



“El Poder del Cerebro: Mantener una Mente Sana Mientras se Vive con EM”

Presented by Augusto Miravalle, MD, FAAN

Moderator:

Hello, and welcome to the Multiple Sclerosis Association of America’s educational webinar “Brain Power: Maintaining a Healthy Mind While Living with MS,” which is part of the educational series “Living Strong with Multiple Sclerosis.” On behalf of MSAA, we greatly appreciate the opportunity to connect with you. As you may know, the MSAA is a national nonprofit organization based in the United States, dedicated to improving the lives of people with multiple sclerosis and their care community.

Some of our free services include patient education programming, a national helpline, cooling equipment and products, funding for MRIs, an online community, and a robust library of publications. Visit our website at MyMSAA.org for more information about our programs and services, recent educational webinars and videos, and much more.

As a kind reminder, we invite everyone reviewing this program to complete the MSAA Patient Education survey form below. This information will help us evaluate the quality, impact, and usefulness of educational programs, as well as provide support for future education funding. Living Strong with Multiple Sclerosis is provided by MSSA and our partner Impact Education.

This webinar series is made possible by generous financial support for education from Bristol Myers Squibb, Genentech, and Johnson & Johnson.

Sponsors of the virtual exhibition, including Biogen, Genentech, and Sanofi Janssen, provide additional support for this series. Details and information can be found in our new virtual showroom by visiting the link below.

Before we begin, we have some important notes. The information that will be shared today is for educational purposes only and is not a substitute for professional medical advice. Additionally, MSAA programs and services are developed to comply with the laws and regulations of the United States of America. Other countries may have laws, regulatory requirements, and medical practices or availability that may differ from those of the United States.

Therefore, MSAA programs and services or partner services that may be described during this presentation are not available to individuals living outside of the specially designated geographic service areas of the United States and Puerto Rico. I am pleased to introduce Dr. Augusto Miravalle, our host of this webcast “Brain Power: Maintaining a Healthy Mind While Living with

MS.” Dr. Miravalle is an Associate Professor of Clinical Neurology at the University of Colorado and provides patient care at Advanced Neurology of Colorado in Fort Collins.

He received his medical degree from the University of La Plata, Argentina, and completed his residency in neurology at Loyola University, his neuroimmunology fellowship at Harvard University in Boston, and his fellowship in Medical Education at the University of Rochester in New York. Dr. Miravalle participates in clinical and scientific research in the field of multiple sclerosis and has a special interest in gray matter pathology, cortical lesions and their impact on cognitive and physical disability.

Without further delay, we are delighted to leave you with Dr. Miravalle.

Dr. Miravalle:

Thank you very much for the invitation. It's a pleasure to be here with you to talk about brain power. In the case of multiple sclerosis, this talk is dedicated to patients with multiple sclerosis, and my role today is to explain what the... the... the recommendations are that we give to patients to maintain a healthy mind while living with multiple sclerosis. My name is Augusto Miravalle.

I am a neurologist. I work in Fort Collins, Colorado, and I am an Associate Professor of Neurology in the Department of Neurology at the University of Colorado School of Medicine.

Before talking about multiple sclerosis in the Latino or Hispanic community, it is a good idea to define what those terms are, since these terms are used in a variety of ways. Hispanic generally refers to people who were born in the regions of America that have been colonized by Spain. Latino refers to people with ancestral and cultural ties to Latin America. There is a more recent term which is Latinx, which refers to a person of Latin American origin or descent.

But this term has... is a gender neutral alternative and does not make a distinction between female or male gender. So it is very likely that in more recent publications you will see Latinx as the preferred term to be used.

As for the prevalence and incidence of the disease, it varies widely. And you are going to see that in the world there are regions that have a higher or lower prevalence of the disease, and that has also been seen recently: that the increase in incidence is also determined by geographical region. And you can see in Table 1, for example, where the global prevalence is estimated, that 30 out of every 100,000 people have the disease. And you can see that compared to certain countries, for example Argentina, that prevalence can be 40 people per 100,000 inhabitants, while in places like Puerto Rico, which has one of the highest prevalence rates in Latin America, it is estimated at 70 people per... compared to one hundred thousand individuals. There is an increase in the frequency of multiple sclerosis worldwide, and it is also true in Latin America, that this increase is not simply explained by greater access to magnetic resonance imaging, for example, but it is also an increase that I believe is directly related to the disease.

And that is... for example, it was measured during a period from 1990 to 2016, that the prevalence of multiple sclerosis in Latin America increased by as much as 40 percent. So something is happening in the environment that is perhaps explained by genetic factors, environmental factors, that result in an increase in incidence and prevalence on a global level.

