



Multiple Sclerosis: Key Issues in Nursing Management

Adherence, Cognitive Function, Quality of Life

2ND EDITION

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Preface: The Roles of Nursing in Multiple Sclerosis

Multiple sclerosis (MS) is a chronic, frequently debilitating neurological disease that affects young adults in the prime of their lives. Over the past decade, the focus of MS management has changed from one of only symptomatic intervention to one of disease modification. Injectable therapies have had an impact on the natural history of MS through the reduction of relapses and delay in disease progression. The initiation of treatment is encouraged as early as possible following diagnosis. Clearly, ongoing symptomatic management and rehabilitation intervention remains critical to the long-term successful management of the disease. Thus, plans of care in MS must be multidimensional and require both pharmaceutical intervention and rehabilitation strategies. The nurse has a vital role to play in the ongoing care of and interaction with patients and their families. Nursing care in MS is a collaboration between the patient/family and the nurse, a partnership whose goal is self-awareness and self-responsibility and whose activities involve a great deal of self-care.

The nurse working in the field of MS is a care provider, facilitator, advocate, educator, counselor, and innovator. The challenges of the disease require many creative interventions in a wide variety of settings. The list of needs for MS care is long and complex. Interventions range from instruction in the use of medications, both oral and injectable, to bowel and bladder management strategies, to the improvement of mobility. The dynamic nature of the disease and the psychosocial, economic, and physical implications of MS call for ongoing skill development and up-to-date information on the part of the nurse interested in MS care.

With the advent of disease-modifying therapy, new breakthroughs in research, the establishment of worldwide networks of care, and the validation of a new specialty branch of nursing, the MS nurse must adopt a vision of MS that includes empowerment, collaboration, skills development, and team building with an ongoing leitmotif of hope.

The nurse has a vital role as an educator of patients and their family members. It is very important for the nurse to encourage them to move out of a passive role and to assume a proactive stance about their disease. By becoming educated, the patient is more likely to feel a sense of empowerment, acceptance, and well-being. The nurse can assist in this process by referring patients to literature, newsletters, and short-term orientation groups, and by explaining the disease process, symptoms, tests, and technical terms. It is important for a nurse to help establish reasonable expectations for proposed treatments, to educate patients in self-care and wellness, and to explain side effects. A nurse's support, advice, education, and expertise can do much to advance MS from an incurable and uncontrollable disease to a manageable problem that is merely a part of patients' lives.

This is the second edition of a landmark work on MS, a monograph originally published to document the roles and contributions of MS nurses. Since the first edition, MS care has evolved and expanded and nurses have continued in their expanded roles. The authors of this monograph wish to thank Teva Neuroscience for their ongoing belief in the value of the role of nursing and for their ongoing support.



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Foreword

Multiple sclerosis (MS) continues to be one of the most life-altering diagnoses a patient can receive. A chronic, often debilitating, neurological disease with no cure, it produces motor, sensory, visual, bowel, bladder, and cognitive dysfunction. Coupled with this range of deficits, the course of MS is unpredictable—patients must adjust to living with a fluctuating disease characterized by periods of relapses and remissions or unrelenting progression.

Advances in our understanding of MS, the availability of disease-modifying agents, and a wide range of symptomatic therapies have facilitated a comprehensive approach to the management of MS. The underpinning of this model of care is to empower patients with the knowledge and skills needed to minimize the impact of the disease and to maximize patients' control over their lives. Nurses care for people with MS in a variety of settings and address a broad spectrum of physical, emotional, and educational needs. The key issues in MS nursing include the following:

- Promoting adherence to complex protocols.
- Adapting nursing care to recognize and compensate for/monitor cognitive impairment.
- Facilitating and assessing the impact of MS on quality of life despite uncertainty or disability.
- Providing individualized attention to the comprehensive needs of those affected by MS.

This monograph is an updated edition of an earlier version that was created by the Multiple Sclerosis Nurse Specialists Consensus Committee (see page 4 for a complete listing of Committee members, all of whom are nurses specializing in MS care) and now includes information through 2004. As with the previous edition, this monograph is designed to enhance MS nursing care, particularly with regard to providing a comprehensive review of several key issues that challenge nurses involved in MS care. These issues are pivotal to the patient's ability to adjust to living with MS despite its many challenges. After reading this monograph, which builds upon the groundwork laid by the contributors to the earlier edition, nurses should be able to

1. Describe the prevalence, diagnosis, and pathophysiology of MS.
2. Describe the role of the nurse in the comprehensive management of MS.
3. Recognize the barriers to adherence to treatment regimens.
4. Identify the signs of cognitive impairment in people with MS.
5. Describe what factors influence quality of life in people with MS.

This monograph is a valuable resource for nurses and other healthcare professionals who care for people with MS in any setting, as well as those who care for other chronically ill patients.



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Introduction

Multiple sclerosis (MS) is a chronic disease of the central nervous system (CNS) that has pervasive effects on the lives of over 2 million people throughout the world.¹ Patients must adapt to the stress of living with a frequently debilitating illness of unknown etiology, an uncertain prognosis, and a variable disease course.

While technologic and pharmacologic advances in the past decade have brought hope to patients and their families, these advances have also created new complexities in long-term management. Injectable disease-modifying agents, energy management, bladder management techniques, regimens to improve sexual functioning, and cognitive and physical rehabilitation programs have made MS management more challenging, time consuming, and demanding for patients and their families.

With these advances, nurses have taken a leading role in the development of comprehensive care strategies. Philosophically, these strategies focus on empowering patients and promoting self-care. In practice, they pose a challenge to the care team to provide ongoing education on the implementation of complicated regimens and to ensure that patients have adequate support mechanisms. Crucial to the success of these tasks is proper assessment of three factors:

- the capacity and/or motivation of patients to adhere to therapeutic regimens,
- the presence and impact of cognitive impairment, and
- the influence of MS and treatment interventions on the patient's/family's quality of life.

Each of these factors alone, and in combination, helps determine how an individual patient will respond to management efforts by the healthcare team. For example, although a patient may be willing to learn about and implement a therapeutic regimen, cognitive and physical impairment may make this difficult. People whose quality of life has been negatively affected by MS may be unwilling to adhere to complicated regimens that further disrupt their lives. Nurses caring for patients and their families should understand how MS has affected each individual. They can help patients and families compensate for the unchangeable aspects of the disease and assist them in addressing those aspects that can be changed. Strategies to promote active participation and adjustment to change are key factors in the nurse–patient partnership.

Overview of Multiple Sclerosis

MULTIPLE SCLEROSIS FACTS AND FIGURES

MS affects an estimated 400,000 people in the US.¹ Although considered a relatively rare disease, MS is of particular interest to healthcare professionals and providers because of its potential to cause severe disability, and because the typical age at onset is young adulthood. In addition, the multifaceted nature of the disease affects healthcare, social service, community support, and economic issues. As a result, patients, families, and the healthcare community are presented with many lifelong challenges.

PATHOPHYSIOLOGY AND ETIOLOGY

MS is characterized by damage to the myelin sheath and underlying nerve fibers within the CNS—that is, the brain, optic tracts, and spinal cord. Partial or complete degeneration of the myelin sheath manifests as lesions or plaques scattered throughout the CNS. These plaques may be found in the periventricular white matter; in the optic nerves, and in the white matter of the spinal cord, brainstem, cerebellum, and cerebrum. The loss of myelin interferes with the efficiency of electrical conduction within the CNS; thus, the major clinical manifestations of MS relate to sensory and motor dysfunction, as well as cognitive and affective disorders. Damage to the underlying axons is likely the cause of the irreversible neurological disability. This damage was originally thought to occur late in the disease; however, work in the late 1990s by Trapp and colleagues demonstrated that permanent axonal damage occurs early as well as late in the disease.²

Although the etiology of MS is not clear, researchers believe that a multigenetic predisposition to the disease may exist (ie, the result of defects in more than one gene).³ In addition, it is hypothesized that the myelin loss associated with MS results from an immunologic attack caused by sensitization to myelin or to an infectious agent (possibly viral or bacterial). Proinflammatory lymphocytes that are autoreactive to self-CNS antigens

such as myelin become activated in the periphery, disrupt the blood–brain barrier, and enter the CNS, where they become reactivated. The cascade of immunological events that follows causes demyelination and damage to nerve fibers, ultimately resulting in neurological symptoms and disability.

CLINICAL FEATURES AND DIAGNOSIS

Because the damage to myelin and axonal loss is not localized to one particular area of the CNS, MS results in a diverse range of neurological impairments. The symptoms of MS can be classified as primary, secondary, and tertiary and vary in intensity from patient to patient and within the patient from time to time. Primary symptoms—such as bowel and bladder dysfunction, tremor, sensory loss, ataxia, and visual disturbances—result from myelin and axonal damage in specific areas of the CNS. These may give rise to secondary symptoms, such as urinary tract infections and decubitus ulcers.

In addition to the classic motor and sensory symptoms of MS, patients may experience a variety of cognitive deficits. The neuropsychological disturbances are probably related to the overall involvement of white matter, particularly in the periventricular frontal regions⁴ and in the corpus callosum. Memory or recall problems and slowed information processing are most commonly reported, although abstract reasoning and problem solving can also be affected.

Tertiary symptoms are the detrimental effect of the disease on patients' work, socialization, education, and family life and can, in part, be caused by lack of effective interventions aimed at primary symptoms.

The diagnosis of MS is dependent on a number of factors. The patient history should indicate episodes of symptoms or a progressive course of symptoms that are correlated to the CNS. The neurological exam should support the history and lead the provider to order laboratory evaluations. Current diagnostic criteria require that the patient experience at least two attacks of neurological symptoms separated by at least 1 month, and clinical evidence of two or more lesions, occurring independently of any other disease or condition.⁵

Although there is no specific laboratory or radiologic test to definitively diagnose MS, magnetic resonance imaging (MRI) with gadolinium (Gd) has proven useful for imaging cerebral and brainstem lesions and many spinal cord lesions. In patients presenting only with optic neuritis, MRI has frequently demonstrated asymptomatic lesions elsewhere in the CNS.⁶ Current guidelines recommend that baseline brain MRIs be conducted in all patients with suspected MS,⁷ as detected brain lesions provide evidence of dissemination in both time and space.⁷ If the brain MRI is nondiagnostic or presenting symptoms are at the spinal cord level, a spinal cord scan should also be obtained.⁷

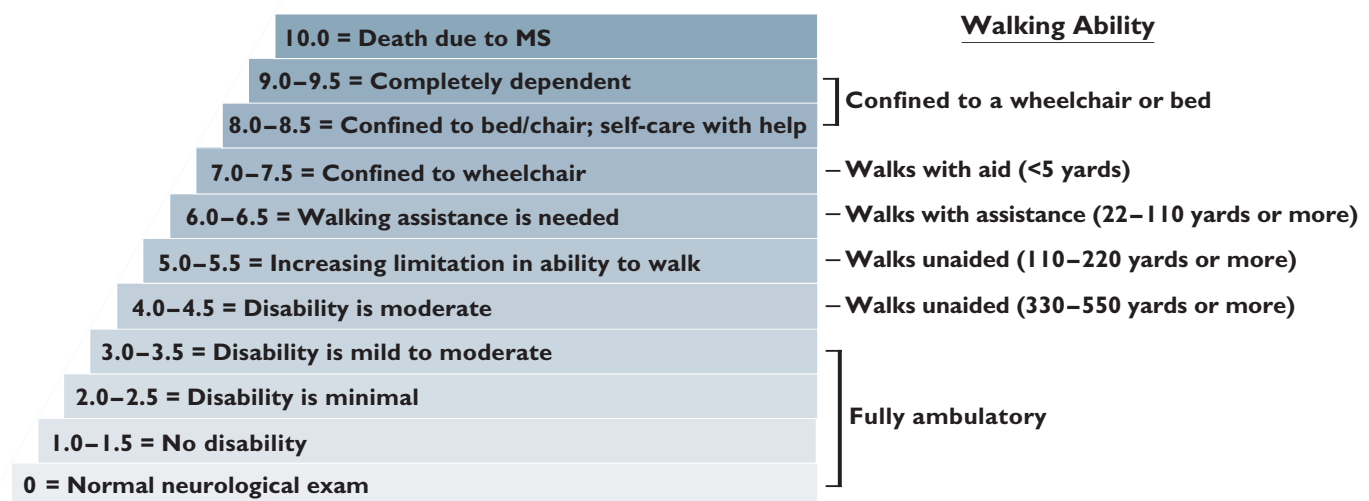
According to the McDonald diagnostic criteria, an MRI that would support the diagnosis of MS must have at least three of four of the following findings (one spinal cord lesion can be substituted for one brain lesion): 1) one Gd-enhancing lesion or nine T2 hyperintense lesions if Gd lesions are not present, 2) at least one infratentorial lesion, 3) at least one juxtacortical lesion, and/or 4) at least three periventricular lesions.^{5,7} McDonald criteria add the technology of the MRI to establish dissemination in time. If a patient presents with a single episode of neurological symptoms and an MRI suggestive of MS, the diagnosis cannot be made because the criteria for dissemination in time have not been met. According to McDonald criteria, another brain MRI (with and without contrast) should be done at least 3 months following the initial MRI. If this

MRI shows a new Gd-enhancing lesion, the criteria of dissemination in time have been met. If the second MRI does not show a new Gd-enhancing lesion, a third MRI should be done after the recommended time frame of 3 months. If that MRI shows either a Gd-enhancing lesion or a new T2 lesion in a different area of the CNS, the diagnosis of MS can be made. All other possible diagnoses must be ruled out as well.

