Polypharmacy & the SLP during the COVID-19 Pandemic: Part 3

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- [Farzana] The title for our course today is polypharmacy and the SLP during the COVID-19 pandemic part three. It is my pleasure to introduce today's presenter, Dr. Jeanna Winchester. Dr. Winchester is a clinical cognitive neuroscientist who specializes in neuro degeneration and aging. She is a professor, a published author, and a scientist. Welcome Dr. Winchester. Thank you so much for presenting for us today. And at this time I will turn over the classroom to you.

- [Jeanna] Thank you so much. I really appreciate being here today and being able to present this part three of the polypharmacy course. As we have been going through these portions of polypharmacy as they relate to dysphasia and speech therapy in the current pandemic crisis, we have been going through the different systems of dysphasia. And today we're gonna talk a lot more about cognition. For disclosures, I do receive a paid honorarium from continuing ed for this presentation. And I also have a single member LLC that I utilize for this contract work, there's also other adjunct teaching physicians as well as my contracted work as a professor of medicine. However, I do not have any other financial disclosures to report.

In general, at the end of this course, we would like for you to be able to describe the risks of polypharmacy associated with dysphasia, speech language disorders, and cognitive decline. I hope that you'll be able to identify the factors contributing to polypharmacy and I'm gonna try to help you understand how that relates to teens, children, and adults during this pandemic. As well, you'll be able to describe the longterm effects of polypharmacy in cognition in individuals that have survived COVID-19. So we have been talking a lot about these bodily systems that are contributing to dysphasia and specifically how polypharmacy can affect each of these systems. Then we're gonna take that even further and continue to discuss how the pandemic and these serious infections can actually increase the likelihood of

dysphasia due to the breakdown associated with the infection, as well as the likelihood of a serious hospitalization and an infection increasing the risk of polypharmacy. The problem is is that this is kind of a three pronged approach because polypharmacy then can interact with those systems of dysphasia. Just to review, polypharmacy is defined as five or more medications being taken at any one time. We're gonna see that in truth, that it's closer to 10 or 12 medications that an individual is taking at any one period of time. Polypharmacy can result in falls, frailty, disability, and mortality in older adults, and polypharmacy in general will increase the risk of falls up to five times. For example, this can result in gait disturbances and can have effects on cognition. Polypharmacy and cognition is very important because the use of psychotropic drugs or psychiatric medications is another way to describe this.

Basically, anything that is going to affect either a psychiatric function or a cognitive function is a very significant type of medication just by the very nature of what it's doing. And the use of psychotropic medications to treat cognition or neuropsychiatric function is increasing, the number of adults that take them is increasing. And the number of prescriptions being written per adult is increasing. So polypharmacy is a significant risk for these types of adults with this type of medication, because they're likely to be receiving more than one medication at any given time and there's a high prevalence of this being provided to adults as time goes on.

This type of polypharmacy then can cause additional dysfunction in that adult, seeing the cumulative and interactive effects of taking five or more medications, we've already shown in the neurological and in the respiratory domain, that this can have a significant effect on the body including dysphasia. With cognition, though, it can go even further because the interactive effects and the cumulative effects of taking multiple medications of this kind can cause a significant breakdown of the cognitive and neurological systems. So a recent study looked at this investigating the relationship of antidepressants mood stabilizers anxiolytics, antipsychotics and analgesics, which is

basically gonna focus on antiseizure medication, different types of antipsychotics and things that are going to treat the pain in elderly individuals. Polypharmacy and these types of psychotropics medications were common because these can be prescribed an off-label situations. So a well-meaning physician may be prescribing benzodiazepines in order to treat inflammation and pain. Well-meaning physician may provide pain medication after a surgery, without continuing to understand what that person's level of pain is, and whether this needs to be titrated. We saw a major opioid crisis the last number of years, and this was because of the continued prescribing of pain medications when maybe the pain level was no longer proportional to the strength of the medication that was being provided. And there is an addictive quality to many of these medications.

The body can become used to these medications, it's called a tolerance effect. And then those individuals have to continue to receive higher and higher dosages of those medications just to be able to experience the same type of relief. You can imagine how this can go out of control when there are off-label uses for these medications outside the boundaries of what this medication was intended for. And you see this a lot in the use of benzodiazepines and other antidepressants in order to treat things not related to depression.

