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# Multiple Sclerosis And Its Effect On The Central Nervous System

## Multiple Sclerosis

### Abstract

MS affects the central nervous system (CNS) but exactly why it happens is unclear. In the CNS, nerve fibers are surrounded by a myelin sheath, which protects them. Myelin also helps the nerves conduct electrical signals quickly and efficiently. In MS, the myelin sheath disappears in multiple areas, leaving a scar, or sclerosis. Multiple sclerosis means 'scar tissue in multiple areas.' The areas where there is no myelin or a lack of myelin are called plaques or lesions. As the lesions get worse, nerve fibers can break or become damaged. As a result, the electrical impulses from the brain do not flow smoothly to the target nerve. When there is no myelin, the fibers cannot conduct the electrical impulses at all. The messages from the brain to the muscles cannot be transmitted.

## Multiple Sclerosis

Multiple Sclerosis (MS) is an unpredictable and inevitably disabling neurological disease that is prevalent in young adults today. An abnormal reaction occurs in the immune system causing it to damage the central nervous system (CNS). MS causes the disruption of information inside the brain and spinal cord. The immune system attacks myelin (what surrounds the nerve fibers), and demyelination occurs. The disease can eventually cause deterioration of the nerves which can become permanently damaged.

MS is not a fatal disease, but it can be highly disabling. According to Dr. Loren A. Rolak, "Multiple sclerosis is seldom fatal and the life expectancy is shortened only by a few months. Concerns about the prognosis center primarily on the quality of life and prospects for disability" (Rolak, 2003, para. 6). The majority of people diagnosed with MS will have a normal lifespan barring any unforeseen complications. The most common complication happens with people who are severely disabled. They experienced a premature death as a result of an infection or pneumonia. Even though that is the most common, those cases are still extremely rare. The National Multiple Sclerosis Society (NMSS) says, "Around two-thirds of people diagnosed with MS are able to walk without a wheelchair two decades after their diagnosis" (NMSS, 2017, para. 4).

About a quarter of a million Americans are affected by the MS disease. Adults are most commonly the people diagnosed with MS. The average age range when MS is diagnosed is between the ages of 20 and 50, but it can appear in children as well as older adults. Rolak also stated, "Multiple sclerosis favors women over men by a ratio of nearly 2 to 1, and it strikes most often between the ages of 20 and 40. Caucasians are especially vulnerable, particularly those of northern European extraction, and there is a geographic preference for people living in northern latitudes" (Rolak, 2003, para. 3). From what scientists have discovered, they have found that MS tends to stay within families and can be passed by

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genetics,? “There is a 1 to 5% ?risk of developing MS if a parent or sibling has the disease” (Rolak,? 2003,? para. 3).

People who have MS could experience a wide range of symptoms.? The symptoms could affect them mentally,? physically,? emotionally,? or psychologically.? Symptoms and their severity differ notably from person to person and can vary depending on where the location of the damaged nerve fibers.? Some of the more common symptoms are dizziness,? fatigue,? tingling or pain in part of your body,? slurred speech,? tremors,? partial or complete vision loss,? double vision, numbness or weakness in limbs,? or problems with bowel and bladder function.

There is no proven way to prevent MS,? but there are medications that can help slow down the progression of the disease and help delay disability.? MS is usually treated with corticosteroids.? “A standard regimen uses Intravenous Methylprednisolone (Solumedrol) 1 gram daily for 3-5 days,? sometimes (but not always,? depending on physician preference) followed by a tapering dose of oral steroids” (Rolak,? 2003,? para.? 15).

There are five drugs that the Food and Drug Administration (FDA) has approved as disease-modifying agents.? The natural history or relapsing-remitting are altered by these medications.? Four of the five drugs can be self-administered and are Intramuscular beta-interferon-la (Avonex),? subcutaneous beta-interferon-la (Rebif),? subcutaneous beta interferon-lb (Betaseron),? and glatiramer acetate (Copaxone).? All of these medications have little effect on MS after the disease enters the secondary progressive phase.

All medications can have side effects.? Some short-term use side effects of oral corticosteroids can include: Glaucoma,? Fluid retention (causes swelling in lower legs),? high blood pressure,? problems with memory,? behavior,? and weight gain.? Long-term use effects can include: Cataracts,? high blood sugar (can trigger or worsen diabetes),? increase risk of infection, Osteoporosis,? suppressed adrenal gland hormone production,? and thin skin,? bruising, and slower wound healing.? Injected corticosteroids side effects can cause: temporary side effects near the area of injection,? skin thinning,? loss of color in the skin,? facial flushing,? insomnia,? and high blood sugar.