However, despite its usefulness in detecting asymptomatic lesions, there are circumstances when clinical presentation or MRI alone does not allow an MS diagnosis. These include cases in which active evidence of brainstem, optic nerve, or spinal cord disease on neurological examination is absent, or a patient presents with fewer attacks or only insidious neurological progression suggestive of MS, or there is clinical evidence of only one lesion.⁵ Hence, in cases where clinical presentation is unusual or the imaging criteria are not fulfilled, cerebrospinal fluid (CSF) and/or abnormal visual evoked potential (VEP) testing are used to provide additional diagnostic support.⁵

Neurological deficit, both at diagnosis and over the course of the disease, can be quantified by the Kurtzke Expanded Disability Status Scale (EDSS).⁸ This is a standard scale (0 = normal function and 10 = death due to MS) used to rate the degree of MS-related neurological disability (Figure 1); however, this scale is

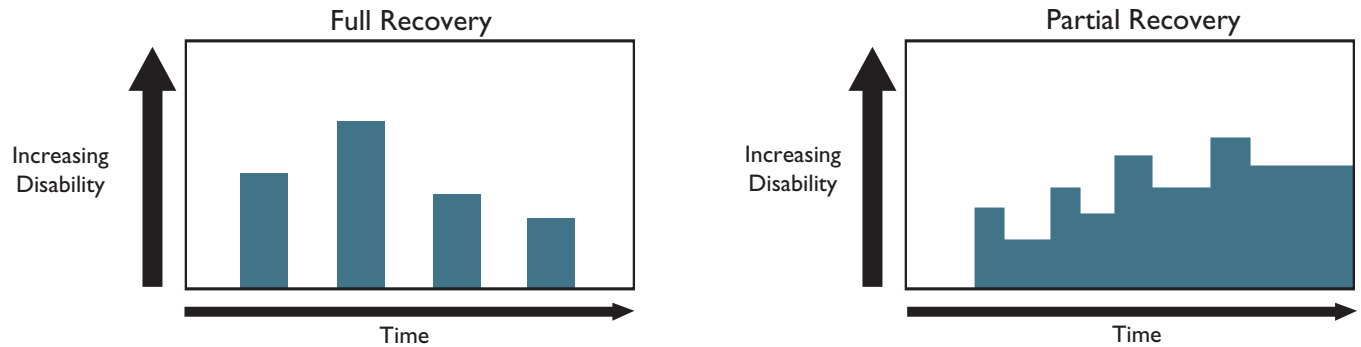
FIGURE 1. Expanded Disability Status Scale (EDSS): Progression to Disability



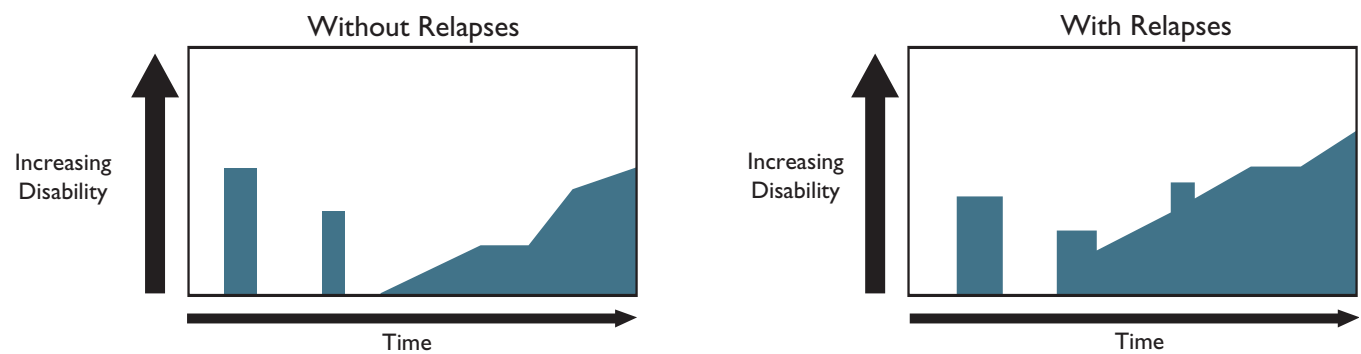
Kurtzke J. *Neurology*. 1983;33:1444-1452.⁸

FIGURE 2. Types and Courses of Multiple Sclerosis

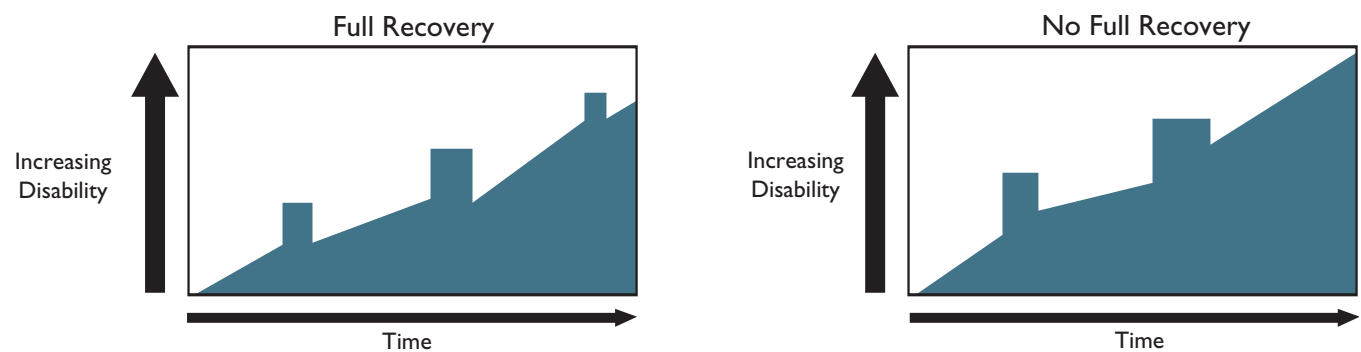
A. Relapsing-remitting



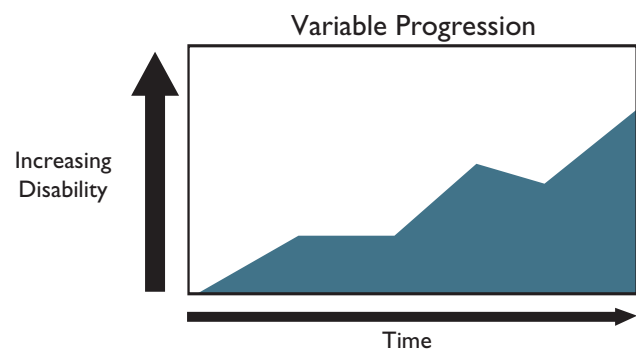
B. Secondary-progressive



C. Progressive-relapsing



D. Primary-progressive



Adapted with permission from Lublin FD, Reingold SC. *Neurology*. 1996;46:907-911.¹⁰ (<http://lww.com>).

heavily weighted toward ambulation and may not provide a true picture of the patient's functional status. Another measure that may be used clinically is the MS Functional Composite, which consists of the Paced Authority Serial Addition Test (PASAT), a nine-hole peg test, and a 25-foot timed walk.⁹

DISEASE COURSE

The course of MS is unpredictable, differing from patient to patient and within a given individual over time. At one extreme, some patients may have two or three relapses and never become disabled; rarely, a small number of patients may experience frequent attacks and die within several months of diagnosis.⁶

Four distinct clinical courses of MS have been identified: relapsing-remitting, primary-progressive, secondary-progressive, and progressive-relapsing.¹⁰ These courses are depicted in Figure 2. The typical pattern of disease is relapsing-remitting at onset, with attacks occurring randomly over many years. Relapses are followed by complete, partial, or no improvement. These unpredictable neurological events constitute an important and distressing element of the disease. During relapse, transient neurological dysfunction occurs, with or without complete recovery.^{11,12}

Secondary-progressive disease begins with a relapsing-remitting course followed by progression at a variable rate, in some cases interspersed with acute attacks. Progressive-relapsing disease is marked by progression from onset, which is punctuated by clear, acute relapses. Primary-progressive MS is characterized by progression from onset, but without relapses or remissions.

ADVANCES IN MULTIPLE SCLEROSIS TREATMENT

Advances in MS management focus on both disease modification and symptom management. Treatment regimens have become more complex and therefore more challenging to the patient, the care partner, and the healthcare team. An important goal in the nurse–patient relationship is patient and care partner empowerment. This requires skills and knowledge that the nurse can help provide. Nurses provide education so that patients can make informed choices. In addition, an important part of the nurse's role in caring for people with MS is to ensure that the patient can make informed treatment decisions. Because there is an inherent relationship between a patient's adherence to a treatment regimen, level of cognitive functioning, and quality of life and the medication the patient is prescribed, the disease-modifying treatments available as of this printing are discussed at the end of this monograph.

Promoting Adherence to Therapeutic Regimens

Problems with adherence to pharmacologic and non-pharmacologic treatments are well documented in the healthcare literature. Estimates place the extent of non-adherence between 30% and 70%, with an average of above 50%.¹³

Adherence to healthcare regimens presents considerable challenges to chronically ill patients. In MS, the extent of physical disability and/or cognitive impairment and the complex nature of current treatments make it challenging for even the most motivated patient to adhere to a self-management plan.

THE CONCEPT OF ADHERENCE

The term “adherence” has replaced “compliance” in both the medical and nursing literature and in everyday conversation. The terms “compliance” and “noncompliance” have been described as value laden, implying the subordinate position of the patient in relation to the healthcare professional.¹⁴ In particular, the term “compliance” is incongruent with the essence of the nurse–patient relationship, which has traditionally involved the nurse fostering the patient’s interest and ability in participating in his or her own care. This nurse–patient relationship was exemplified in a conceptual framework developed by Orem.¹⁴ Orem’s framework suggests that the degree to which people are able to perform necessary self-care measures determines the degree to which a nurse should be involved in patient care. In other words, if a patient’s ability to meet self-care needs is not adequate, he or she has a self-care deficit. When a self-care deficit exists, nurses must act to help patients meet their therapeutic self-care demands and to promote the patient’s ability to meet demands, within the framework of a genuine interpersonal relationship.¹⁴

According to Quigley and Giovinco,¹⁵ consistent elements in the various definitions of “compliance” found in the literature include implied power relationships exerted by the healthcare professional over the patient,

coercion, and domination. A widely cited definition of “compliance” is that of Haynes and colleagues, which states that compliance is “the extent to which a person’s behavior, in terms of taking medications, following diets or executing other lifestyle changes, coincides with medical or health advice.”¹⁶

Because of the negative authoritarian connotations associated with “compliance,” terms such as “adherence,” “therapeutic alliance,” “consensual regimen,” and “effective management of therapeutic regimen” have emerged.^{14,17}

From the nursing perspective, adherence can best be defined as the active, voluntary, and collaborative involvement of the patient in a mutually acceptable course of behavior that results in a desired preventative or therapeutic outcome. Core elements include partnership, mutually established goals, and a therapeutic alliance.

THEORETICAL PERSPECTIVES

Research into the issue of adherence has focused on explaining how and why patients do or do not adhere to prescribed treatment regimens. Attempts to isolate variables that may influence patient behavior—such as age, gender, and other demographic variables—have not identified a significant correlation between these variables and adherence.¹⁷ In contrast, several psychological theories give some insight into the phenomenon of adherence and nonadherence.

Self-efficacy

Self-efficacy or “control,” as defined by Bandura, refers to a judgment made by an individual about his or her ability to organize and implement a new, stressful, or unexpected course of action.^{18,19} How individuals perceive this ability is the key to whether a particular task will be accomplished, as perception strongly influences both the expenditure of energy and its duration, especially when an individual is faced with obstacles or unpleasant experiences.²⁰ Accordingly, individuals who persist longer at activities that are perceived to be threatening or negative, such as the preparation and administration of a daily injection, reportedly gain a reinforced and greater sense of self-efficacy compared with those who give up prematurely and, as a result, retain self-debilitating expectations and fears.^{19,20}

A growing body of evidence suggests that self-efficacy is strongly linked to adherence in a variety of contexts, including continued use of injectable immunomodulatory agents in MS.^{19,20} This is critical, since MS regimens rely upon patients' ability to overcome such complex tasks as preparing and self-administering agents and managing related side effects, even though, as shown in the work by Fraser et al, daily therapy does not result in an *immediate* payback but rather the promise of a *future* benefit, ie, fewer relapses.²¹ Nevertheless, Fraser and colleagues, in a series of studies in over 600 MS patients taking glatiramer acetate (Copaxone®), reported that a single unit increase in the Multiple Sclerosis Self-Efficacy Scale (MSSE) score (a rating scale of 10 to 100, with 10 equating *very uncertain* and 100, *very certain*, as to how certain individuals are that they will be able to perform specific behaviors) was associated with an increased likelihood of medication adherence.¹⁹⁻²¹ Patients in the adherent group had significantly greater levels of self-efficacy that persisted for at least 6 months ($P=0.001$).²¹ For example, individual patients with total MSSE scores of 1800 were 16.4 times likelier to adhere to treatment than individuals with scores of 400.²¹ When patients were evaluated by MSSE subscales that rated control and function separately, individuals in the adherent group had both a significantly greater belief in their ability to control their MS ($P=0.004$) and in their ability to function with their disease ($P=0.001$) compared with their nonadherent peers.²¹

Bandura suggested that successful performance of tasks enhances self-efficacy. With regard to MS patients specifically, education about the preparation and self-administration of injectable immunomodulatory agents, encouragement of hands-on practice in the presence of a nurse or other practitioner, and provision of telephone support can empower individuals to achieve realistic expectations and adhere to their treatment.

Health Belief Model

Many researchers have adapted psychological theories in an effort to help explain adherence. The health belief model, initially developed by a group of social psychologists to explain lack of participation in disease prevention or detention programs, has been expanded to account for patients' adherence to healthcare regimens.²² This

model suggests that patients may weigh the advantages and disadvantages of engaging in any action, such as taking a medication.

The health belief model holds that in order to engage in health-related behavior, patients must believe that^{13,23}

- they are susceptible to a particular health problem,
- the problem would lead to serious organic or social problems,
- taking action would reduce their susceptibility to the problem, and
- costs associated with the action are outweighed by its benefits.

Thus, before deciding whether to pursue a health behavior, patients need two main types of information: 1) the benefits or potential gains (ie, the extent to which it will reduce the health threat) and 2) the costs (the degree of physical, psychosocial, cultural, spiritual, and financial distress associated with a proposed course of action). For an example of how this theory may apply to a person with MS, see Case Study 1.

