Polypharmacy & the SLP during the COVID-19 Pandemic: Part 1

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- [Amy] And at this time, it is a pleasure to introduce Dr. Jeanna Winchester who's presenting part one of our four part series on polypharmacy and the SLP during the COVID-19 pandemic. Jeanna Winchester is a clinical cognitive neuroscientist who specializes in neuro-degeneration and aging. She's a professor, a published author, and a scientist. So welcome, Jeanna. Thank you so much for joining us.

- [Jeanna] Thank you so much for having me. I'm really excited to be here. Okay, let's go ahead and get started. As we said that this is going to be a four part series and it's really going to give a broad overview of some of the risks of polypharmacy, particularly in this population. The skilled nursing setting and the aging and long-term care populations are particularly at risk for polypharmacy. And so I'm gonna provide you a lot of evidence as to why that's true. And while you may think to yourself, "Okay, what does pharmacy and pharmacology "have to do with me? "I am in the rehab disciplines. "This seems more like physician or a nursing role." What I'm gonna show you is that you still have a role here. And you can be a part of that team that can identify this polypharmacy and bring critical information back to that nurse practitioner, back to the nursing team or the physician team, or the physician's assistant, for example, and be a part of the solution to what is a very large problem.

When we first started discussing this course, the COVID-19 pandemic had not broken out yet. This is something that we were discussing at the beginning of the year, but we decided to add this additional element because it is disproportionately affecting the populations that the rehab disciplines work with. And it is also increasing the number of medications that these patients are gonna be taking. Even patients who maybe didn't have respiratory conditions before now are gonna experience a greater respiratory dysfunction after surviving COVID-19. Even in the more mild cases, this is shown to be true. And so there was a great overlap. There was just a way for us to incorporate this

information into the topic that we're already discussing, and be able to bring you this very comprehensive overview and hopefully something that you'll find useful in your everyday clinical practice. So I don't have any disclosures to really disclose here. I am receiving a paid honorarium, of course. I do a number of contract work that I facilitate through my own LLC. I am a sole proprietor. I do some other adjunct work and some contract work where I am a professor of medicine as well. I don't have any content disclosures or sponsorship disclosures. In general, we are going to cover a broad range of topics, and after this course, participants will be able to describe the risks of polypharmacy in the long-term care setting, list the factors contributing to polypharmacy across the respiratory system of dysphagia, and identify components of the oral mech exam that may be affected by polypharmacy and COVID-19.

The oral mech exam is gonna come up a few times throughout this four part series, and we can show you how this exam that maybe you have used for years and years and years might now take on a whole new meaning. Not only in terms of polypharmacy, but also in terms of evaluating some of the symptoms and signs of deterioration that can occur after surviving COVID-19. So let's begin with some essential pharmacy concepts. This is just gonna set the stage. Pharmacology in general is a very difficult and elaborate field. But there are some essential concepts that are important to you in the therapeutic disciplines. And that's to understand some of the basics and be able to relate to the nursing team, be able to relate to that physician team, and you may spend more time with a patient, then that physician team over a longer period of time, and you may be able to observe some signs and symptoms that you can then relay back to that nursing and physician team, provide them with that critical information, and be able to contribute to reducing the risk of polypharmacy for the long-term care in aging populations. In general, substances that are applied for therapeutic purposes fall into some general categories. Drugs and medications are the intuitive one. This is what we generally think of, but it is not the only category in pharmacy. Drugs and medications are chemical agents that are

capable of producing biologic responses within the body. There are desirable and undesirable effects. We call desirable effects therapeutic effects, and the undesirable ones, adverse reactions or adverse effects. After the drug is administered, it is considered a medication. So there's a bit of a time component there. When the drug is in the store, when the drug is at the manufacturer, it is a drug.

As soon as it is administered for a particular effect, a therapeutic effect, it becomes a medication. Biologics are another category. If you have patients particularly that have RA or other autoimmune disorders, they may be receiving biologics. These are a different class of pharmacology. These are agents that are naturally produced in animal cells by microorganisms or by the body itself. Hormone therapy can be a form of a biologic. We are now becoming more familiar with the COVID-19 pandemic with things like monoclonal antibodies, interferons, and vaccines. Interferons are a little bit more applicable though, in conditions like multiple sclerosis. So you may see this in some of your patients. But there's other natural blood products and components that can be given to a patient. And whenever anything enters the body that was not previously there, there will be a reaction.

