalgia

have increased rates of depression, anxiety and mood disorders [1, 18, 40]. At this time, further research is required to assess whether depression is independent of chronic fatigue and fibromyalgia or secondary to the consequences of the chronic illness [5]. Unfortunately, patients with chronic fatigue and fibromyalgia live in depressing situations with severe social and activity restrictions beyond their control due to the compounding plethora of symptoms that are overwhelming and debilitating.

Further research is required. At this time, it is difficult to realize whether the syndromes are precipitated by life events or have organic causes. In the meantime, health care professionals should realize the complexity while caring for a patient living with chronic fatigue or fibromyalgia syndrome.

Nurses collecting the health history and assessing the patient

Imagine you are caring for a patient complaining of extreme fatigue, pain, sleep deprivation and other complaints as listed above. Would you immediately think "Oh, this may be chronic fatigue or fibromyalgia?" Probably not, as chronic fatigue syndrome and fibromyalgia may present with overlapping symptoms or other diagnoses seen in clinical practice. In primary care, fatigue is the seventh-most common complaint and may be the presenting symptom for a plethora of different diseases in addition to chronic fatigue and/or fibromyalgia [43]. However, by obtaining a thorough history and completing a physical examination, appropriate diagnoses are obtained in 85 percent of the cases [43].

Most patients who present to their primary care provider or hospital complaining of generalized pain, fatigue or change in sleep patterns will typically not be diagnosed during that visit, because the first inclination may be the patient has depression, hypothyroidism, viral illness or is affected by a recent life event. In addition, chronic fatigue and fibromyalgia are diagnosis of exclusion because there are no confirmatory diagnostic tests. Therefore, one of the key things a nurse can do to help a practitioner properly diagnose the patient is to take a thorough history.

Nurses collect histories on their patients all of the time. But it can be difficult when the patient presents with vague complaints that overlap numerous other medical conditions. Without collecting a thorough history, it is impossible to completely assess the history of the present illness and past medical history in order to arrive at the proper diagnosis and appropriate, therapeutic plan of care. Ultimately, the inevitable result will be an incomplete, inappropriate treatment plan for the patient because he/she will be misdiagnosed.

Patients with fibromyalgia do significantly better when they receive a comprehensive, individualized treatment regimen [22]. It is possible that you may have cared for a patient presenting with symptoms supporting a potential

diagnosis of chronic fatigue syndrome or fibromyalgia, but the primary care provider is treating the patient for another speculated diagnosis, such as depression. Research conducted by the CDC indicates that less than 20 percent of chronic fatigue syndrome patients in this country have been diagnosed [7].

Nurses working in a doctor's office, clinic or hospital will care for patients with chronic fatigue and/or fibromyalgia syndromes before their official diagnosis or during their care. Some questions about common ailments of chronic fatigue and fibromyalgia can be asked of any patient. Nurses should consider doing this when attempting to collect the patient history [22, 36].

Start the discussion by identifying the "subjective" chief complaint verbatim as the patient states, which usually is pain if it is fibromyalgia and fatigue if it is chronic fatigue syndrome. Some of them may initially complain of changes in their neurological system such as confusion, inability to concentrate or inability to remember details. The nurse should always document the subjective symptoms as the patient states them, enclosed in quotation marks to reflect the patient's exact words. However, the nurse should not leave the conversation just at the subjective statement, but elaborate upon the subjective complaint by asking specific questions about the patient's complaint. Below are some examples of primary subjective complaints that may be conveyed by a patient with chronic fatigue or fibromyalgia and potential questions that may be asked by the nurse:

If the patient's primary subjective complaint is pain, such as "I am in pain all the time," "My body constantly aches" or any statement related to pain, the nurse can expand by asking:

- ♦ What is your pain level on a scale of zero to 10? The nurse should always assess and reassess the patient's pain level with each reassessment or subsequent encounter with the patient. Fibromyalgia is classified as mild, moderate or severe based upon the subjective report of pain by the patient [38]:
 - ♦ Mild fibromyalgia is characterized by mild muscle pain with a pain level of one to three on a 10-point pain scale.
 - ♦ Moderate fibromyalgia is characterized by moderate muscle pain with a pain level of four to six, and it typically affects everyday functioning.
 - ♦ Severe fibromyalgia is characterized by severe muscle pain, with a report of seven or higher. The excruciating pain is so intense that patients are typically unable to work.

What is the location of the pain? Is the pain localized, radiating, superficial and/or deep? Encourage the patient to point to the location of the pain to ensure the nurse notes the precise location. Is it consolidated to one area? One side of the body?

- ♦ Any recent headaches? Where are the headaches located? What time of the day do the headaches occur? Do you have any

nausea, vomiting or blurred vision with the headache?

- ♦ Temporomandibular jaw pain?
- ♦ Noncardiac chest pain?
- ♦ Any muscle aches or joint pains? Any problems in the muscles, such as any pain or cramping? Are your muscle aches associated with fever, chills? Any stiffness in the joints? Any swelling, heat, erythema (redness)? Any limitations in your movements?
- ♦ Chronic pelvic pain?
- ♦ Restless leg syndrome? Restless leg syndrome occurs in 20 percent of patients [22].
- ♦ What is the character/quality of the pain? The nurse wants to gain specific descriptive terms, such as burning, sharp, dull, aching, gnawing, throbbing and shooting.
- ♦ What is the timing of the pain (onset, duration and frequency)? When did the symptoms first appear? How long did it last? Is the pain steady or intermittent? Does it resolve? Has it resolved completely? The majority of fibromyalgia patients remember a sudden onset of pain since it was probably when their life changed. However, if the pain began gradually, determining the exact time of onset may be difficult.
- ♦ How do you behave when you are in pain? Patients with chronic pain (greater than six months), may not be forthcoming about their pain, since they may be just "dealing with it" [29]. Therefore, if the nurse can assess the patient's behavior/response to pain, it may provide new clues about the pain.
- ♦ What is the setting of the pain? Where was the patient when the symptoms first appeared and/or continuously appear? Is something bringing the pain on for you?
- ♦ What are the aggravating and alleviating factors? Is the pain aggravated by movement, rest, position, weather? Is the pain relieved by rest, medications, application of heat or ice?
- ♦ What are the associated factors of the pain? The nurse wants to find out if there are any other body systems related to the pain.
- ♦ What is the patient's perception of their pain? How does the pain affect the patient? Ask the patient, "What do you think it means?" The nurse should keep in mind that a patient with chronic fatigue and fibromyalgia will have a lower threshold of pain called allodynia.
- ♦ What is your ultimate goal in pain relief? Many patients have experienced "chronic" pain for so long that they may have begun compensating for the pain and/or they provide little indication that they are in pain. However, the nurse can objectively assess for signs of chronic pain as well as prompting questions related to bracing, rubbing, diminished activity, sighing and change in the patient's appetite [29].