CASE STUDY I

HL is a 35-year-old woman with MS. She had been experiencing urinary urgency and frequency for several months and had been incontinent on two occasions. An initial bladder evaluation demonstrated HL is retaining a postvoid residual volume of 250 mL of urine. Urodynamic studies showed failure to empty because of sphincter dysfunction. The nurse at the MS care center recommended HL learn to self-catheterize. In order to consider this recommendation, HL first had to believe that she may be subject to further episodes of urinary incontinence, retention, and bladder infections; second, she had to acknowledge that not catheterizing could lead to physical discomfort and social embarrassment; and, third, she had to be convinced that self-catheterization would lessen the chance of long-term urinary complications occurring. In summary, in order for HL to decide to learn to self-catheterize, she had to believe that the risk of self-catheterization (disruption of routine, fear and anxiety over procedure, and potential for bladder infection due to technique) was outweighed by the benefit (relief from urinary incontinence and associated social embarrass-

ment). She had to realize that the only way to avoid incontinence and reduce her risk of infections was to self-catheterize regularly.

Although this model is useful in assessing how health beliefs may influence patients' actions, it does not always explain why a person decides to take action. What factors, both internal and external, influence a patient's decision to take action?

Other Relevant Psychological Theories

The social learning hypothesis, known as the locus of control theory, states that if people perceive the reinforcement of a behavior as contingent on their own behavior (internal locus of control), they are more likely to repeat the behavior than if the reinforcement is contingent on factors beyond their control (external locus of control).²⁴

One might consider positive health as the reinforcement for health-promoting behaviors such as following a treatment regimen. Patients may interpret their health (ie, the reinforcement of health-promoting behavior) as either internally controlled (under their control) or externally controlled (not under their control). For example, a person with MS may fail to adhere to a therapeutic regimen because of an underlying belief that changes in health are not really under his or her control but are determined by outside forces. For such a person there is no point in adhering to a therapeutic regimen, since the reinforcement for this behavior (positive health) is controlled by external forces. On the other hand, persons with an internal locus of control may be more likely to follow a therapeutic regimen, since they believe that it is their behavior that controls the reinforcement, at least to some extent.

Models of behavior change have emerged that are useful when developing strategies to assist patients with adherence. They are the transtheoretical model²⁵ and the harm reduction model.²⁶ The transtheoretical model describes the process of change as long-term and dynamic, and incorporates individual variables. Patients move through stages of change, but not always in a linear manner. This allows room for the ups and downs most

people experience while attempting to incorporate new self-care strategies into their routine.²⁵ The underlying premise of the harm reduction model is that healthcare providers use a nonjudgmental approach when helping patients change behaviors because the individual's dignity and freedom to choose are of prime importance.²⁶

Using these models, the stages associated with behavior change are²⁷

- precontemplative—aware of the problem, but not planning to change
- contemplative—ready to change
- preparation—develops a plan
- action—progresses toward a goal with support
- maintenance—goals are reached and sustained
- relapse—returns to previous behaviors, and feels comfortable that he/she is not being judged

Implications

Psychological theories have provided researchers with a framework on which to develop “compliance” models and identify key elements in reducing nonadherence. For example, the self-efficacy model highlights the importance of empowering patients to overcome doubts about their ability to achieve challenging tasks or activities when faced with obstacles or adverse experiences. The health belief model highlights the need for information to be presented in a way that convinces the patient that the risk of the illness or health problem is real. The locus of control theory suggests that patient beliefs concerning reinforcement of health-promoting behaviors may be important. Increasing self-confidence and understanding medications and their effects may foster the belief that positive health states can result from a person's own action. In other words, patients with a strong internal locus of control may be more likely to adhere to treatment regimens, since they believe that such adherence may actually make a difference in their health. All theories point to the need for open communication between healthcare professionals and patients, as well as ongoing patient education. The transtheoretical and harm reduction models provide a basic structure upon which healthcare professionals can build a therapeutic relationship with patients that takes into consideration each individual patient's desires and needs and is non-judgmental.

As the healthcare professionals who have the most frequent interaction with people with MS—either in a hospital, MS center, or home care setting—nurses are strategically placed to help solve the problem of non-adherence. The following sections identify barriers to adherence as they relate to persons with MS, as well as specific interventions that can be used to try to change the patient's health-related behaviors.

BARRIERS TO ADHERENCE

While psychosocial theories may offer useful guides to factors affecting treatment nonadherence, disease-specific factors may also play a role. Nurses must evaluate all aspects of a patient's situation that may influence adherence, recognizing that each individual's personality can contribute to the success or failure of the therapeutic interaction. There will be patients who are resistant to any therapeutic intervention or partnership. It is important to remember, however, that patients' attitudes and beliefs are dynamic, changing over time. A patient who may be resistant to integrating complicated treatment regimens into his or her life at one time may reassess his or her situation at a later date. Barriers that can contribute to nonadherence can be loosely grouped into the categories listed in Table 1. Explanations of how these barriers relate to people with MS follow.

TABLE 1.
Barriers That Contribute to Nonadherence

- Communication problems
- Knowledge deficits
- Physical impairments
- Social and cultural variables
- Financial concerns
- Emotional distress
- Psychiatric disorders
- Cognitive deficits

Communication Problems

The quality of the interaction between patients and healthcare professionals is an important factor. Research has shown that patient satisfaction has a direct effect on adherence.²⁸ Dissatisfaction can occur as a result of poor communication on the part of the healthcare provider. Nursing experience suggests that those health-

care professionals who show sensitivity to patients' verbal and nonverbal communication and who take the time to empathize and understand patients' feelings facilitate patient adherence, as well as satisfaction.

In many cases patients may not be aware of what is expected of them. Healthcare professionals have their own perceptions of the goals of different therapeutic regimens and, therefore, of what constitutes adherence. Patients' perceptions may differ radically from those of other patients and of healthcare professionals.

For example, in the case of HL, the patient in Case Study 1, the major goals of bladder management from the nurse's point of view were to maintain renal function, avoid urinary tract infections, and establish normal voiding patterns. Thus, the nurse recommended that HL perform intermittent catheterization at regular intervals throughout the day. HL's major goal, on the other hand, was to avoid incontinence, but she may have been reluctant to catheterize herself regularly. Unless HL had a clear understanding of the importance of ensuring that the bladder is emptied on a regular basis, she may have chosen not to perform the procedure at the prescribed intervals. She may, in fact, just have done it at those times when it would prove particularly embarrassing to be incontinent.

A patient's expectations play an important part in his or her willingness to adhere to treatment regimens. If a patient has unrealistic expectations of what a particular medication or treatment regimen can do, he or she is less likely to continue taking it. Thus, it is crucial that the healthcare provider carefully explain not only what a particular treatment does but also what it does not do.

For example, interferon (IFN) β -1b (Betaseron[®]) was the first immunomodulator approved for the treatment of relapsing-remitting MS (RRMS). Phase III clinical trials indicated that the drug reduced the frequency and severity of relapses and decreased the lesion burden seen on magnetic resonance imaging.^{29,30} However, although it does reduce the number and intensity of relapses, this agent has not been found to be associated with change in functional status and can be associated with unpleasant side effects.³¹ Before the approval of

IFN β -1b, people with MS had been living with a disease that had only supportive treatments. Thus, it is not surprising that the approval of IFN β -1b was accompanied by unprecedented publicity and widespread therapeutic optimism among patients, their families, and the neurological community. In a study of patient expectations of treatment with IFN β -1b, approximately 50% of patients who started therapy had unrealistically optimistic expectations.³¹ Approximately 20% discontinued therapy within 6 months; of these, 64% had overly optimistic expectations. These findings were further borne out in a survey of 700 MS patients in the North American Research Consortium on MS (NARCOMS) Registry, which demonstrated that 71% of patients taking IFN β -1b discontinued therapy, compared with 40% taking intramuscular IFN β -1a (Avonex[®]) and 21% of patients taking glatiramer acetate.³² Among the various reasons cited for cessation, an increase in symptoms was the most common (21%), followed by a lack of obvious benefit (15%) and flu-like symptoms (14%).³²

Healthcare professionals must help patients set realistic expectations of treatments in order to promote adherence.

Knowledge Deficits

Patients' lack of knowledge about their symptoms and about treatment regimens can be an important factor in nonadherence. If patients are not given accurate, easy-to-understand information, they cannot be expected to help in the management of their symptoms. If they are not given all the information necessary to make an informed decision, they may be unable to perform a legitimate evaluation of the benefits of a specific treatment regimen. Nevertheless, receiving accurate, complete information does not necessarily mean that it is understood or integrated by the patient. Knowledge alone does not ensure adherence.

Physical Impairments

In some cases, a person with MS is physically incapable of taking an active part in his or her disease management. For example, visual disturbances can interfere with reading instructions and preparing and taking medications. Mobility problems can prevent a patient from accessing clinical services, including rehabilitation cen-

ters. Other physical symptoms—such as tremor, fatigue, weakness, and vestibular disturbances—can also impair an individual's capacity to adhere to treatment regimens.

Social and Cultural Variables

A number of social and cultural variables can influence adherence. Social isolation is a major contributor to nonadherence. According to Cameron, the literature reveals that the stability and support of a patient's family are strongly correlated with adherence.³³

The stigma associated with a chronic debilitating illness can have a negative impact on patient adherence. Many people with MS may try to hide the existence of their illness from their family (because of fear of alteration of role), from employers (because of fear of loss of status), and from friends (because of fear of rejection). If so, they may be reluctant to adhere to a rigorous management plan calling for self-injection of a medication and participation in physical therapy programs.

Cultural and gender issues also play a role in adherence to management protocols. A woman with MS from a Middle Eastern culture may find it extremely difficult to even talk about, let alone perform, intermittent catheterization. A man with MS may be humiliated by his erectile dysfunction and too embarrassed to use any of the devices or drug delivery systems available to relieve the problem.

Financial Concerns

For many patients, limited financial resources may not allow them to follow a particular treatment regimen. People with MS are often faced with a heavy financial burden. Not only are they expected to take a wide variety of expensive medications, but they frequently need costly equipment such as wheelchairs and transfer devices. At the same time, a patient's income may be restricted because he or she is unable to work because of physical and/or cognitive deficits. In addition, lack of adequate insurance coverage can interfere with a patient's capacity to adhere to a comprehensive management plan.

Emotional Distress

Emotional distress associated with a variety of stressors (both MS related and other life stressors) can

impair a patient's motivation or ability to adhere to treatment regimens. Heightened emotional distress is commonly reported. The diagnosis of MS carries with it an emotional impact that is lifelong. At various times, patients diagnosed with a chronic illness may experience feelings such as fear, anger, denial, anxiety, depression, and hopelessness. Any and all of these emotions may reduce patients' motivation to take medications or perform complicated tasks designed to improve their well-being.

Psychiatric Disorders

People with MS may have concomitant psychiatric disorders. Problems such as borderline personality, bipolar disorder, schizophrenia, and major depressive disorder may play an important role in an individual's willingness or ability to adhere to treatment regimens. In addition, patients who are substance or alcohol dependent frequently do not adhere to their MS therapy.

Cognitive Deficits

Approximately 50% of people with MS experience some degree of cognitive impairment.^{34,35} Memory loss is the most frequently reported cognitive deficit. Specifically, people with MS have difficulty learning and later recalling new material.^{34,35} Deficits in information processing speed are also common. A sizable proportion of patients may have visuospatial deficits and/or deficits in executive functions, such as problem solving or planning and sequencing activities.

The implications of these deficits for adherence are obvious—cognitively impaired people with MS will find it difficult to remember to take medications and may have problems carrying out multistep procedures such as self-injection and self-catheterization.

NURSING INTERVENTIONS THAT FACILITATE ADHERENCE

As the largest segment of healthcare providers and the conduit for the dissemination of information to patients from other members of the healthcare team, nurses have a great opportunity to enhance patient adherence. Specific ways in which nurses play an important role in facilitating adherence are discussed below and summarized in Table 2.

TABLE 2. Nursing Strategies That Facilitate Adherence

Fostering the Nurse–Patient Relationship

- Take the time to empathize and sympathize
- Establish a trusting relationship
- Establish a sense of support (availability and accessibility)
- Be sensitive to and provide necessary support for cultural/body image/gender differences

Educating Patients

- Provide understandable information regarding benefits/side effects, risks of therapy
- Give simple, structured instructions
- Provide care partners with instructions
- Encourage use of tape recording, memory notebook, etc.
- Furnish a nondistracting environment
- Offer reinforcement

Enhancing a Patient's Support Network

- Facilitate access to healthcare system
- Facilitate access to home healthcare agencies
- Involve care partners/home care nurses
- Refer to a physical/occupational therapist
- Involve family and friends in care
- Suggest phone contact with other professionals
- Provide community resource material (eg, National Multiple Sclerosis Society)
- Interact with case managers, insurance providers, pharmacies, access programs
- Refer to social worker, physical/occupational therapist, church group, vocational rehabilitation
- Contact pharmaceutical company-funded patient support programs

Setting Realistic Expectations

- Help patients prioritize interventions
- Utilize hopeful approaches
- Offer options
- Present coping strategies (relaxation, deep breathing, visualization, etc)
- Consider concomitant illnesses (eg, psychiatric disorders)

Fostering the Nurse–Patient Relationship

Nurses who specialize in caring for people with MS are crucial to the comprehensive management of these patients. Intimacy is vital to the relationship, which evolves over time. Long-term consistency of the relationship is helpful but cannot always be guaranteed, par-

ticularly in settings such as a hospital or outpatient department. However, the nurse and patient can define expectations of the relationship. Before setting mutually agreed upon goals, it is important that the nurse ask the patient about his or her experience with following treatment plans in the past. This may give the nurse an indication of what goals can be accomplished in the future and, thus, establish a sense of realistic hope.

Trust is an essential element of the nurse–patient relationship. Because of the possible social stigma and disruption to lifestyle associated with the disease, a person with MS must know that whatever he or she says will be treated confidentially. The nurse agrees not to discuss the patient's illness with the patient's employers, family members, or friends unless given explicit permission to do so. Trust is enhanced by the nurse's availability and unconditional caring, offered in an environment of acceptance.

