



Let's Talk About Brain Health and MS

Presented by:
Dr. Diana Andino

Yahaira Rivera-Bobadilla:

Hi. Good evening, everyone. Welcome and thank you for joining MSAA's live webinar. Tonight, alongside Dr. Diana Andino, we'll be learning about brain health, MS, and cognition. I'm Yahaira Rivera, Director of Mission Delivery and Program Development for MSAA and your host for the program. Before we get started, I would like to take this opportunity to go over some of the resources and services that MSAA provides.

As you may know, MSAA is a national nonprofit organization dedicated to improving lives today through vital services and support for the entire MS community. Our services include a national helpline providing English and Spanish services Monday through Friday 8:30 a.m. to 8 p.m. Eastern time. Also, MSAA provides equipment and cooling products designed to improve safety, mobility and help with heat sensitivity.

We also offer an MRI access program to help cover some of the costs for individuals with MS who qualify for assistance. We provide educational programs, including webinars and on demand videos, online tools, publications and digital resources. That includes the ultimate MS Treatment Guide, which is an interactive guide that describes and compares 20 FDA approved MS treatments and will help you make informed decisions and choices. Additionally, MSAA offers support through community connection to help you stay connected with other members of the MS community. To learn more about MSAA's programs and services, please visit our website, mysaa.org and give us a phone call to speak with one of our client services specialists.

Just a couple of reminders. During tonight's program you will have the opportunity to ask questions by typing them into the chat box or by using the Q&A. We're going to do our best to answer as many questions as possible during the Q&A portion of tonight's webinar. At the end of the program, we ask that you please complete a brief survey that will appear on your screen. Your feedback is extremely important to us. A link to the survey will also be included in the chat box.

Also, please note that this program will be recorded and will be made available on demand on the MSAA digital library in the upcoming weeks. As a friendly note, MSAA strives to provide useful up to date information on matters of concern to people living with MS and their families. This program is for educational and informational purposes only and does not constitute any

formal recommendations. Please speak with your doctor or healthcare provider team if you have questions or concerns about your diagnosis and treatment.

And now, without further ado, I'd like to introduce you to our speaker. Dr. Diana Andino is a board certified neurologist and fellowship trained in multiple sclerosis, neuromyelitis optica, and other conditions of the central nervous system. She completed her fellowship at UT Health Austin's Multiple Sclerosis and Neuroimmunology Center within the Mulva Clinic for the Neurosciences and her neurology residency at Loyola University Medical Center in Chicago. Dr. Andino is currently practicing at Austin Regional Clinic in Austin, Texas. She's interested in improving access to care for underserved patients, especially those affected by multiple sclerosis and related diseases. She is a member of the MSAA's Hispanic/LatinX Advisory Board, and also a member of the American Academy of Neurology. Welcome, Dr. Andino.

Dr. Diana Andino:

Thank you, Yahaira. I really appreciate the introduction and thank you for everyone for joining us today. Really excited for this. So as Yahaira said, today we'll be learning a little bit more about how MS affects our brain and central nervous system and how that can cause some symptoms, including cognitive changes and things that we can do about it to improve our health and especially our brain health. These are some of the disclosures that I have. Next. During the presentation, we'll talk about different processes that affect the brain function. We'll talk about what it actually means when we say brain health and how we focus specifically on multiple sclerosis care and brain health and health and lifestyle behaviors that can improve our health in general.

So just so that we start all on the same page, we all know someone who has been affected, or we all have MS. One of the things that usually it's important to remember is that you are not alone in this time. In the world, when we look at the statistics of the patients that we do know that have MS, about every 5 minutes, someone somewhere in the world is diagnosed. So it's a fairly common disease to have. In the US, the latest estimate was close to a million people living with MS. But that doesn't really include all the ones that are not diagnosed or that do not have an established healthcare professional. But we think that it's over a million people that have MS.

We know that it's a presentation that usually involves relapses and progression symptoms and is basically, a very basic way to put it, our immune system attacks and damages the tissue in the central nervous system. And when we refer to the central nervous system, as physicians, we're telling you it's the brain, the spinal cord and the optic nerve. That's why the imaging that we do focuses on those areas. It's a progressive disease and is a neurodegenerative disease, and therefore you'll have some disability both physically and mentally along the way. And one important fact to consider is that for young and middle age people, it's one of the leading causes of non-traumatic disability. That means that it's not due to a motor vehicle accident, but it's a degenerative disability that causes a lot of people to be out of work, unfortunately.

