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- ANTHONY LEQUERICA: 00:06 [music] There's so many things going on. There's a heightened sense of stress and anxiety that people are experiencing that are known to cause problems with good sleep.
- ERICA WEBER: 00:18 Hi. And welcome to the next segment of our podcast series focused on critical issues faced by the disability community in the times of COVID-19. I'm Dr. Erica Weber, a research scientist in the Center for Traumatic Brain Injury Research, here at Kessler Foundation. And I'm joined today by my colleague, Dr. Anthony Lequerica, for a conversation on the all-important topic of sleep. Dr. Lequerica is a senior research scientist at the Center for Traumatic Brain Injury Research at Kessler Foundation. He's also a clinical neuropsychologist with a background in sleep-wake disorders and has explored these conditions in the context of traumatic brain injury at Kessler. So to start off, what constitutes a sleep disorder? And how is this an issue in the disability community?
- LEQUERICA: 01:02 There's a number of conditions that fall under the umbrella of sleep disorders. And some of the most common disorders tend to be things that interfere with the ability to fall asleep or stay asleep throughout the night or to get a full night of restful sleep. And within traumatic brain injury, there's a higher incidence of sleep disturbance, especially complaints related to insomnia or the inability to fall asleep or stay asleep. Sleep apnea also is gaining a lot of attention as a condition that is quite common after a traumatic brain injury. And so I think-- there's other sleep disturbances that are less common. Things like narcolepsy or restless legs syndrome or periodic limb movement disorder, which is movements during sleep that disrupt the continuity of sleep throughout the night. But those are two-- especially the ones that are gaining, I think, the most attention now are sleep apnea and insomnia.
- WEBER: 02:12 So I can imagine what people probably feel most of the time is that they're just tired or don't really feel rested after a night of sleep. If you have insomnia, you might be more aware of your symptoms. But that may not always be the case. So how do these disorders tend to get noticed or diagnosed?
- LEQUERICA: 02:33 In some cases, it's actually the bed partner. If there's a person who has a bed partner, for things like sleep apnea, they're typically the ones that notice first. When they notice that the person snores especially is a big thing in sleep apnea. Not that everybody snores will have sleep apnea. But it's very common that most people who have sleep apnea tend to be snorers. And the bed partners will usually report that the person will stop breathing during the night. Not for very long periods of time. But they'll hear snoring. And then they'll hear it stop. And the person's kind of not breathing for a while. And then they'll kind of catch their breath. And sometimes when you ask the person in the morning, "Did you stop breathing in the night?" Or, "Did you wake up last night?" And this can happen hundreds of times in the night. And the person may not even be aware of it. But they may be aware of other symptoms, like being groggy during the day or waking up with a dry mouth or having a headache or other symptoms like that in the morning. And usually, the person

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who's there to observe these things will be aware of it. But the person who was experiencing it might not always be aware.

WEBER: 03:58

Yeah. So this really sheds light on how caregivers and other people in the home can really help people, say, with a TBI notice what symptoms are happening and be able to help pinpoint the origin and at least give that information to the doctor. So it's more of a family visit, it sounds like. That would be helpful when they go in to speak with their primary care or sleep specialist. So what's usually the track to diagnosis for these sorts of disorder?

LEQUERICA: 04:34

Now, there's a lot more awareness. Traditionally, these things were overlooked and underdiagnosed. But now, as there's more attention in the media and people are more aware, more physicians - even primary care physicians - are starting to ask these questions. Usually, it just takes a doctor doing a good clinical interview, to know the right questions to ask, and also to know some of the signs that sleep apnea tends to be associated with certain aspects of physiology that lead to obstruction in the upper airway, like obesity. There's a lot of studies that have shown even neck size to be a factor. People with larger neck sizes tend to be at risk. And so usually, a good clinical interview will draw these out and knowing the right questions to ask. But it's always good for consumers to be informed about these things so that when you notice something that might not be right, you can definitely bring it up to your physician if they don't voluntarily ask for it, and get directed to the right treatment.

WEBER: 06:01

Right. It sounds like being able to notice these things and then go to speak to a physician is really kind of the gold standard for what's being useful to getting diagnosed and getting hooked up with the right treatment.