This is a much more common situation nowadays, and there are talks of the community and in research about the second crisis being the benzodiazepine crisis. The benzodiazepines and antidepressants are being prescribed at a level that was similar to the opioid crisis in these off-label situations in combination with other medications, because polypharmacy is becoming a very significant issue. So for example, this study looked at antidepressants being prescribed in adults for medical conditions that were not related to depression. About 12% of those individuals took at least two antidepressants, two types of antidepressants. And you've probably seen this on TV, they're called adjuvant prescriptions, where you might take one type of

antidepressant, well that antidepressant produces a certain kind of side effects that doesn't make you feel very great. So then you have a second one to try to manage the side effects. Now you've got two antidepressants going, and the combination of them are supposed to be okay, but this might be in conjunction with other medications this the individual is taking, and polypharmacy can start to go out of control. They also found in the research study that about 25% of elderly individuals were also using some sort of a psycholeptic which is affecting another type of psychiatric function or possibly a pain medication and analgesic. In addition to possibly another antidepressant or another anti-psychotic or another antiseizure medication, in addition to the two psychotropics that were currently being prescribed. The mean age of those participants were 69 years and it ranged from about 59 to about 79. So it's the population that is prevalent in longterm care.

And more than 80% of those individuals were women. We've seen this in other discussions of polypharmacy that women are more likely than men to have a polypharmacy issue. This could be behavioral, it also could be the bias of the clinical community in order to try to treat women. They may take it from a more emotional standpoint than a physical standpoint. Men may behavior really refuse medication more than women.

Women have a higher likelihood of wanting a pill or a medication. So there's a lot of factors that can go into that, but they do see that there's a high prevalence of the population of elderly women having a polypharmacy issue, particularly as it relates to things like antidepressants, antipsychotics, antiepileptic medications and other off-label applications of these psychotropics. More than 40% participants were taking the psychotropic medication in that group, among that 40%, three out of four of them were taking more than one at a time. So they were taking these psychotropic medications and they were taking them concurrently. And this includes antidepressants, those pain medications and the hypnotics, the ones that are trying to

reduce anxiety. Participant taking these psychotropic drugs were generally older. They took more medications in general, polypharmacy increases as the age of the individual increase. So people that were closer to 75 and 80 years old, generally took three, four, five, six medications as opposed to the 55 year old or 59 year old who maybe was taking one or two. They also had more comorbidities as they were with this polypharmacy. And that's a difficult one to tease out. Does it have to do with the fact that they have more going on? And so they're taking multiple medications or did the polypharmacy begin to interact and cause issues? So they developed other issues that weren't related to the original issue. This is not well teased out, they're not quite sure that a lot more research is going into this.

Does polypharmacy cause the comorbidities or do the comorbidities predispose a person to want more medications or is it some combination of the two? What they did find was that in these older individuals with polypharmacy, there was a reduction in muscular strength compared to individuals that did not take the psychotropic medications. So individuals were becoming more sedentary possibly, maybe they were having issues with sarcopenia, maybe it was affecting their metabolism. A lot of these medications can have issues with metabolism. So are these all contributing to lower muscular strength?

What we've seen from other discussions of dysphasia is that sarcopenia and malnutrition are serious consequences as it relates to dysphasia. So if the malnutrition and the sarcopenia or the metabolic imbalance is already there to begin with due to the polypharmacy, the introduction of dysphasia could exacerbate this entire situation. Specifically, they found that cognitive and mobility scores were significantly more impaired with those psychotropic users. So taking these medications for whatever label or off-label use with the original intent. It resulted in significant reductions in mobility and did impair cognition. So these are side effects that need to be taken much more seriously because there has to be a balance between the reason why you're

taking the medication to begin with and the possible mobility and cognitive side effects that can occur. What they found was that participants taking two or more psychotropics were at the greatest risk for the impaired cognitive measures, independent of other variables. And these are serious cognates, particularly executive functioning and global cognition. And you have to remember the age of this group. We're talking from 59 to 79. These are individuals already at a higher likelihood of having issues with executive dysfunction, mobility, and global cognitive confusion, to add polypharmacy on top of that which can cause or exacerbate the situation. We can see why the research and the community are starting to look at these major issues and see the red flags and try to address the polypharmacy issue. Specifically, this relates to speech and language function, because we are talking about cognitive function here.

And although pharmacology is not as emphasized in speech therapy, what I'm hoping here is that by exposing you a little bit more to pharmacology, not necessarily asking you to sit there and understand the chemistry and the physiology and the way that it works, what I'm trying to do is expose you to it in a general form and show you how it relates to your clinical practice, because it does affect cognitive function and there's clear issues with dysphasia.

So working with your nursing team to understand what the medications do, ask them questions, ask them more about the antidepressants, the antipsychotics, the antiepileptics, the analgesics and the hypnotics. Now they're gonna give you much more of a nursing based response. However, take some notes, go do a little bit more of your own education. There's a lot of great literature out there, and there are webinars and videos out there to help you get to know this information, even just passively looking at things on YouTube and online, you can begin to understand what these medications do from a general standpoint. You are not required to sit there and look at all the chemistry, but if you can understand it from a general view, you're able to see what types of cognitive functions are impaired and better understand why a patient

may act in a certain way and may have issues in a certain way. This specific study provided further evidence. There's a lot of evidence out there that polypharmacy of psychotropic medication use can affect things like the executive functions. Global cognition in general which is gonna affect things like reactions, but it can affect psychomotor function. And this is where we can really see what the executive functions and psychomotor function, how it can relate directly to dysphasia. Is going to have to an effect on cognition. It really depends on what kind of medication it is. If it's an antidepressant or an antiepileptic or a hypnotic, it might slow their cognition. And so they're having issues with concentration 'cause they might be slower, but if it's something that's trying to ramp them up, let's say that they're trying to lift the mood, like with any antidepressant, this actually might cause issues with attention and concentration for a different reason. They might be a little bit more scattered and have issues with that type of interaction. All of them can affect the memory systems because we're adjusting neuro-transmitters.

