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Consequences of Excessive Daytime Sleepiness

DR. LESLIE LUNDT:

Welcome to ReachMD.

DR. CHRIS BOJRAB:

Thank you very much. It's my pleasure to be here with you today.

DR. LESLIE LUNDT:

So, Chris what are some of the physiologic consequences of hypersomnia?

DR. CHRIS BOJRAB:

There are a number of physiologic consequences of hypersomnia that go far beyond just simply the feeling of tiredness or fatigue the following day. I heard a comedian once say that the wages of sin are death, but once they take out taxes is just that tired hung over feeling the next day, but there is really a lot more to it than that. We are learning a lot more about sleep and about functions of sleep and while it is still a bit of a misery, we know significantly more than what we knew 10 years ago. A lot of our interest is focused on what we call slow wave sleep, stage III stage IV sleep, and all sleep is not equal. This stage of sleep we refer to as slow wave sleep serves a number of critically important functions. During this period of slow wave sleep which for most of us is perhaps a couple of hours out of the night, we produce probably 80 to 90% of the growth hormone that we produce as adults. There is also a disproportionate amount of conversion of T4 to T3 during this period of sleep. There is a disproportionate amount of androgen synthesis that occurs during slow wave sleep. There are specific things that go on in our brain that helps with certain aspects of memory during slow wave sleep. The HPA axis does important work during slow wave sleep, so when we disrupt this phase of sleep or when we are not reaching this stage of sleep, we are really putting ourselves at risk for missing out on those biologic functions so if you think about what somebody may look like who is deprived of sleep or who specifically is deprived of slow wave sleep, what do you think a patient might look like who doesn't get enough growth hormone, doesn't convert enough T4 to T3, doesn't build enough androgens. Doesn't get good relaxations of ligaments and tendons, you know that patient might look like somebody who is tired, who is weak, who has trouble repairing muscle tissue after an injury, who has trouble building lean body mass, people who have these sort of sub-syndrome or endocrine problems. It sounds a lot like the patients who we see with chronic fatigue or fibromyalgia and in fact loss of sleep, especially loss of slow wave sleep has been frequently associated with patients with syndromes like fibromyalgia or chronic fatigue, so it's more than just simply about being tired the next day, missing out on those certain critical aspects of sleep put us at increased risk as you think that we have been about. It also puts us at increased risk for disorders of metabolism. We may be more vulnerable to diabetes; we may be more vulnerable to infection because we are not engaging in some of the processes that keep those immune cells functioning well while I am

engaging in the processes that keep our endocrine system functioning well. So it goes far beyond simply that tired feeling the next day.

DR. LESLIE LUNDT:

So many complicated body systems obviously that have downstream effects as well are affected, it sounds like.

DR. CHRIS BOJRAB:

Absolutely.

DR. LESLIE LUNDT:

Now, how about some of the more behavioral kinds of consequences, what do you see?

DR. CHRIS BOJRAB:

You know we really underestimate the risks that people are at when they suffer from excessive daytime sleepiness, people that have excessive daytime sleepiness, whether that comes from untreated or partially treated sleep apnea or <____> sleep disorder, conditions like narcolepsy, problems with insomnia, take your pick, that these patients who manifest with excessive daytime sleepiness are at significantly increased risks for accidents and injury. There is about 4 to 4-1/2-fold increased risk in being involved in a serious motor vehicle accident when people are sleep deprived. Mass General a few years ago did a study where they were looking at their house staff and they looked at the frequency with which their residents had been involved in motor vehicle accidents and they were significantly more likely to be involved in a motor vehicle accident when they were post off as opposed to other nights. People have actually done studies in driving simulators trying to ascertain the degree to which sleep impairment or sleep loss impairs our ability to drive safely. In one such study, they looked at patients that were allowed to drink alcohol up to the point where they were legally intoxicated where they had blood alcohol level of 0.08 and then they took people and sleep deprived them and put them back in driving simulators sequentially to see how long that somebody have to be awake before they are as impaired as when they are legally intoxicated and the answer turns out to be 17 hours, so once you have been awake for 17 hours, you were as impaired in your driving skills as somebody who is legally intoxicated, and how many times for those of us who are working longer hours, longer shifts in the hospital or wherever, how many times that we have been up for 17 hours and gotten behind the wheel. So again, people are frequently surprised to learn the extent to which this kind of impair our psychomotor performance. Again, as I mentioned, I get a number of referrals of patients coming into the office where they think they got attention deficit disorder and on testing they really do demonstrate significant loss of concentration and attention. It does, you know, reach the same level of that which we see with significant ADDs, so attention impairment, cognitive impairment, processing problems, memory problems; these are all some of the behavioral consequences of excessive daytime sleepiness.

DR. LESLIE LUNDT:

If you've just joined us, you're listening to ReachMD, The Channel for Medical Professionals. I am Dr. Lundt, your host, and with me today is Dr. Chris Bojrab. We are discussing the consequences of excessive daytime sleepiness.

DR. LESLIE LUNDT:

Now, Chris, I wonder of how much work has been done looking at this in children and teenagers. It seems like, especially teenagers don't sleep, at least someone in my house don't sleep, nearly as much as I think they should anyway. Is there any data what happens with them?