Nurses nurture a partnership between themselves and their patients. This partnership often includes families and other caregivers and recognizes patients' motives and priorities. Nurses empower patients and their families to make informed decisions by sharing their expertise and supporting the patient's priorities and decisions.

Educating Patients

It is essential that patients are provided with the knowledge necessary to perform the recommended self-care behaviors. Given that many patients have some degree of cognitive impairment, educating people with MS can be a challenging experience for nurses. Patients frequently ask the same questions repeatedly or fail to carry out specific procedures correctly. Written or audiovisual instructions that can be taken home and referred to as necessary can be helpful in these situations, as can involving the family or caregiver to assist the patient. Patients should not be considered capable of performing a particular procedure until they have performed it in the nurse's presence.

Simple, understandable, and complete instructions are critical. For example, people with MS should not be expected to undertake an exercise program without having been explicitly told the type and frequency of exercises to be performed.

People with MS are expected to learn to incorporate complicated, and sometimes intrusive, treatment regimens into their lives. Any way that the nurse can make this easier for patients will help encourage adherence. Learning about the patient's typical daily routine and identifying ways in which treatments can be incorporated into existing activities can facilitate adoption and maintenance of new therapeutic regimens. Providing patients with a written schedule of treatments, physical therapy, and doctor appointments can be helpful in encouraging adherence, as can the use of memory notebooks and reminder calls. Regimens should be simplified and should include as few lifestyle changes as possible. Patients should be made aware of pharmaceutical company–funded patient support programs that provide education materials and advice on immunomodulating agents.

The amount and type of information are not the only factors involved in a patient's ability to process information. Many nurses find that the environment where the patient learns the information makes a difference. It may be beneficial to teach patients difficult treatment regimens—such as self-administration of an injectable agent or self-catheterization—in the home. If a patient learns a procedure in the place where he or she is going to be performing it regularly, barriers to adherence can be identified and the learning process can be facilitated.

Reinforcement and acknowledgment of success are crucial. When a person with MS successfully manages to adhere to a self-injection regimen or control bladder symptoms, the nurse reinforces that his or her efforts are paying off, which augments a patient's sense of control over symptoms.

Enhancing a Patient's Support Network

Emotional and spiritual support influences patient adherence. Therefore, it is important that the nurse include the family in the management plan when appropriate. Should a person with MS have no social support or network on which to rely, the nurse can make a referral to a support association. The National Multiple Sclerosis Society can provide valuable support and networking opportunities for people with MS.

Nurses can direct patients to agencies that will allow them to maximize their health insurance opportunities. The increasing use of nursing case managers by managed care organizations can benefit people with MS. These case managers can develop contacts and resources within the community that can reduce obstacles to adherence. Case managers can recommend that patients try to obtain expensive medications through subsidized access programs and help them in their decisions regarding the amount and type of equipment needed to facilitate activities of daily living.

Setting Realistic Expectations

Because MS is a disease with no cure, the availability of disease-modifying agents has raised the hopes and expectations of people with MS and their families. Patients frequently have unrealistic expectations of what the new agents, symptomatic medications, and alternative therapies can do for them. They may also have unrealistic expectations that more traditional treatments, such as physical therapy programs, will enable them to regain functional ability. Thus, it is important that nurses give patients all the information they can—both positive and negative—about treatment options.

Closely associated with the need to set realistic expectations is the need to provide patients with options whenever possible. For example, patients may adhere to a physical therapy program better if they have a choice of exercises or places where they can pursue the program. Others may not find it convenient to go to a center or outpatient department, preferring to have a physical therapist come to their home. On the other hand, some patients may welcome the opportunity to get out of the house and attend a center for physical therapy.

If a patient has a concomitant disease(s), it may be more difficult for him or her to adhere to multiple regimens. Thus, it may be unrealistic to expect a patient to be able to tolerate a treatment. When formulating an overall management plan, it is important to take into account concomitant conditions, including psychiatric disturbances, and the compounded negative effects. In such a situation, side effects, such as the flu-like syndrome associated with the beta interferons, can be particularly problematic. Case Study 2 highlights some of the points raised in this section.

CASE STUDY 2

BE is a 42-year-old man recently diagnosed with RRMS. He requested that his neurologist prescribe one of the disease-modifying agents. After discussing the options with BE, the neurologist prescribed glatiramer acetate (Copaxone®) and asked the MS nurse to talk to BE about the regimen. An appointment was made for BE to return with his care partner for further education. To learn something about the patient's previous experience in adhering to treatments, the nurse asked BE if he had ever taken medication on a regular basis. BE replied that he had been prescribed antibiotics and generally did not complete the course because "he felt better halfway through." The nurse asked BE what his therapeutic expectations of glatiramer acetate were. He said he knew that the drug was not a cure, but hoped that it would help reduce the physical disability he had been experiencing. The nurse explained that glatiramer acetate might reduce the frequency of relapses, but it would not restore him to his prior level of ability. She then explained that BE might experience some mild side effects, such as an injection-site reaction, and that, in rare instances, some patients experience an immediate postinjection reaction, characterized by signs and symptoms that include flushing, palpitations, chest pressure, and difficulty in breathing. She assured BE and his care partner that these side effects, if experienced, were transient. The nurse provided the patient with current information about long-term outcomes with sustained use of glatiramer acetate and emphasized that the implications of sustained use were positive in the study. She suggested that this might help the patient plan for at least 1 year of injections with regular opportunities for individual follow-up. She demonstrated the injection technique and asked BE if he would feel comfortable having to give himself a daily subcutaneous injection. He said that he would try, and after demonstrating the technique again, the nurse asked BE to practice on himself. She also asked the care partner to participate in the training. Once she felt confident that they had mastered the technique, the nurse provided BE and the care partner with written instructions. In keeping with the nurse's philosophy of sustained support, she followed up with weekly telephone calls until she felt that BE was comfortable with the procedure. She continued to call monthly until

his checkup at 3 months. Finally, the nurse assured BE and his care partner that she would be available by phone to answer his questions and address any concerns. In addition, the nurse provided the contact information for the industry-supported “helpline” as another mechanism to help sustain long-term adherence.

CONCLUSION

Patients with MS have a variety of physiological and, in many cases, psychological and cognitive deficits. Adhering to a treatment plan that stabilizes the disease and relieves symptoms to some extent allows patients the opportunity to continue to pursue their normal activities and improve their quality of life.

It is vital for nurses to identify barriers to adherence and to develop strategies that promote adherence. Strategies that enhance self-efficacy, knowledge, communication, and realistic expectations are vital to long-term adherence. Nurses must be aware of potential

financial issues, psychological stress, and the availability of social support. Nurses, based upon their knowledge and skills, are in the best position to address adherence issues.

An open, trusting nurse–patient relationship is critical to long-term adherence. Recent anecdotal evidence from the pharmaceutical industry supports the importance of nursing education and sustained nurse–patient relationships to patients receiving self-injected therapies.

Historically, the nursing profession has espoused the promotion of patient independence and self-care. The dynamic, uncertain, and complex nature of MS presents nurses with unlimited opportunities to provide practical, problem-solving information that will help patients and their families cope with the demands of the illness and its treatments. By encouraging people with MS to participate in the management of their care, nurses empower patients with a sense of control and facilitate the psychosocial adaptation to this disease.

Cognitive Impairment: Assessment and Interventions

The symptoms of MS vary from patient to patient and within a patient over the course of the disease.

This variability is not limited to the degree of physical dysfunction, but also includes the pattern and severity of cognitive dysfunction. In the majority of people with MS who have cognitive deficits, the impairment is mild to moderate.³⁶

Estimates of the prevalence of cognitive impairment among people with MS range from 40% to 70%.^{37,38} Cognitive deficits can occur early in the course of the disease, in the presence of minimal physical changes, and thus may have little or no correlation with the severity and duration of the disease.^{36,39-42}

In up to 20% of patients, cognitive deficits are severe enough to disrupt activities of daily living, family and social relationships, and working ability.³⁷ Research suggests that although 60% of people with MS are working when diagnosed, only 30% or less are working after 10 years. Many of those who stopped working reported having done so because of physical and cognitive impairments associated with MS.⁴³⁻⁴⁵

Even relatively mild and subtle cognitive deficits may have an impact on patients' day-to-day lives; therefore, assessment of cognitive function should be part of initial and ongoing assessments of people with MS. Time constraints of the neurologist and the nurse generally preclude extensive cognitive screening of all newly diagnosed patients. Furthermore, it is neither practical nor cost-effective to refer all patients for a full neuropsychological evaluation. Accordingly, researchers have identified short, MS-specific screening batteries that can be used in the clinical setting in these cases. As the healthcare professional who has the most regular contact with patients, the nurse plays a pivotal role in recognizing the signs of cognitive problems, identifying the need to refer patients for formal evaluation, and monitoring progress of these deficits and effectiveness of interventions.

THE NATURE OF COGNITIVE IMPAIRMENT IN MULTIPLE SCLEROSIS

In general terms, cognitive impairment refers to adverse changes in the high-level functions carried out by the human brain, including comprehension and use of speech, visual perception and construction, calculation ability, attention, memory, and executive functions such as planning, problem solving, and self-monitoring.⁴⁶ Cognitive functions that may be affected in people with MS are listed in Table 3.⁴⁷ Recall memory may be impaired in people with MS, but recognition memory is usually preserved. Attention span and information-processing speed, executive functions, and visuospatial perception may also be affected.⁴⁶ However, people with MS perform normally, or with minimal impairment, on tests of general intelligence, language, attention span, and implicit memory.⁴⁶

TABLE 3.
Cognitive Functions Affected in People With Multiple Sclerosis

- Memory (both learning and recall)
- Attention and concentration
- Speed of information processing
- Comprehension of information
- Word finding
- Abstract reasoning
- Executive functions
- Visual perception and constructional ability

RESEARCH PERSPECTIVES

In the past, the prevalence of MS-related cognitive impairment has often been underestimated, primarily because of the use of insensitive diagnostic procedures such as the 5-minute "bedside mental status" exam.^{48,49} Studies comparing a brief mental status exam with a standardized battery of neuropsychological tests have found that the mental status exam fails to identify half of those patients who are impaired. Historically, studies of prevalence using academic medical centers rather than community-based samples may actually result in overestimates, since such centers tend to attract more severely disabled patients. Using sensitive neuropsychological instruments in representative patient samples suggests that approximately half of the MS population experiences some degree of cognitive impairment.^{37,39,50,51}

In addition to the prevalence of MS-related cognitive deficits, researchers have investigated the relationships between

- the extent of neuropsychological impairment and indices of neurological disability (eg, EDSS score),
- the duration of illness and severity of cognitive dysfunction,
- the course of MS (ie, chronic progressive vs relapsing-remitting) and cognitive impairment,
- specific MS-related findings on MRI and the type of cognitive deficits.

There have been anecdotal reports of a relationship between menopause and the development of cognitive deficits. More study is still needed to determine the significance of this relationship. In addition, research is needed to investigate the relationship between aging and the development of cognitive impairment in people with MS.

Contrary to popular assumptions, people with MS who have minimal sensory and motor impairment are also at risk of cognitive impairment.⁴⁸ Studies to date have reported weak correlations between the extent of cognitive impairment and indices of disability, such as the EDSS.⁴⁸ In one study, a group of patients with mild physical disability (mean EDSS score of 2.6) scored significantly worse on tests of memory than did normal controls. Almost 50% of the patients with MS in the study were cognitively impaired.⁴⁰ In an early cluster-analysis of people with MS, one subgroup was cognitively impaired but had minimal neurological disability in other functions (mean EDSS score of 2.2).⁵²

The evidence regarding the correlation between degree of cognitive impairment and disease duration is contradictory. Some researchers have found a significant, albeit low, correlation between these two variables,³⁶ whereas other researchers have not.^{40,41,51} Clearly, cognitive and neurological deficits do not necessarily develop in parallel, at least in patients who are still in the early phase of the disease.⁴²

The relationship between disease course and cognitive impairment is also ambiguous. Some studies have demonstrated that people with primary-progressive dis-

ease are significantly more likely than those with RRMS to experience cognitive impairments,^{39,41,53,54} while other studies have not.^{36,49} In general, patients with primary-progressive disease perform worse on memory testing than patients with relapsing-remitting disease.⁵⁵ It should be noted, however, that patients with primary-progressive disease are often older and have had the disease longer than patients with relapsing-remitting disease.⁵⁵ Those with accumulated disability may also be limited in their testing performance by visual and motor dysfunction.

Research has identified a variety of clinicopathological correlates between MRI parameters and cognitive deficits in MS.^{39,56-61} Nearly all people with MS have abnormal MRI findings, although the overall amount of brain involvement and the sites of lesions vary considerably from patient to patient. MRI studies have demonstrated modest relationships between lesion load and location and cognitive dysfunction. Correlations have been found between lesions in the corpus callosum and the speed of information processing, as well as rapid problem solving.⁶² Other work by Pozzilli and colleagues showed poor performance on tests of verbal fluency in patients with atrophy of the anterior third of the corpus callosum.⁵⁹ Frontal lobe lesions have been thought to affect certain cognitive domains such as conceptual reasoning.⁵⁷ Periventricular lesions may be associated with deficits in memory.⁵⁹ However, none of these findings are strong enough to be relied upon to accurately predict the extent and severity of cognitive deficits for individual patients.