But if you go back to that essential concept, it depends if that reaction was desirable, that is what's considered therapeutic, or was it undesirable meaning it was an adverse event. We wanna try to reduce those adverse events as much as possible. And this is where the rehab disciplines are starting to broaden. There are complementary and alternative medicine therapies. And for the rehab disciplines, I'll give you some examples. This involves natural plant extracts, herbs, vitamins, minerals, dietary supplements, and here's where the rehab disciplines come in. And additional techniques outside the realm of conventional therapies. For example, in PT, you might have massages. There might be the use of acupuncture. There might be physical manipulation, and a TENS unit, for example, provides electrical stimulation. It affects the body in a therapeutic effect. There are ways for this to be billed to insurance and it

is a part of a therapeutic regimen. Now, in speech, this is only beginning. Some of you may have heard of this at some of the conferences in the last three, four or five years that there are some techniques to the oral pharyngeal cavity particularly related to dysphagia. There are some additional techniques that are beginning to be utilized to understand how the biological components of dysphagia can be affected, can be treated. These are prescribed by the EMT or other physicians, but perhaps this is being carried out by the speech therapist.

Now, this is just a new and burgeoning field. This in your lifetime is going to continue to grow. And so I want to make you aware of this that even though it might not fall into the pill form, or let's say an injection, or something else that you might traditionally think of, this is a component of complementary and alternative therapies and it's becoming more and more prevalent. I'll give you another example. In Alzheimer's, this has been in the last 10 or 15 years, the dermal patches that can deliver the Memantine or whatever acetylcholine esterase inhibitor that they are trying to deliver and other medications because Alzheimer's patients have a tendency not to take their medications regularly because of their memory issues. This can affect when you perform your therapy, so they might wear these patches.

This again is a form of medication that has changed form. It's becoming more prevalent. And this is an example of something that's been an innovation that is now becoming more of a standard of practice. You are likely to see as we go into conferences, and we continue to grow in the rehab disciplines in the next 10, 15 years, you're likely to see more and more innovations of this type. And they would fall into these more complementary and alternative therapies. You'll have that education. You'll have that knowledge and be able to facilitate utilizing those alternative therapies even in your own clinical practice. So in speech, this is not necessarily something you'll use tomorrow, but I wanna make you aware of it because innovations are happening every day. In general, pharmacy and pharmacology are going to fall into these categories.

But the names of the items themselves are gonna have several different names. There's gonna be a chemical name, a generic name, and a trade name for these drugs. And it can make it very confusing to know what is what. And the problem is that a combination of drugs contain more than one active ingredient. The goal here is to minimize those adverse events. And that's what we said you can be vital. But how do you know? How do you know the different chemical, generic and trade names, especially when this was not something that was emphasized in your background? Well, there's a lot of communication that you can have with your nursing team. Ask those questions. They are extremely knowledgeable. They can probably tell you a little bit about the drug. But what you need to understand and some of what I'm gonna show you in this series is how that may incorporate into your focus, what you can be on the lookout for so you can provide that essential, vital feedback about any of the signs and symptoms that coincidentally, someone else just might not see. But maybe you do under certain situations, and you can be that vital component that prevents an adverse event. Overall, side effects are confused with adverse events. Side effects are these non-therapeutic reactions to a drug.

They may come and go and maybe for a short time. It's generally considered tolerable. It can sort of push the barrier of what tolerable means, but we still need an immediate intervention. So if a patient is saying to you, "I don't feel well when I take this," it is still important to relay that information. Now, what happens with the physician and the nursing team beyond that point depends on a lot more than what you are gonna be involved in, but again, relaying that information can be important. If you see something in your patient, say something. This is something that has occurred. I have seen this personally, particularly with medications related to dementia, particularly with some of the stronger medications related to neurological function where the patient developed the relationship with a therapist more than the nursing team and the physician team coincidentally, and the patient revealed to the therapist things that they were afraid, maybe a little bit just not sure who to tell. And the therapist seems like someone they

could tell. Make sure that you are relaying that information. If you see something, say something. Better safe than sorry. You can definitely be a part of that team that can make a difference in this patient. And it's because medications and therapies can be given so many different ways. We think of oral, but that is not the only one. Sublingual, buccal, parenteral, NG-tube/Enteral, transdermal, ophthalmic, optical, nasal, vaginal and rectal, all of them count as medications. They enter the body through a portal of entry, and they will affect the body. And this is where polypharmacy can really come into play because patients may not realize that all those vitamins and all those different things that they're taking, including their over-the-counter medications count as medications. Polypharmacy in general, the purpose of identifying it and why we want to educate you today, the main point here is to prevent medical errors.

That's what we're trying to do, reduce those adverse events. Medication errors occur when any preventable event that may cause or lead to an inappropriate medication use, or the patient may be harmed while the medication is in control of the healthcare professional, the patient or just the overall consumer. In any of these scenarios, a medical error can occur and it often does. So there is a dual responsibility of the providers and the patient. And this provides a simple though useful way to conceptualize medication errors, resulting from maybe the healthcare provider's error, or even the patient's error.