A psychotropic is affecting a neurotransmitter either directly or indirectly. And chances are it's affecting three, four and five of them indirectly just because a selective serotonin reuptake inhibitor is specifically targeting serotonin. Serotonin doesn't just function on itself. Serotonin directly affects other neurotransmitters like dopamine. It depends on where it is in the pathway. The nervous system reuses these hormones, it breaks them down and they with other chemistry become other neurotransmitters. Acetylcholine is also going to affect dopamine. They're going to interact, epinephrine and norepinephrine are gonna have widespread effects across all the neuro-transmitters, and glutamate and GABA are these larger level of neurotransmitters that can indirectly affect through different pathways, these other neurotransmitters. And that's why it's important to know this, that even though an antidepressant might be focusing on a chemical that is loosely related to the idea of depression, that chemical does not exist in a vacuum, and it can affect other types of cognitive functions, functions that are the privy and the scope of practice of the speech

language pathologist. So again, those major ones that we really wanna focus on, we wanna look at all of these, but you really wanna focus on the executive functions, that concentration attention and memory, because those are most significantly related to deficits and quality of life and can really affect these older adults. And you have to remember prior to the beginning of this particular research study, which is a part of your literature, the list of literature that I provided for you today in your references, this study, the patients had relatively normal cognition before taking the medications. They tested at near normal levels for 60 year olds to 80 year olds. They took the medications, they experienced the polypharmacy and the polypharmacy resulted in deficits in these areas.

So we are starting to see a causal effect. Another study is decided to look at these effects between different minority groups and particularly among African American participants. The age range of that particular study was 73 years and it was about 400 African-American older adults. And in this study again, more of them were female than were male. As a community it's not an entirely understood why, but it's probably a combination of behavior, bias of the clinical community. We saw that bias of age in the neurology group. That'll come up again here.

Here, this might be a bias of gender. It also might be behaviors that women may seek pharmacological interventions more than men because of just some differences in preferences and behavior. Regardless, it's not necessarily a good thing here to see more women than men in this type of study. What they did find was shockingly, more than 75% of everybody, all 400 individuals or 399 individuals included here, we're taking more than five medications per day and on average, it was more like seven medications per day, which showed a clear association between polypharmacy and poorer memory function in these individuals that were African American of lower socioeconomic status. This is beyond what they expected based on socioeconomic status and understanding what we know about differences between minority groups

versus Caucasian groups. In some minority groups, we see differences in cardiac function and respiratory function and the processing of metabolism, just because genetics come into play a little bit there, these individuals are from different parts of the world. This is beyond what you would expect for that to be true. So again, the polypharmacy is taking the variations in memory function that are normal, that we would expect and it's making it worse. So there's likely an association between this type of psychotropic polypharmacy and memory dysfunction, rather than a one to one causation. You know, there might be something in the middle, it might be an interactive effect. It might be situational. There might be another factor here that we're just not quite seeing.

So the speech-language pathologist is going to be the expert, that's gonna be able to identify and provide therapeutic interventions in this type of population, because we are talking about cognition and you are the population that's gonna understand how important polypharmacy is as it relates to executive function. You can't necessarily break down all the chemistry, but you're the expert that will understand the implications on memory and executive function. And I really hope that you will continue to learn more.

And I hope you engage that nursing team. They're the experts. You know, physicians do know a lot about pharmacology, but from my experience, the nurses know more, and they know more because they're the ones who physically hand out the medication. And so there's just a bit more that comes with experience when you see it in front of you, and nurses just have more experience in this area of seeing, of hearing and of experiencing what happens to the patient when the medications are given. So yes, go ahead and ask questions to a physician, but a nurse is gonna tell you so much more. Take that the information then, and build it in with your expertise and even become the agent of change that's gonna provide that expertise back to the physician and the nursing team, because you're the expert when it comes to cognition. This all can be

helpful to you in order for the entire interdisciplinary team to utilize a review of medications. You can do this even during your evaluations and in your therapy sessions. I was telling you this before with the neurological function. You can kind of kill two birds with one stone as it were. What you wanna do is to try to obtain some of the necessary polypharmacy information for example, just knowing how many there are. You can then write those down and you can try to understand, go ask that nursing team, which category do they fall into. What's interesting is that you may also help the nursing team and the physician team identify overlap. Sometimes patients don't tell the nurse all the medications they're taking.