So when we look at different mechanisms and pathological changes with multiple sclerosis, we don't really know what the process is, but we know that it's a combination of multiple mechanisms going on and also pathological changes that affect different areas of the central nervous system. There's an ongoing inflammation that sometimes we can see lesions enhanced on our MRI, and what we mean by that is that the MRI usually includes a dye that you receive that will light up inflammation areas and those areas we'll see, we'll call enhancement lesions. And what that means is an indication that there's an active blood brain barrier that has been broken due to some sort of pathological process and is letting dye go in.

And therefore, when we take the picture, it lights up. The goal is to have no lesions light up because that means that there's no active ongoing inflammation. But when you have an acute relapse, or what we ask patients to get an MRI to see if they have any enhanced lesions, is because we can act on them with steroids most of the time. And that basically decreases the inflammation, blocks down the blood brain barrier and allows the healing process to start.

So at the same time that you have inflammation, you have neurodegeneration happening, and you'll hear me say that a couple of times throughout the presentation. What I'm referring to that is basically axon damage, which is a part of the nervous system as well as the neuronal loss that is caused by oxidative stress. Basically just a lot of scavengers that shouldn't be there, causing a lot of extra stress on the cells and that leads to the engine called the mitochondrial to not function well, and then you have more brain tissue damage. While those two processes are going on, the inflammation and the degeneration, your brain is supposed to keep up with it, but in some patients, like MS, you're not able to keep up with that compensatory mechanisms that our brain is supposed to have, and that includes the remyelination, like the recording of the the brain and the nerve cells have a myelin. So you're not able to produce again that myelin to recover, and you're not have enough neuroplasticity that will overcome those areas that have been damaged with good, healthy tissue to take over those functions. So as you can see, it's a super complex process and it's very difficult to target a therapy for it because there's a lot of things that are going on. So unfortunately, we're learning a lot about it, but there's not a lot of therapies that will target all of it at the same time. Next.

So when we look at those different processes, like we talked about the acute inflammation, there's also chronic inflammation, you'll have neuronal loss, axonal degeneration and the demyelination that loads both the white and the gray matter. And each patient is very different. As you know, your MS does not look the same as your neighbor's MS, or your family member's MS, or even twins. Sometimes one has MS and the other one doesn't. But what we know now is that the same clinical presentation of MS can be caused by different processes along your nervous system. So the progression that you're seeing for disability can be actually in one patient being those more from chronic inflammation, and you'll hear me say "smoldering disease" is kind of like a buzz word right now for chronic active lesions, and external degeneration, on one hand.

But in the next patient, you might see that their processes of disability is actually induced mainly by demyelination and not enough neurons, neuronal loss and things like that. So each patient is different and that's why we see sometimes they respond better to other medications. So we're understanding the processes that lead to disability a little bit better so that we can have better target therapy for each patient down the line.

At the same time, you will have different factors that are super important to include when we're talking about each patient's presentation. Genetics play a role, age, comorbidities, life style, environmental factors, smoking, nutrition, all that stuff play a part into all this processes that are speeding up or slowing down. So that's why brain health is very, very important.

From... when assessing these processes, the best thing that we have right now to look easily and more accessible to lesions, it's an MRI. As Yahaira mentioned, they have a wonderful program for access for MRI. So the reason that it's really important to have that done on a yearly basis at least, is that we can assess brain lesions, and that can help us make medical decisions about your management. At the same time, sometimes we do it sooner to detect lesions so that we catch them early, if we're able, so that we can start treatment early on as well. And while you're on treatment, it's important for us to monitor your progression and also for

side effects. If you are developing any sort of infections or you're not responding well to the medication.

And what this picture shows is basically the different type of lesions that we look for as neurologists when we're looking at your MRI. So the first one on the top, you can have what are called black holes, are just basically kind of like the chronic nerve loss that is irreversible. So that will stay with you for a long time. There's another image on the other side that shows they got a Lorentzian line at the top, at the bottom. And that's again, just the blood brain barrier kind of breaking down and allowing for the contrast to go. So that's why it's important for you to continue to get MRIs usually.

When we look at the brain atrophy, and what I mean by a brain atrophy is just the amount of brain volume that we see, there's not a super good way to measure it. But our MRI pictures, again, can tell us a little bit about the brain volume and give us like idea of how you're doing in that sense. Brain atrophy in many people with MS is a lot faster than the usual and precedes throughout the disease course. So it never stops. This example shows actually that people with MS untreated, so not on any therapy, versus patients that have been healthy without an MS diagnosis.