LEQUERICA: 06:18

Typically, with insomnia, there's consequences during the day. Even sleep apnea, when it's severe enough, there are consequences during the day that may play out as excessive daytime sleepiness. With insomnia, it tends to be people realizing that they're just exhausted during the day. I think insomnia's more-- people are more aware of the not being able to sleep. And it tends to cause a great deal of distress. And then which in turn makes it even worse. Because when you're anxious, it's kind of an aroused state of being. And that's not conducive to sleep. So those kinds of things tend to be easier for the person themselves to recognize.

WEBER: 07:09

Right. And that's a good point that you bring up, that this is going to intersect so much with important things like mood and anxiety and well-being. Because I imagine it can go both ways, right? That being anxious or depressed might interact with your ability to sleep. But also, not getting a good restful night of sleep might also have a negative impact on your mood, anxiety, and how you're feeling during the day.

LEQUERICA: 07:37

Yeah. That's an excellent point. One of the biggest issues, especially in chronic insomnia, is that certain patterns develop over time. And they kind of feed into the problem. You're exactly right that when you don't get a good night of sleep, people tend to be more irritable, have a shorter temper. And it can make it difficult to function during the daytime, difficult to concentrate. And for people that already have cognitive impairment from either a brain injury or another condition, it can make it even more difficult. And for people that experience fatigue during the day that is the kind of cognitive fatigue that we see after a brain injury or other disabilities or MS where fatigue tends to be a part of it, having insomnia tends to make that just

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a lot worse. And it's kind of like a cycle. The worse you feel during the day, the lower your mood. And it starts to become kind of a cycle. And one of the most common things that we see is insomnia that goes from being an acute condition to becoming more chronic or longlasting. And it's because of these factors that kind of keep it-- we call them perpetuating factors that kind of cause patterns of behavior and changes in mood and things like that, which kind of make the disorder last for longer periods of time.

WEBER: 09:25

Well, you've already laid out that people with a traumatic brain injury or potentially other neurological disorders might be at greater risk for sleep disorders in general. But based on what you just said, it sounds like right now, during the Coronavirus pandemic, people might be a lot more at risk for having sleep problems that might develop into sleep disorders because of these sorts of perpetuating problems, like depression, anxiety, and these other behaviors.

LEQUERICA: 09:57

Yeah. There's actually a lot of issues that come up now with-- there's so many things going on. There's a heightened sense of stress and anxiety that people are experiencing that are known to cause problems with good sleep. And the changes in our behaviors have also changed in a way that are not the greatest when it comes to sleep. For example, we're being asked to self-isolate and stay home. And so people are, number one, out of their usual routines. And when there's no routine and no set schedule, that's something that makes it very difficult to maintain a-- the sleep cycle, it works based on circadian rhythms. And kind of having a set schedule is kind of one of the best things we can do. We call it sleep hygiene. It's the best practices. The same way we shower regularly. We try and eat healthy. We exercise. And when it comes to maintaining good sleep patterns, sleep hygiene is what we look to.

LEQUERICA: 11:21

And of the core tenants of good sleep hygiene is to maintain a consistent schedule. And for a lot of people, with so many changes now and not having your usual routine, it can cause things to be offset. And so that's one thing. The other thing is there's a lot of staying indoors and not as much exposure to sunlight. And the circadian pacemaker that we have in the brain, it runs on light and dark cycles. And so I think as the weather becomes nicer-- I mean, we still have to maintain physical distancing from other people. But hopefully, people will be able to maybe step outside and not be in the dark most of the day.

LEQUERICA: 12:19

The other aspect is the stress and boredom. A lot of people are complaining about just being bored, not having things to do. And so some people are-- not that napping is bad. But excessive napping and sleeping most of the day and especially taking naps later in the day can be disruptive of getting a very continuous sleep at night. So to the extent possible-- it's difficult now with all that's going on. It's a lot of-- we're being hit with a lot of these things at once. The stress. The loss of our usual routine. So we have to work a little extra hard to be mindful of those things and kind of try and establish a routine. I actually struggled myself this morning trying to keep my usual routine of getting up early, even though there's no commute anymore. My working hours haven't really changed. But since I'm not commuting to a location, I don't have that extra time. But I still have to try and force myself to get up at the same time, to go down, do my morning exercise. It's difficult. But these things, I've been finding, at least for myself, and keeping a routine is-- I feel much better in the day when I maintain some sort of schedule that I adhere to.