And to talk a little more in detail about those factors that I mentioned previously, we know that race and multiple sclerosis... There is an association between the two, and that association not only explains a greater or lesser risk of developing the disease, but also a risk other than motor ability and disability that patients may have through and throughout their illness.

We know that Asians, for example, Africans, Amerindians, and mestizos, generally have a lower risk of getting multiple sclerosis. On the other hand, white Caucasians, especially those who are of northern European descent, have perhaps the highest risk overall of developing the disease.

What is interesting is that Hispanics, even though the risk is lower, those Hispanics who have multiple sclerosis have worse clinical outcomes. And this is not simply explained by a lack of access, for example, to the healthcare system due to socioeconomic reasons, but rather it is apparently a biological difference that multiple sclerosis in these groups, in Hispanic and Latin American patients, tends to more greatly affect part of the brain or central nervous system, such as the spinal cord, for example, which has been determined to have a worse clinical prognosis. So there is a difference not only in the risk of developing the disease, but there is also a difference in the prognosis for those people who have developed the disease. Now we are going to talk about the ability of linking between the disease, developing the disease, and genetic content.

Up to 10 percent of patients with multiple sclerosis have a relative, whether it be parents or siblings, with the disease. But 90 percent of patients do not have a family history of the disease. As for the genes that have been described to be associated with the disease, most of those genes have to do with the way in which our immune system recognizes what those components are that it has to react against and control, or those parts of the body that they simply have to protect.

There is a genetic profile called HLA-DRB1 that has been associated with an increased risk of developing the disease. Today there are more than two hundred multiple sclerosis susceptibility genes that have been identified. As I mentioned earlier, this is the allele, which is HLA; it is the one with the highest risk, and when you put all those alleles together or all those genes together, they can explain the risk of disease up to 50 percent.

But like I said earlier, the disease is not hereditary. In other words, the disease itself is not inherited. What is inherited is the group of genes that, perhaps when a person is exposed to certain environmental and nutritional factors, as we are going to explain, for example, vitamin D, those genes increase the risk of developing the disease. Studies that have been done at the University of Nottingham, and that have also been replicated in Argentina, suggest that certain infections, for example, chronic infections by helminths, which is a type of parasite, can influence not only the risk of disease, but also the prognosis in those who have... in those patients who have multiple sclerosis and who are also infected with certain parasites.

This study resulted in the development of a vaccine, and that vaccine has been studied in patients, and unfortunately the results have not been very significant. However, it is interesting to see that different infections, in this case by parasites, can regulate immune responses and change the clinical profile of patients with multiple sclerosis.

And now we are going to change the focus of the conversation a bit to talk about brain health and why it is important. As you have seen in neurology in the last decade, neurologists are concentrating a little more on trying to explain what brain health is.

Brain health refers to optimal brain function. It is the ability to function, to remember, to learn, to play an instrument, to exercise, to concentrate. Simply put, brain health is about getting the most out of, getting the most out of your brain, and helping to reduce some of the risks that occur as you age. Another term related to brain health is called cognitive reserve.

If we look at the brain from a functional point of view, we usually talk about how we use 10 percent of our brains. And that 10 percent is used to do our daily activities: driving, bathing, working, running. 90 percent of the brain is what we call cognitive reserve.

So that cognitive reserve is there to help us evolve. For example, if you decide tomorrow to learn a new language, learn English or learn a new instrument, you will be using neurons from cognitive reserve to, through training, develop part of what is the brain's active capacity. But cognitive reserve is also there to help us adapt brain function as we lose brain, we get older or, in the case of patients with multiple sclerosis, develop brain atrophy that is directly related to the disease. And this is simply a summary of what I just said. Brain health declines over time for everyone. That is a natural aging process. But that aging, that brain atrophy, occurs much faster in patients with multiple sclerosis. And to put this concept, which is very important, in terms of numbers, for example, we can measure brain atrophy through what is called a nuclear magnetic resonance.

When we look at the change in brain atrophy in patients with multiple sclerosis who aren't receiving any medical treatment, that atrophy can be as high as 1.5 percent per year. What that means is that untreated multiple sclerosis patients can lose up to 1.5 percent of their brain each year. When we compare that with patients, with individuals without multiple sclerosis, for example with healthy people of the same age, brain atrophy is about 0.2 percent per year.

So a significant difference in terms of what the aging and brain atrophy process is occurs through multiple sclerosis. The good news is that with certain drugs that have been proven to treat the disease, we can decrease brain atrophy to levels that are very close to what brain atrophy is from simply aging. And this puts into light what I just explained: you can see here in the graph that, over the years, as we get older, brain volume will decrease from brain atrophy that occurs in healthy people, in healthy individuals. As you can see here in green, that brain atrophy is much less than what you can see in patients with multiple sclerosis, in this case orange, who are not receiving treatment for their disease.