And that's where you can come in in speech and cognition. We're gonna go into this more in part three. I'm gonna give you a little preview today, though we're gonna go into it more in part number three when we talk about cognition, because patients and medical compliance are a very big issue. There are legitimate reasons to discontinue a medication, but especially in long-term care and especially the more medications and treatments a patient receives, it can just be difficult to do it correctly. And even timing can be off and sometimes when timing is off, this can also result in a medical error. But then in long-term care when you add the problems of memory, attention, and other

speech language and cognitive disorders, medical compliance can become a real big issue. Medication errors are the most common cause of morbidity and preventable death in healthcare and many geriatric patients have multiple chronic disorders, each of which may be treated by individual specialists, meaning at different locations and different facilities. So patients may receive multiple prescriptions, sometimes for the same condition. Maybe they've got two drugs for the same condition. But when they went to one specialist, they said one thing. When they went to their general practitioner, they said another thing. And then when we went to the third specialist, they said yet a third thing. Everybody tries to intervene. They're trying to provide that therapeutic medication. But now it's on the patient to try to figure out what was right. And if you add in other speech language and cognitive disorders, this can become the prescription, if you will, for a medical error. Some of these things can have conflicting actions. And this is where the term polypharmacy really came into play in the last five and 10 years. Polypharmacy meaning multiple medication use dramatically increases the risk of drug interactions and side effects.

And there is significant variability between patients. So just because medication A works for one patient doesn't mean it's gonna work the same way in every way all the time in every single patient that comes across your caseload. It's just not true. Biology doesn't work that way. People are generally the same, but everyone is a little bit different. So we have to respect the patient. When they're telling you something is happening, listen to them. Now, with memory issues and other speech language disorders, we have to gauge this a little bit because maybe they don't remember that they told you. And this can get very difficult. These are things that we hope to continue to present on in the coming years, how to take some of those details and those higher level concepts and begin to provide you the speech therapist and anyone in the rehab disciplines with more information. These are additional courses that can be provided. And I highly encourage you to seek out that information so that you can develop that eye, how to know when someone may be repeating something to you because it might

be a cognitive or speech language deficit. And when they're saying it to you because it's real, because something is really happening to them and maybe you're the ear. You're just the person they finally decided to tell. And walking that fine line can be very difficult. But all of it can reduce the risk of polypharmacy just by being aware, just by having that extra ear and that little more scrutiny in your eyes. And just looking a little deeper, just that is the first step to reducing these adverse effects and polypharmacy. In Medicare patients in 2019, a little over 27,000 patients were sampled. And what they looked to see is this relationship of polypharmacy and Medicare beneficiaries. What they found was that patients who had polypharmacy were more likely to be female. And this is a behavioral characteristic, it's becoming more well understood. And this can have beneficial effects and adverse effects.

Females are more likely in their behavior to seek medical attention. This is good because they're more likely to catch conditions before men. However, polypharmacy is where this can go awry. They are also more likely to take the multiple medications, renew the old prescriptions. Females like more tangible pill form versus of medical interventions. This is just the psychology of medicine. It's something that is very true.

So this can be beneficial because they can intervene earlier. But the adverse effect is they're also more likely to have polypharmacy later in life, which actually can become destructive. Individuals with depression diagnoses with and without dementia and mild cognitive impairment are more likely to have polypharmacy and that is because of some psychotropics. Here, we call them psychotics or we have a couple different names just because that's the way that psychiatry works. They call them a couple different names. But anything that has to do with altering mood often results in multiple medications necessary because you can't just dampen an individual if they're running too hot. And you can't just amp someone up if they're a bit depressed. Generally, these involve multiple medications and they run the risk of polypharmacy. This is extremely likely in terms of mild cognitive impairment and dementia. We will go over this a lot in

part two when we talk about the neurological system of dysphagia. And then other diagnoses are just more likely to have multiple medications to treat them. And these are very likely to cross your caseload. Congestive heart failure, diabetes mellitus, end-stage renal disease, those patients are likely to also be Medicare and Medicaid, hypertension, and as they get into long-term care, the consequences of hypertension, myocardial infarction, various types of ischemia, and then respiratory diagnoses. The respiratory diagnoses are what we will focus on today. Polypharmacy has significant effects across the cognitive and speech language domains. We're gonna talk about this quite a bit in part three. Tips for reconciling medications in speech therapy. You can turn this into an attention, executive function and memory test. Also, you'll be able to do a review with the patient and you may be able to see signs and symptoms that someone else was not able to see. As I said, I'm giving you an overview here, but I'm gonna give you some very specific examples in part number three. Here, what we're emphasizing is cognitive comprehension.