The most defining characteristic of fibromyalgia is chronic, widespread muscle aches and pains. However the pain can also occur in the joints (arthralgia without synovitis) and may be described as "exhausting, burning, miserable or unbearable" [50]. Most fibromyalgia patients

complain of a generalized, widespread pain that may "travel" or is referred to the deep tissues associated with muscle contraction and movements [18, 38, 39]. Other patients may complain of a specific pain on one side of the body as well as above and/or below the waist [18]. In the majority of the cases, axial skeletal pain in the cervical spine, anterior chest, thoracic spine, hips and/or lower back will be reported [18, 32]. Some patients report the pain and tenderness as sporadic, such as it "comes and goes," but typically the pain will be worse in response to stress, increased activity or changes in the weather [27]. The National Guiding Clearinghouse (2009) recommends that the nurse should focus the pain assessment on the type and quality of pain, source, location, duration, time course, pain affect and effects on quality of life. Use self-report as the primary source of pain assessment, and use the same pain measurement tool at subsequent visits [28]. Research has also demonstrated that the subjective complaint of pain may be higher in women suffering with fibromyalgia than men, because of the following mechanisms [50]:

- ♦ Differences in primary afferent input to the CNS, with developmental and menstrual cycle-dependent enhancement.
- ♦ Developmental and phasic gonadal-hormonal modulation of pain regulatory systems, stress-induced analgesia and opioid receptors.
- ♦ Higher levels of trait and state anxiety.
- ♦ Increased prevalence of depression.
- ♦ Use of maladaptive coping strategies.
- ♦ Increased behavioral activity in response to pain.

In the patient with chronic fatigue syndrome, pain is often generalized and not confined to any structure or nerve root. Typically the patient will complain of sporadic pain in unexpected areas with various qualities: sharp, shooting, burning and aching [5]. The pain is generalized and is not limited to the classical fibromyalgia "tender points," but 75 percent of the patients will exhibit positive tender points during the exam.

In order to objectively assess for "tender points," the practitioner will elicit a subjective complaint of pain or "tender points" from the patient while palpating the muscles at multiple sites. Tender points are defined as "pain" during a digital palpation of an approximate force of 4 kilograms (kg) [18, 50]. The nurse should avoid confusing "tender points" with "trigger points." The American Family Physician (2002) defines "trigger points" as the presence of discrete focal tenderness located in a palpable taut band of skeletal muscle. "Trigger points" produce referred regional pain and a local twitch, as opposed to "tender points," which refer to pain at the site only [2]. Trigger points help define myofascial pain syndromes [2].

ACR research recommends practitioners utilize an algometer or dolorimeter device at several tender points to quantify the sensitivity of pain and to rule out other similar presenting disorders, such as rheumatoid arthritis (RA)

and systemic lupus erythematosus (SLE). The device is a useful tool for assessing the nature of altered central nociceptive processing, allodynia (painful response during a nonpainful stimulus) and hyperalgesia (increased sensitivity to pain) [50]. To properly use one of the mentioned device tools over the tender points, the nurse or practitioner should adhere to the following steps [22]:

- ♦ First, visually locate the evaluation sites.
- ♦ Then, with the thumb pad, press perpendicularly into the evaluation site for four seconds one time to avoid sensitization.
- ♦ Apply four kilograms of pressure to the site, enough force to blanch the examiner's nail bed.
- ♦ Always examine the 18 diagnostic sites and three control sites in the following order: forehead, distal middle third of the right forearm, and nail of the left thumb. The three control points should be palpated and recorded to provide baseline documentation of the patient's pain perception.
- ♦ Examine the right site and then the corresponding left site.

The patient should sit on the examination table for the evaluation of the upper body. The individual should lie on his/her side contralateral to the site for the testing of sites the greater trochanter, and should lie on his/her back for the evaluation of the medial knee. In fibromyalgia, 11 of the 18 pressure areas should have "tender points" at a minimum to support the diagnosis. The nurse needs to be sensitive and thoroughly assess the patient prior to performing the exam because if the patient is anxious or has a history of psychological trauma, such as sexual abuse or childhood trauma, he or she is more than likely to have significant "tender points," therefore skewing the data [1, 40]. In addition, the patient with RA and SLE will not have a complaint of "tender points" in a minimum of 11 areas.

If the primary subjective complaint is fatigue, such as "I am so exhausted all the time," "I am constantly yawning," or "I have no energy or motivation to do anything," the nurse can expand by asking:

- ♦ "Tell me how you spend a typical day." This will help the nurse understand how the patient is able to perform ADLs and function on a daily basis. Asking this question and the following questions allow the nurse to assess the patient's functional ability. The functional ability refers to one's ability to perform activities necessary to live in modern society and can include driving, using the phone or performing functional tasks, such as bathing and use of the toilet [29].
- ♦ Ask: "Are you independent or do you require assistance with feeding, bathing, hygiene, dressing, using the toilet, walking, standing or climbing stairs?"
- ♦ "Do you require the use of a wheelchair, prosthesis or mobility aide?"
- ♦ "What is your energy level after completing your daily activities and/or exercises?" This is a key factor in potentially differentiating

chronic fatigue and fibromyalgia syndrome. Many patients with fibromyalgia may be able to tolerate exercise, whereas it often aggravates the symptoms in chronic fatigue syndrome [5]. Many patients with chronic fatigue syndrome experience a significant amount of post-exertional malaise lasting more than 24 hours after exercise and/or completing their ADLs.

Ask the patient to discuss his/her previous energy level to help in comparison and to possibly pinpoint when the symptoms began.

- ♦ "What is the duration and onset of fatigue?" Typically, most patients with chronic fatigue complain about a sudden onset of pain that is continuous, regardless of the amount of sleep and/or lack of activity.
- ♦ "When during the day is the fatigue worse: morning, as the day goes on, relieved by rest, after exercise, or overall progressive rather than fluctuating?" [43]. Eighty percent of patients with fibromyalgia report fatigue that is worse in the morning and early evening [22].
- ♦ "What are your sleep patterns? How long do you typically sleep? What is your bedtime ritual? Do you use sleep aids prior to going to sleep? What is your activity during the day? Do you exercise?" If possible, ask the patient's sleeping partner if the patient snores or kicks while asleep. "How long does it take for you to fall asleep at night? How many times do you wake up during the night? How do you feel when you awake in the morning?"

Sleep disturbances are present in most cases of fibromyalgia and chronic fatigue syndrome, approximately 65 percent [22]. However, it is usually not the presenting complaint. Typically, patients will complain about sleeping all night, but waking up and still feeling tired [18]. Treatment modalities provide only moderate benefit for the patient, suggesting it is an effect rather than the cause of the fatigue [32].

The most defining characteristic of chronic fatigue syndrome is a significant degree of unexplained, persistent or recurrent fatigue that is unrelieved regardless of the amount of sleep or rest. Patients with chronic fatigue syndrome and fibromyalgia report their fatigue as so debilitating, their activity level is reduced by at least 50 percent [5]. The nurse should inquire about the patient's previous level of activity. In addition, ask the patient about his or her overall demeanor after exercising; most patients with chronic fatigue lose the natural effect of exercise and feel worse instead of better [5].