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- WEBER: 14:10                      Well, I can definitely relate to that. It's been really tempting to enjoy a little bit of this not having to get out of the house at the same time. And I'm, by nature, more of a night owl and like getting up late in the morning. So trying to keep myself on a routine is taking a lot more willpower than I thought it ever could. So I can imagine this may be really difficult too if-- let's say there's a person with a traumatic brain injury. You might be having those cognitive problems, whether it's memory or executive functions, decision making, being able to remember that higher-order goal of staying on the schedule even if you're tempted not to and there's maybe a more pleasant answer of staying up late to watch that movie that you had your eye on. So what do you think that caregivers can do to help their partner with a traumatic brain injury stay on that routine?
- LEQUERICA: 15:18                I think it's difficult. I think it's difficult for everyone, including caregivers who themselves may be struggling with the same issues. But I think being mindful of the importance of them and not underestimating the importance of maintaining a schedule. I think it's difficult. I think it has to start with an intention. And kind of even writing down a schedule on paper may make it more salient to kind of, "This is something that we're going to make as our goal. And this is something that we're going to work towards." I find that when I write things out, it keeps it at the forefront of my mind. And leaving it in a place where it can be seen on a regular basis is a good reminder to try and stick to some kind of schedule.
- WEBER: 16:12                      And then maybe keeps everyone accountable.
- LEQUERICA: 16:15                Yeah. That too. Checklists, things like that I think are really good. And then also doing kind of activities that are going to help you de-stress. I know that there's kind of a magnetic pull of the [laughter] cellphone or the smartphone or looking at YouTube. But it's really easy to-- and it's great to stay informed about what's going on in the world and about what the recommendations are as we move through this pandemic. But I also think it's important to be mindful of not overloading some of the more anxiety-provoking aspects. I think there's just so much access to media that it's very easy to get overwhelmed by everything. So maybe even limiting the amount of screen time on going through YouTube videos or looking at the Coronavirus updates. Even setting aside a certain time of day. In the morning, look at what's going on in the world. And then kind of shut it off. Because it can be very anxiety-provoking. And so that's one thing.
- LEQUERICA: 17:48                There's also other ways to kind of maintain a sense of calm even in these times. And the smartphones could be used for other things. There's YouTube videos on guided meditation or mindfulness or things like that. Set aside time during the day where you can just sit and have a-- a lot of people are good with meditation. And I know that a lot of people I've worked with-- and myself included. I find it difficult to just meditate without any kind of guide. And I think it takes a lot of practice to get to that point where you could just sit and meditate. At least for me because my mind tends to race and go from thing to thing. So the guided meditations - and I find a lot of them on YouTube - are really useful because you could at least focus on someone's voice to guide you through, kind of get yourself calm and centered. And it takes your mind off of all the stress of all that's going on. And I think that's hugely important for everyone to set aside some portion of your day dedicated to kind of-- it's like an exercise. The same way when you exercise a muscle, it gets stronger. It's the same when it comes

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to that relaxation response. But it's something that is not really valued in our society like it is in some Eastern cultures. But I think it's something-- in other cultures, people grow up with it. And it's part of who they are. And it's their routine. I think we have to work a little harder to make it a routine and get to the point where we're able to kind of exercise that relaxation muscle, so to speak.

WEBER: 19:41

And I know there's a lot of new apps that have really gotten a lot more traction because people are starting to recognize that this is probably important in the day-to-day but really important right now, when everyone is experiencing a lot of stress and missing that routine. Or let's say they used to go work out at the gym in order to kind of tire themselves out so that they could relax more so later on in the evening. So finding these sorts of new ways to be kind to your body and be able to make sure that you have given yourself your best shot at a good night of sleep. This has become a lot more salient and important right now.