Did they know what the medication is for? Can you utilize reading and writing or other SLP related therapeutic tools and assessments to see if they understand how, when, in what way, and then why is this medication being given? And how is it different than the other medications that they have? Or how is it the same possibly compared to some medications that they have? You're able to ensure that they'll have that individualized care. But you're also gonna be able to use this as a therapeutic and evaluation tool to see their attention, executive function, memory, recall, and other speech and language domains, especially if they have five plus medications they're taking. And we'll show you in some cases, it's really more like 10, 11, 12 medications that they're taking. It's important because age-related decline in the lean body mass and total body water leads to increased concentrations of water soluble drugs in the body and most drugs are water soluble. And because the drug is distributed across a smaller body of water, it can have greater effects. This also this also can cause some toxicity in the liver because changes to the liver as we get older results in more levels of free drug

availability in the bloodstream. So that drug that maybe they were taking at 50 that they have this prescription and they still just keep renewing it and they still just keep saying that they need it, whether or not they need it at 60, that's up to the doctor and the nurse practitioner and the other teams. However, they may not have told them. And during your therapeutic exercises, you find out there's three, four drugs that they're still taking, maybe they're not supposed to be taking it and their body has changed according to the aging process. So you may be that vital team member that just brings that important piece of information. In here with COVID-19 and the respiratory system of dysphagia, the focus here is on the cardiovascular system. Aging changes the cardiovascular system. It decreases cardiac output.

There's less efficient blood circulation. This all can slow the way that the drug moves the body. Maybe they need a smaller dose over a longer period of time that may be slowly increased to an amount that is safe and effective. I will tell you this is particularly true in patients that are taking anything related to Parkinson's or Lewy bodies dementia. These particular dopaminergic drugs need to be in a very specific concentration relative to the person's body mass. If they have significant dysphagia and their body weight drops dramatically in a short period of time, this can have significant psychotic effects.

You are the team that would evaluate those effects. And just by being aware that that can happen, opens your eyes, helps your ears open up a little bit, and you can just see a little bit more and be that vital member that takes that key information back to the physician and nursing team. And in general just by getting older, we have alterations in kidney function that can increase the amount of time before drugs are eliminated from the body. So timing here matters as I said that medical compliance is very important. If they double up on their drug too, they don't give themselves enough time between taking the medication, they can end up basically with an overload. And this can be toxic when it accumulates in the body causing a significant adverse event. Overall, the

aging population is gonna have sarcopenia that just happens, the loss of muscle mass as we get older, and lower lean muscle mass can really have an effect on the aging population. And sarcopenia was found in nearly 10% of people aged 60 to 70. And this number goes up significantly when we get to the 80s, 90s, and centenarians. Many drugs are gonna affect or interfere with various metabolic processes and the balance of our circulation. This can cause cardiovascular and energy dysfunction. They can be more fatigued or they can be more excitable. This may change when they should be eating. It might change the when you do your evaluations. Diminished blood flow, electrolyte imbalance, hormonal and acid based imbalance can also occur, which might increase the risk of reflux dysphagia, which we'll talk a lot more about in the fourth component where we go into how GERD and reflux can deteriorate the pharynx and cause dysphagia or exacerbate dysphagia.

The rehab team can affect the capacity. Polypharmacy in general as it applies to the rehab team, what you might see are the effects on the patient's capacity to complete activities of daily living and it might alter their ability to navigate their home environment. You wanna to be aware of some of the signs. Altered cognitive status, a change in speech language function, especially slurring of words, word finding ability, we're gonna show you in parts two and three some of the psychiatric and cognitive effects on executive functions and global cognition. They can have that altered physical state 'cause they have too much or too little of the drug. And they can also have that altered interaction with others. If you start to notice that your patient not currently in COVID-19, this doesn't apply in COVID-19. But when this all resolves later on, and patients return to eating in a dining hall scenario in a more social situation, if they begin to retreat from those social situations, this may be due to apathy, fear, and depression related to the dysphagia, or it also could be a sign of actual depression related to a comorbidity or polypharmacy. We see depression in general in 11% or more of patients over the age of 70. And other chronic conditions can make this worse. So overall, we're approaching dysphagia from a viewpoint of the bodily systems.

Today, we're gonna talk about respiratory and in part two, we're gonna go over the neurological. In part three, we're gonna do cognitive and in part four, we're gonna look at the gastrointestinal because reflux itself, by its definition, is dysphagia. Because movement through the alimentary canal should only go in one direction, and it shouldn't come back up. Any backflow is dysphagia. We're not gonna emphasize the muscular component so much because you're speech therapists and that is your bread and butter. You do not need me to tell you more about that. You receive this more often than not. So what I'm trying to do is fill in the information with the other bodily systems that can contribute to a breakdown in the swallow mechanism and contribute to dysphagia so that you can be more informed and make those decisions. Overall, there's an evolving and accelerating effect of dysphagia related decline across the bodily systems of dysphagia.