Children with chronic fatigue or fibromyalgia typically do worse in mathematics and analytical subjects such as science. When assessing fatigue in a child, the nurse needs to ask the parents or child the following questions:

- ♦ "Are you able to attend school? Do you participate in sports? How often do you see your friends? What type of activities do you do with your friends? What do you do after your activities?" Encourage the patient

and family to keep a diary of activities and symptoms [33].

- ♦ If the primary subjective complaint is "I just cannot think straight," "I feel like I am in a fog," "I feel like I am losing it," or "I just cannot remember anything," the nurse can expand by assessing the following [29]:
 - ♦ **Assess the patient's orientation status** by asking:
 - ♦ "What time of the day is it?" The nurse can ask any question about time, such as the date, day of the week, year or season.
 - ♦ "Where do you live? Where are you currently? What city do you live in? What state do you live in?" All of the questions inquire about places specific to the patient.
 - ♦ "What is your name? How old are you? What type of work do you do?" All of the questions relate to the person.
 - ♦ **Assess the attention span.** Is the patient able to concentrate during the conversation or does it appear as if he or she is wandering? The nurse can assess this ability by giving the patient a series of directions to follow, then noting whether the patient completes them in the same order.
 - ♦ **Assess recent memory.** "Tell me what you ate in the last 24 hours," or "What time did you arrive here today?" It is important to ask questions that the nurse can corroborate.
 - ♦ **Assess remote memory.** Inquire about past events that the nurse can verify, such as past health, birthday, anniversary dates or historical events that are relevant for the patient.
 - ♦ **Assess the patient's ability to learn new words** that are unrelated. The nurse can say to the patient, "I am going to say four words. I want you to remember them. In a few minutes, I will ask you to recall them." Then state four random words to the patient, repeat them, and then five minutes later, ask the patient to recall the four words.
 - ♦ **During the exam, assess the behavior** of the patient and facial expressions:
 - ♦ Are they appropriate to the conversation?
 - ♦ Does the patient make eye contact?
 - ♦ How is the patient's speech, such as the quality, pace, articulation and choice of words?
- ♦ **Assess the mood and affect of the patient** by their body language, facial expression and by asking "How do you feel today?" or "How do you usually feel?"
 - ♦ Patients with chronic fatigue and fibromyalgia typically complain of confusion, forgetfulness, an inability to concentrate and to recall simple words and numbers, and the transposition of words and numbers, a condition known as "fibro fog." The cognitive

impairments typically prevent patients from performing activities of daily living (ADL), getting lost in familiar places or losing the ability to communicate effectively. Patients who work may fear losing their job, and many pediatric patients drop out of school because of their inability to complete their schoolwork [22].

- ♦ “Fibro fog” may be the primary symptom in patients with fibromyalgia, reflecting impairments in working, episodic and semantic memory that are roughly equivalent to 20 years of aging [50]. Cognitive symptoms associated with chronic fatigue and fibromyalgia are exacerbated by pain, mood and anxiety disorders, and poor sleep [50].
- ♦ **Question the patient about other coinciding symptoms and/or co-morbidities.** The nurse should keep in mind that the patient may not always disclose each symptom, because pain or fatigue is typically so overpowering and may be debilitating for the patient. Other questions that may be appropriate due to the possibility of other conditions include the following [6, 18, 29, 50]:
- ♦ **Overall:** “Do you have any other symptoms?”
- ♦ **“What was the state of your health when you noticed the initial symptoms? Were you feeling sick?”** Many patients with chronic fatigue syndrome began their chronic symptoms after recovering from an acute viral illness. Therefore, the nurse should prompt additional questions about the patient’s state of health when symptoms began and any preceding symptoms because the person’s memory may have been “clouded.”
- ♦ **Cardiac.** “Do you have any chest pain? Where is the precise location? Does the pain radiate? Do you have any lightheadedness, dizziness, visual changes, sometimes syncope and a slow response to verbal stimuli? Do you ever have the urge to lie down immediately?” Each of the questions assess for NMH, which may coincide with the syndromes [5].
- ♦ **Immunology:** “Do you currently have a sore throat? Tender lymph nodes? Is it associated with a cough, fever, postnasal drip or hoarseness?” Each of the questions helps determine a current infection or potential coinciding symptoms that may occur with chronic fatigue or fibromyalgia. “Nasal congestion and hypersensitivity to environmental stimuli, such as odors, bright lights and loud noises?”
- ♦ **Gastrointestinal.** “Have you had any change in your bowel movements? When was your last bowel movement? Do you have frequent bouts of diarrhea? Constipation? Do you have any abdominal pain and/or cramping?” Irritable bowel syndrome is a common

complaint, and symptoms related to the condition should be explored.

- ♦ **Neurology:** “Any tingling or numbness in the hands and feet?” Many patients with chronic fatigue and fibromyalgia experience numbness and tingling.
- ♦ **Motor issues:** “Any changes in motor problems, weakness and/or loss of balance?” Chronic fatigue patients also endure motor problems, such as ataxia muscle weakness and fasciculation (loss of balance and clumsiness commonly occur.) [5].
- ♦ **The Romberg test should be completed to assess for a loss of balance.** The nurse can objectively assess for it by asking the patient to stand up with the feet together and arms at their sides. Once the patient is in a stable, standing position, instruct the patient to close his/her eyes and to hold the position. After 20 seconds, the patient should be able to hold the position. If not, it is a positive Romberg sign that occurs with cerebella ataxia, loss of perception and loss of vestibular function.
- ♦ **Sensory:** “Do you experience any intolerance to heat and/or cold?” Raynaud’s phenomena may coincide with chronic fatigue and fibromyalgia syndrome. Raynaud’s phenomenon is abrupt episodes of progressive tricolor changes in the fingers in response to cold, vibration or stress. Initially the fingers will appear pallor (white) from arteriospasm and resulting deficit in supply; then cyanotic (blue) from slight relaxation of the spasm that allows a slow trickle of blood through the capillaries and increased oxygen extraction of hemoglobin; finally rubor (red) due to return of blood into the dilated capillary bed or reactive hyperemia. The symptoms include bilateral cold, numbness or pain with pallor or cyanosis, and then burning, throbbing, pain and swelling with rubor color [29].
- ♦ **Psychiatric.** In general, most nurses do not feel comfortable asking a patient or his/her family about a psychiatric history, but it is imperative. The nurse can initiate the subject by asking the patient:
 - ♦ “If you had to complete this sentence, “today I feel ...” It is important to ask the patient to complete the sentence to provide a subjective response about his or her current mood instead of a closed-end question such as “Do you feel happy,” which could induce only a simple “yes” or “no.”
 - ♦ “Do you feel depressed?”
 - ♦ “Who is your support system?”
- ♦ **Reproductive.** If the patient is a female, ask about her menstrual cycles (onset, last period, increase pain, bleeding in between cycles).
- ♦ **Skin.** “Any skin rashes? Skin breakdown?”
- ♦ **Lifetime psychiatric co-morbidities** is common in patients with fibromyalgia, including mood disorders (bipolar disorder, major depressive disorder), anxiety disorders (generalized anxiety disorder, obsessive-compulsive disorder, panic disorder, post-

traumatic stress disorder (PTSD), social phobia, eating disorders and substance use disorders. Any patient with a history of psychologic disorders and/or a potential new onset should be referred to a psychiatrist as needed [28]. In addition, if a patient responds that he or she is sad, the nurse should ask questions to assess whether the patient is a potential threat to him- or herself or others. Ask:

- ♦ “Do you have any intentions of hurting yourself? Others? Do you have a plan?” Always document it precisely and adhere to the protocols within the organization if the patient is ever a potential threat to him- or herself or others.