Sometimes there just isn't enough time for them to interact with the physician, to tell them everything that's going on, but by incorporating this and being another member of the team who understands what is happening here, you might be able to have a conversation with the nursing and the physicians team, where the nurse practitioner, or the physician might be able to make an adjustment. You'll be able to provide that information from cognitive standpoint, which might be very important information to them because you have to remember physicians and the entire nursing team from nurse practitioner to CNA, they are all looking at it from a different perspective.

You bringing your perspective can be so important. It's also specifically beneficial in assessing free recall and aphasia to very specific things. Asking an individual to tell you what medications they're taking as you write it down and being to assess their free recall, ask them what the medication is for. Ask them why. Why are you taking that? Do you know how many times you have a little bit of memory built in here? You can listen for their speech response. If you wanna do it both for free recall in a vocal speech form, you could also do this written where you help them write, and you can look at the ways that they write it down. You'll obtain the information to be a part of that critical team, and you'll be able to build it into a true assessment. It's important to do this because like COVID-19 or any other serious viral infection, I want you to take this information

and I want you to be able to sort of broaden it to the larger issues with serious bacterial or serious viral infections. We know that there's gonna be a likely altered cognitive status, even just from what we talked about in the previous neurological lecture related to delirium. Delirium is different from dementia. Dementia is progressive and continues. Delirium is more of a short term issue. Then, as I said, in the other lecture, there's a lot of literature out there about postoperative delirium related to anesthesia. So what if this patient had a recent surgery and then they got sick? There can be a much longer standing delirium, but the difference between delirium and dementia is that delirium is more temporary. Dementia is progressive, degenerative and continues. We know that there's gonna be a likely altered cognitive status while infected if you're over the age of 60, we know this because that is true in every major infection that attacks the body in an individual of that age, just because there's the effective age, there's everything that happened to that person in their first 60 years of life on top of the serious infection itself.

How might this affect consent, compliance in care? Again, this is the area where the experts speech pathologists can be very important because it's likely gonna affect things like memory, attention, lexical recall. Can they recall the words? Can I have word finding difficulty my entire life? It's just the way that I was made. It's gonna get worse as I older, this will be a component of how someone would assess me, getting to know your patient before the infection, if you see this in your building, and then they become infected, noticing that change, relative to how they were before, it could be in the lexical domains. But I wanna let you know that the aging community has caught on. They know that you're likely going to give them a word list. They have started reading. They have been talking to their friends. They're watching videos on how to beat memory tests and how to beat these word lists. I have performed these types of lexical recall and memory tests in the short term and in the longterm delay on thousands of individuals. I can tell you, they learned. Sometimes they could identify the test and they gave me the list before I read it to them. They were very practiced. So I want you to

also emphasize things like thematic recall and other types of associative memory. Utilizing, they could spit words back at me in a comprehensive way as a trick, but they didn't know how those words were related to each other. And this is how free recall can be so important. Have them read their medication lists to you. They probably have said the words many times. And just from just some basic recall, they can put the words out there, but then ask them why, why do you take this? What time of day? What is the purpose of this medication? You can test that thematic and their comprehension as well as their ability to recall that much more complex information that's relative to them. We've already said neuro motor functions, but we also want to emphasize things like taste and smell. We know that this is involved in COVID-19 and COVID-19 can have an issue, can affect things like executive functions and dysphasia.

Those are common in any super infection and they are common with delirium. They're also common with anyone that has issues with prolonged high fevers can have issues with the executive functions, memory, and attention, and some forms of recall. So it applies here in this very serious virus, but you can take that information then, and also apply it in chronic bronchitis, serious bacterial encephalitis infections, other very serious viral infections, individuals that have bouts with HIV, as the HIV flares up, there are ways that you can take this information and apply it in other situations as well. We know this because cognition and the nervous system are use it or lose it situation.

We have to keep using these functions in order to keep the functions. And so it's still important for that individual to age in place and continue to remain in their setting as long as possible and be engaged. This is going to increase the likelihood of rehabilitation, and it's also going to possibly slow decline. So you want to as much as possible, if you are working in acute care or you were working in longterm care of any kind, try to assess that patient as early as possible. You wanna try to facilitate the maintenance of their functions while that patient is recovering as early as you possibly can. As long as they can keep it and maintain it and use it as long as possible, the less

likely they are to lose it. They're more likely to have better patient outcomes. However, you may not be affecting the destruction to the other systems of the body. This type of viral infection or any type of viral infection can have possible end organ damage while cognitive function may not affect those other types of damage. Maintaining their cognition is still gonna be correlated with a reduction in repeat hospitalization and the likelihood of better patient outcomes.