So on the green line, as you know, as we age, all of us will have some sort of brain atrophy happen. That's part of our normal aging process. But in patients that are not treated, their atrophy rate, it's actually more than three times what it should be. And it starts pretty early on, as you can see, like at age 25, you're already losing some of that good brain tissue. And at the beginning of your age, your brain is not as flexible. If the brain wasn't as flexible to keep up and compensate for those atrophy and for those neuronal losses, doesn't we're all know losses, you will have a lot more symptoms. But because our brain is so smart and flexible and the neuroplasticity happens a lot better when we're younger, we're able to compensate, which means that ongoing damage may go on, may not be recognized until our reserve and our good tissue has deteriorated significantly.

I know this is a lot of information, but the next slide, please. But this is the kind of the last about, kind of, our pathology, our science part of the presentation. There's different processes that are causing inflammation and degeneration. So there's a really good review article that shows different ways to classify MS lesions. There's one that is called active, another one that is called inactive and there's one that is kind of in between, can be active or inactive and it's called smoldering, kind of this in-between lesion that stays a little bit longer, chronically.

When we talked about different components in our brain, there is macrophages. We'll start with the top lesion, the active one. So it includes macrophages and microglia, these are just different components that are in our brain tissue and throughout our body. But when we think about macrophages, it's basically a type of a white blood cell that helps eliminate foreign substances. And it's basically like a scavenger that engulfs something that shouldn't be there or a virus or a foreign visitor and it creates an immune response to fight that off. So when you have an active lesion, you have some inflammation going on that this macrophage or this scavenger ghost tries to fight that off.

With microglia is basically the cells of the brain that regulate that development of the brain, it maintains really good networks for neuron connections, and it also helps with injuries. It actually repairs the injury itself. So it's a good cell that we should have, but in lesions with MS, it actually gets lost. So some of the new therapies that are being developed are focusing on this microglia to see how we can enhance it or maintain it longer, so that way it creates a better protection.

So with active and demyelinating lesions, you may develop an inactive lesion as well. So then you have this mixed, this smoldering lesion and it can be demyelinating or it can be post-demyelinating, which means that if the damage is happening or it already had happened. During this time, when we take an actual slide picture, as is depicted on the second from the bottom, you get this rim of little macrophages and microvilli are kind of fighting off, but it's still an ongoing inflammation. So it's not a lesion that it's all done and without any problems, but it can still cause some symptoms of inflammation and it can expand over time and then it kind of stops expanding. So we'll learning more about it. We don't have a specific treatment, like I said, for smoldering lesions, but that's something that you might hear from your doctor talk about, or when you look at like different trials or things like that, microglia, macrophages, smoldering - that's all the words that you're now familiar with.

So that's my pathology and processes sort of a slide. We're going to talk more about the things that we're familiar with now, the symptoms of MS. And these are something that we are all familiar with, but we'll just go over a quick overview of things that MS can cause. Next. So when we look at MS, it can affect a lot of different areas, you'll have depression, anxiety, mental health complaints, cognitive impairment, vision loss or double vision. You can have various spasms or stiffness, feeling very clumsy or uncoordinated, poor balance, tremors, sexual dysfunction, bladder dysfunction, bowel dysfunction. You may have problems swallowing or speaking. And then vertigo can be like kind of a very early symptom sometimes. And it also affects your sleep. At the same time, kind of it's a general complaint or symptom that we hear is sensitivity to different temperatures, whether it's too hot or too cold, some pain, general pain fatigue or exercise intolerance as well. So a lot of things can happen with MS, unfortunately. Next.

So when we see those symptoms, the burden of this is itself as it continues to worsen, the brain continues to accumulate damage. And as you see, we started the circle from the top right side corner, we said that MS affects all areas of life and then you have a quality of life that is pretty poor, that you're not able to compensate well. And as the disease advances, it continues to cause more severe symptoms. And then we said that it causes disability and unemployment and then you lose insurance and then you increase your dependency on family members and caregivers. And anytime you have a relapse, you go to the hospital, and it just creates this really awful circle that it continues to affect. So our goal is to intervene early so that way we can prevent disability, we can prevent unemployment and give you a good quality of life, even though we don't have a cure for MS, our goal is to start treating early.