Throughout the communication with the patient, it is important to develop a professional rapport to enhance a trusting relationship. While collecting the history, nurses often must ask closed-ended questions, but they also should ask more specific, open-ended questions to ensure the patient is responding truthfully and not just providing answers he/she thinks the nurse wants to hear. In any conversation, certain answers may be elicited or perceived because of the manner in which the question was asked. Therefore nurses should be conscious and wary of that.

Differential diagnosis of chronic fatigue syndrome and fibromyalgia

At this time, there is no diagnostic laboratory value or radiological exam that confirms the diagnosis of chronic fatigue or fibromyalgia syndrome. However, there is a laboratory test, anti-polymer antibody assay (APA assay) that detects anti-polymer antibodies in the blood of most patients with fibromyalgia and fibromyalgia-like symptoms [3, 22]. An article published in the *Journal of Rheumatology* entitled “Anti-Polymer Antibody Reactivity in a Subset of Patients with Fibromyalgia Correlates with Severity” demonstrated that 47 percent of patients with fibromyalgia and 61 percent of patients with severe symptoms of fibromyalgia reacted positively to the APA assay [3]. Since the APA assay is not exclusive to fibromyalgia and reactive to all patients, a diagnosis is made by exclusion of other diagnosis with similar manifestations.

Depending upon the history of present illnesses, symptoms exhibited by the patient and physical examination, the physician or practitioner will contemplate a diagnosis by ruling out other conditions that present with overlapping similar clinical manifestations. Some of the more common differential medical conditions that may mimic or present in the same manner include acquired immunodeficiency disease (AIDS) anemia, autoimmune disease, cancer, depression, hypothyroidism, Lyme disease, multiple chemical sensitivities, myofascial pain, polymyalgia rheumatica (PMR) and sleep apnea [5, 22, 27]. The conditions and symptoms manifested similar to chronic fatigue and fibromyalgia syndrome are as follows:

(fibromyalgia). The CDC (2009) recommends a two-step process when assessing for Lyme disease [11]:

- ◆ The first step uses an ELISA. These tests are designed to be very “sensitive,” meaning that almost everyone with Lyme disease – and some who do not have it – will test positive. If the ELISA is negative, it is highly unlikely that the person has Lyme disease, and no further testing is recommended. If the ELISA is positive or indeterminate (sometimes called “equivocal”), a second step should be performed to confirm the results.
- ◆ The second step uses a Western blot test. Used appropriately, this test is designed to be “specific,” meaning that it will usually be positive only if a person has been truly infected. If the Western blot is negative, it suggests that the first test was a false positive, which can occur for several reasons. The CDC does not recommend testing blood by Western blot without first testing it by ELISA due to the potential risk for false positive results.
- ◆ **Multiple chemical sensitivity (MCS)** is a controversial syndrome in which multiple symptoms reportedly occur with low-level chemical exposure. It is so controversial that the American Academy of Allergy and Immunology, the American Medical Association (AMA), the California Medical Association, the American College of Physicians and the International Society of Regulatory Toxicology and Pharmacology have rejected it as an organic disease. The most common symptoms associated with MCS includes fatigue (chronic fatigue and fibromyalgia), difficulty concentrating (chronic fatigue and fibromyalgia), depressed mood (chronic fatigue and fibromyalgia), memory loss (chronic fatigue and fibromyalgia), weakness (fibromyalgia), dizziness (fibromyalgia), headaches (fibromyalgia), heat intolerance (fibromyalgia) and arthralgias (aching around the joints, also seen in fibromyalgia) that typically interfere with daily life and work (chronic fatigue and fibromyalgia). Typically, all symptoms have been attributed to exposure to low-level chemical exposures [31]. Although there is no specific diagnostic test for MCS, patients should be encouraged to see a physician who specializes in environmental health.
- ◆ **Myofascial pain** is a common, painful disorder that affects the skeletal muscles. Myofascial pain is more prevalent in men than in women seen with chronic fatigue and fibromyalgia [49]. The patient will present with a localized, unilateral muscular pain, stiffness (fibromyalgia), limited movements and muscle weakness (fibromyalgia). Upon examination, “trigger points” will be noted from referred pain [19]. Trigger points are typically more “nodular” type areas with radiating pain and muscle twitching [49].

Patients with fibromyalgia pain typically have more localized pain rather than radiating.

- ◆ **Polymyalgia rheumatica (PMR)** is a disorder characterized by stiffness worse in the morning (fibromyalgia), weakness (chronic fatigue and fibromyalgia), fatigue (chronic fatigue and fibromyalgia) and pain (fibromyalgia) symptoms that are proximal, not distally within the neck, shoulders, back and upper thigh. Other symptoms include low grade fever (chronic fatigue) and arthralgias (fibromyalgia). There is not a diagnostic test, and it is diagnosed based upon symptoms, history (typically women over 50 who respond to steroid therapy) and an increased ESR and a normochromic, normocytic anemia [18, 27]. Erythrocyte sedimentation rate (ESR) is a nonspecific inflammatory test that is useful to monitor the course of a disease (such as PMR) or malignancy. A normochromic, normocytic anemia is noted, demonstrated with a low Hgb and HCT but normal MCV.
- ◆ **Sleep apnea** is a disruption of breathing while sleeping that lasts less than 10 seconds and occurs a minimum of five times in an hour [27]. Many times, patients will not be aware of their sleep apnea; it will be reported by a significant other or parent, and the patient may complain of “waking up tired” and irritability. Other signs include loud snoring and thrashing in bed [49]. Sleep apnea is confirmed by a polysomnography (PSG) device and observation during an overnight exam while the patient is sleeping [27].

Other potential laboratory and diagnostic tests that may be analyzed include, but are not limited to the following:

- ◆ **Basic metabolic panel (BMP)** also known as chem-7 and a SMA-7 tests the calcium, carbon dioxide (CO₂), chloride, Creatinine (cr), glucose, potassium, sodium and blood urea nitrogen (BUN) levels. A BMP is an important laboratory test to rule out dehydration (CO₂), diabetes (glucose) and kidney failure (BUN/cr).
- ◆ **Complete blood count (CBC)** with a differential count. A normal CBC includes a white blood count (WBC), red blood cell (RBC), hemoglobin (Hgb), hematocrit (HCT), mean cellular hemoglobin (MCH), mean cellular hemoglobin concentration (MCHC), mean cell volume (MCV), red cell distribution width (RDW) and platelets. The nurse can expect the white blood cell to be increased with a bacterial infection and the red blood cells to demonstrate anemia. Since anemia was previously discussed, the nurse needs to be aware of the differential count to provide the clinician additional clues on the type of infection (viral, bacterial or allergic in nature). It includes lymphocytes (increased or decreased with viral infection,

AIDS, influenza), neutrophils (increased bacterial infections and decreased with infectious mononucleosis), and eosinophils (decreased with stress and ACTH imbalance), basophils (increased with infection and hypothyroidism) and monocytes increased bacterial infection.