You're also more likely to improve that patient's quality of life as they're going through this difficult time, just not adding to the deterioration, helping them remain strong, helping them be able to retain as much as possible, their cognitive function can be the key to them getting through this difficult time, because of all the types of things I have ever seen and I've ever interviewed patients about cognitive health is the scariest thing for an individual, especially as they age individuals are the most afraid of losing their cognitive function, because they know that that's gonna affect things like agency and consent and the ability to continue to live a life that they would like to have. In terms of the research, the case studies have also looked at previously at risk individuals, a mild cognitive impairment or individuals who have a current MCI diagnosis. And are these patients that are at risk of MCI or currently have MCI, what is the risk of delirium during or after a COVID-19 positive diagnosis?

They also acknowledge that this is likely under reported just because this is such a brand new thing, and this is something that needs to continue to be studied. It's not just the patients with dementia, it's the patients that are at risk of cognitive decline or who maybe have experienced it already in a mild form. Moreover, patients are more likely to show signs of cognitive deficits in the next number of years. So because the MCI may be just beginning or they're at risk of the MCI, this may exacerbate that situation, speed up the decline and this may continue over the next couple years. But it's not just aging adults. What we wanna show you here is that there are speech and language and cognitive disorders in children, in teens. In the UK, they were looking at

this type of delirium and other cognitive issues in hospitalized children. So here we have issues with a patient possibly having unrelenting fever. Again, a high fever is a scenario where the immune system is trying to address the virus or the bacteria or the insult of any kind, and it's going to raise the body temperature because viruses and bacteria are very sensitive to not only chemicals and other parts of biology, but they're sensitive to temperature. They really need a very specific range of temperature in order to grow. So the body tries to raise the body temperature in order to try to make it harder for these viruses and bacteria to grow. Well, the nervous system also needs the body to stay at a very specific temperature. When there's any change in the core, temperature of the body too low, like in hypothermia or too high, in very high fevers, Scarlet fever and in other situations, these are the types of effects that are expected. And when it's an unrelenting fever that can go on possibly for days or a couple of weeks, there can be nervous system damage. If we have a question here, if the patient has temporarily delirium and or medications being adjusted, do you monitor or intervene as soon as possible?

With the interdisciplinary team, the interdisciplinary team should always try to assess and intervene as soon as possible because when it comes to cognition and neurology, the sooner, the better? Now they, as a team together, it may be modifying or intervening in different ways, but the assessment and monitoring and being able to know as soon as possible is so important because it can change what comes next absolutely. So we see here that individuals that have cognitive disorders that are more likely in children with unrelenting fever, you can have issues that are related to the nervous system. Children are also demonstrating a variable type of rash. They're having much more skin related issues, issues related to the eye conjunctivitis, issues with swelling and other parts of the body. This swelling can be affecting the peripheral nervous system, which can result in generalized pain in the extremities. This can also result in issues with GI. Children are more likely to demonstrate these GI issues and end up with a what's called a vasoplegic shock, which requires norepinephrine and

others types of medications in order to affect blood flow. What's different between children and adults is that generally children don't seem to have the respiratory conditions that we are seeing in adults. However, they are having these other patient profiles. And some of them do relate to the unrelenting fever and any unrelenting fever can have a significant effect on the nervous system. Speech and language and cognitive disorders in children, these case studies work performed in a small number of children. Again, it's new, it's not as well known. So it really depends on what is happening in these children.

This particular study is a case study from May and it was in eight children. One of those children did pass away from ischemic infarction, that children was more of a team. So we are seeing some of the cardiac issues occurring in these preteen and teams that are experiencing these diagnostic profiles. But the age of the study did go from four to 14 years. And all of those children did have some sort of vasoplegic response, some issues with blood flow, and having fever at any of those ages. At any age, across the lifespan from four to 40 to 90 years old. Unrelenting fevers can have issues with the nervous system.

So even in children, there's a large cerebral and cardiovascular insult and the hyper inflammatory syndrome that has become a more representative across the lifespan in these individuals. These patients were hospitalized between three days and a week, which is similar to what we see in adults. It gets longer in older adults, but in the adult population. And anytime you're hospitalized and any time you have this complex profile, there is a risk of polypharmacy in children. Polypharmacy and children is not quite as studied as it is an older adults, because we know the number of medications has a tendency to go up as you get older. However children are developing. So the effects of polypharmacy of even two, three, four medications in a child may have an effect developmentally and this could be different between boys and girls 'cause their physiology is a little bit different. It could be different between infants, children,

toddlers, pre-teens, that could be different than what happens after individuals go through puberty and they're in the post-pubescent, teenage years, this is not well known, it needs to be studied further. In general, a study did in June perform an investigation in children, 582 children. And they did see that about a quarter of those children had preexisting conditions. We know that diabetes and obesity are becoming major issues among children. And this is going up and up. In this study among 582 children, more than 60% were hospitalized. About 4% of those children required the invasive mechanical ventilation, and then four children, not a 582 did pass away, 578 of them survived but 25 of those people, 25 of those children needed additional respiratory support. We don't have the stratification of the total age of the 25 kids, but we know in general, this entire study was conducted between newborns and five-year-olds.