And if we put that same concept and superimpose it with what happens clinically, you can see the clinical attacks here, which are represented at the bottom of the figure that you can see, that clinical attacks are related to brain lesions, which can be seen with those orange bars, and those brain lesions are also going to represent an inflammatory process that accelerates the loss of brain volume as one of its consequences.

One of the, perhaps, principles of the disease is that the immune system - you can also identify it is inflammation that occurs in the brain. The immune system is what is generating and affecting the brain's ability to compensate. So patients... we don't know why patients with multiple sclerosis develop the disease. But what we do know is that their immune system is what is reacting against their brain cells, the myelin in their brain.

And there are many consequences of that. But one is that inflammation can damage the connections between brain regions, hampering the brain's ability to recover effectively. And there is also research explaining how that inflammation can disrupt neurovascular coupling, which is critical for brain health and the health of the human body. So, now that we know on a

practical level what is happening in the disease... We have been talking about the biological and pathological part of the disease, about the lack of compensation that the brain has through the inflammatory process, about the consequences of brain atrophy and the loss of adaptation in the brain. Let's talk about what can be done to help.

Not everything is bad news in this presentation. So what I'm going to share with you on the next few slides is how to support and help brain health when living with multiple sclerosis.

And these, perhaps, are the pillars of what we call the components of brain health in multiple sclerosis. On the one hand, it is essential that there be a prompt diagnosis, an early diagnosis. Perhaps one of the worst risk factors and prognoses that a patient can have with the disease is when there is a period of time between the patient having their first symptoms and the patient being diagnosed. The longer this period is extended, the worse their clinical functioning is in the future.

Related to an early diagnosis is, of course, appropriate treatment, early treatment. The sooner inflammation in multiple sclerosis is controlled, the better the brain can be allowed to recover and the more current brain health can help with clinical pathology. In addition to these concepts, it is very important to take into account a healthy and well-balanced diet, a healthy lifestyle, exercise. And, as we will also talk about, exercise not only helps the body to be healthy, but it also helps the mind and brain to be healthy.

We will now go into a little more detail with these principles or pillars of brain health. We know that delays in terms of a timely and early diagnosis generally occur when a person with symptoms of multiple sclerosis does not see a neurologist. That is why it is very important to recognize what the symptoms of multiple sclerosis are. We know that the most frequent are sensory symptoms, for example, paresthesia or tingling in the hands, feet, face.

Also vision loss, a loss of vision. Not only is it very important that these symptoms be present, but there also must be signs in the physical examination. To give you a concrete example: if a patient has symptoms of tingling in their arm, for example, when seen by the neurologist or doctor, that tingling must be associated with a lack of sensitivity to touch. It is the same with, for example, visual symptoms. Visual symptoms have to be associated with a lack of visual acuity. And the duration of symptoms is also important.

We always say that in multiple sclerosis there have to be symptoms for at least 24 hours. So those symptoms that last for a short period of time, for minutes, and that end up going away without any kind of this problem, those really are not symptoms that constitute a clinical attack.

This figure tries to explain what the natural history of multiple sclerosis is, that is, what happens in a patient with multiple sclerosis from the beginning of the disease, which you can see in the center of the slide, which is CIS, clinical isolated syndrome. It is a term that describes the first functional clinical attack. And you can see that over the years, patients not only have clinical attacks, which are generally one attack every eighteen months or two years without treatment, but they also have a lot of brain lesions, and you can see it here.

Brain lesions are represented by those... below the slide, by the arrows that you see that represent the number of brain lesions. And we estimate that at the beginning of their disease, patients with multiple sclerosis have between five and ten brain lesions every two years or so. That is without treatment, patients who do not receive any type of treatment. And if the disease continues, you can see that patients continue to accumulate brain lesions.

And as we said before, there is a neuronal loss, an axonal loss, which is represented by the red line, which will determine brain atrophy or advanced brain aging.

How can all of this be prevented? As we said before, timely diagnosis, proper treatment. But there are also nutritional and environmental factors that will benefit a favorable prognosis of the disease. We know that low levels of vitamin D, for example, are associated with worse clinical outcomes. I know that one thing you can do if you have multiple sclerosis is to ask your doctor to measure your vitamin D levels and, if those levels are low, that a supplement can be taken. And the vitamin D supplement can be taken orally. It can also be supplemented through diet. We also know that obesity, for example, can negatively affect multiple sclerosis. Multiple sclerosis patients who are obese have worse clinical outcomes. And we also know that socioeconomic level, for example, negatively affects clinical results, and that it might be related to the lack of access to doctors or to the healthcare system, lack of access to a timely diagnosis.