- ◆ **Creatinine phosphokinase (CPK)** to exclude myocardial infarctions (MI) and inflammatory myopathies (heart, skeletal muscle and bone) demonstrated by an elevated CPK level [24]. A CPK test may be completed if the patient complains of noncardiac chest pain.
- ◆ **Serum cortisol.** Cortisol and corticotrophin-releasing hormone (CRH), which are also produced during the activation of the HPA axis, influence the immune system and many other body systems. Recent studies revealed that chronic fatigue and fibromyalgia patients often produce lower levels of cortisol than do healthy individuals. However, at this time it is not a conclusive diagnostic marker because some patients do not produce an abnormality [9]. Overall, neuroendocrine disturbances are associated with dysfunction of the HPA axis in the following manner [22]:
 - ◆ Low free cortisol levels in 24-hour urine samples.
 - ◆ Loss of the normal circadian rhythm, with elevated evening cortisol level (when it should be at its lowest level). Many patients with chronic fatigue and fibromyalgia experience sleep deprivation. Research has demonstrated that fibromyalgia patients have an intrusion of alpha waves (during the first few hours of sleep) into slow delta wave stage III/IV (deep) sleep, and was the first objective abnormality noted [22, 50].
 - ◆ Insulin-induced hypoglycemia associated with an overproduction of pituitary ACTH.
 - ◆ Low levels of growth hormone.
 - ◆ Stimulated ACTH secretion leading to insufficient adrenal release of glucocorticoids.

Tilt test is indicated if there is a fall in blood pressure and/or excessive rapidity of heart beat upon standing, which improves when sitting or lying down. Patients often report that they experience dizziness or are light-headed upon standing. The tilt test involves the patient lying horizontally on a table and then tilting the table upright to a 60-70 degree angle for approximately 45 minutes, during which time blood pressure and heart rate are continuously monitored [9]. A positive tilt test may occur due to a cardiac origin or coincide with chronic fatigue syndrome and fibromyalgia.

Treatment of fibromyalgia and chronic fatigue syndrome

Managing chronic fatigue and fibromyalgia can be as complex as the illness itself. Unfortunately, at this time there is no cure nor any prescription drugs developed specifically for the syndromes

[10]. Therefore, the treatment of chronic fatigue and fibromyalgia syndromes involve a multidisciplinary approach and collaboration with the patient and family. Although there is not a precise, ideal treatment plan, each plan should be individually compiled based upon the symptoms of the patient. Health care professionals should be professional, supportive and empathetic to the patient and his/her family because there has most likely been a delay in proper diagnosis, extensive work-up and previously failed treatment modalities. Effective communication and educating the patient and family will alleviate many of their fears and concerns. Nurses should take the time to explain the diagnosis and plan of care for the patient and family.

It may take some time to find a combination of traditional and alternative therapies that works for the patient, but it is important to begin symptom management without delay. For instance, untreated sleep problems can actually make other symptoms, such as pain and memory problems, worse [10]. One key to successfully manage the syndromes is to develop a collaborative, multidisciplinary approach with the patient and family to ensure an individualized treatment is developed and revised as needed. The following treatment modalities are used in children, adults and the elderly:

- ♦ **Cognitive behavioral therapies (CBT)** is a nonpharmacological measure often prescribed to help chronically ill patients cope with illness and develop behaviors and strategies to help alleviate problematic symptoms, such as pain and fatigue [10, 18]. It has been successful in helping patients with cardiovascular disease, diabetes and cancer, and recent studies indicate that CBT can be useful in treating some chronic fatigue and fibromyalgia patients [10]. The goal of CBT is to reduce pain, enhance self-efficacy and to improve the overall function of patients by helping them learn to manage their activity levels, stress and symptoms. Optimally, CBT can help the patient change his or her perceptions and behaviors that may be perpetuating symptoms and disability [5, 18, 32, 36].
- ♦ **Counseling** is recommended for many patients living with chronic fatigue and/or fibromyalgia, because living with the syndromes can be difficult. Similar to other debilitating chronic illnesses, chronic fatigue and fibromyalgia can have a profound impact on daily life, requiring patients to make significant lifestyle changes and adapt to a series of new limitations [18]. Consulting a trained professional will help most patients build effective coping skills and problem-solving techniques. A supportive counselor may help the patient cope with the prospects of long-term illness as well as the anxiety, depression, grief, anger and guilt that often accompany chronic illness. A competent therapist using problem-solving techniques and standard psychotherapy and counseling methods can help the patient work through these issues. In some cases, a therapist may

recommend a combination of medication and psychotherapy. The CDC (2006) has outlined some common difficulties faced by patients coping with chronic fatigue and fibromyalgia syndrome [18]:

- ♦ The severe, changing and unpredictable symptoms of varying severity.
- ♦ A decrease in stamina that interferes with ADLs.
- ♦ Memory and concentration problems that seriously impact work or school performance.
- ♦ An uncertain prognosis that makes it hard to plan for the future.
- ♦ Loss of independence, livelihood and economic security.
- ♦ Alterations in relationships with family and friends.
- ♦ Worries about raising children.
- ♦ Concerns about the potential impact of decreased sexual activity on intimate relationships.
- ♦ Skepticism and misconceptions about the illness.
- ♦ Many patients may feel anger, guilt, anxiety, isolation and abandonment that can intensify other symptoms, such as depression, sleep deprivations or anxiety. It is important for patients to acknowledge the life-altering changes imposed by their illness and to develop effective coping strategies to deal with these changes [18].
- ♦ **Exercise** is a great component to enhance strength, reconditioning of the muscles and release endorphins to alleviate stress. However, some patients may never be able to achieve the ideal level of exercising or continue it. As many as 40 percent of all fibromyalgia patients discontinue exercise because of the pain and fatigue [18]. The percentage may be higher in patients with chronic fatigue and the extensive malaise after exercising. Therefore, the nurse should encourage patients to exercise at the highest level possible without exacerbating or worsening their symptoms. Always assess patients' progress or decline in function to ensure the treatment plan is adjusted to meet their needs.
 - ♦ Researchers recommend daily aerobic and flexibility exercises, such as aquatic therapy (swimming and water exercises), walking, rowing and biking as essential components of the rehabilitation program [22, 27]. The goal is to encourage the patient to perform 60 to 75 percent of age-adjusted maximum heart rate (210 minus the person's age) two to three times a week [18]. Encourage the patient to begin with gentle warm-up, flexibility exercises, slowly progressing to stretching all of the major muscle groups [22]. The goal of warming up should stretch to only the point of slight resistance, not to the point of pain [5].
 - ♦ Nurses should reiterate to patients that they need to exercise safely without

increased pain. If increased pain is noted, patients should alter their exercise regimen, speak with their primary care provider and possibly be referred to rehabilitation therapy. Physical therapists (PT) ensure proper exercise techniques and promote strengthening of the muscles, ligaments and joints. The patient should also be informed that continuous, ongoing exercise is imperative to maintain exercise-induced gains. Ideally the patient should avoid exercising late in the evening because endorphins are released, which can cause difficulty sleeping. A number of randomized, controlled trials of multidisciplinary treatment and exercise combined with education or cognitive behavioral therapy demonstrated that patients with fibromyalgia had improvements on a six-minute walk with significant decreases in pain and efficacy in their overall symptoms [22].