So even very young children are having issues, which means that if you're working in the school system, medical speech pathology is still very, very important. Medical speech pathology as applies to the pediatric population, and as it applies to the school system is only just beginning to be emphasized.

But if you are working in the school system, it is very important to also know your systems of dysphasia, to understand these speech language and cognitive disorders, how they can be affected by these different types of biological issues, because it can have an effect on development and maintenance of skills that they've already developed. And the likelihood of continuing to have a healthy development later on. Just as there's a cardio and cerebral vascular and pulmonary damage that can affect the systems of dysphasia in adults, it can affect these systems in children, but there is a caveat. They are children and their time to recuperate function in return, to more active lifestyles maybe shorter than in adults and older adults, but they still require that rehabilitative support. There's learning memory tasks, switching attention, motor function, and dysphasia that can be affected. So in the school systems, these can be

very important. If you have COVID-19 diagnosis, dysphasia and other cognitive disorders in young and middle aged adults, we've discussed how this is important in the neurological psychiatric and delirium situations, but for the SLP, it's important to emphasize similar tasks as we discussed in the neurological course from this cognitive perspective. The memory tasks can range from simple to complex. There can be spatial awareness, navigating environments, motor function, and dysphasia, attention comprehension, and global cognition can be affected even in a young and middle aged adults. So we're talking about individuals that are 18 to 40. If they have these serious infections, we can expect similar types of deficits. It may not be to the same degree. They may be able to be rehabilitated in a different way, but we will still see them there. In this group, it is especially important to bring it back to polypharmacy and the cognitive domains previously discussed.

So again, you can do a review of medications, the various types of recall, can they recall it to you accurately without looking. The thematic comprehension and the recall, do they know why they are taking this medication and what it does? Procedural memory and task switching and executive functions. Can they walk you through the steps of how to take the medication? And if you were to change the steps up, can they adapt, can they function? Particularly with dysphasia, swallowing is a multi-regional and multisensory experience, as we've explained encompassing more than just swallowing. So whether it is older adults, young adults, or children, it's all gonna be about how they feel about what happened. Does it hurt, is an aversive experience. And then with the older adults, just by being older, there's a higher likelihood of depression. This is key, and it can increase the risk of a maladaptive experience. These emotional cognitive motor and multisensory integration factors can all affect the eating experience and results in dysphasia. And finally, it's about fatigue, just being infected, just going through the experience, just living through this pandemic is exhausting, but for older adults, fatigue can predispose an individual to dysphasia. Polypharmacy itself, the medications themselves. In addition to the other cognates, we have discussed

fatigue is increased by polypharmacy. They become more sedentary and as we said, there's a loss of mobility. And individuals are coming from any major serious infection of any kind, we are gonna see dramatic fatigue, but in this particular sense, it's true because this type of severe infection found in COVID-19 can be quite tiring regardless of the age group. So that is true in children and teens as well. In older adults who have that increased fatigue, that can lead to an aspiration risk because the effect of age, malnutrition, sarcopenia, what is happening with the neural motor respiratory and cognitive domains, now they're tired, now they're really, really tired. And how are they going to be able to perform your compensatory techniques? How are they gonna be able to incorporate those compensatory techniques 24 hours a day, 365 days a year in order to remain safe the entire time.

So in general, we see that there are psychotropic medications that are common in these populations. So let's take a minute to kind of see where we are. If at any point here you would like to continue to open up the floor to questions, please let me know. But what I'm gonna do is I'm gonna take a moment to kind of summarize where we are with cognition and also bring it back to some of that neurology and respiratory function.

So we've seen here with psychotropic medications that psychotropic medications can include those related to depression, anxiety. The hypnotics are gonna be related to other aspects of delusion, hallucinations, anti-psychotics again, are gonna be related to delusions and hallucinations, other psychotic behavior, borderline personality disorder, any sort of treatment of bipolar disorder are gonna result in these types of psychotropics being utilized. But this also involves individuals that are taking the analgesics things for pain, and then anything related to any sort of seizure medications. There's a hot high likelihood that that individual is not only taking one, they're probably taking multiple medications at any given time. And in truth, we see that this is going to be us not only just two medications, but from the research that we've shown you here,

it is more likely on average, that is gonna be more like five to seven medications. And as they get older and closer to their late 70s and early 80s, and going into their 80s, it's gonna be closer to 10 medications, 12 medications. We saw from the neurology lecture that these can occur in addition to something that might treat neurogenic disorders. So let's say we have a patient that is suffering from Alzheimer's disease. They may be taking an anti-acetylcholine esterase inhibitor in order to try to, again, it's affecting acetylcholine, the idea being that the more acetylcholine the person has, the more that they can use in order for the medial temporal lobe to be able to execute the memory function. We know that this is significantly impaired in patients with Alzheimer's disease for a lot of reasons. This is one type of medication that is out there, but Alzheimer's has a lot of other things going on. They have issues with sleep, sleep disturbances and neuropsychiatric conditions can range from an Alzheimer's specific form of depression, to issues of anxiety, psychotic behavior, combative behavior. There are executive dysfunctions.