And I like this graphic because it really shows us what we mean by evolving and growing. So here in the summer, this wonderful waterfall, this whole area is gonna be covered in green. There's lots of plants. And you can see in this picture how tiny the person is relative to this waterfall in this area. But now in the winter, we can really see where that water goes. As the waterfall crosses over and it begins to hit the area below, guess what? It is not just affecting the little area of water below it. As you can see, when it freezes, you see that it splashes everywhere.

And it can affect everything around it. And that's that evolving and accelerating effect that these systems interact, and sometimes they can snowball out of control. So let's focus on the respiratory system for today. In general, this is gonna apply to what you already know about the anatomy and physiology of the speech and hearing mechanism. I'm not gonna spend a lot of time repeating that to you because, again, that is something that you hear a lot of. What I wanna emphasize is that these respiratory mechanisms can be altered by aging, nutritional status, those electrolyte imbalance, and absolutely not only with infections in general, but specifically with

COVID-19. But I want you to also realize that evolving and accelerating effect, it is not just what's happening in the pharynx and in the oral cavity. To a degree, you have to remember some of what you learned at the masters level. That the anatomy and physiology of the speech and hearing mechanism also includes the primary and secondary muscles of respiration. And these all can be affected by the cognitive, neurological, muscular, and gastrointestinal systems, especially if you have a breakdown in more than one system. And generally in this population, there's gonna be multiple comorbidities. So you can see how that can snowball out of control. Overall, there is an aspiration risk related to dysphagia. We know this. Aspiration pneumonia is the most risky consequence of everything related to dysphagia and aspiration. Here we have the misdirection of those oral pharyngeal or gastric contents into the larynx and the lower respiratory tract.

It doesn't go where it's supposed to go, and it does it enough times that it can actually stir up an infection within the lungs themselves, and particularly if this patient is sedentary, or for example, with COVID-19, if there's an additional infection that is also contributing to the lungs, this can really cause a life threatening event. Aspiration in general is that underlying mechanism in the development of the pneumonia that is associated with inhaling those contents. And when we get to the reflux component in part four, and we'll talk a little bit more about aspiration pneumonitis. When you aspirate not only the bolus, but also the acid that comes from the gastrointestinal track. But it occurs even in the young and in healthy individuals who aspirate oral secretions, particularly in their sleep. So positioning is very important. And if the volume of aspirated fluid is large, or the defense mechanism is immunologically or medical-physically compromised, aspiration pneumonia can occur. So you can see how in patients that are surviving COVID-19 already have an increased risk of aspiration and dysphagia. In terms of polypharmacy, that risk is also increased even in the absence of COVID-19. Nearly one in 25 older adults are taking multiple medications and are likely to experience adverse drug-drug interactions. The

prevalence of polypharmacy is highest among the oldest old and the most common polypharmacy is associated with those cardiovascular and cardiopulmonary diagnoses. And this right here is why it's important to relay this information to you speech therapists. Individuals that live with the consequences of having cardiovascular and/or cardio pulmonary diagnoses over a long period of time, we're talking years, decades, they are just more likely to come across your caseload. So when you're doing your medical history review, if you're just aware of those diagnoses and you see multiple medications or ask the nursing team, ask the physician team what these patients are taking. I'm gonna give you a list of some here in just a second to show you what I mean. It opens your eyes and it opens your ears to signs and symptoms that maybe you wouldn't have seen before.

But now that you are looking for them a little bit more intently, a little bit more purposely, you are able to see the subtle effects and the subtle signs. You can then bring that vital information back to the interdisciplinary team. And together, you guys can form a more comprehensive treatment plan. Because research has shown that more than 60% of patients had more than three comorbidities that required medications and nearly 25% of that population had five plus comorbidities, each requiring a medication.

But here's the problem. Medications are not supposed to be taken forever. Just because they had it for a short period of time, again, this is why polypharmacy can happen and they get treated at multiple sites and it's no one person's fault. It's situational. There's just so many things going on that people can take medications for much longer than they're supposed to that's not therapeutically beneficial may become adverse. So studies have looked at this. And what they found was when those cases were reviewed later, about half of the medications that these patients were taking, regardless of how many comorbidities they had, could be discontinued. The physician just needed to know what was happening. And remember, it's a short time that

physician is interacting with the patient. Even the nurse practitioner, it's a little bit more but it's not as many sessions as you. The nursing team, the nurses and the CNAs, maybe, because they're spending more time with patients. But in the assisted living, and in the home health situation, this is highly variable. So again, you might be that person that realizes through some of your evaluations and interactions, in this situation, maybe it's causing some adverse events, maybe these could be discontinued. It's important just to bring the question back to the team and see if as a team, they can look at it and see if this is appropriate because it's possible that they may not need some of those medications anymore. And in fact, some of those medications, and especially in this situation of polypharmacy, may be making things worse. Importantly, when these medications were discontinued, only about 2% of people needed to bring any of those medications back. So generally, when people discontinued the medication, they didn't need it again.