- ♦ If the patient is unable to complete an exercise regimen privately or with a therapist, the patient may suffer with a condition seen in fibromyalgia, the inability of the muscles to relax. Patients can have a surface electromyogram (sEMG), a biofeedback therapy that teaches them to learn to relax their muscles [38].
- ♦ The nurse needs to reiterate to the patient with chronic fatigue syndrome to avoid post-exertional malaise, a common symptom defined as an exacerbation of symptoms following physical or mental exertion, with symptoms typically worsening 12 to 48 hours after activity and lasting for days or even weeks. It is important, however, not to avoid activity and exercise altogether. Such avoidance leads to serious deconditioning and can actually worsen other symptoms. It is also important not to engage in an endless "push-crash" cycle in which patients do too much, crash, rest, start to feel a little better, do too much again, and so on. Instead, encourage patients to learn to pace activities and work with their health care professionals to create individualized exercise programs that focus on interval activity or graded exercise. The goal is to balance rest and activity to avoid both deconditioning from lack of activity and flare-ups of illness due to overexertion. Effective activity management may help improve mood, sleep, pain and other symptoms so patients can function better and engage in activities of daily living [18].
- ♦ **Lifestyle changes**, including prevention of overexertion, stress reduction, dietary restrictions and nutritional supplementation, are frequently recommended in addition to drug therapies to treat sleep, pain and other specific symptoms [27].
- ♦ **Diet.** There is no specifically recommended diet, but many patients report intolerances for

certain substances that may be found in foods or over-the-counter medications, such as alcohol or the artificial sweetener aspartame. While evidence is currently lacking for nutritional defects in chronic fatigue and fibromyalgia syndrome patients, it should also be added that a balanced diet may be conducive to better health in general and would be expected to have beneficial effects in any chronic illness [33]. In addition, encourage the patient to limit caffeine, alcohol and chocolate as they may interfere with adequate sleep [27].

- ◆ In 2001, a research study conducted by Donaldson et al, demonstrated that 19 of 30 participants responded very favorably to a raw vegetable diet, seeing marked improvement in all fibromyalgia symptoms. The authors implied that a diet composed of fresh fruit and salads results in high intakes of fiber, vitamin C, folate, potassium and magnesium. Animal product consumption was very low, especially intakes of meat, poultry and fish. Intakes were mainly from once weekly to none, resulting in low intakes of fat, cholesterol, vitamins B12 and D, and zinc. This dietary intervention shows that many fibromyalgia subjects can be helped even without understanding the full cause of their symptoms. Further controlled studies are needed to reproduce and extend the results obtained here to see whether this dietary intervention is a viable adjunctive therapy for managing fibromyalgia in a clinical setting [17].
- ◆ **Manage stress.** Encourage patients to identify and recognize stressors in their lives. The nurse should ask the patient how he or she responds to stress and potential stressors? Once the stressors are identified and the patients recognize their own responses, they may be able to make changes or learn to adapt adequately.
- ◆ **Sleep apnea.** Continuous positive airway pressure (CPAP) is a nonsurgical approach to provide air during sleep for a patient with sleep apnea. CPAP delivers air nasally via a continuous set positive pressure device. The nurse needs to ensure the mask fits properly over the nose and mouth [27].
- ◆ **Sleep education.** The CDC (2008) recommends educating patients with sleep deprivation to practice the following techniques [10]:
 - ◆ Establish a regular bedtime routine.
 - ◆ Avoid napping during the day.
 - ◆ Incorporate an extended wind-down period.
 - ◆ Use the bed only for sleep and sex.
 - ◆ Schedule regular sleep and wake times.
 - ◆ Control noise, light and temperature.
 - ◆ Light exercise and stretching earlier in the day, at least four hours before bedtime, may also improve sleep.

Support systems are imperative and beneficial for the patient. Because of the enormous amount of stress and symptoms, patients need a supportive system surrounding them. In addition to support from families and friends, there are local support groups available, which may be located through the Arthritis Foundation (AF), chronic fatigue and fibromyalgia websites [49].

Medications are used to alleviate many of the “problematic” symptoms, such as anxiety, depression, pain and sleep deprivation. Health care professionals should assess the baseline medications, prescribed medications and use of any herbals and/or over the counter (OTC) drugs to avoid contraindications. In addition, at this time, many prescribed medications are initiated based on the patient’s complaints and the primary care provider’s knowledge and experience of other patients in their practice who use the drugs. Therefore, what may work now or for somebody else may need to be tailored to meet the needs of another patient. No two patients should be treated identically, but the care should be individualized. At this time, there are only three medications approved by the United States Food and Drug Administration (FDA) for the medical treatment of fibromyalgia [48]:

- ◆ In June 2007, Lyrica (pregabalin) became the first FDA-approved drug for specifically treating fibromyalgia. Lyrica (Pregabalin), marketed by Pfizer Inc., was previously approved to treat seizures, as well as pain from damaged nerves that can happen in people with diabetes (diabetic peripheral neuropathy) and in those who develop pain following the rash of shingles. Lyrica is not considered an antidepressant but it is related to gabapentin (neurontin) classified as an analgesic/anticonvulsant. The major side effects of Lyrica include sleepiness, dizziness, blurry vision, weight gain, trouble concentrating, swelling of the hands and feet, and dry mouth. Allergic reactions, although rare, can occur. In June 2008, Cymbalta (duloxetine hydrochloride) became the second FDA-approved drug for specifically treating fibromyalgia. Cymbalta (duloxetine hydrochloride) marketed by Eli Lilly and Co., a serotonin-norepinephrine (SNRI), was previously approved to treat depression, anxiety and diabetic peripheral neuropathy. The major side effects of Cymbalta include nausea, dry mouth, sleepiness, constipation, decreased appetite and increased sweating. Similar to other antidepressants, Cymbalta may increase the risk of suicidal thinking and behavior in people who take the drug for depression. Therefore, the nurse should assess the patient’s mood and suicidal ideations with each encounter and educate the patient and family about the risk.
 - ◆ Both Lyrica and Cymbalta reduce pain and improve the overall function in people with fibromyalgia. While those with fibromyalgia have been shown to experience pain differently from other people, the mechanism by which these

drugs produce their effects is unknown. Eli Lilly announced, although it is not understood how Cymbalta works in people, medical experts believe it increases the activity of two naturally occurring substances called serotonin and norepinephrine [30]. There is some data suggesting that these drugs affect the release of neurotransmitters in the brain. The FDA (2009) has stated that studies of both drugs demonstrated that a substantial number of people with fibromyalgia received good pain relief, but there were others who did not benefit. Therefore, it reiterates the importance of assessing each patient’s response to therapy.