All of these can lead to a complex situation where this patient may be taking more like 10 or 12 medication. Now it's important to note that this is your being a part of the interdisciplinary team. So of course there has to be that interaction with the nurse practitioner and or the physician, but your assessment of the patient, especially if they're closer to the mild cognitive impairment stage or the early Alzheimer's stage could be critical. If that patient also has dysphasia, which is very likely just because if they're over the age of 55, but also with the Alzheimer's diagnosis, as we pointed out in the neurology lecture, if they have dysphasia, they may also be suffering from malnutrition and sarcopenia. This is gonna change their body composition and everything about pharmacology depends on your weight, depends on how nourished you are and your body mass. Dosages are calculated according to body weight. So if this individual is taken a lot of medications to treat something related to the neurology, they may also that polypharmacy just from treating the neurology may be affecting their cognitive. If they have a cognitive of decline on top of that, either diagnosed or

suspected at the MCI stage, a diagnosed or suspected at the dementia stage, we've added cognitive decline on top of this and all of this can spiral out of control. They can continue to take more and more medications in order to treat this situation. And as I pointed out before these types of neurodegenerative diseases can last anywhere from seven to 15 years. These patients are likely bouncing from setting to setting or in their own building, perhaps there's a significant number of staff changes. So it's a different rehab team. It's a different set of nurses, it's a different set of physicians. Having these reviews of polypharmacy, incorporating them into your speech therapy and language assessment, not only can help you get a sense of the individual.

You can build it into the assessment in order to get a sense of what they're doing, what's going on with them but if you then review that information with the nursing team or the physician team, making sure that all the consents and that all of this interaction is HIPAA approved. Having that feedback from the nursing and the physician team might be important. Because again, this patient may have told you something that they haven't told anybody else or so many things are happening, that when you write it down and you put it in front of you, you are able to see more of what's going on.

And by providing that view back to the nursing team and to the physician team, you may be able to give them a perspective that they didn't have before of this patient for the best of intentions. Sometimes it's just a little bit too much to look at, an individual can't put all the pieces together, but if you and a couple other individuals put your heads together and make sure that you really understand what this patient's profile is, you might be able to see something that you just didn't see before, and as a team, be able to make an adjustment at a time that's critical that might improve their quality of life, slow the decline, or possibly try to obtain some quality of life outcomes that they're looking for. So we do have a question here with regard to delirium in older adults that are hospitalized with these infections, or otherwise. There's a current limitation on family visitations in the acute hospital can have the effect on exacerbating the delirium

and agitation. There is the situational component. I also wanna say that that is also true in cases of cancer, where there has to be any situation where there's an immune compromised situation. And I appreciate that comment because it is a great comment. What happens when there's a situation where the patient is quite isolated from their family members. I also hope that you'll take this further and think about your nursing home patients, whether or not they have an infection. Some of your nursing home patients live in a nursing home. I live in Florida, they live in a nursing home that is two, three, five, and 10 states away from their family. Some of them live in two or three times zones away from their family, depending on if they live in a warmer state versus a colder state in the North. So there is even just without the infection, this is such a great comment. But it is also true in the longterm care scenario. Isolation can exacerbate dementia and isolation can exacerbate delirium. The clinical team though, is going to have more of an interaction with this patient, and hopefully the clinical team is able to assess that patient over a period of time.

So you can take that isolation into account, especially if you're working in facilities in the South that are full of residents, which is very true in Florida, California, Arizona, and the Southern portions of Texas that are just warmer, these individuals live weeks, months without seeing their family ever. And as they have either delirium or dementia, they can retreat from their quote unquote friends at the facility, which you also confined in these longer term care situations, is that not only are they separate from their family members for weeks and months out of the year, whether or not they have an infection or not. They also are seeing a high turnover of staff. So the therapists they trusted, the nurse, the physician that they trusted, after a while, when you start to see this happen four or five, six times, I've interviewed patients that just tell me, look, I could answer your questions, but you're not gonna be here in a month. And then somebody else is gonna ask me these questions as well. All of this can be so important in establishing that rapport and understanding where that patient is coming from. So I think that that is a great comment because it really can exacerbate the polypharmacy, it can exacerbate

the infection because as a person becomes stressed, their ability to fight the infection changes, and it can also exacerbate that delirium or that dementia. It's absolutely true. And those effects absolutely can follow the patient post-discharge. We have another question here. Is there one medication over another that is commonly reduced first. That aspect of polypharmacy still remains unclear whether or not a certain medication should be changed relative to another is so dependent on that patient's situation. But from some of the research that we're seeing here from this series, it was not so much whether or not it was a medication. It seems to be more related to the number of them and maybe those interactive effects and whether or not they were related to those comorbidities. In the research study we showed you here, those patients tested at nearly normal levels, before they were given multiple psychotropics.