And no adverse events or deaths were attributed to discontinuing the medication. Upwards of 88% of those patients who discontinued those medications had improved quality of life. Because sometimes even if it's not causing a full-on adverse event, it can still impair their quality of life. In terms of dysphagia and polypharmacy, one symptom of polypharmacy among Americans is reduced saliva output. And recent evidence suggests that this can be anywhere from 13% to 37%. And it also was observed in nearly half of patients taking antihypertensives, analgesics, statins, anticholinergics, psychiatrics or psychotropics as we'll talk about in part two, antibiotics, and PPIs. And in the last five years, we've started to really see how PPIs can be helpful but they can be taken too long. They can cause adverse events and sometimes even be related to dementia. So this dry mouth or this issue with saliva output can be associated with many more mechanisms in the speech language and dysphagia mechanisms. And artificial substitutes for saliva are available, but they only provide modest relief and can require multiple applications throughout the day. Sometimes humidifiers can be helpful but importantly, it is beneficial to have that

conversation with the nursing team and find out if the medication that is causing the dry mouth is truly still important. If yes, you can begin to work with that patient to get around some of the oral issues that may occur and the pharyngeal issues that may occur. But if not, perhaps they can make that change. So here, we're gonna do a case study of polypharmacy and COPD. And we're gonna talk a little bit about patients suffering from other respiratory syndromes. As I go through this list, you're gonna see how many of these medications are also going to apply in COVID-19. So I'm gonna go through it kind of quickly because I want you to be able to come back and read through these slides. But what I'm gonna do is I'm gonna read the list so we have some time for questions. I can get through the material. And you can read more about these medications as we go forward. Broncodilators, mucolytics, expectorants, antitussives, and xanthine inhibitors as well as antibiotics are just some of the medications that are necessary in COPD. And in truth, they're gonna be taking multiple medications at the same time.

Mucolytics and expectorants, all very common, but there's also short-acting beta two agonists and long-acting beta two agonists. Again, I really encourage you to come back and read about where these apply. Short acting anticholinergics and long-term anticholinergics are an alternative. Sometimes these are applied to treat aspects of COPD, emphysema, and chronic bronchitis. And sometimes patients are also receiving corticosteroid treatments particularly here.

There are some applications with COVID-19 because corticosteroids can reduce inflammation and improve gas exchange. But they may also have issues with asthma and other allergies. So they might be receiving leukotriene inhibitors and xanthine derivatives can help with other respiratory difficulties and not surprising, whether prescribed or over-the-counter, chances are they're taking some sort of decongestant. So you can see how so easily right away a patient with a respiratory condition can have five or more medications. Now we go into other applications. Vasoconstrictors,

antihistamines, and antitussives, they're trying to suppress the cough may be recommended. Imagine what else this patient may be taking in addition to just trying to treat the COPD and the respiratory conditions. What are they taking for the heart conditions, the depression? What are they just taking over-the-counter? Going through some of this list, you can absolutely turn this into a speech language and cognitive, not only evaluation, but a therapeutic intervention. Because this patient needs to know why and how much, when and in what capacity they're supposed to be adhering to that medical regimen. And if you start to see some of the overlap, that allows you to make the list, begin to understand the picture, and possibly bring it back to your team so that together, they can make sure that this patient is getting what they need. When we add COVID-19 on top of it, we see that there is a lot of individuals that are gonna be prescribed multiple medications because of the respiratory component of COVID-19. In general, patients that were hospitalized were more than 65 years of age. African-Americans are disproportionately affected and other minorities, particularly if they have the presence of diabetes, which will enter extra medications. They also have a tendency to be more affected than females. From the data we have seen so far, it is still very early in this process.

And then obesity and other respiratory disorders like those that occur from smoking predispose these individuals to being hospitalized. These infections can have severe outcomes, including death, and COVID-19 absolutely affects the neurological and cognitive systems of dysphagia. All infections do. We are going to cover this more in parts two and three. Just by having a fever. Having a fever with a neurological and cognitive condition, and especially if that patient has mild cognitive impairment or dementia already can cause a decline. This type of severe infection can have a significant effect. This also can change their medical compliance. And it can bring out some neuropsychiatric conditions, not only in the older adults, but we're seeing in some of the younger adults in COVID-19 apathy, aggression, defiance, depression. We have a great course that we put on that talks a lot more about neurogenic dysphagia.