THE ROLE OF NEUROPSYCHOLOGICAL EVALUATION

Compared with standardized neuropsychological tests, bedside mental status examinations are generally insensitive to the cognitive deficits associated with MS. Thus, cognitive impairment frequently goes undetected by treating neurologists.⁶³ Formal neuropsychological evaluation by a neuropsychologist provides important information regarding cognitive dysfunction. Some researchers suggest that in those cases where formal neuropsychological evaluation is not indicated, smaller batteries of sensitive screening tests should be performed.^{37,48}

The issue of whether to perform neuropsychological evaluation of a person with MS is complicated by the fact that cognitive deficits could be threatening to a patient.⁴⁸ Newly diagnosed patients may be devastated by the prospect of cognitive dysfunction. On the other hand, those who have had the disease longer and have experienced deficits without understanding their cause may be relieved to know that these problems are a result of their MS.⁴⁸

The nurse may need to provide information regarding the examination itself, length of testing, and materials that patients need to bring, such as reading glasses. The clinician can assess any special needs or characteristics of the patient, such as an affective disorder, that might alter the test results or necessitate a postponement of the evaluation. It is important for clinicians to realize that the functional impact of particular cognitive deficits identified by such a test may vary, depending on the patient's premorbid level of functioning and coping abilities, employment status and settings, and social support network.⁴⁸ Neuropsychological evaluation, through either comprehensive testing or screening batteries, is a valuable tool. In addition to clarifying the presence and severity of cognitive impairment in people with MS, it provides information critical to the management of patients. In many instances, families and caregivers incorrectly attribute a patient's cognitive problems to obstinacy, depression, or other forms of emotional disturbance.³⁸ Identification of cognitive strengths and weaknesses allows clinicians to give patients and their families a clearer picture of the impact that MS may have on their lives. It also allows all those involved in the care of people with MS to optimize the patient's capacity for living an independent, active life.⁵⁰

COGNITIVE REHABILITATION

Treatment for cognitive dysfunction in MS either is directed at compensation for deficits or is restorative, looking at strategies to improve performance. Most success, however, has been found in compensatory strategies.

Formal treatment options for cognitive deficits are limited.⁶⁴ Patients with global cognitive impairment, particularly memory deficits, are unlikely to benefit from

standard psychological interventions; therefore, the aim of counseling in these cases is to educate the patient and family about ways to adjust to cognitive deficits.

It is not clear whether medications improve attention or memory deficits.^{65,66} Amantadine, an agent frequently used to treat fatigue in patients with MS, was shown to improve sustained attention in one study.⁶⁷ However, another study showed that neither amantadine nor pemoline—another agent frequently used to treat fatigue—enhanced cognitive performance.⁶⁸ There is a growing body of anecdotal evidence supporting the use of donepezil for cognitive dysfunction in MS, particularly deficits in memory. Clearly, more study in MS cognitive dysfunction with donepezil as well as other agents currently used for the treatment of cognitive dysfunction associated with Alzheimer's disease is warranted.

Despite promising results in the treatment of some types of cognitive impairment in patients who have suffered head injuries, there has been less emphasis on cognitive rehabilitation in MS.⁶⁹⁻⁷² There are two major approaches to cognitive rehabilitation: 1) attempting to restore impaired functions through direct retraining and 2) attempting to improve function through the use of compensatory strategies.⁷⁰ Restorative approaches include procedures such as memory drills designed to strengthen memory functions and exercises to improve information processing, speed, and efficiency.⁷³ To some extent, direct retraining is based on the assumption that the human brain has a certain amount of "plasticity" and, if properly challenged through systematic, graded practice, the brain may be able to regain some of its losses. Many of the exercises based on the retraining hypothesis have produced improvement on some measures in patients with head injury or MS. However, this approach has been disappointing in its failure to have an impact on performance of everyday activities. Apparently, the brain does not have the ability to recover lost cognitive functions as easily as was originally thought. During the past few years there has been a gradual shift in emphasis toward compensatory methods, such as the use of organizational strategies, filing systems, notebooks, and other aids. Compensatory methods do not attempt to restore impaired cognitive

abilities. It is assumed that these abilities may not in themselves improve, although fluctuations are possible because of the nature of the disease and treatments. Instead, the focus is on how the individual can function more effectively in everyday life.

Most cognitive rehabilitation programs utilize a combination of direct retraining and compensatory measures specifically geared to the needs of the individual patient.⁷³⁻⁷⁶ To date, there is limited research evidence on the value of cognitive rehabilitation in MS. Cognitive rehabilitation is now available to patients with MS, and a number of studies either are under way or have been reported at scientific meetings. Anecdotal reports suggest that both memory and attention/concentration deficits may benefit from rehabilitation. However, definitive conclusions await the results of ongoing research.

IMPACT OF COGNITIVE DEFICITS

Patients in whom cognitive impairment is the major disabling feature have higher unemployment rates.³⁸ In addition, there is anecdotal evidence that these patients have more family instability, less than optimal adherence to treatment regimens, and more chaotic interactions with clinic personnel than do patients with primarily motor deficits.⁶⁴

Formal research has shown that cognitive impairment may exert a profound negative effect on daily activities among people with MS.³⁸ Impaired memory and attention deficits can make activities such as learning a new task or reading a book difficult or even impossible. Patients may forget appointments, lose objects, and have trouble following the plot of a movie.³⁵

Attention and concentration problems caused by MS can be particularly disruptive because daily life often requires completing two or more tasks at once. A strong capacity to direct attention is needed to learn new information, perform self-care regimens successfully, and cope with adjustments in daily life.

Many patients report a reduced ability to rapidly process information, particularly when the information is coming quickly from different directions, such as in a busy work environment or hectic household.³⁵

Compromised ability to synthesize and prioritize information with MS is common, but it may be subtle and not recognized as rapidly as memory problems. It may present as a lapse in judgment.³⁵ For example, a football fan with MS who follows the results of games closely in order to predict the outcome of upcoming games may find it difficult to sort the more important from the less important factors in his analyses. Consequently, he may predict an outcome based on irrelevant information.

A particularly embarrassing and hard-to-hide problem is word retrieval, or the “tip-of-the-tongue” phenomenon. Patients get stuck in mid-sentence because they cannot recall a particular word.³⁵ Although frustrating to patients and their family members, this problem can be accommodated by substituting another word or describing what is meant.

People with MS sometimes experience problems with visuospatial organization. Thus, for example, when asked to assemble a child's toy, they may have difficulty putting the parts together.³⁵

Executive functioning, which involves the ability to adapt to novel situations, generate alternative solutions to problems, and self-regulate behavior, is a critical factor in a person's capacity to satisfactorily complete daily occupational and domestic activities. This aspect of cognition is often impaired in people with MS.⁷⁷

Any or all of these cognitive dysfunctions can have profound repercussions on the lives of people with MS and may cause major disruptions in school, work, lifestyle, sexual and family functioning, friendships, and activities of daily living.

THE ROLE OF THE NURSE

The failure of healthcare professionals, patients, and patients' families to recognize or acknowledge the presence of cognitive dysfunction in MS may negatively influence adjustment to the disease and can create additional stress for all involved. It is important that the nurse focus on the patient's abilities and how to compensate for limitations.

TABLE 4.
Guidelines for Neuropsychological Evaluation Referral Decisions

	<i>Tests Indicated</i>	<i>Counsel</i>	<i>Tests Not Indicated</i>
Cognitive dysfunction affects capacity to function effectively at work and home	✓		
Patient denies concern about cognitive deficits, and there is no clinical evidence			✓
Patient's employer reports reduced work capacity	✓		
Patient concerned about potential for cognitive dysfunction		✓	
Patient seeks vocational counseling to obtain employment suitable to his/her ability level	✓		
Patient seeks disability benefits	✓		
Patient concerned that cognitive deficits may affect ability to adhere to rehabilitation program	✓		
Clinician wants baseline cognitive assessment prior to initiating immunomodulator therapy	✓		
Family recognizes cognitive problems, but patient denies them		✓	
Patient has noted cognitive impairment, but deficits not likely to be functionally significant, given the patient's low-demand environment			✓
MS of long duration with severe physical disability			✓
Subtle or fluctuating cognitive deficits that may have functional impact	✓		

Recognizing Deficits

As the healthcare professional who often has the most frequent interaction with people with MS, the nurse can detect early signs of new or worsening cognitive deficits. Patients and family members may also identify the cognitive deficits. As mentioned above, the decision whether to refer patients for a full neuropsychological evaluation can be difficult. Table 4 lists some guidelines to assist nurses and other clinicians in this decision.

Nurses frequently initiate a referral to a neuropsychologist and can assist with counseling patients regarding the need for a neuropsychological evaluation. The rationale for conducting a neuropsychological evaluation may include the following:

- Ensuring accuracy in reporting the status of cognitive abilities to vocational and disability determination agencies.
- Providing appropriate rehabilitation that takes into account cognitive deficits and incorporates compensation strategies.
- Assisting in determining baseline cognitive functioning in order to guide treatment planning.
- Creating awareness of cognitive deficits on the part of family, caregivers, and employers.
- Addressing the patient's anxiety about ill-defined cognitive difficulties.

Because the identification of cognitive deficits through formal neuropsychological evaluation can have a great impact on patients and their families, it is important to recognize other factors that may masquerade as, or contribute to, cognitive impairment. People with MS frequently experience stress, depression, and mood swings. The unpredictability and debilitating nature of the disease, as well as the fact that there is no cure, can cause

TABLE 5.
Drugs That May Affect Cognition

<i>Name/Class of Drug</i>	<i>Use in MS</i>
Amantadine	Fatigue
Anticholinergics/antispasmodics	Bladder management
Anticonvulsants	Neurogenic pain
Tricyclic antidepressants	Depression
Anti-inflammatory agents	Pain
Baclofen	Muscle spasticity
Benzodiazepines	Muscle spasticity

emotional distress. Affective disorders, such as depression, may cause secondary difficulties with memory and concentration that may be falsely interpreted as direct results of MS. In some cases, concern about cognitive dysfunction may be enough to produce emotional distress.

Patients may become trapped in a vicious circle in which anxiety and depression about the disease lead to lapses in memory and concentration, and in turn, the actual existence or threat of cognitive dysfunction leads to anxiety and depression. Nurses can help patients and their families share information that might give some indication of whether there is an emotional component to cognitive problems.

An important part of cognitive assessment is an investigation of concurrent medications, their dosages, and their possible impact on cognition. Some medications frequently used in MS have side effects that may lead to or be mistaken for cognitive problems. Table 5 lists examples of medications that may affect cognition; it is by no means exhaustive.

Nursing Interventions

Nurses can play an active role in helping patients and their families adjust to cognitive deficits. A large part of a nurse's time is spent educating patients on various aspects of their illness. People with MS not only take a number of medications, including disease-modifying and symptomatic agents, but are frequently required to

adhere to physical therapy and complicated bladder and bowel programs. Therefore, the educational role of the nurse who cares for people with MS may be substantial.

Cognitive deficits in people with MS complicate the task of education. Nurses can explore options that will help overcome these difficulties with patients and their families. For example, in cases in which memory is limited, patients should be given written and/or audiotaped instructions regarding the administration of various treatments. Repetition and reinforcement of information may be essential. Having a care partner present for educational sessions is a must when cognitive deficits are present.

Reducing distractions and demands may prove useful for patients with attention/concentration problems. Patients find it easier to retain information if it is taught in a familiar environment, such as the patient's home. Unfamiliar environments (eg, a medical center) may present unnecessary distractions and noise as well as increase anxiety.

Safety issues related to cognitive impairment must be addressed. The nurse's role may include assessment of the patient's home environment and support network, and the patient's ability to perform roles such as driving, cooking, and child care. The cognitively impaired person may be at risk for abuse. Referral to protective service agencies may be appropriate. The nurse needs to be aware that the safety of the environment needs to be evaluated on an ongoing basis. The nurse also needs to be more diligent about the care of other general health issues. Resources for the cognitively impaired person include the National Multiple Sclerosis Society and adult/child protective services.

Table 6 lists strategies that have been found to be helpful in the management of cognitive problems. Nurses should suggest these strategies to patients and their families and work with them to overcome some of the problems presented by cognitive impairment.

Case Study 3 exemplifies the role of the nurse in helping identify signs of cognitive deficits and devising strategies to help patients compensate for these deficits.

TABLE 6.
Strategies to Help Cope With Cognitive Deficits

- Make lists (eg, shopping to do)
- Use calendars for appointments and reminders for events; develop a consistent daily routine
- Develop a memory notebook to log daily events, reminders, messages from family and friends, driving directions, etc
- Organize the environment so that items used regularly remain in familiar places
- Modify the learning environment for patients' comfort (eg, heat, light, etc)
- Schedule the teaching session for early in the day, and limit it to a short period of time to minimize fatigue
- Conduct conversations in quiet places to minimize distractions
- Repeat information, and write down important points
- Use simple, set-by-step instructions—include the “obvious” (ie, when giving cooking instructions, include, “Turn off the stove when finished.”)
- Follow verbal instructions with written backup, and use “visuals” (ie, diagrams, pictures) when possible
- Involve care partners in instructions (ie, follow-up phone call to care partner, family at home)
- Teach basic organization skills
- Openly discuss concern about cognitive dysfunction
- Have the care partner monitor the patient for safety
- Keep the patient mentally stimulated (eg, puzzles, word finds, computer games)
- Introduce change slowly, one step at a time
- Refer for formal cognitive rehabilitation

CASE STUDY 3

CS is a 35-year-old married woman with a 9-month history of RRMS. She went to see her neurologist because she was experiencing a relapse. Her main symptoms at that time were whole-body paresthesias, right-sided weakness, and severe gait difficulties. The neurologist suggested that she consider beginning therapy with intramuscular interferon β -1 a (IFN β -1 a). CS told the clinical nurse that she had been experiencing difficulty with her memory and was considering quitting her job as a securities analyst because even when her disease was stable, she was finding it increasingly diffi-

cult to concentrate and constantly felt fatigued. She wanted to work but was unsure what type of employment she would be able to do, given her neurological deficits. The nurse recognized that the memory lapses experienced by the patient could be signs of cognitive impairment and suggested that CS consider formal neuropsychological evaluation. A clear picture of the nature and magnitude of her cognitive deficits would be useful for vocational counseling and would allow the healthcare team to prepare a program to help her adjust to any cognitive problems. In addition, it would be useful to have a baseline assessment of cognitive and physical status in order to monitor the progression of disease and the effectiveness of IFN β -1 a. CS underwent formal neuropsychological testing by a neuropsychologist, the results of which showed that although her basic executive, language, and visuospatial abilities were intact, she demonstrated moderate difficulty in tasks that involved significant attention demands. Memory for complex, nonverbal information was particularly affected. CS was referred for vocational counseling. When teaching CS how to self-administer IFN β -1 a, the nurse demonstrated the task, repeated the instructions several times, and provided video and audiotaped instructions for CS to take home. Her husband also received instructions, since he would possibly have to assist CS with injections from time to time. The nurse also provided written instructions. These included a checklist that would allow CS to make sure she had followed each step. She emphasized the importance of developing a routine, such as administering the injection at the same time every week. In order to check that CS had retained the instructions and was administering the drug properly, the next time CS returned to the clinic, the nurse asked her to self-inject. She also suggested strategies for CS and her husband to organize their home environment to compensate for her cognitive deficits. For example, objects should always be returned to their proper locations—the can opener always goes in the top drawer, keys on a key hook by the door. The nurse demonstrated relaxation and meditation techniques that would help improve concentration. The nurse also suggested that CS see a cognitive rehabilitation specialist for more formal training in cognitive rehabilitation and stress-management techniques.