So the study showed that it wasn't necessarily one psychotropic over the other, it was the fact that psychotropics in general and neurological and respiratory medications in general have a tendency to be prescribed two, three, four of them at the same time. And it seems to be a lot more related to the fact that there are many of them. And when you start to play around with the body's chemistry, there are going to be effects that are unknown and interactive effects. Think of it like, you know, any sort of body of water, if it's a Lake, or if it's an ocean. When you start to play, or even just a pool trying to maintain, I live in the South.

So there are pools here, you know, trying to maintain a clear pool, safe for someone to swim in involves a number of different chemicals. And those chemicals are affected by the organisms that are inside of it, what happens to it? What rains, what enters it, what time of year it is, how hot it is, how cold it is, much of this relates to the body's chemistry as well. And infections are gonna change all of that. Age is gonna change all of that, pharmacology is gonna change that as well. Here we have a question of, so if there's a cognitive issues are more due to polypharmacy, speech therapy would be more teaching compensatory strategies as the impairment is due to pharmacology.

This is absolutely a great comment. So the question here is whether or not speech therapy is gonna focus more on the pharmacology or the cognitive component. I would say that the assessment and your carrying out of what happens will be largely from a cognitive and speech focus and a neuro motor focus as we showed in the previous talk. Your interaction with the nursing team and with the physician team, they're gonna give you a lot more feedback about the pharmacology, but together your focus with them should also be on body weight and the dysphasia, and are they staying nourished, and are they staying healthy enough for the dosage to be correct? So there is a component of dysphasia there because if you treat the dysphasia, they are more likely to stabilize their weight. I have known individuals who take Parkinson's medications, and there are multiple Parkinson's medications that an individual has to take where they develop Parkinson's related dysphasia, a neuromotor dysphasia. All of a sudden they have a drop in weight. Well, anything that affects the dopamine system, because these neurotransmitters don't exist in a vacuum, they don't only affect motor function.

Dopamine is also related to a visual motion and sensory motor integration in the parietal lobe and in the ventral parietal occipital junction. This is why when L-DOPA and other Parkinson's medications are off, a patient can have serious delusion, hallucinations, and delusions that was pharmacologically induced because they've dropped so much weight, now the Parkinson's medication is too strong, but it may not be just the dopaminergic ones. It may be one of the other ones that they are taking as well. So your interaction with the physician and the nursing team will be cognitive and dysphasia focused. Your interaction with the patient in your assessment will be neuromotor and cognitive, which will span that speech language, cognitive, and dysphasia focuses that's really great. Being an educational component in order to facilitate educating the nursing staff and the physician staff and your buildings, you can hold in-services, you can provide some cheat sheets, as we showed in some of these other continuing education focuses. You can be a part of the agent of change that's

going to bring this discussion in a broader scenario to your building so that the entire interdisciplinary team is able to also see how some of these effects can occur. That's a wonderful question because each of these factors has significant implications for the SLPs, spanning the systems that contribute to dysphasia and in this particular section part three, as it relates to cognitive and speech language decline. These factors may contribute to an increasing number of individuals requiring skilled care. However, there's a caveat there with the broadening of home health and the implications in tele-health, especially more in the mild cognitive impairment, the mild scenarios, younger adults, teens, and in children, you might see more of an expansion in the telehealth situations.

So I have included each of these types of studies and the references here, I really recommend that you continue to get educated. Polypharmacy just like repeat hospitalization, these are newer concepts in longterm care. They are concepts that are gonna continue to be something that is very important as we go forward as a community and more research is coming out every single day. It's something that's gonna be so important to you as the speech therapist and it will really help increase the likelihood that you helped that patient find something that will improve their quality of life maybe even slow the decline in one area or another. Thank you so much for listening and I will turn it back over to Kathleen.

- [Farzana] Thank you so much Dr. Winchester for sharing your knowledge and expertise with us. This was a fantastic presentation. We really appreciate your insight and highlighting current evidence-based polypharmacy research, which we can apply to our everyday practice and improve interdisciplinary collaboration during this COVID-19 pandemic. Thank you to everybody who participated in today's course. I hope you enjoyed it as much as I did. Make sure you join us next week for the final four-part course in polypharmacy and SLP during the COVID-19 series. We look

forward to your feedback on the course evaluations and hope to see you in future courses on speechpathology.com. Have a great rest of your day.

- [Jeanna] Thank you.