One of the things that we talked about causing unemployment and disability., one of the most common complaints that I hear is that cognition is not as sharp as it was before, or that I cannot think as well as I could before. So... next. So when we think about the cognitive impairment or just basically bad memory or bad processing speed, all that stuff gets comes clumped together into cognitive changes of MS. What we're actually seeing is that lesions in the white matter or brain atrophy as a whole or the gray matter lesions, any lesions sort of in the areas of our memory centers in our brain can lead to cognition impairment and that by itself can be a very early sign of something wrong and something that could potentially lead to an MRI that will detect MS early on.

Cognitive changes is a very common complaint and more than 50% of people with MS will complain at some point of some cognitive changes, including when you're in the early, early stage, like sometimes we're referred to clinically isolated syndrome or ideologically isolated syndrome, it's still all MS, but just a very early stage of MS. But cognitive changes can be

present as early as that. Most commonly, the things that you will hear about getting affected is processing speed, which is basically how fast can you capture information or process information when you're at a task. It can also be your memory just referring to your recall, to your ability to process memories from before. And those are usually the most common things that people notice, but also when you do a more thorough assessment or when you have patients ask more specific questions, your attention is actually impaired as well.

So the tasks that you were doing before, that you could multitask and see the TV at the same time that you're talking to someone on the phone and writing your text message on the other side, that all gets really difficult and your attention to details will become impaired as well. Executive function is really important, especially for all of us who are trying to do good decisions throughout our lives, our executive functioning, you know, helps us pay our bills on time, makes decisions of common sense. And if we don't have a good function of that, we won't be able to keep up with those more complex tasks.

Another common thing that you will hear patients say is I cannot think the right word at the time or I know what I want to say but the words just won't come out so that a fluency and that a verbal recall is affected. And most commonly we just say a word finding difficulty and that's a very common complaint as well.

Some under-recognized symptoms of cognition issues are actually what is called visuospatial perception, which is actually the relationship of your visual system and your space in time and your perception of the world; trying to find your space and what's coming at you, who's coming at you, recognizing their features, recognizing places. And that gets a little bit more tricky when you have poor cognition and impairment with MS. At the same social cognition, that refers to the ability to interact while doing events, or when you get a lot of social stimuli, that can be very overwhelming. And that's common, it's not something that we usually talk about, but a lot of patients have started to recognize that when we ask those questions, Actually, I do feel that I get overwhelmed when I don't have social cues anymore, I'm very inappropriate, or their partners will say that too. So we have to be cognizant of those changes. And start asking those questions as physicians as well, but also bring it up when you're a patient.

So that's all in terms of like symptoms. And I want to move on to the next slide so we can get to the actual part at the top where it's brain health and everything that comes with that. So couple of things so that we all are on the same page, definitions so that we are knowing what are we referring to when we talk about brain health, the World Health Organization, or W.H.O., actually has a definition regarding brain health, and it refers as: the state of brain functioning across cognitive, sensory, social-emotional, behavioral and motor domains, allowing a person to realize their full potential over the life course, irrespective of the presence or absence of disorders. It's a lot of words, but it's basically giving you all the functions that you should have as a normal person and allowing you to have a full potential irrespective of what disease you have. And that's what we are striving for.

Another thing that we'll be talking about is brain reserve. So that itself refers to the physical quantity of the brain tissue that you have. When we are born, we're all given a certain amount of brain volume and that is the term and genetically or congenitally that we cannot change. But that's our reserve of what we have. And a different aspect, the cognitive reserve, is actually the ability of the brain to process tasks and to actively compensate for physical damage. So the cognitive reserve is independent of how much brain tissue you have, but is actually how much of that is working and compensating to be able to... for you to have a normal day to day activity, basically.

So, when we explore further those definitions, what we are seeing is that in people with MS, brain health as a whole declines faster due to damaging the myelin, the neurons and in the brain atrophy. So like we said, the brain reserve affects amount, and if the brain wasn't as flexible and compensating, then you will have a lot more problems early on. However, there's a finite amount of brain tissue that can adapt to change, and that brain reserve, which is actually cognitive reserve, is slowly used up over time, and if the brain continues to do that, your clinical symptoms will become more apparent. And the ongoing damage will cause more problems than they did earlier on in the disease. So, as your brain reserve goes down, your cognitive reserve goes down, that all is going to show up as more clinical symptoms. And that influences the progression of your disease itself. Next.