In terms of diet, there is a lot that has been studied in multiple sclerosis, and perhaps the diet with the greatest clinical evidence is what is called the Mediterranean diet, which is mostly made up of - the Mediterranean diet - of fruits, vegetables, and cereals. You don't actually have to have animal protein, but if you want to include animal protein in your diet, fish and shellfish have the best effect on brain health, and what you can see here is that red meat is perhaps the worst. And that's because red meat is generally associated with a higher amount of saturated fat. And you know that saturated fats, especially those of animal origin, have the worst effect on brain health. So the recommendation today is that you try to get most of your nourishment through vegetables, fruits, and plant-based protein. And if you really need to include animal protein, consider fish and seafood as the largest part. Regarding nutrition, it is also important to maintain adequate hydration.

And if you choose to drink alcohol, do so in moderation, and do not exceed more than one glass of wine per day. To the right of the presentation you can see a very interesting study that has been done with a positron emission resonance that measures brain activity. You can see that patients who follow a Mediterranean diet have increased brain activity.

So not only do they have better brain health, but the brain is much more active and brain function is much more efficient.

Another nutritional factor that is important to eliminate is salt. And salt, as we know in medicine in general, whether due to cardiovascular levels or another risk factor, is not good, and there is no exception with baseline multiple sclerosis. It is a negative factor in multiple sclerosis. And today it is known that patients or cultures that actually have a higher proportion of processed foods, for example, patients in those cultures have a worse clinical condition.

As for smoking, you also know in general, it is not good for your health or for multiple sclerosis. People who smoke are 50 percent more likely to develop multiple sclerosis. So, if you have a family member who is worried about whether or not they will develop multiple sclerosis, you have to tell them not to smoke, not to eat salt, and to check, for example, their vitamin D. These are things that you can educate your family members about, that there are practical ways to reduce their risk of developing the disease.

What activities can you do, in addition to what we have discussed previously, to keep an active mind? And it is very difficult in multiple sclerosis. When you see patients, they have many challenges. There is a greater amount of depression, anxiety, stigma. So it is very difficult to

really be... excited to do all these kinds of activities, but it is very important to do them. And there are times when patients need to have family support, social support to help them.

So if someone in your family has multiple sclerosis, you can help encourage them to be cognitively and physically active. Here is a list of activities that you can do that have been related to better quality of life and brain function improvement such as the use of puzzles, hobbies; music is very important, either through learning an instrument or also simply listening to music.

Music has a very positive effect on brain health and also on mental health.

There are many studies that have... have looked at, for example, the use of music therapy in patients with multiple sclerosis. And music therapy is not only used to improve, for example, motor function in patients who have lost upper limb dexterity. For example, instruments like the violin and the piano are used to help them increase motor dexterity. But music also has an effect on cognitive functions. Music can be used to improve memory. For example, through songs, patients can remember facts better than if they tried to memorize them without music. Music also has a positive effect on depression and anxiety, which are factors that are very frequently associated with multiple sclerosis.

And studies that have been done with nuclear magnetic resonance suggest that musicians, those people who really take to music professionally, develop parts of the brain, in this case, in the portion called the corpus callosum, which is the link between the right and left part of the brain. We all have the corpus callosum, and multiple sclerosis preferentially affects the corpus callosum. And there is brain atrophy that occurs, and one of the parts that is generally affected the most is the corpus callosum, which is key.

It is what connects the right and left part of the brain and helps optimize brain function. And it has been seen that this part of the brain is more highly developed in professional musicians, so it is interesting to see that perhaps simply by playing music you can improve not only brain function, but also the structural function of the brain.

We have already reached the end of this conversation, the idea of which was to give you a summary of what is known today about multiple sclerosis from the point of view of what the risk factors are, what the role of race is, for example, what happens in Latin American patients with multiple sclerosis, but also to give you an idea of what brain health is and what you can do to improve brain health. Brain health represents optimal brain function.

It is what allows us to remember, learn, play an instrument, concentrate, and maintain a clear and active mind. Although brain health declines over time, and this happens to everyone throughout the aging process, this change is most noticeable in people with multiple sclerosis who are not receiving medicine. Brain lesions, loss of volume, and decreased cognitive reserve represent key ways in which brain health declines in patients with multiple sclerosis.

The interventions that can be done - whether it be an adequate early diagnosis, a balanced diet, a healthy lifestyle - will have a very positive effect on maximizing neurological reserve, cognitive function, and physical function by reducing disease activity.