People who are diagnosed with MS can experience many different changes.? The changes usually start with just getting the news of the diagnosis and continue throughout the course of the disease.? Anxiety,? stress,? and depression are the most common emotional responses,? but “Other emotional changes that may occur in MS include clinical depression,?bipolar disorder, and mood swings.? All of these are more common among people with MS than in the general population.

Depression and bipolar disorder require professional attention and the use of effective treatments” (Emotional and cognitive changes,? (n?.?d?.?),? para.?.? 3).? Those emotional problems can be severe enough without having MS?.? but having a disease could be critical.

Cognitive changes also occur during the progression of the disease.? Any part of the brain can be affected,? so the loss of any cognitive function is possible.? Memory,? attention and concentration,? word-finding,? speed of information processing,? abstract reasoning and problem solving,? and executive functions are all things that could possibly be impaired.? Those cognitive changes affect people with MS and can change how they live their daily lives.

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Scientists in Canada have been working to reverse the symptoms of MS. The scientists described, “Results from a trial involving 24 patients with a highly active, relapsing form of the autoimmune disease as ‘very exciting’” (von Radowitz, 2016, para. 2). The downside to the trial was that it was extremely risky. Only the patients who were still in the early stages of the disease were likely to benefit from the treatment. What was done in the trial was, “Doctors testing the therapy, known as IAHSCT (immunoablation and autologous hematopoietic stem cell transplantation), took stem cells from patients’ bone marrow and froze them before injecting powerful chemotherapy drugs to destroy the immune system” (von Radowitz, 2016, para. 6).

The stems cells were put back into the body to create a new immune system. In over thirteen years, seventy percent of the patients experienced a standstill in the progression of the disease.

There were some side effects to the treatment. During the treatment, “One participant in the study died of liver failure due to the treatment and another required intensive care for liver complications. All the patients developed fevers which were frequently associated with infections” (von Radowitz, 2016, para. 15). There were many risks with this study. The participants’ immune systems were unprotected from the treatment, so the risk of infections and side effects of the medications on top of that was extremely dangerous. But, this study’s concept proves that scientists are getting closer to finding a cure by using chemotherapy-based treatment.

I have heard of Multiple Sclerosis before, but I never knew what it was or how serious of disease it was until this assignment. I had to do a lot of research to learn about this disease. There are so many different parts of it to try and follow. Some individuals are living with MS to this day with no current symptoms or no signs of disease but when a consumer is young and going through their childhood this would be the last thing on their mind. Being a young adult and just thinking things are normal or “it will go away” could lead to very bad things. Life would be challenging with this disease and would make a healthy young male or female very grateful that does not have this appreciation. It is really interesting how MS is not the same in hardly anyone or how the symptoms also differ from person to person. Diseases that have no known cause are interesting because they keep you wondering about how quickly the scientists are going to discover one, or if they ever are since they have been working on finding one for MS for over thirteen years.

Unfortunately, there is not a cure, but rather treatments that have been proven effective in slowing down the progression of the disease. The medications most commonly used to treat MS are Glatiramer Acetate, Interferon beta-1a, Interferon beta-1b, and Mitoxantrone. Except for Mitoxantrone, the medications listed above are types of proteins manufactured by a biotechnological process from one of the naturally occurring interferons. On the contrary, Mitoxantrone belongs to the general group of medicines called antineoplastics. It acts in MS by suppressing the activity of T cells, B cells, and macrophages that are thought to lead the attack on the myelin sheath. People diagnosed and properly treated for multiple sclerosis may live a normal life expectancy, and maintain an active lifestyle. It all depends upon the state of mind of the individual. My mother is a primary example, that MS does not have to control one's life, but to the contrary, an individual has the power to control it.

There are several important aspects of living with this disease, instead of at its mercy.

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First, one needs to acknowledge the existence of the disease. Second, an individual should allow time to process the idea of living with the disease. Third, one should become an active agent in fighting the disease by becoming informed. Fourth, a person should be willing to make adjustments, which may alter one's lifestyle. In conclusion, an individual should not be afraid of multiple sclerosis, but dare to live a fulfilling life.

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