CONCLUSION

Cognitive deficits in people with MS can be as debilitating as physical problems. When cognitive problems are suspected, it may be useful to discuss these problems with the patient and family. Formal neuropsychological evaluation is not necessary for every patient, but in cases where cognitive impairment may negatively impact a patient's capacity to function effectively in the workplace or at home, some form of screening to provide insight into the nature and extent of cognitive deficits is advised.

Further research in the area of cognitive impairment in MS should focus on issues such as the effectiveness of

cognitive rehabilitation. In addition, it is important to investigate the interrelationship between MS-related cognitive deficits and the aging process, menopause, and menstrual cycle. The impact of hormone replacement therapy in people with MS should also be studied.

As the healthcare professionals involved in many aspects of the management of people with MS, nurses have the opportunity to detect the early signs of cognitive impairment and to monitor cognitive function. Most importantly, nurses help patients and their families adjust to the sometimes devastating impact of MS-related cognitive impairment.

Impact of Multiple Sclerosis on Quality of Life

MS—with its unpredictable course, potential for progressive physical disability, and cognitive impairment—has a widespread impact on patients' lives. Physical and cognitive deficits may negatively affect social interaction, recreational activities, educational and vocational attainment, and overall satisfaction with life. The stresses of coping with a chronic illness may lead to difficulties with relatives and friends, resulting in a sense of isolation, depression, and lack of control. The lack of control over one's life circumstances may contribute further to a sense of desolation.

As a key healthcare professional involved in caring for people with MS, the nurse plays a leading role in empowering patients to take control of their lives by arming them with the knowledge to make informed decisions. However, it is important that nurses do not attempt to influence patient decisions by imposing their own values. By creating an atmosphere of unconditional acceptance, nurses can earn patients' trust and encourage patients to share their expectations, desires, and values. It is important to remember that each patient has different hopes and aspirations, and that what one may consider poor quality of life, another may consider acceptable.

BACKGROUND

Over the past 3 decades, solicitation of the patient's perspective in assessing the experience and outcomes of medical care has become central to the monitoring and evaluation of healthcare. The outcomes movement has accelerated the development of measures that assess health-related quality of life (HRQOL). In other words, these instruments assess physical, functional, mental, and social health status. They are useful in evaluating the human consequences as distinct from the financial costs or clinical outcomes of interventions.

It is now recognized in the MS community that it is essential to assess HRQOL among MS patients in order

to obtain information on both the physical and psychosocial impact of the disease from the patient's perspective. This aspect of MS research has become particularly important as a result of the availability of disease-modifying agents. The agents were evaluated and approved based on their effects on narrowly defined measures of physical outcome; however, understanding of their broader impact on patients' lives remains incomplete.⁷⁸ Nurses are well aware that many factors beyond the direct effect of medications on the disease process influence the success or failure of these treatments.

Defining Quality of Life

Quality of life (QOL) is dynamic, with factors differing across individuals over time. From a philosophical perspective, it can be defined as the degree of congruence between actual life conditions and one's hopes and expectations, and the degree of what is unique to each person and dynamic in nature.⁷⁹

The concept of HRQOL can be distinguished from the more general, philosophical concept. It is often defined as "the value one places on current abilities and limitations, including the effects of illness and treatment upon physical, emotional, and social well-being."⁸⁰ Table 7 lists definitions of QOL and HRQOL and associated dimensions.^{79,81-90} Dimensions of QOL not directly affected by the disease may affect a patient's capacity to cope with the disease and adhere to or implement treatment plans.

Measurement of Health-Related Quality of Life

Instruments that measure HRQOL take two forms—generic and disease-specific. Generic instruments are not directed at any one particular medical condition and can be used to compare results across a number of related and unrelated disease states. Among the most widely used of these generic instruments are the Health Status Questionnaire, commonly known as the Short Form (SF)-36 Health Survey™, and the Sickness Impact Profile™ (SIP). Each collects patient-reported information, and both have been widely used in a variety of disease states.^{78,91}

Disease-specific instruments are designed to focus on areas of particular relevance to patients with a given condition.⁷⁸ Because of their narrow focus, disease-

TABLE 7.
Definitions and Dimensions of Quality of Life and Health-Related Quality of Life

<i>Definitions</i>	<i>Dimensions</i>
A state of complete physical, mental, and social well-being and not merely the absence of disease and infirmity ⁸²	Physical, mental, and social well-being ⁸²
The degree to which one has self-esteem, a purpose in life, and minimal anxiety ⁸³	
The degree of satisfaction with perceived present life circumstances ⁸⁴	
An individual's perceptions of well-being that stem from satisfaction or dissatisfaction with dimensions of life that are important to the individual ⁸⁵	Health and functioning, psychological/spiritual, family, social and economic ⁸⁵
An abstract and complex form representing individual responses to the physical, mental, and social factors that contribute to normal living ⁸⁶	
Patients' appraisal of and satisfaction with their current level of functioning compared with what they perceive to be possible or ideal ⁸⁷	Physical concerns, functional ability, family well-being, emotional well-being, spirituality, treatment satisfaction, future orientation, sexuality/intimacy, social functioning, occupational functioning ⁸⁷
A personal statement of the positivity or negativity of attributes that characterize life ⁸⁸	Psychological well-being, physical status, symptom control, nutritional concerns, social concerns, and affective states ⁸⁸
The perception of the impact of the disease that is both subjective and culturally bound ⁸⁹	Physical, emotional, social, or psychological functions; symptoms of disease or its treatment ⁸⁹
A multidimensional construct emphasizing perceptions of both positive and negative aspects of physical, emotional, social, and cognitive functions, as well as the negative aspects of somatic discomfort and other symptoms produced by a disease or its treatment ⁹⁰	
The congruence or lack of congruence between actual life conditions and individuals ⁷⁹	

Adapted with permission from King CR et al. *Oncol Nurs Forum*. 1997;24:27-41.⁸¹

specific measures generally offer greater precision in assessing the impact of a disease or treatment and are more sensitive to small changes over time.⁷⁸ A number of MS-specific measures have been or are being developed. For a summary of the key features of some of these instruments, as well as the SF-36 and SIP, see Table 8.^{78,92-98}

Using generic and disease-specific HRQOL instruments in a clinical setting can provide valuable insight into the QOL of patients. However, regular use can be time consuming and is more appropriate for research purposes.

IMPACT OF MULTIPLE SCLEROSIS ON QUALITY OF LIFE

In a study designed to demonstrate the impact of multiple system disease, investigators found that overall, MS has a much greater impact on QOL than does either inflammatory bowel disease or rheumatoid arthritis.⁹⁵

The motor, sensory, visual, bowel, bladder, and cognitive problems associated with MS can disrupt all facets of a patient's life. The disruption associated with these symptoms from MS range from mild to severe and may vary over time according to disease course and support mechanisms in place. Symptoms can affect a patient's

TABLE 8.
Generic and Disease-Specific Health-Related Quality of Life Instruments

<i>Instrument</i>	<i>Description</i>
SF-36 Health Survey ⁹²	<ul style="list-style-type: none"> • Generic • Patient-reported data • 8 subscales (physical, social, and role functioning; emotional well-being; mental health; general health perceptions; bodily pain; vitality) • Likert scale • Normative data (can be used to compare HRQOL of study population with that of general and/or other disease population)
SIP ⁷⁸	<ul style="list-style-type: none"> • Generic • Patient-reported • 136 items in a yes/no format • Subscales include ambulation, bodily care, mobility, eating, work, home, management, socialization and communication
Quality of Life Questionnaire (QOLQ) for MS ^{93,94}	<ul style="list-style-type: none"> • Disease-specific • Patient-reported data (administered by interviewer) • 24 items on 5 dimensions (5 items on self-selected physical problems, 5 items on mobility, 4 items on fatigue, 3 items on control, and 7 items on emotional upset)
Miller-Farmer QOL Index ⁹⁵	<ul style="list-style-type: none"> • Disease-specific • Patient-reported data • 41 questions on 4 subscales (functional and economic, social and recreational, affect and life in general, and medical problems)
MS Quality of Life Inventory (MSQLI) ⁹⁶	<ul style="list-style-type: none"> • Disease-specific (developed under the auspices of the Consortium of Multiple Sclerosis Centers) • Includes SF-36 • Patient-reported data, with supplemental objective data (EDSS and cognitive function) • Designed to supplement rather than replace Kurtzke EDSS • Dimensions measured include fatigue, pain, sexual satisfaction, bladder and bowel control, visual impairment, cognitive function, mental health, and social support
MS QOL 54 ⁹⁷	<ul style="list-style-type: none"> • Disease-specific • Patient-reported data • Includes SF-36 supplemented with 18 items (4 on health distress; 4 on sexual function; 1 on satisfaction with sexual function; 2 on overall QOL; 4 on cognitive function; and 1 each for energy, pain, and social function)
Life Situation Survey ⁹⁸	<ul style="list-style-type: none"> • Disease-specific (chronic illnesses, including MS) • Patient-reported data • 20-item scale includes 10 commonly accepted QOL domains (eg, work, leisure, health, love–affection, self-esteem) and 10 additional items specific to chronic illness (eg, stress, mobility, autonomy, energy level, social support, mood/affect, and public support)

capacity to work and cause loss of self-esteem and a dramatic erosion in the lifestyle of patients and their families.

MS is generally diagnosed during early to middle adulthood. The primary developmental goals of this period are the formation of mature interpersonal relationships, choosing or developing a career, and integrating sexuality into a meaningful long-term relationship.⁹⁹ Patients may be confronted with considerable alterations in their social environments. In some cases, unmarried patients are forced to return to their family homes, and both patients and their parents and siblings must adapt to this frequently stressful situation.

Couples who may be in the process of starting a family must adapt to a change in circumstances from when the original commitment to the relationship was made.⁹⁹ Single patients may find themselves without the necessary support. In both situations, feelings of isolation may result.

Symptoms such as gait problems, loss of balance, tremors, and changes in speech and cognition may be interpreted as signs of alcohol intoxication, thus complicating social situations considerably. Other symptoms such as head shaking and shaky voice seriously impair a patient's capacity to communicate and be understood.

The impact of MS on a patient's sexual functioning should not be underestimated. Symptoms such as spasticity, urinary incontinence, and fatigue interfere with this aspect of a patient's life. In addition, medications, such as anticholinergics, used to manage MS symptoms, as well as medications used to treat other common health problems, can affect sexual functioning.¹⁰⁰ Side effects associated with the beta interferons, such as flu-like syndrome, can also make patients less interested in sexual activity. Alterations in body image can negatively impact a patient's perception of himself or herself as a sexual being.

People with MS may face a restricted range of job opportunities, transportation and architectural barriers, financial disincentives, and limited vocational rehabilitation services. Employer perceptions and self-evaluation

of work capacity influence the vocational decisions of people with MS, often negatively, because of inadequate or wrong information.

THE ROLE OF THE NURSE

Monitoring the impact of MS on QOL is a continuous process. The ultimate goal is to help patients maintain or enhance their QOL. Individuals diagnosed with a chronic disease are confronted with long-term adjustment issues and must constantly strive to maintain a sense of normalcy while managing physical symptoms, performing activities of daily living, and interacting with others.¹⁰⁰ They struggle to retain autonomy and control. Nurses can support this effort.

Nurses who care for people with MS play a pivotal role in facilitating individual and family adjustment to the illness. The impact of MS on emotional status and family relationships often goes unrecognized and untreated. Many patients do not feel comfortable sharing with a physician the concerns they may have about the impact of MS on their social and personal lives. In particular, questions about sexuality and family planning may remain unasked because of embarrassment or lack of knowledge of potential resources.

Because of their unique role as educators and conduits of information between patients and other members of the comprehensive care team, nurses have the opportunity to initiate discussions on emotionally loaded issues as well as other more mundane, but no less important, aspects of social and psychological well-being that can affect QOL. The nurse can facilitate an environment in which a patient will feel comfortable addressing these issues.

In addressing QOL issues, nurses must be prepared to give individualized attention and advice, employ empathetic listening skills, and approach patient and family concerns creatively.

An important first step in helping patients adjust to the limitations of their illness is to create an atmosphere of unconditional acceptance. People with MS, like most people, do not want to be judged. No two individuals are the same, and each reacts differently to what

appears in many cases to be similar sets of circumstances. It may be challenging at times to deal with patients who, from a clinical perspective, have a mild disability yet do not cope well with their illness. These patients need as much support and empathy as those with more severe disability. The value that patients place on certain aspects of life may change as the disease progresses. “Everybody, well or ill, disabled or not, imagines a boundary of suffering and loss beyond which she or he is certain life will no longer be worth living.”¹⁰¹ QOL can be regarded as a “movable line” that may shift as a patient’s life circumstances change. Thus, QOL is not necessarily determined by the level of a patient’s disability.

Nurses must be prepared to look beyond the clinical parameters of MS and help patients to adjust, not only in the immediate postdiagnosis period but throughout patients’ lifetimes. This can include education and referrals that support empowering patients toward self-determination, identifying local support groups, enrollment in patient support programs, contacting home healthcare agencies, or simply being there for patients—and their families—to talk to. Empowering patients is an integral part of the nurse’s role when dealing with QOL issues.

The Importance of Education

In order to begin coping with the diagnosis and its implications, patients and families must have access to information. Processing information is difficult for people who have been diagnosed with a potentially debilitating disease. Healthcare providers must repeat the information many times and in language that all involved can understand. A systematic approach to providing information needs to be part of the nursing plan for people with MS.