So there's an international consensus about the quality of standards to diagnose MS and brain health focus in MS care. So we always say that "time is brain," as in, like, the sooner you do something to save your brain, the better it's going to be long term. When we have irreversible damage and cell loss, the frequency of the inflammation attacks are really often at the beginning of the disease, usually, during those relapses. Early treatment with any disease modifying therapy gives you the best outcome, as it continues to lower relapse rates. And then the goal is to have less disability progression and overall improvement throughout your life. At the same time, lifestyle choices that are not healthy or comorbidities, that we will talk about, kind of worsen those outcomes and expedite the disability and the atrophy and neuronal loss as well. So the goal is to preserve as much good brain tissue and maximize the lifelong brain health by reducing disease activity with the different drugs that we have, but also modulating the lifestyle and the comorbidities that we encounter a lot in our lifetime. Next.

So some of the things that we can do to improve our brain health or preserve our cognitive reserve is basically the things that all of us have talked about with you at some point or that your physician has mentioned to you. Smoking is really bad, we don't have to tell you that. But please just stop smoking and find help if you are smoking, on how to quit. It's one of the best things that you can do as a patient with MS if you do smoke, please stop, as it may lead to a lot of more problems. It not only decreases the brain volume at a faster rate, it actually creates more of an inflammatory state in your body, and that creates more relapses and more disability, and overall, you'll have poor outcomes.

At the same time, smoking has been linked to increasing cognitive impairment. So it can actually induce a lot of those symptoms that we had talked about - the memory loss, poor attention, all of that can be a sign of ongoing inflammation in your brain and ongoing damage. We do know that smoking causes cancer. It's important to get those screenings. But if you do have a prolonged smoking history, your survival, or like, how long you live may be decreased as well. So there's all reasons not to do it. But if you do, as soon as you stop smoking for even 72 hours to the first week, we already see different pathological changes, actually, in your body for the better. And patients will start feeling better within three days as they stop smoking. Usually energy levels will go higher, less inflammatory changes, their disease may be less active, inside their lungs you can actually see different changes for the good. So, it's reversible, for the most part. So the less smoking history that you have, the better.

We do know that a study... Oh sorry, one more thing on the last slide. There's something called clinical isolated syndrome, which is kind of the first time that you encounter an MS symptom, and then see something, within your MRI or something suspicious. They have a study where they have these patients who are diagnosed with CIS, or clinical isolate syndrome, or smokers, and they compared them to patients that were non smokers. And what they noticed is that

patients who smoke are twice more likely to develop more inflammation and inflammatory lesions throughout their central nervous system, brain and spinal cord, and develop more MS full diagnosis criteria sooner than the other people that do not smoke. But again, clinical isolation syndrome is kind of like your early onset of MS, so our criteria is changing a little bit. But again, it just shows how smoking can expedite that inflammation and those relapses and further loss of brain tissue. Next.

The next thing that we always get questions about is kind of like, what about my food and my nutrition? What should I be eating or not eating? And fortunately, there's no specific diet to follow. Despite a lot of different research on the field, we do know that what we eat is also medicine. So we do want to be mindful of that. But at this time, there's no clear diet to follow except what we'll discuss is a mediterranean style diet, which is more of a non-inflammatory diet. But again, there's no specific type that has been studied for MS. When you ingest something, food or drinks or anything like that, it actually changes the microbiome in the gut. And that is basically little bacterias and different things that we have in our gut system, like in our intestines that are hanging out and are supposed to be really good in balancing different toxins and giving us antibodies and creating all this wonderful ecosystem.

But sometimes when we ingest food that it's not as good as nutrition value or actually is really bad in terms of content of sugar or fat and all that stuff, it can have a negative effect on your immune system. So we try to treat food as our medicine as we think about not only taking our disease modifying therapies, but also as we take our food, think about it that you are actually doing something for your body, for your gut, and therefore for your immune system that can have a good long term effect.

With the Mediterranean diet, what that focuses on and has more of the study in the neurology world is basically creating a less inflammatory state in your gut microbiome and in your immune system. With the Mediterranean diet, it's including a lower sodium or salt intake, limiting the sugars and the processed foods, lots of fruits and veggies, but also being mindful of the fruits that have a lot of different carbohydrates and sugar content, focuses on lean source of protein, so fish, clean meats and, you know, chicken and all the things that not have a lot of fat. But if you do eat fat, it tells you to eat healthy fats, which is kind of your avocado, your nuts and all that good stuff. At the same time, it focuses on fiber as it helps with digestion, a less common symptom of MS and the GI tract is usually constipation. So that's something really good to remember. And it all balances are with hydration. There's no magic number to take of water, but it's really important to remember to take some water with you throughout the day as you're just managing your microbiome and therefore you're managing your immune system.