LEQUERICA: 20:29

Yeah. Definitely. I think we should really, really take advantage of all that's available to us and try not to fall into the pitfall of being overwhelmed by the aspect of social media that is bombarding us with negativity. And again, I think it is important to stay informed. But it can be a slippery slope when that takes over your day. Then there's also other research looking at the effect of exposure to blue light. And computer screens, cellphones, those are all emitting a wavelength that is not really conducive to sleep. Not that it's going to ruin your sleep during the day. But in the night, if you can't sleep, it's not a great idea to get up and stare at a screen close up, like on your cellphone, or play cellphone games in bed before you go to sleep.

WEBER: 21:38

Yes. So it sounds like being able to limit your access to computers and media and things a bit of time before you go to bed might be a good idea. So for instance, not watching Governor Murphy's briefings on Coronavirus right before you fall asleep. That might be a little more stressful. But save that for mid-day, when they air them live.

LEQUERICA: 22:05

Yeah. That's a good point. So there's two things. There's the exposure to blue light. And then there's the content of what you're watching. And most people who do struggle with insomnia, one of the biggest issues is-- I mean, certain people with disabilities do experience pain as a barrier to good sleep. But most people do report racing thoughts. And it's just something that-- it causes the central nervous system to be more aroused. And so anything you could do to put a period of time where you wind down before you go to sleep, you kind of disconnect from the media, can really go a long way in helping at least with falling asleep in the beginning of the night.

WEBER: 23:01

Yeah. And you mentioned earlier that strategic napping could be important. So not necessarily napping due to boredom or other reasons. But making sure that you're taking a nap when it makes sense and also that you're doing it in a way that is most helpful. Can you tell us a little bit more about what really constitutes a strategic nap and how they could be used for good instead of [laughter] evil?

LEQUERICA: 23:28

Yeah. Actually, I'm a big proponent of napping from boredom. But [laughter] it's not the best thing for your nighttime sleep. People have more time on their hands. They're not out and about as much. And so there's just more downtime. And a lot of times, sitting in front of the TV-- one of the most difficult things is to combat falling asleep in front of the television just before you go to sleep. One of the biggest drivers

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of a good night's sleep is-- so there are two processes that go on with sleep. One of them is a circadian process, which is based on our exposure to light and dark. And we have kind of a pacemaker in the brain that kind of tells us when to sleep and when we should be awake. And there's another process that has more to do with what we call sleep pressure. So when you wake up in the morning-- if you think of it-- think of it as a balloon. And in order to sleep really well, you want to build up enough sleep pressure that your balloon is full. So that when you go to sleep at night, that full balloon will deflate slowly. And your sleep pressure will go down. But you need a certain amount of pressure in that balloon to get you over the hump to give you a good night of continuous sleep. In the morning, you wake up. Your balloon's deflated. The longer you're awake, the more your balloon inflates. The more hours you spend awake, the sleepier you get when nighttime comes again.

LEQUERICA: 25:19

And so that's one thing that gets disrupted in people with insomnia, is that sleep pressure. And one of the causes of that is not having your balloon full at the beginning of the night. And one of the things that will deflate that balloon is taking naps, especially too close to bedtime. Now, for insomniacs that are in treatment for insomnia, there are strict guidelines to napping. And someone who's involved in a specific treatment for insomnia will probably be given instructions on what to do. So I would always consult with your doctor on that. But in general, most people have a dip in alertness kind of after lunchtime. And there's nothing wrong with taking a brief nap in the afternoon. In fact, some cultures allow for a period of time where everything shuts down in the afternoon while people rest. And that's fine. But as a general rule, taking too many naps throughout the day is deflating that balloon so that you don't have enough sleep pressure by the time you get to your bedtime to get you over the hump of getting-- you just need a certain amount of pressure that will give you the best chance of getting a continuous night of sleep where you're going to progress through the stages of sleep in an orderly way, and you're going to get very restful sleep. So the danger of napping, especially if it's too close to your bedtime, that really tends to deflate your balloon. And taking too many naps in the day will deflate that balloon.