It is clear that MS presents patients with many challenges that may impact their QOL. Patient and family education is extremely important. The more patients know about the disease, the more empowered they are to take control of their lives. Factual information about MS is a basic element in the quest to enhance QOL among people with MS and is crucial to the success of all other initiatives.¹⁰² Knowledge can help support health and minimize the negative features of this unpredictable disease.

As disseminators of this knowledge, nurses can help patients adjust to the disease. An understanding of underlying concepts—such as the disease process, symptoms and therapies, prevention of complications, and nonmedical therapies—is the essential first step for patients in learning needed behaviors and coping skills.

Strategies to Maintain Quality of Life

Based on the work of McDaniel and Bach,⁷⁹ the following key dimensions that affect QOL in people with MS were identified. These dimensions encompass a patient’s ability to

- adapt
- communicate
- socialize
- be productive

Although this list is by no means conclusive, it provides a framework for nurses to help patients identify behaviors and develop strategies that will facilitate QOL.

Ability to adapt

Patients must be able to initiate and respond to changes in their lives. This involves recognizing the need to respond to change; identifying and evaluating options for change; and setting, reevaluating, and achieving flexible goals. Patients may have to adjust to life changes and limitations in their ability to work, travel, and pursue recreational and social activities. The ability to adapt to change allows patients to continue to function as a valuable member of society. Nurses can help patients do this by encouraging them to explore available options. These options may include choices regarding treatment and physical therapy regimens, as well as employment and recreational activities.

Ability to communicate

It is important for people with MS to be able to express their feelings. The disease carries with it a number of emotional stressors. If patients are unable to communicate adequately, the quality of their lives can be severely eroded and even more stress can be placed on them. In addition, many patients do not feel comfortable talking about their physical symptoms, particularly those that may affect their bladder, bowel, and sexual functions.

Nurses can help both patients and their families explore ways to improve communications by first exploring their premorbid communication style. Nurses can share with patients their insights about improving communication. This is important when there are cognitive difficulties, which may affect the speed with which patients formulate thoughts. In some cases, patients and their loved ones may need to be referred to a family counselor, support group, or neuropsychologist.

Ability to socialize

One of the factors in QOL is the ability to develop and maintain satisfying relationships. This involves identifying those important relationships in patients' lives that may be negatively affected by the disease. It also involves evaluating whether the quality of these important relationships has been affected by the changes imposed by MS. Patients must determine whether changes are needed within these relationships in order to maintain them and must learn to embrace relationships that they value. It is important for people with MS to seek out relationships that are both supportive and reciprocal.

When sexual relationships are affected by MS, nurses can recommend a variety of approaches to limit the impact on QOL, including medications, assistive devices, audiovisual and written materials, group discussions, couples' sessions, and didactic presentations.

Ability to be productive

Because of the wide-ranging physical and cognitive impairments associated with MS, many patients are faced with the prospect of a reduced capacity to work. Early retirement or the necessity to give up a career can cause a serious deterioration in a patient's QOL, not only from a financial perspective but also because of a loss of self-esteem. A referral to an occupational therapist for work-site evaluation is helpful in assessing difficulties in the work environment and identifying adaptive measures that help people achieve the desired or a realistic level of productivity, given the extent and severity of the individual patient's symptoms. It is important to remember that, in some cases, early retirement can improve QOL.

Loss of role, such as that which may be experienced by people with MS who are unable to fulfill the many responsibilities of parenthood, may lead to feelings of failure, uselessness, and loss of self-esteem. Nurses can help patients adjust to the change in their roles. By providing them with information on home assistance services, nurses can assist patients in adapting to and compensating for the consequences of MS. Case Study 4 exemplifies how MS may affect a patient's QOL and how correct information and support can provide patients with the opportunity to retain some sense of autonomy and not allow the disease to rule their lives.

CASE STUDY 4

VC is a 37-year-old woman who was diagnosed with MS 5 years ago. She was married 2 years prior to diagnosis and was 2 months pregnant at the time she was diagnosed. VC was under the care of a community-based neurologist who had little experience in treating people with MS. Because VC assumed that the disease might have a hereditary component, she elected to have a therapeutic abortion. As time went on, she became increasingly preoccupied with her disease. However, since she did not have access to a specialized MS center, the information she obtained was not particularly reliable. Because she was afraid of becoming pregnant again and was experiencing intermittent bladder dysfunction, VC refused to have intercourse with her husband. She still very much wanted to have children, so she and her husband eventually proceeded with adopting two children. Unfortunately, VC's symptoms prevented her from coping particularly well with the responsibilities of motherhood. She became easily fatigued and, because of gait problems, found it difficult to keep up with her many household and family duties. In addition, VC began forgetting things, which compounded her problems. Her husband knew no more about the disease than his wife, and neither was aware that MS could be associated with cognitive deficits. VC's husband became resentful, thinking that his wife was so focused on the symptoms and progress of her disease that she neglected her family responsibilities. In reality, VC was experiencing feelings of isolation and anxiety, because she could no longer perform what were once routine tasks. Because she had no really reliable source of information about the disease, VC assumed that her case was typical and that she

could only expect things to get worse. Her self-esteem was gradually eroded, and the increasing strain on the marriage was evident to friends and family. A family member suggested that the couple contact a specialized MS center located in the next state. VC's husband did so and was able to get a referral from the local neurologist. Having built up a belief system concerning the effects and limitations of MS, VC was initially reluctant to pay much attention to the MS nurse at the center. The nurse spent much time listening to VC's sometimes totally wrong perceptions about the disease. Over a period of months, the nurse was able to gain VC's confidence, providing her with accurate information. Once VC had internalized this information, which in many ways was contrary to her long-held beliefs, she was able to begin to adapt to her condition in an appropriate manner. She learned to self-catheterize and eventually felt comfortable enough to resume sexual relations with her husband. She joined a support group and saw how other mothers had adjusted to the role of being a mother while coping with MS. The MS center nurse arranged for an assessment of VC's home, and modifications were recommended that would allow VC to compensate for her gait problems. After several months of counseling and education provided by the MS center nurse, VC and her family were much more equipped to deal with the challenges associated with MS. Although VC still experienced neurological and cognitive problems, she began to learn that the level of her disability need not determine her QOL.

CONCLUSION

T.S. Eliot wrote that "if you don't have the strength to impose your own terms upon life, you must accept the terms it offers you." QOL could be defined as the terms upon which a person is able to live life. Imposing these terms suggests that the person must be empowered as much as possible to take control. Certainly, people with MS may need to feel autonomous to the extent that the severity of their disease and their premorbid personality allows them. By assessing QOL over time, healthcare professionals can learn much about which factors positively influence the QOL of people with MS and use this information to empower patients to take control by giving them options. Thus, patients are given the ultimate control over health-related and life-planning strategies.

Treatment Options and Patient Education Needs

Until 1993, treatment of MS was symptomatic and episodic. There were no drugs available that actually affected the progress of the disease. With the advent of interferon β -1b (Betaseron[®]), clinicians were able to offer patients a disease-modifying agent and, as a consequence, hope. The subsequent approval of new disease-modifying therapies—the immunomodulator drugs intramuscular interferon β -1a (Avonex[®]), subcutaneous interferon β -1a (Rebif[®]), and glatiramer acetate (Copaxone[®]), and the immunosuppressant mitoxantrone (Novantrone[®])—have provided clinicians with additional treatment options. It is also becoming clear that early treatment with an immunomodulator provides the best long-term outcomes, an important point in the care of MS, which is a lifelong disease.¹⁰³

With the availability of numerous effective agents, how is the treatment decision made? Anecdotal reports indicate that once clinicians have described the drugs and outlined the benefits and disadvantages of each, in most cases, patients make the decision. Because clinicians may defer to the patient's choice, it is important that there be a clear understanding by the patient and the clinician of what is known about each agent—in particular, drug efficacy, side effects, and the administration regimen. Nurses must take a patient's history of adherence, cognitive capabilities, and definition of QOL into consideration before initiating educational activities or new protocols. Table 9 summarizes key features of the disease-modifying agents that should be considered in the treatment decision.¹⁰⁴⁻¹⁰⁸

FACTORS INFLUENCING THE TREATMENT DECISION

From the clinician's perspective, the efficacy and safety of the treatment regimen are paramount. Although patients are also interested in these aspects, they are concerned, too, with mode of administration, tolerability, and the impact on QOL. As long-term adherence is key in the success of disease-modifying therapies, and all

therapies have been established as efficacious, additional lifestyle-related factors need to be considered when selecting a therapy.

Data from randomized clinical trials have demonstrated that each of the disease-modifying agents reduces the frequency and severity of relapses and delays the progression of disability, albeit to varying degrees.^{29,30,96,109-121} The following data, gleaned from randomized trials, provide an overview of available agents in terms of meeting these efficacy criteria. When making treatment decisions, it is important to note that early treatment with an immunomodulatory agent has been found to be beneficial in delaying the accumulation of disability over the course of the disease, and that with early treatment and strict adherence to therapy, long-term efficacy in treating MS is achievable with an immunomodulatory agent.

IFN β -1b

As noted, IFN β -1b was the first immunomodulatory agent approved for the treatment of RRMS. Pooled data from randomized, placebo-controlled trials examining the efficacy of low-dose (1.6 MIU) and high-dose (8 MIU) IFN β -1b in RRMS patients demonstrated significant reductions in the frequency and severity of relapses at 2 years and at 5 years.^{29,109}

The 5-year pooled analysis investigated MRI lesion burden of disease, showing that IFN β -1b reduced the number and size of lesions seen on MRI.¹⁰⁹ This extension study indicated that the efficacy of this agent plateaued around year 3 and that although initially it was more effective than placebo at reducing the frequency and severity of relapses, this effect was not seen in the later years of the trial.¹⁰⁹ It is not known whether this may have been due to the natural history of the disease or a high dropout rate in both the placebo and active treatment groups.

Intramuscular IFN β -1a

With regard to intramuscular IFN β -1a, a randomized, placebo-controlled trial of IFN β -1a 30 μ g administered once a week via intramuscular injection for 2 years was shown to delay the time to sustained progression of disability as measured by an increase of ≥ 1.0 unit in EDSS

TABLE 9.
Key Features of the Disease-Modifying Agents¹⁰⁴⁻¹⁰⁸

Category	Beta Interferons			Selective Immunomodulator	Immunosuppressant
	Interferon β -1b (Betaseron [®] , Berlex Laboratories)	Intramuscular Interferon β -1a (Avonex [®] , Biogen Idec)	Subcutaneous Interferon β -1a (Rebif [®] , Serono Inc, Pfizer Inc)	Glatiramer acetate (Copaxone [®] , Teva Neuroscience)	Mitoxantrone (Novantrone [®] , Serono Inc; OSI Oncology)
Description	<ul style="list-style-type: none"> Recombinant agent, produced in <i>E. coli</i> Unglycosylated Amino acid sequence differs from naturally occurring agent in that it is substituted for the cysteine residue at position 17 	<ul style="list-style-type: none"> Recombinant agent produced from Chinese hamster ovary cells Glycosylated Identical in amino acid content and sequence to human β-interferon 	<ul style="list-style-type: none"> Recombinant agent produced from Chinese hamster ovary cells Glycosylated Identical in amino acid sequence to human β-interferon 	<ul style="list-style-type: none"> Selective immunomodulator Synthetic polypeptide Approximates the antigenic structure of myelin basic protein 	<ul style="list-style-type: none"> Antineoplastic anthracenedione Synthetic
Indication	<ul style="list-style-type: none"> For use in ambulatory patients with MS to reduce the frequency of relapses 	<ul style="list-style-type: none"> For use in relapsing forms of MS to slow accumulation of physical disability and decrease the frequency of clinical relapses 	<ul style="list-style-type: none"> For use in relapsing forms of MS to decrease the frequency of exacerbations and slow the accumulation of physical disability 	<ul style="list-style-type: none"> For reduction of frequency of relapses in patients with RRMS 	<ul style="list-style-type: none"> For reducing neurological disability and frequency of relapses in SPMS, PRMS, or abnormally worsening RRMS
Dosing frequency/route	<ul style="list-style-type: none"> One subcutaneous injection every other day 	<ul style="list-style-type: none"> One intramuscular injection weekly 	<ul style="list-style-type: none"> One subcutaneous injection three times weekly, preferably on same three days and at the same time, ie, late afternoon or evening 	<ul style="list-style-type: none"> One subcutaneous injection daily 	<ul style="list-style-type: none"> IV administered for 5 to 15 minutes every 3 months
Considerations	<ul style="list-style-type: none"> Injection-site rotation and skin management Laboratory monitoring <ul style="list-style-type: none"> Neutralizing antibodies Hematological/hepatological abnormalities 	<ul style="list-style-type: none"> Injection-site rotation and skin management Laboratory monitoring <ul style="list-style-type: none"> Neutralizing antibodies Hematological/hepatological abnormalities 	<ul style="list-style-type: none"> Injection-site rotation and skin management Laboratory monitoring <ul style="list-style-type: none"> Neutralizing antibodies Hematological/hepatological abnormalities 	<ul style="list-style-type: none"> Injection-site rotation and skin management 	<ul style="list-style-type: none"> Cardiotoxicity, which increases with cumulative dose. MS patients who reach cumulative dose of 100 mg/m² should be monitored for evidence of cardiotoxicity prior to subsequent dose, and total cumulative lifetime dose is not to exceed 140 mg/m²

RRMS, relapsing-remitting MS; SPMS, secondary-progressive MS; PRMS, progressive-relapsing MS.

score.¹¹⁰ In addition, there was a statistically significant reduction in relapses and MRI burden of disease.¹¹⁰

More recently, intramuscular IFN β -1a has also been found to be beneficial for patients with brain lesions on MRI who are at high risk for developing clinically definitive MS when treatment is started at the time of a first demyelinating event.¹¹¹ Data from the CHAMPS trial showed a significant delay in the next neurological event, thus delaying the onset of clinically definite MS.