When we talk about supplements, again, there's no specific supplement that has been studied to reverse damage of MS or to prevent demyelination. But one of the few things that has been a studied with pretty good data is vitamin D, not only for MS, but also for other autoimmune conditions. We know that monitoring vitamin D levels and making sure that they're optimized can have really beneficial effects on your fatigue and other symptoms. So we really encourage patients to take daily vitamin D. Next.

The next thing that we're going to talk about is comorbidities. So those are basically other illnesses that you have besides MS, and that we're all going to have, that can expedite or accelerate disability and increase our risk of getting sicker or even dying or reducing our quality of life. Some of the common ones I just mentioned here, but there's a lot of different ones. Most commonly is high blood pressure or heart disease, that's super common in a lot of our Latino populations and black people. But it's common for everyone. So it's really important to ask your

doctor or check them for free at the pharmacy or somewhere else that you have access to a blood pressure monitor, if you're concerned about it, if you have a family history of it. Is interminable, so they can give you medication, and therefore you're able to manage it as an outpatient before it gets into a problem, but if you do have prolonged high blood pressure and heart disease, that actually can lead to lower brain volume, and that refers again to that cognitive reserve, that brain atrophy rate that we talked about before.

Diabetes, high cholesterol, or problems with your peripheral artery system can accelerate the disability, again, because we know that diabetes causes nerve issues, causes blood clots. If you have peripheral artery disease, it causes inflammation and just more disability along the line. So it's really important for you to manage them well to prevent complications from them. Same thing with diabetes. We know it can lead to vision loss. So instead of blaming something on MS, that I cannot see anymore, it might be something related to something different, like diabetes that is affecting my eyesight. And so it's important for you to diagnose those early so that way you can prevent changes later on.

With mental health, it's a really big topic that probably needs its own talk. But it can... having undiagnosed or not-treated-well depression and anxiety can cause a lot of fatigue, a lot of cognitive changes, and overall just a low quality of life. And when you don't feel good or you don't think well of yourself, you're less likely to be on treatment and not take your medications. So it's really important for you to be conscious of that and ask for treatment from your doctor, for your mental health, or find your own counseling, find resources for that. And the last thing that I wanted to mention is infections, cancer, all that can lead to decreased overall survival. One of the things that we monitor with each disease modifying therapy is for infections, while you're on it. So it's super important that you keep up with all those screenings as well. Next.

With physical exercise, anything that is cardiovascular, that gets your heart pump going, will increase your cognitive reserve or brain reserve. And as you do that, you may lose weight. It's not the goal of exercise, but if you are overweight, the obesity has been found to actually cause more lesions or expand the lesions that are there because, again, it's a pro-inflammatory state. So any type of exercise that you can do will be great. Next.

When we look at different factors of lifestyle, we also include sleep, as it basically boosts your immune system overnight. So it's really important to create a good sleep routine. It will improve your mood every morning and just create kind of your own routine every night and go to bed at the same time and you will find a lot of relief with other symptoms as well. It's really good to consider your stress level. Some stress level is good for us, but a lot of stress can impair your immune system, and actually, again, not be able to respond to infections or over attack the good cells that you have. So medi... the actual medi... it should be "meditation" not "medication," can be beneficial to improve your whole brain health. So practicing anything that you find calming will be really important.

And lastly, something that we don't prescribe to patients, but we always should think about is having social wellness is really important, as it can show some improvement on your memory and making sure that you stay connected with your circle of friends or family, or encouraging you to connect with someone else, or the MSAA, and even if spending time with pets or friends or animals can be really beneficial because that will boost wellness and therefore your immune system. Next.

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So mental fitness is basically things that we can do to enhance our cognitive reserve. So there's no... it's kind of your exercise routine but for your brain; things that you can do to enhance anything intellectually and actually will give you kind of a protection, if you don't have any cognitive impairment yet, from developing it. So, higher education levels or just learning something new, reading, picking up a book, picking up a new hobby, creating something with art or just plain old brain games can be really helpful to maintaining sharp cognitive reserve. Next.

And when we talk about cognition, lastly, one of the things that I wanted to mention is that it's important for you to advocate for yourself, as well as your physician, to recognize that cognitive screening should be done early in your stage of MS journey. So ideally, this is kind of the timeline that will happen throughout your diagnosis. But we should tell you about awareness of cognitive changes and making sure that you know what to look for, but also your family members so they are aware about, just, education resources and things that we have available. When you're in clinic, we should be performing some sort of a screening test for cognition, not all the time, but at least once a year or every two years, that tells us how your processing speed is doing, how your memory recall is doing, and anything that will give us a baseline screening test. And then we monitor that over time, whether it's yearly or if you feel that something is changing sooner than that, every three months or every six months, it's really important for you to be monitored with that.