LEQUERICA: 27:18

Now, there's some people that can take naps during the day and still sleep fine throughout the night. There's a certain amount of variation from person to person in terms of how much sleep we need. It tends to hover around seven to nine hours, or within there for most people. But there are differences. There are individual differences. And there are some people who might say, "I take naps during the day. But I sleep fine at night." Well, then that's fine to take naps. But for people who-- you kind of have to monitor yourself. If you find that you're not sleeping well at night, maybe think about what you're doing during the day and are you taking naps during the day and what kinds of things are you doing to make sure that your balloon is full by the time you get into bed so that you can have a more continuous night of sleep. Yeah. There is some individual difference there. But I think it's something to be aware of and something that you can kind of think about. If you're exhausted and tired and you're not in a specific treatment where you're not supposed to be napping, then by all means. Especially if it's a matter of safety and you have to drive somewhere or operate heavy machinery, of course, you have to take a nap. But on the other hand, there's people that will take a nap and then wake up more groggy. And especially if the nap lasts a certain amount of time. So everyone's different. I think it's a matter of monitoring yourself and figuring out what works best for you. But it's something to

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think about if you're having difficulty sleeping at night, to kind of reflect on what you're doing during the day.

WEBER: 29:09

Absolutely. And I know you've been conducting some work on naps and how that helps with cognitive processes. I think you have a current study that's not actively recruiting right now just because we're out of the office during the Coronavirus. But can you tell us a little bit about the study that you have ongoing?

LEQUERICA: 29:29

Yes. So this study does involve napping, specifically during rehabilitation. So we initially started with a pilot study that looked at the effect of taking a nap. And I'm specifically looking at a type of learning. So there's a lot of different kinds of learning that happen during sleep. And we know that sleep is good for a lot of different kinds of-- good cognitive functioning is dependant on good sleep. But there's certain stages of sleep that are associated with certain types of learning. And one of those is what we call stage two sleep, which makes up a good portion of your sleep at night, has been linked to motor learning. So relearning how to do a new motor skill. So when someone with a stroke or a brain injury is relearning how to button a shirt or use their fine motor skills to zipper a jacket, things like that. There's been studies that have shown that a nap after a period of intense learning like that will actually improve the retention. So the person will be able to complete the task more accurately and in a more efficient way after a nap. And these studies have looked at people in two different conditions, where one group would get just a period of rest where they would be calm and relaxed but they wouldn't be sleeping, and the other group would be sleeping.

LEQUERICA: 31:18

And what they found is that after a period of training where the person is learning the task-- and most of these use kind of a tapping task. So looking at sequencing with finger tapping. People were learning the sequence, got better and better and better. And then there was a period of either a nap or rest. And what they found was that after the period of training, people who had the nap, their performance actually jumped and became much, much better than it was at the end of training. Whereas people who had just the rest without sleep were kind of where they were at at the end of training. They didn't make any gains. They didn't make any loss. And so the study that I'm looking at now is using that same task to kind of look-- and the idea is that if this is something that helps learning, maybe we can incorporate napping into the rehabilitation process, where after a period of intense motor learning in physical and occupational therapy, maybe a nap can help speed up the progress. And so we're starting kind of on an experimental level where we're using just a tapping task to see-- and the study we're doing now actually involves neuroimaging. So we're looking at what's going on in the brain. And we're also looking at brainwaves to see what stage of sleep the person goes into when they take the nap after the training. And so hopefully, this will lead to further studies of implementing some kind of a-- something into the treatment and see if it really does help.

WEBER: 33:16

Wow. And it reminds me of how it was always recommended when you're in school and studying for a big test to make sure you got a good night of sleep the night before because otherwise, you wouldn't necessarily retain it. So it's interesting to see that this might be helpful on the short-term but really in a very critical period of learning. Rehabilitation for anyone who has undergone rehabilitation in a formal program, they know that it's busy. They keep you incredibly busy with all the PT and the OT, speech.

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Your schedule is full. So the amount that you're trying to learn then while your body is trying to heal, anything that we can do to give it a boost would be huge.