Subcutaneous IFN β -1a

Clinical trials of subcutaneous IFN β -1a (and glatiramer acetate, discussed below) were the first studies of immunomodulators to employ a crossover design in which patients originally randomized to placebo could agree to continue in an extension phase of the trial, switching over to active treatment. This change came about after the establishment of IFN β -1b's efficacy, rendering placebo-based comparisons no longer appropriate for ethical reasons.

The efficacy of subcutaneous IFN β -1a was established through results of an initial 2-year placebo-controlled clinical trial in which both high (44 μ g) and low (22 μ g) doses of the drug given to patients with RRMS reduced relapse rate, disease progression, burden of disease, and number of active lesions, compared with placebo.¹¹²

A 2-year blinded extension of the original study was then conducted in which patients who had been randomized to placebo were switched to either high- or low-dose subcutaneous IFN β -1a.¹¹³ Results showed that clinical and MRI benefits of subcutaneous IFN β -1a were maintained over 4 years in patients always on active treatment, and patients switched to active therapy experienced fewer relapses and exhibited reduced MRI activity and lesion burden than they had during the placebo period. Efficacy outcomes in patients who had always received active treatment were consistently better than those in patients in the crossover group. A dose–response effect remained evident through the initial and extension phases of the study.

Patients in this trial were retrospectively evaluated for disease activity at approximately 8 years. Of the original

patients, 68% returned for 7- to 8-year follow-up. Results supported benefit of subcutaneous IFN β -1a over this time period, particularly in patients who received therapy at the highest dose for the entire duration of the study. However, after the fourth year in the study, these patients may have stopped, switched, or resumed therapy with subcutaneous IFN β -1a.¹¹⁴ Thus, “long-term” results reported for this study should be interpreted cautiously, since they are likely to be confounded by actual treatment duration and dosage given.

Glatiramer Acetate

Glatiramer acetate has been studied extensively and has the longest serially documented record of continuous use in the clinical trial setting. Results of the initial 2-year double-blind, placebo-controlled pivotal trial¹¹⁵ and an extension study of the double-blind period of up to 11 months¹¹⁶ demonstrated sustained beneficial effects of glatiramer acetate on relapse rate and on progression of disability. After up to 35 months of double-blind treatment, patients had the option of continuing in an open-label extension study. In this extension, placebo patients were switched to glatiramer acetate therapy.^{117,118} At 8 years, a greater percentage of patients always on glatiramer acetate (group A) demonstrated improvement or stabilization in neurological disability than patients initially on placebo (group B), underscoring the importance of early and sustained treatment in RRMS and the risks associated with delaying therapy.¹¹⁹ Clearly, there are limitations to these data. Without the benefit of placebo comparison, the strength of the efficacy data is diminished. Also, without adequate information regarding dropout from the trial, it is difficult to draw efficacy conclusions. However, continuing participants have outperformed natural history, indicating that glatiramer acetate has long-term efficacy.^{119,120} These data continue to establish glatiramer acetate as a safe and effective therapy for RRMS and underscore the need for early intervention.

Data show a favorable effect of glatiramer acetate on most MRI measurements of disease activity. Results of the large randomized, placebo-controlled, 9-month European/Canadian trial demonstrated a significant reduction in the total number of enhancing lesions in glatiramer acetate–treated RRMS patients compared with

placebo patients.¹²¹ In an open-label 9-month extension crossover phase, in which placebo patients began active treatment, the effect of glatiramer acetate on MRI markers of disease was sustained.¹²² A subanalysis of the same patient cohort also demonstrated that glatiramer acetate treatment significantly reduced the proportion of new MRI-visualized lesions that evolved into persistent hypointense T1 lesions, also known as “black holes.” These results indicate that glatiramer acetate may interfere with events that lead to the development of irreversible tissue disruption and loss after new lesions are formed.¹²³

Mitoxantrone

Mitoxantrone is an immunosuppressive, antineoplastic agent approved for use in secondary-progressive, relapsing, or worsening RRMS. It is not approved for primary-progressive disease.¹⁰⁸ In clinical trials, mitoxantrone, in combination with methylprednisolone, was shown to significantly improve primary and secondary end points, such as the percentage of patients without new Gd-enhancing lesions, changes in EDSS scores, and annualized relapse rates.¹⁰⁸ However, an important caveat associated with mitoxantrone treatment is that it has a dose-dependent cardiotoxic effect: its lifetime cumulative dose in MS patients is 140 mg/m².¹⁰⁸

Head-to-Head and Open-Label Comparisons

Two head-to-head trials of the beta interferons have been conducted: EVIDENCE and INCOMIN, yielding results on how the interferon agents compare with each other. The EVIDENCE (Evidence of Interferon Dose–Response: European–North American Comparative Efficacy) trial evaluated the efficacy of intramuscular IFN β -1a (30 μ g once weekly) and subcutaneous IFN β -1a (44 μ g three times weekly) in RRMS patients in a randomized, controlled setting.¹²⁴ Results showed that patients who received the higher interferon dose, ie, subcutaneous IFN β -1a, were more likely to be relapse free and also had significantly fewer active lesions at 24 weeks than their counterparts who received the lower-dose, intramuscular formulation. Results for these end points at 48 weeks continued to favor subcutaneous IFN β -1a.

Another head-to-head trial, INCOMIN (Independent

Comparison of Interferon), compared intramuscular IFN β -1a (30 μ g once weekly) with IFN β -1b (250 μ g every other day) in patients with RRMS.¹²⁵ At the 2-year point in this prospective, randomized study, a greater percentage of the IFN β -1b patients were relapse free than were their IFN β -1a counterparts, and a significantly greater percentage of IFN β -1b patients remained free from new T2 lesions compared with the IFN β -1a patients. Differences in efficacy between the two drug groups became more pronounced during the second year of the study.

Results from two open-label trials, both including no-treatment arms, showed that treatment of RRMS patients with an immunomodulator is vital. In one open-label trial comparing intramuscular IFN β -1a (30 μ g once weekly), IFN β -1b (8 MIU every other day), glatiramer acetate (20 mg daily), and no treatment for 18 months, treatment with any agent was beneficial compared with no treatment.¹²⁶ However, reductions in relapse rates, delays in disability progression, and the proportion of relapse-free patients were significantly better only in IFN β -1b– and glatiramer acetate–treated patients.¹²⁶ In a second open-label analysis that was a retrospective, observational trial, patients treated for 16 months with intramuscular IFN β -1a (30 μ g once weekly), subcutaneous IFN β -1a (44 μ g three times weekly), IFN β -1b (250 μ g every other day), glatiramer acetate (20 mg daily), or no treatment were compared.¹²⁷ The number of relapses was significantly lower in all active treatment groups compared with pretreatment levels. With regard to disability, no significant EDSS score reductions were noted, although trends were observed in both the IFN β -1b and glatiramer acetate groups.

Natalizumab

Research into the pathophysiology of MS implicates the glycoprotein $\alpha_4\beta_1$ integrin, expressed on the surface of monocytes and lymphocytes, in the processes of cell adhesion, regulation of immune cell activation in inflamed tissue, and migration of monocytes and lymphocytes into the brain parenchyma. Consequently, it was thought that treatment with a selective adhesion molecule inhibitor administered shortly after the onset of MS relapses would potentially accelerate clinical

recovery. Results thus far with the experimental $\alpha_4\beta_1$ -integrin antagonist natalizumab have shown significant effects on MRI end points, and further insights into its effects on clinical end points are awaited.^{128,129}

Convenience

The mode of administration of the immunomodulators is a lifestyle issue. Once patients have overcome the hurdle of accepting that the best treatment options currently available involve self-injection (mitoxantrone is an infusion), they must then decide which dosing route and frequency best suit their lifestyle. Many patients are attracted to a once-weekly injection and are prepared to deal with the larger needle associated with the intramuscular route. Others cannot come to terms with the needle size and opt for the more frequent subcutaneous route. It does not appear that an every-other-day injection, as is performed with interferon β -1b, is preferable to a daily injection, as is the case with glatiramer acetate. Anecdotal reports suggest that patients may prefer the daily to the every-other-day regimen because it is less confusing. In patients with cognitive impairment this is of particular importance.

There are certain well-defined groups of patients who prefer a particular regimen over another. People who travel frequently find the once-weekly regimen best suits their life circumstances. This regimen may be appropriate for patients unable to self-inject because of physical and/or cognitive deficits and who do not have a family member or caregiver available to attend to a daily regimen. Such patients may require weekly injection by a healthcare professional. Once a regimen is begun, patients quickly adapt to the requirements of administration.

The subcutaneously injected immunomodulators are available in autoinjector form, and all of the immunomodulators are available in prefilled syringes. Interferon β -1b is available in a room-temperature formulation.

Adverse Events

Data from the studies of each of the disease-modifying therapies, and clinical experience with them, indicate that glatiramer acetate has the mildest side-effect profile.¹³⁰ The beta interferons are often associated with a flu-like syndrome that may persist for several

months after commencement of treatment.^{104,105} In retrospective analyses, the beta interferons have also shown hepatotoxicity.^{131,132} Menstrual disorders, depression, suicide, and hematological changes have been associated with the beta interferons.¹⁰⁴⁻¹⁰⁶ Patients treated with any of the beta interferons should be advised to report related symptoms of depression or suicidal ideation immediately to their prescribers.

Glatiramer acetate has been associated with mild injection-site reactions and, occasionally, with a postinjection reaction characterized by palpitations, chest tightness, and flushing.¹⁰⁷ These reactions are transient and self-limiting and rarely result in discontinuation of therapy.

All of the immunomodulators, because they are regularly injected (often by the patients themselves), have the potential for injection-site reactions and are associated with a number of skin issues. However, all can be managed when observed early and may be avoided by meticulous injection-site care and site rotation.¹³³

In clinical trials of the beta interferons, some patients developed neutralizing antibodies to these agents. Depending on the data set, neutralizing antibody rates range from 5% for intramuscular IFN β -1a, to 24% for subcutaneous IFN β -1a, and to 45% for IFN β -1b.¹⁰⁴⁻¹⁰⁶ The reported frequency of neutralizing antibodies depends on a variety of factors that appear to include beta interferon type, dosage/dosage frequency, and route of administration,¹³⁴ as well as manufacturing issues and methods to assess the presence of antibodies.¹³⁵ The current recommendation is that physicians and patients should be aware of the possibility that antibodies may develop, but their significance is not known. Some reports indicate that neutralizing antibodies may reduce drug potency.^{136,137} The decision to continue treatment should be based on clinical response. Data suggest that antibodies that develop in response to glatiramer acetate treatment are not neutralizing and have no detrimental effect on safety or efficacy of the drug; indeed, they may enhance efficacy.¹³⁸

Treatment choice should be directed to promote maximum efficacy with a minimum of side effects.

The Nurse's Role in Making the Treatment Choice

The numerous factors that influence a patient's treatment decision make it clear that patients must be equipped with an adequate understanding of the benefits and disadvantages of the immunomodulatory agents. Nurses are in a position to help patients consider which of the agents is most suitable for their life circumstances and expectations. Developing patient skills such as self injection, conveying the importance of early initiation of therapy and adherence, managing side effects, and fostering realistic expectations are within the purview of the nurse. Using key principles of nursing care in MS will facilitate and sustain suitable,

individualized treatment choices, whether they are disease-modifying therapy, symptomatic care, or rehabilitative services.

The key to successful treatment of people with MS is balancing the efficacy of the prescribed agent with a patient's capacity or desire to adhere to a treatment regimen, the patient's level of cognitive impairment, and the impact of a treatment regimen on QOL.

The advent of disease-modifying agents during the latter part of the 20th century added to the complexity of MS care and impelled healthcare providers to assess and reassess care patterns based on evidence added to clinical experience. The nurse is a key member of a team of healthcare professionals tending to MS patients and their families. Day-to-day contact and knowledge and awareness of critical issues in MS require the nurse and his or her healthcare team to convey information about prescribed treatments and to promote health and wellness.

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Multiple Sclerosis Resource Guide

Consortium of Multiple Sclerosis Centers

The Consortium of Multiple Sclerosis Centers (CMSC) provides networking for all healthcare professionals that specialize in the care of patients with MS. It offers a number of activities, including an annual educational conference, annual specialty roundtable discussions, and the North American Research Consortium on MS, which conducts multicenter trials, manages a patient registry, and maintains a Web site (www.ms-care.org). For more information, contact June Halper, executive director (phone: 201-837-0727, fax: 201-837-9414, e-mail: halper@holyname.org).

National Multiple Sclerosis Society

The National Multiple Sclerosis Society (NMSS) funds both basic and health services research. An office of professional education programs maintains a speakers bureau and supports professional education programs in individual chapters. NMSS chapters and branches provide services and information on counseling, equipment, and support programs for people with MS and their families. For more information, call 800-FIGHT-MS (800-344-4867) or visit www.nmss.org.

Shared Solutions™

Shared Solutions™ is a free patient support program available to anyone with MS. Patients taking Copaxone® receive additional materials and services related to Copaxone therapy. This program is designed to help patients, their families, and caregivers with counseling, reimbursement issues, self-injection training, and adherence reminders. Members also receive a quarterly newsletter. For more information, call 800-887-8100 or visit www.mswatch.com.

MS PathwaysSM

MS PathwaysSM provides comprehensive programs and services for patients taking Betaseron® and their families, as well as other people with MS. A wide variety of services are available through MS Pathways, including a training program, reimbursement services, support groups, educational materials, and a quarterly newsletter. For more information, call 800-788-1467 or visit www.ms-pathways.com.

MS ActiveSourceSM

MS ActiveSourceSM is a free service that provides patients, their care partners, and healthcare professionals with information, assistance, and support to help ensure a positive Avonex® treatment experience. Members receive a periodic newsletter and a welcome pack, which includes a journal, a video, and a voucher for free materials. For more information, call 800-456-2255 or visit www.msactivesource.com.

MS LifeLines™

MS LifeLines™ is an educational tool for people living with MS. People taking Rebif® can also find facts and support for their therapy through this free service, as well as register for events, sign up to receive an MS LifeLines™ newsletter, read profiles of other patients, and get tips on living with MS. For more information, call 877-447-3243 or visit www.mslifelines.com.