Moderator:

What can I do every day to help maintain brain health?

Dr. Miravalle:

What you can do every day to maintain optimal brain health is to identify activities that bring you pleasure, that you enjoy doing, but that are also good for your cognitive reserve. Those can be cognitive activities, such as reading, listening to music, physical activities such as walking. Lastly, we recommend that patients get at least 5 hours of aerobic exercise per week, and those 5 hours can be distributed in whatever way they prefer or that is best for their quality of life.

Walking, running, cycling, swimming, and all kinds of aquatic therapy are very good for multiple sclerosis since patients can maintain a relatively stable body temperature, and we know that in multiple sclerosis drastic changes in body temperature are related to fatigue and motor functionality. So you have to develop a recipe that is healthy for your brain, but also something that you enjoy. A quality of life that is also cerebral is directly related, as we said before, with diet. So look at the nutritional factors that you have in your diet and try to eliminate those that you do not need, such as salt.

Moderator:

Music is so important for brain health. Should you play a musical instrument instead of listening to music?

Dr. Miravalle:

As we said earlier, music and the brain have a symbiotic relationship. Music not only increases brain power, but also has a positive effect on brain health and mental health. It has been seen in studies that professional musicians, for example, have better brain adaptation, certain areas of their brains are significantly developed; but also individuals who do not play music professionally benefit from music.

You do not have to be a professional musician to benefit from music, and that has been seen in studies with patients with multiple sclerosis, with patients, for example, with Parkinson's disease and with Alzheimer's, that simply from being exposed to music, patients have a greater impact and brain activity, better quality of life, better emotional activity and emotional health, such as with depression and anxiety. And most of those studies have linked that the amount of music you should listen to is approximately more than 20 hours per week. So a practical thing you can do is put on music when you are cooking, when you are doing what you do at home. What kind of music doesn't really make a difference; even though I would like to say that classical music is better than any other kind of music, that's not true. Music, your brain, and whatever music you enjoy is critical to your brain.

Moderator:

Dr. Miravalle shared many great suggestions in terms of brain health, but I feel like it could be a lot to balance diet, exercise, and all the suggestions he shared. How would you suggest balancing it all?

Dr. Miravalle:

Like everything in life, it's a question of balance, right? You shouldn't try to make all these changes at once because chances are that you will feel like it is a lot at once and you won't stick with it in part of your life. So what you should do is have a plan. And that plan - it is very important to have someone in your life to help you stick with it, be it your family or friends or whoever. And that plan should be something that is practical, something that is realistic.

In other words, that you can do. And give yourself a time. It is very important to have a time, a deadline, right? You might say well, in the next month I am going to eliminate salt from my diet, and it is a step that you take. You don't have to do everything together, and once you've done it, you've done it. Well, next month I am going to decide to walk 30 minutes a day. And over the course of a year, you realized that you have included 12 factors that are healthy for your life, and that way you don't try to make all the changes together.

And that way, you will most likely stick with those changes and adopt them permanently in your quality of life.

Moderator:

One of the suggestions mentioned was to socialize. During the pandemic, I am particularly aware of the restrictions around socialization, which is why I have tried to connect with my parents, who are already older, through Zoom and FaceTime. I still worry about their brain health. My father lives with MS. Is there anything I can do to ensure that during the times when I can only connect virtually, I know that I am connecting in a meaningful way with my parents?

Dr. Miravalle:

One of the many negative consequences of this pandemic is social isolation, with a greater amount of physical conditioning, a greater incidence of depression and anxiety. We see it in our patients, that despite the fact that their disease itself is clinically stable, the patients feel worse. So it is very important to have a... to be proactive with the presence that you have with your relatives with multiple sclerosis, either through technology, phone calls, video calls, Zoom, but also by, for example, sending them packages or letters or really going back to that communication that has been lost all these years. If you can ship, for example, nutritional products, for example.

There are many developments that... Something positive that came out of this pandemic is that there has been a boom in the development of technology and distance learning activities, for example. So there is a lot that you can do, but you have to be proactive. You have to take it into account and really stimulate the approach either directly, if possible, in a healthy or safe way, but also indirectly through technology.

Moderator:

Thank you for joining us in this webinar. MSAA would like to thank our funding partners Bristol Myers Squibb, Genetech, and Johnson & Johnson for supporting this series. We would also like to thank Dr. Miravalle for taking time out of his busy schedule to provide us with this critically important information, and to Impact Education, LLC for their partnership in presenting this program. To learn more about our online educational programs, visit the MSAA event calendar for upcoming webinars.

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