If there's something more worrisome, that you're no longer able to do your activities at work or that family members notice that you are declining faster than we should be, it's important to do formal testing. So there's something called neuropsychological assessment, which is basically a battery of tests that happen by an expert where they test different domains of your cognition and they can help us delineate if this is something related to MS directly. If this is something to mental health issues or is there something completely different process like Alzheimer's or vascular dementia or other things that we should be worrying about? And at the same time, that test can be used to provide accommodations at your job or apply for disability and things that are needed on in the future. The goal of all of this is to identify possible interventions early on and to improve the quality of life that you have on your day to day with accommodations that are needed. So all of this is something that I hope you bring up with your provider. Next.

And last thing I want to close out this presentation is touching a little bit about research. What we know about MS has been found through different studies and through different research. We don't do a very good job of advertising that research is really important, but I do think that one of the studies that came out of brain health, it's really cool that you guys can look into it, I'm not part of Cleveland Clinic, but this is from Cleveland Clinic. It's called Healthy Brain Initiative or HealthyBrains.org. And what I'm showing you here is actually my brain health index. When I took this test, this different series of questions to look at all the domains that affect our brain health, and it helps you optimize kind of your questions depending on your age and your education level and comorbidities and things like that.

So one of the things that they talked about at the end, after you get this score, kind of sees where you land throughout other people, but also strategies that you can do to improve how to... you know, according to this, I need to have a better nutrition and physical activity, so you can see, which is something that I will work on. But I think this is a really good research study to participate. And overall, I think that research is really important for all of us to continue to be part of. So I wanted to just to show you this so that you have a reference and something that you can act on at the end of the presentation. So, healthybrains.org. And I think with that we conclude our presentation, Yahaira, and I think we're good on time.

Yahaira Rivera-Bobadilla:

Yes. Thank you so much, Dr. Andino. This was such a wonderful and informative presentation and we'll now take a couple of questions from the audience. We received lots of questions, but thankfully some of them you were able to answer during your presentation. Some of the questions were about supplements, diet suggestions, activities that they can do. We did receive a lot of questions about what you mentioned, the verbal fluency. Do you have any suggestions for that? How can they help themselves at home, strategies or anything that they can talk with their provider about memory and verbal fluency?

Dr. Diana Andino:

Yeah. So one of the things that will be really helpful is to have a formal speech evaluation. So there's a speech therapist available similar to physical therapists and occupational therapists that will do assessments of that about your fluency or your writing skills and thinking skills. And they can help you delineate different strategies to help overcome it.

One of the things is to actually talk to people. So, during COVID, what we saw is that a lot of people were isolated and they were chatting through Zoom and they were chatting on games online, but they were not having that social interaction, that one on one talking. And that actually impaired their ability to perform. Once COVID restrictions were over, they were not able to keep up on the social aspect of things because they couldn't talk as well as before. So just the normal practice in calling a friend is really good and just reading out loud. It's something that the speech therapy people will tell you to do as well, even though it sounds really silly, but you're by yourself at home, just read out loud and that can help you get a lot of those words coming back. But it is a challenge for sure.

Yahaira Rivera-Bobadilla:

Thank you for that advice. You talked to our audience about the importance of MRI and we did have received questions about it. One of the questions is what about if I'm allergic to the contrast? Is there another tool that can be used to diagnose MS or to progress the monitoring?

Dr. Diana Andino:

Yeah. So contrast is... the more we know about it, the less necessary that it is for a diagnosis of MS, sometimes. So it's okay if you're allergic to contrast, we don't have to use it. The only reason that we will use contrast is that if we are suspicious of something that is active within the last five weeks, but if it's something older than five weeks, it's going to look the same with or without contrast. So we're actually shying away from giving you every single MRI with contrast, because there has been a study that shows that it accumulates in your brain tissue and found in pathology slides at the end of your life when they look at your brain. So we're trying to limit the amount of exposure to dye now. But again, another way that we can make a diagnosis early on for MS is one way is to show enhancing and non-enhancing lesions of MS, but another way is to do a spinal tap that will show oligoclonal bands of like ongoing inflammation. And that can be a different marker. So doing a procedure. Not ideal, but there is options. So you shouldn't be worried if you're allergic to dye.