I'm not just recommending it because it's what I did. I always recommend in general, as speech therapists, find out as much as you can about the neurological system. There is so much more than any of us know and it will always help broaden your perspective and make you a better therapist. But specifically, I want to talk a little bit about the oral mech exam here. The oral mech exam is gonna come up in both the neurological and cognitive parts that are coming up in part two and three, and we're gonna build on this. The oral mech exam, you've used this a lot, but I want to remind you of the five cranial nerves that are essential to be tested in the oral mech exam, and this is what's the important part about the oral mech exam. These cranial nerves can affect swallow function and can tell you a lot about the patient with dysphagia. That should not be your final step.

You should go into more evaluations. But right away at the beginning, an oral mech exam can give you a lot of information that can help get you on to the next step. The trigeminal nerve, cranial nerve five, is gonna roll in mastication, the oral and the pharyngeal phases. The seventh cranial nerve, the facial nerve, has an obvious role in the face. I always say take your hands, slap your cheeks. Where your hands are on your face, that's the facial nerve.

So right away when you lay your hands, lay your head in your hands, you're touching all the areas of the facial nerve. It's kind of obvious that it plays a role in the movement of the face. But going back to the idea of dry mouth, it also affects saliva production. Cranial nerves nine and 10 are essential. Nine is going to affect general sensation, taste, elevating the soft palate to make contact in order to propel the bolus to the pharynx, and of course, that gag reflex. The vagus nerve is kind of self-explanatory. Everything below the hyoid bone, including that cough reflex, sensory motor and visceral innervations. The hypoglossal nerve, cranial nerve 12, is gonna have all intrinsic tongue muscle movements and preparing the bolus to be transited to the pharynx in the oral and the pharyngeal phases. This is what cranial nerve 12 is really all

about in terms of the swallow. And a branch of the 12 cranial nerve, the ansa cervicalis, extends from cervical segments one through three and can facilitate movement of the hyoid bone in the neck muscles to stabilize the neck. So positioning can be effected in cranial nerve 12. Cranial nerves five, nine, and 12 are the most associated with dysphagia. So you have a question here, my question C on the quiz intend to list the hypoglossal nerve 12 but not 11. Particularly here, we're talking about what is most associated? Yes. Well, all cranial nerves and all neurological function can affect the swallowing. We really want you to see in the oral mech exam, specifically which ones are most associated across research. That is a great question. So in general, COVID-19's effects on the respiratory system of dysphagia are also a bit intuitive. Focusing on not only the lobar, the lung components, the respiratory capacity, do they have chest wall capacity? Is their tissue scarring?

What are the long-term effects? Can you even ? Can you even get enough air forcefully to cough out and something that might be in this region? But don't forget, the virus also attacked the tissues of the oral pharyngeal and laryngeal cavities as well. It was affecting that entire upper respiratory tract. We focus quite a bit on the respiratory function because it is a vital life function, but it deteriorated the tissues of the oral pharyngeal cavities as well. And so this can have inflammation and other effects that might interrupt the swallowing process and put an individual on the road to that dysphagia related decline. So as we said, all the cranial nerves and all this neurological function that we're gonna go into in part two definitely can have an effect on the swallow function. But together, an individual that has a respiratory dysfunction, which is kind of obvious in COVID-19, they likely had some sort of respiratory dysfunction before just by statistics and odds and long-term care. They're likely to have an increased risk of polypharmacy. And as we'll show in some of the subsequent parts, this also increases their risk of return to hospital admissions. Right now, people aren't as focused on that. We were heavily focused on it last year. I can guarantee you that will be important next year and beyond as we start to see the return to hospital

admissions keep going up because some of these long-term effects. SARS, the Severe Acute Respiratory Syndrome associated with the coronavirus 2 is the virus that causes the syndrome called COVID-19. It's gonna infect through this ACE2 enzyme that is on the respiratory epithelium. So you can see right away that direct biological relationship between the disease and the destruction of the respiratory system. But overall, it's a part of what's called the RAAS systems that affect neuro-hormonal pathways. And what we'll show you in part two is that a subset of patients, particularly those that were already maybe neurologically or cognitively impaired are at a greater risk because of the relationship that already exists between the respiratory, neurological, and cognitive systems. It was there before.

And many of you have heard me speak in a number of different ways in the last 10 years. This was always there before. Now we have this additional infection that may exacerbate an already tenuous situation. When you see this, we've seen some studies that have looked at some of the medications that might be exacerbating the situation in COVID-19. I wanted to talk about this 'cause you might hear people talk about angiotensin receptor blockers, which are called ARBs or or ACE inhibitors. And they looked at this in a population of more than 12,000 patients. About half of them, a little less than half of them were COVID-19 positive. And about a thousand of those patients had severe COVID-19 illness.