LEQUERICA: 34:12

Yeah. There's also a lot more attention being paid now on the units for nighttime sleep, to make sure that people get a good night's sleep at night to make sure they're prepared for the day. Because that aspect of sleep that improves learning is not only immediately after you do the task, but nighttime sleep plays a big role. And it prepares you for the next day to have enough energy, to have the ability to focus and concentrate. And so sleep is hugely important on so many levels. It also helps your immune system. So during these times when we're so focused on Coronavirus, it's important to get a good night's sleep. So many things go on during sleep that improve our immune functioning, improve your energy during the day. It's important on so many levels.

WEBER: 35:13

And so we talked a bit before about some basic sleep hygiene principals and how someone with maybe milder symptoms or just kind of the average person these days could try to improve their sleep on their own just kind of using best practice. What would you suggest for people who might be struggling a little bit more, might need some more professional intervention, and especially at this point?

LEQUERICA: 35:43

The go-to treatment now for insomnia after years of research-- so throughout the history of studies on insomnia and the treatment of insomnia, especially behavioral-type treatments that are not with the use of medication, there's been a number of different approaches that have been shown to be effective. And what we have now is something called CBTI. And that's cognitive behavioral therapy for insomnia. And this has been shown to be as effective as sleep medications in the short-term but more effective in the longterm in that, with a sleep medication, in the majority of cases, when people stop taking the medication, they may still continue to have difficulty sleeping. Whereas most of the studies have shown that with CBTI the treatment is longlasting. And the reason for that is it is a combination treatment that takes these separate approaches that have been shown in their own rights to be effective on their own. And it combines them into one multi-faceted treatment. And it works based on those processes that I was talking about before, the circadian rhythms and the sleep pressure, or sometimes they call it process S. Which is having that balloon being full in the evening so that you have enough pressure to get you through. And by putting all this together into this one treatment protocol, it has been shown to be extremely effective.

LEQUERICA: 37:42

There's emerging evidence in traumatic brain injury and in other specific conditions now. Now, the research has been done in kind of a general population of individuals with insomnia, now moving into different disorders or other disabilities to show that it is effective in these other conditions. Sometimes modifications may be needed for people who may have cognitive impairment or things like that. But it's extremely effective. And the effects tend to be longlasting. And so there are more and more psychologists and nurse practitioners and people usually affiliated with sleep disorder centers that are trained in CBTI. So if someone is having difficulty, you could also go online and look up-- there's a society for behavioral sleep medicine. A lot of the practitioners that are trained in this have certification in behavioral sleep medicine. So it's becoming easier and easier to find people who are trained in this. Although, it's still not as easy to find, unless you're looking through a sleep disorder center will tend





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to have a referral base so that people can be treated. But I think going to your primary care doctor or your local sleep disorder center may be a good start.

WEBER: 39:39

I bet that there may be potential for CBTI to be delivered virtually, using telemental health services. I know a lot of psychologists are starting to do that so that their patients aren't kind of left out in the cold during this time when people might need it the most.

LEQUERICA: 40:00

Yes. I'm glad you said that because there's actually have been studies that have shown this to be effective via telehealth. So even before the Coronavirus, people were looking at this to be able to have a larger outreach so that people who are able to deliver this kind of treatment can do it even over the phone so that you can reach people in more rural communities or people that don't have transportation or are not able to go regularly. And typically, within four or six-- some programs it's four, six, or eight sessions. And that's it, maybe with some booster sessions afterwards. But it's not the kind of treatment that lags on forever. It's relatively short-term and very focused. And it's very effective.

WEBER: 41:02

This has been a great conversation, and a lot of really interesting information about why it's important to focus on good sleep habits and being aware of what sleep disorders might be hanging around for the general population but also for people with disabilities like traumatic brain injury. And we'll make sure to include some of the resources that you mentioned and other things that we think might be helpful for new listeners in our program notes. Check out our playlist for additional podcasts on our Coronavirus series. Thank you so much, Dr. Lequerica, for being our guest today on sleep disorders. And take care of yourself.

LEQUERICA: 41:43

Thank you. Thanks for having me. It's a pleasure.

ANNOUNCER: 41:48

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