- ◆ Lyrica and Cymbalta are approved for use in adults 18 years and older. As of June 2009, there is no data available for the safe efficacy in children and breastfeeding women, and both drug manufacturers have agreed to implement studies.
- ◆ In January 2009, Forest Laboratories Inc. and Cypress Bioscience Inc. announced that Savella (Milnacipran HCl), an SNRI, was approved by the FDA for the management of fibromyalgia. The safety and efficacy of Savella was established in two U.S. pivotal phase III clinical trials involving over 2,000 patients with fibromyalgia. The two studies demonstrated that Savella doses of 100 mg/day and 200 mg/day demonstrated statistically significant and clinically meaningful concurrent improvements in pain, patient global assessment and physical function. As of March 2009, Savella is available in pharmacies. The most common side effects noted during the clinical trials were nausea, constipation, hot flush, hyperhidrosis (abnormal perspiration), vomiting, palpitations, heart rate increased, dry mouth and hypertension [20].

Although there are no FDA-approved medications for chronic fatigue, the other most common medications prescribed for chronic fatigue and fibromyalgia are [18, 36]:

- ◆ Antidepressants are recommended as the initial treatment of fibromyalgia to alleviate depression and promote sleep. Sleep-maintenance disorders are more difficult to manage than are sleep onset problems. In general, antidepressants are most commonly used because of their effect on serotonin. Nurses should educate patients taking an antidepressant to take the dose as prescribed and avoid double dosing; relief and change in problematic symptoms may take two to four weeks; avoid abrupt discontinuation and notify the primary care provider if they feel suicidal [25].
- ◆ Tricyclic antidepressant agents (TCAs) have the strongest evidence for efficacy, such as amitriptyline (Elavil, apo-amitriptyline) 10 milligrams (mg) orally at bedtime, gradually increasing to 40 to 50 mg depending upon

the efficacy [32, 36]. Research studies have indicated that amitriptyline (Elavil) has been effective in improving sleep and increased the non-REM stage four sleep by increasing serotonin levels in the patient [10]. Nortriptyline (Pamelor) also has a unique component to help alleviate neurogenic pain [25].

- ◊ Avoid TCA medications in older adult patients as it can cause confusion and orthostatic hypotension [27]. Therefore, Trazodone (Desyrel) may be a preferred option for the elderly patient due to its minimal side effects [27].
 - ◆ The most common side effects with TCAs include anticholinergic reactions, such as urinary retention, dry mouth, dry eyes, blurred vision and constipation and sedative properties [25].
- ◊ If the patient is not staying asleep, adding a serotonin-selective reuptake inhibitor (SSRI) may be helpful. Selective serotonin reuptake inhibitors (SSRIs) such as citalopram hydrobromide (Celexa), escitalopram oxalate (Lexapro sertraline, fluoxetine (Prozac) and sertraline hydrochloride (Zoloft), can be prescribed alone or in combination with TCAs for pain relief and depression [18, 27, 36]. However, the nurse should educate the patient that the SSRIs do not help alleviate fatigue [23].
- ◊ Fluoxetine (Prozac) should be the first antidepressant agent used to treat depression in children and adolescents; however, all of these medications should be used only with extreme caution and extensive parental education. Psychiatric consultation is recommended. The doses of all antidepressants should be individualized, based upon the symptoms and history.
 - ◆ Over the years, there has been numerous literature cautioning health care professionals in prescribing antidepressants to children and adolescents. According to the National Institute of Mental Health (2009), in the FDA review, no completed suicides occurred among nearly 2,200 children treated with SSRI medications. However, about 4 percent of those taking SSRI medications experienced suicidal thinking or behavior, including actual suicide attempts – twice the rate of those taking placebos or sugar pills. In response, the FDA adopted a “black box” label warning indicating that antidepressants may increase the risk of suicidal thinking and behavior in some children and adolescents with major depressive disorder (MDD). A black-box warning is the most serious type of warning in prescription drug labeling. The warning also notes that children and adolescents taking SSRI medications should be closely monitored for any worsening in depression, emergence of suicidal thinking or behavior, or unusual changes in behavior, such as sleeplessness,

agitation or withdrawal from normal social situations. Close monitoring is especially important during the first four weeks of treatment. SSRI medications usually have few side effects in children and adolescents, but for unknown reasons, they may trigger agitation and abnormal behavior in certain individuals [37].

- ◆ The most common side effect of SSRIs is insomnia [25].
- ◊ Serotonin-norepinephrine (SNRI), Cymbalta (duloxetine hydrochloride) and Savella (milnacipran HCl).
- ◊ Anti-anxiety medications include antidepressants, such as SSRIs; paroxetine (Pexeva), trazodone (Desyrel), benzodiazepines, nonbenzodiazepine sedatives, or L-dopa and carbidopa may be used in fibromyalgia syndrome, especially if the patient suffers sleep disturbances due to restless leg syndrome [36].
- ◊ Clonazepam (Klonopin) an anticonvulsant/benzodiazepine that should never be confused with clonidine (Catapres) antihypertensive/ cardiac medication. Clonazepam is ideal for the chronic fatigue/fibromyalgia patient with concomitant restless legs syndrome or mitral valve prolapsed (MVP). The starting dose is 0.125 or 0.25 mg and titrate the dose to the lowest effective dose. The nurse should instruct the patient to take it as prescribed, never take double doses or abruptly discontinue due to the risk of seizures. Side effects include, but are not limited to increased fatigue, bleeding, sore throat, fever, clay-colored stools, jaundice or behavioral changes [25].
- ◊ Corticosteroids are not useful in the treatment of fibromyalgia without concomitant rheumatic illness, such as joint, bursa or tendon inflammation [22, 36].
- ◊ Herbal supplements and vitamins are frequently used by people with chronic fatigue syndrome for symptom relief. Although there have been few clinical trials, many chronic fatigue syndrome patients report symptom relief with supplements. The potential danger is these products are unregulated, and information on potency and side effects is frequently unknown. Nurses and health care professional need to question patients about supplement use and OTC products to determine safety, efficacy and possible negative interactions with prescribed medications and therapies. The CDC (2008) discourages patient use of herbal remedies like comfrey, ephedra, kava, germander, chaparral, bitter orange, licorice root, yohimbe and any other supplements that are potentially dangerous [10].

Pain is the primary symptom, especially for the patient with fibromyalgia, and it needs to be addressed appropriately by the primary care provider. Ideally, patients should avoid the use of any pain medication if possible, but many endure excruciating, debilitating pain and it needs to be addressed. The goal is to ensure the patient

is prescribed pain medications that alleviate the pain but are nonaddicting.