They didn't find a direct relationship between ACE inhibitors and ARBs, that pulmonary function that we were talking about before. There was a modest trend leaning towards beta blockers. And as you see in the previous slides when you review them later, these are related to other respiratory disorders. So it's hard to know, is it comorbidities? Are there other other factors where they are already predisposed? What you should know is that if you see some of those medications related to cardio, respiratory or pulmonary function, and you see a patient in the next couple of years that survived COVID-19, this should help you to open up those eyes, open up those ears, and look a little further at

the possible effects on the respiratory, neurological, cognitive, and gastrointestinal systems of dysphagia. You already know quite a bit about the muscular. I'm trying to open your eyes to the rest of them because COVID-19 is gonna cause other things related to aspiration risk. Thrush, other microbiomes reduce chest wall capacity that we've already talked about, which occurs in the aging process anyway. Reduced or even absent cough reflex. So even if they're not having an issue from the COVID-19, they might have a reduced or absent cough reflex for the next five years. What are they aspirating on after now? And in general, we're gonna have that oral pharyngeal and laryngeal sensitivity and motor responses reduced just by being infected. If they got a severe infection of a different kind that was respiratory and neurological in nature, that would also be true.

Because we have such a large number of people that are gonna have this infection now and in the next year as we go into the winter months, it's important for you to just be aware so you can be on the lookout. Whether you're doing this on site or whether you're doing this by teletherapy, having this knowledge will make you a better therapist because I know that this is the group. These are the clinicians that can really make a difference in this population. Overall, as we finish up here, it's gonna affect nutritional demands. It's gonna exacerbate that sarcopenia that's already there. Dramatic weight loss. For other reasons related to COVID-19, and fighting an infection could occur, how is that gonna throw off the polypharmacy?

We talked about that happening just with dysphagia. What happens when you add an infection? And then we are likely to see in the coming years an outbreak of the super infections we've already come to deal with in long-term care. MRSA, Cdiff, SIBO, other super infections that are prevalent in nursing homes anyway are likely to spread because we now have a number of compromised individuals. So overall, we see these widespread effects of polypharmacy across the bodily systems that are affecting the swallow. And COVID-19, just because it affects the respiratory system which can have

an effect on the neurological and cognitive systems and COVID-19 can affect the neurological system directly, already, we have this perfect situation for a number of long-term care and aging residents who will need more rehab therapy. So speech PT and OT can work together. The entire rehab team with nursing and physicians can be vital in determining whether some of the previous medications are necessary. Are there any signs and symptoms? How can this be incorporated in evaluations and treatments? And can you improve the quality of life of your patient even a little, especially if they made it through the other comorbidities, plus COVID-19? I'm telling you, they need their quality of life improved. Even a little bit here, a tiny little effect can make a huge difference in this patient's life. So overall, here we have our references that you can look through.

These are very current, 2019, 2017, 2020. I tried to pick references that you could go back and find. I obtained them all on Google Scholar so they're readily available to you. I also recommend that you read as much as possible if you can. And let's take a few minutes here as we have our last five minutes or so to see if there's any additional questions. And I really just want to emphasize that we're gonna see a huge change. We're gonna see this a little bit in part two. Previously, we saw the shift from skilled nursing to ALS and ILS in the last 10 years. We've started to see the shift to home health as people are starting to stay home more. But with this current situation, it will be very interesting to see how there may be a shift back towards the skilled setting because we may have a whole slew of individuals between the ages of 70 and 110 who may need more skilled care because they survived COVID-19 and even some of the other illnesses that they may have been going through during this time. So let's take a couple of questions here. We just see, "Thank you so much." I really appreciate being able to speak here today. As I said, there's a lot going on in terms of how the rehab disciplines might be able to see what's happening here and be able to apply it to what's happening in the future. We might see this shift as you start to evaluate your patients now and as you're seeing them in the long-term care setting or in the

telehealth setting, you're gonna be able to understand some of the implications. And then I highly encourage you to keep reading, keep getting new information. And to be able to keep learning because the next five years are gonna really change what we knew about the long-term care population, and we're gonna see some of those chronic effects. All right, thank you so much. I'm really excited for parts two through four. And just get out there, keep doing what you're doing. Thank you so much for all that you do. I know that you don't get enough praise and enough thanks. And I want you to know that we all know and appreciate what you do.

- [Amy] And I would just like to thank you for joining us today. Really great part one, and I think it sets us up nicely for the rest of the series as well.