Yahaira Rivera-Bobadilla:

Thank you. Lots of the questions were also related to how can a patient and also a provider distinguish between age related cognitive symptoms and signs versus MS-specific cognitive signs?

Dr. Diana Andino:

The best way to do that is through a formal testing. And I think one of the biggest challenges that we have as providers is doing that. With normal aging, there's a lot of things that could blame on normal aging. But when you have a 40 year old that looks or thinks like a 60 year old, that's something that you should address. But the best way is just to do like a formal cognitive testing, and that will kind of match you up with your peers and see if you are above the curve or lower than the curve. Getting access to good neuropsychological testing is a challenge, getting that access in your own language, like in Spanish, is a challenge, but make sure that you work with your provider. There are options for that.

Yahaira Rivera-Bobadilla:

And does age play a factor in those cognitive issues? We have a question, for example, do children with MS, or teenagers, also have these cognitive issues?

Dr. Diana Andino:

They do. So one of the common things for kids when they get diagnosed with demyelinating diseases or MS is they stop performing well in school or just have attention disorders that go underdiagnosed. So a lot of challenges that come in as your first symptom are cognitive because there's so much inflammation going on in your brain, usually when you're young as well. So that's very, very common to hear rather than I'm weak on my right arm or I cannot see, a lot of, like, I'm not thinking well, my school performance.

Yahaira Rivera-Bobadilla:

Thank you. That's very interesting. You talk about vitamin D and you suggested a diet that at least would help them. What about other supplements to help with cognitive issues, do you have other suggestions besides vitamin D?

Dr. Diana Andino:

There's not a whole lot that has been studied that we can recommend. The only data there's a little bit showing called coenzyme Q10 is a different supplement. But again, not clear. It's not FDA'd or anything like that. But there's some studies that coenzyme Q10 can be helpful, but most helpful will be just kind of like what you eat, how you exercise, how you sleep and all those good things.

Yahaira Rivera-Bobadilla:

Thank you. And more questions about cognitive, the brain health in relation to, when it comes to MS, is there a relationship or is there research that relates MS to maybe developing later on Alzheimer's or dementia?

Dr. Diana Andino:

Not that it will develop. Alzheimer's, specifically, is a different type of mechanism, of how... MS is affected by the myelin or the coating of your nerves. Alzheimer's, it's a different protein that gets accumulated. Same thing with like vascular dementia. It's like another type of dementia that is caused by a lot of strokes or high blood pressure. So it's different things that we see as a mechanism, but the presentation can be confusing. So a lot of patients will see, well, my dad

had always, oh, you know, memory issues, Did he have MS too? And it's not as clear as that, for sure. There's a lot of other things that can cause, like you said, even like other neurodegenerative disorders, like less diagnosed. So it's important to do like the testing and the assessments needed to delineate those two different processes for sure, and the MRI will be helpful too, so we can see.

Yahaira Rivera-Bobadilla:

Thank you, Doctor Andino, thank you so much for all the information. Our time together is coming to an end, but I would like to give you an opportunity, do you have any last advice or words for our audience tonight about brain health, MS, and cognition before we bring a closure to our program?

Dr. Diana Andino:

Well, I want to say thank you to you and your team for inviting me tonight and for everyone for joining. I think we got a really good audience tonight. So really happy about that. And that's the first step, just learning about it. I think the next thing that I could ask is that you bring it up with your provider. I heard this yesterday or I heard this tonight. What can I do about it? And taking charge of your own health will be the most important thing and changing your lifestyle or addressing all those issues that we have. So really appreciate all the time from you guys. And I'll be happy to connect individually if you have questions as well.

Yahaira Rivera-Bobadilla:

Wonderful. Thank you so much again for taking time out of your busy schedule to be here with us tonight, for all the information that you shared. On behalf of MSAA, we are very thankful to Dr. Andino for her time and for her presentation. Tonight's webinar was recorded and will be made available on our website. Please visit our MSAA website and check out our calendar for upcoming events and additional programs. On behalf of MSAA, thank you Doctor Andino, and thank you to our wonderful audience. Thank you for being engaged and for all the questions that you sent throughout the program and for joining us tonight. We admire your resilience and thank you for sharing your inspiring stories with us. Please take a few minutes to complete the brief survey. The survey will be on your screen and also in the chat and know that MSAA is always thinking about the entire MS community. And we hope that you and your families continue to stay safe. Thank you and have a wonderful evening. Bye bye.