- ◊ Gabapentin (Neurontin) and zonisamide (Zonegran), (analgesics/anticonvulsants) are typically prescribed for neuropathic pain; however they may be useful for fibromyalgia patients [18]. The typical dose is 100 mg/day and increased to 200 to 800 mg/day [49]. Nurses should assess the patient prescribed gabapentin (Neurontin) to discontinue gradually over one week as it may cause seizures. In addition, the patient should avoid taking it within two hours of an antacid. Women of childbearing age should speak with their doctor if they are contemplating a pregnancy and/or breastfeeding [25].
- ◊ Guaifenesin (cold expectorant/cough medicine) is in some review of the literature demonstrating “significant benefits in decreasing pain, improving other symptoms as it works on the NMDA receptor” [1, 22]. At this time, there are no protocols, and the validity is questioned, so further research is needed on the true effectiveness of guaifenesin. Nurses should be aware of the potential use of guaifenesin and fibromyalgia, especially since it is available over the counter.
- ◊ Muscle relaxants, such as cyclobenzaprine (Flexeril) 5 to 40 milligrams are typically prescribed to alleviate musculoskeletal pain, especially spasms; however they are also effective in improving sleep when taken at bedtime as well as providing relief the subsequent day [18]. Nurses should assess the patient for drowsiness, dizziness and blurred vision. In addition, muscle relaxants may cause anticholinergic side effects (urinary retention and dry mouth), especially in the elderly or if a patient is already prescribed a medication that induces anticholinergic side effects [25].
- ◊ Nonsteroidal anti-inflammatory drugs (NSAIDs), including COX-2 selective agents and acetaminophen are not effective analgesics when used alone, but when combined with a TCA they may provide a beneficial efficacy. Nurses should assess the patient for a history of hypersensitivity, bleeding disorders, gastrointestinal bleed and severe hepatic or cardiovascular diseases prior to administering [25]. The patient should be instructed to take NSAIDs with a full glass of water and to remain upright for a minimum of 15 to 30 minutes after administration to reduce the risk of ulcer formation [25].
- ◊ Opioid/narcotics, such as codeine, fentanyl, hydrocodone, methadone, oxycodone and tramadol (Ultram) should be avoided or used sparingly to avoid addiction and overuse.
- ◊ Tramadol (Ultram) (50 to 100 mg two or three times daily) is prescribed for pain relief in patients with fibromyalgia. The dose should be slowly tapered gradually when discontinued. Tramadol can be used alone or in combination with acetaminophen.

Significant side effects of tramadol include respiratory distress, hypotension and seizures. The risk of seizures is exacerbated if the patient is taking an anti-depressant (SSRIs, TCAs or monoamine oxidase inhibitors) [25].

- ♦ Lidocaine/trigger point injections may be useful if the pain is confined to a specific region. Interestingly, there is limited data available in the review of literature about Lidocaine/trigger point injections for the treatment of chronic fatigue and fibromyalgia syndrome. However, it is mentioned on the supportive websites for patients with fibromyalgia and treatment of myofascial pain. Trigger point injections involves inserting a needle directly into the “trigger point” of the muscle. The beneficial goal of the injection is the mechanical disruption of scar tissue. The patient may require multiple injections to infiltrate several centimeters of the tendon and muscle. After the injection procedure, the nurse should ice the area to reduce swelling and edema [42].

Memory and concentration may be enhanced by encouraging the patient to participate in relaxation and meditation training and memory aids, such as organizers, schedulers and written resource manuals, and can be helpful in addressing cognitive problems. Stimulating the mind with puzzles, word games, card games and other activities may also be beneficial for some patients [10].

Other treatment modalities commonly known as alternative therapy.

Alternative therapy has evolved in Western medicine over the past 20 years [7]. Alternative therapy may include acupuncture, balneotherapy, chiropractic manipulation, electro-therapeutic point stimulation, heat/ice, hypnosis and biofeedback, journaling, massage, meditation and yoga to reduce pain [22, 36]:

- ♦ **Acupuncture**, a type of traditional Chinese medicine, is one of the most ancient and widely used treatments for a vast array of conditions. It involves poking thin, solid needles in various areas in the skin to alleviate pain and/or nausea [44].
- ♦ **Balneotherapy** is a relaxing measure that involves the patient bathing in warm water containing sulfur or other minerals, [44].
- ♦ **Chiropractic manipulation** is completed to manipulate a joint barehanded or by the chiropractor using a machine or instrument to apply pressure.
- ♦ **Electro-therapeutic point stimulation (ETPS)** is a form of transcutaneous electrode nerve stimulation (TENS) that combines acupuncture, massage therapy, electrotherapy and physical therapy to increase or decrease circulation, stimulate the central nervous system, relax contracted muscles and release endorphins the body’s natural painkillers [23].
- ♦ **Heat/ice alterations** may provide some pain relief.
- ♦ **Hypnosis and biofeedback** is a natural state of mind that provides relaxation during an

altered state of consciousness [38].

- ♦ **Journaling** is a tool for recording one’s own personal life. Some patients may find writing as a way to express feelings, to gain new perspectives and to pay attention to the patient’s true feelings [27]. The nurse should encourage the patient to “free-flow journaling,” writing anything that comes to his or her mind and to keep it without the worry that others will read it [27].
- ♦ **Massage** is a relaxing, healing mechanism that involves manipulating soft tissues in the body by using touch [27,44]. In patients with fibromyalgia, massage may help stretch tense muscles, improve flexibility and diminish the pain and stress [44]. Many massage therapists are trained on releasing the tight bands that contain “trigger points.” In addition, they specialize in a variety of myofascial release techniques [38].
- ♦ **Meditation** may help the patient reduce anxiety and pain and promote health [27].
- ♦ **Yoga** is an ancient practice that involves controlling breathing, meditation and exercise to enhance the mind and body [36]. Yoga postures help the patient to develop body awareness, strength, flexibility, balance and coordination [38].

According to personal stories of patients living with fibromyalgia reported online on various support sites, there is no one therapy ideal for patients, but a combination of medications, lifestyle changes, exercise and alternative therapies help the majority of them. In addition, patients require a support system to help them in day-to-day life and dealing with the disease that remains so complex and misunderstood by health care professionals.

The prognosis of chronic fatigue and fibromyalgia syndrome varies among each individual, but neither condition is progressive in nature with prompt, adequate diagnosis and appropriate/individualized treatment. With prompt diagnosis and an effective treatment plan, the CDC (2006) estimates that chronic fatigue syndrome improvement rates varied from 8 percent to 63 percent in a 2005 review of published studies, with a median of 40 percent of patients improving during follow-up. However, full recovery from chronic fatigue syndrome may be rare, with an average of only 5 to 10 percent sustaining total remission [7]. Each patient is affected differently; some people with chronic fatigue syndrome remain homebound and others improve to the point that they can resume work and other activities, even though they continue to experience symptoms [7].

There is limited data available in the literature mentioning the prognosis of fibromyalgia. However, according to the Current Medical Diagnosis and Treatment (2007), fewer than 50 percent of patients experience a substantial improvement in their symptoms [32]. According to various support networks accessed online, many patients with fibromyalgia improve with a combination therapeutic regimen.

Patients living with chronic fatigue and fibromyalgia endure a lot of frustration with bothersome symptoms that affect their daily lives and a health care community that does not understand the conditions as we should. It is imperative as nurses that we understand the complexity of the syndromes while caring for the patient. The nurse should also provide reassurance to the patient that their symptoms are real and can be managed. Although complete resolution of pain and the associated symptoms is unlikely, appropriate therapies can reduce the pain and improve the patient’s overall quality of life.

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