DR. CHRIS BOJRAB:

There is Leslie. I think there is a wealth of data out there looking at the degree to which not getting a good night's sleep impairs school performance. Children and adolescents really do have a slightly different circadian pattern than adults do. In fact, in recognition of this difference, some school systems across the country have actually made adjustments to their school day, starting their school day a little bit later and running their school day a little bit later as a means of trying to capitalize on their natural circadian rhythm, so rather than having students starting classes at 8 o'clock in the morning, some school systems have changed their school day to where they start at 9 o'clock, or in some cases, I've heard even as late as 10 o'clock, then extending the school day until 4 or 5, and a number of these school systems have reported increased performance on standardized testing. So you know, it's early in this data, but I think that it's worthwhile looking at that. Certainly this makes good face value sense that what's good for the goose is good for the gander, and if we are seeing these kind of cognitive difficulties in adults that certainly are children in primary or secondary or tertiary educational settings could be at risk for the same kind of cognitive impairment that we see in adults. There is more data in adults, but there is some data in younger people as well.

DR. LESLIE LUNDT:

One of the things that amazes me with my kids, and I wonder if this happens in adults too is when there are sleepy, they deny they are sleepy, oh I am not sleepy, no I don't want to go to bed, I couldn't possibly be sleepy and you know they are, so is there is a link between sleepiness and lack of awareness or judgment, not only in kids but in adults.

DR. CHRIS BOJRAB:

It certainly has been my perception that that is the case. I am not aware of many studies offhand that have demonstrated that, but I can surely say a personal; I was actually diagnosed with sleep apnea probably 6 or 7 years ago and my wife said you know you snore like a lumberjack and you have prolonged times that you are not breathing at night, you wake up gasping, you need to go get a sleep study or you are going to die, and I felt good. My energy is always good, I am sort of a short sleeper, I never have required a lot of sleep and I rarely ever take a nap, so I didn't really have the behavioral manifestations of sleep apnea, but I said I certainly would take her word and I went in for my sleep study. I got a call from the pulmonologist who asked me if I was still working. My sleep apnea was so bad he said a lot of people with sleep apnea that bad were on disability.

DR. LESLIE LUNDT:

Wow!

DR. CHRIS BOJRAB:

So, certainly even those of us who consider ourselves to be well informed and highly educated are pretty crummy judges of the quality and quantity of sleep that we receive at times.

DR. LESLIE LUNDT:

Yeah, one of my favorite stories actually comes from I think somebody you know, Dr. Mary O'Malley who is a sleep doctor in Connecticut and she tells the story about how she was referred a patient who came in because he was falling asleep while driving and she had him do the Epworth sleepiness scale which is a scale real simple, a question, as you know measurement of how sleepy you are. So he thought they are doing this Epworth sleepiness scale and basically marks down nothing, that he never falls asleep in situations that are inappropriate. So Dr. O'Malley takes a look at the patient and his scoring and she says gosh, you know you were referred to me because you were falling asleep in your car, but your form here says you never fell asleep and the exact question is do you ever fall asleep in a car while it stopped at a red light or while it stuck for a few minutes in traffic and well yeah Dr. O'Malley, I don't fall asleep while I am stopped in the car, I felt asleep when I am driving the car. So it spoke hardly to me about judgment being impaired in some of these patients that they really truly don't think they are impaired like the study you mentioned where after 17 hours of being awake that you are as impaired behind the wheel as if you are drunk. I mean all of us who have gotten in a car where hopefully most of us don't get behind a wheel when we are drunk, so very interesting.

DR. CHRIS BOJRAB:

Exactly.

DR. LESLIE LUNDT:

Now I wonder is there any data in terms of work productivity, are sleepy people, I mean you would assume they are less effective at the job, but do we know that?

DR. CHRIS BOJRAB:

Yes we do. There are two issues, the issue of absenteeism, those patients that suffer from excessive daytime sleepiness and as a result they simply can't make it in to work or feel unable to make it into work and that certainly is something that is well recognized in the literature and has been one of the areas of focus for a number of our colleagues and occupational medicine for a long period of time, but there is also this emerging notion of what's called presenteeism and that is reduction in work productivity, work quality even when people are there. It's interesting if you look at data from the national transportation and safety bureau, you will see that the most frequent times a motor vehicle accident will occur is during that 3 a.m. to 6 a.m. time period. We also know from tracking the data from self-reported information from hospital systems is that third shift is the most frequent time for medication errors, dispensing errors, or some type of errors in providing care to the patients are made, so there are some significant impact in terms of our ability to function adequately in the workplace settings predicated upon this excessive daytime somnolence.

DR. LESLIE LUNDT:

Makes sense and again, you know, I would encourage physicians just to think back of what it was like in the bad old days when were interns and residents and how awful it was the next day after being on-call and how you felt and certainly my experience was we had several car accidents in our class for people driving home when they really shouldn't have been and even in medical school one death of one of the residents died in a hot tub from falling asleep.

DR. CHRIS BOJRAB:

Yeah, it really is shocking. I remember one time when I was moonlighting in the medical school, I got called up to the floor at about 3 or 4 o'clock in the morning by one of the nurses and they will call me out to patients who was terribly tachycardic and I asked how tachycardic were they and they said their rate was over 200 per minute and I asked if they had any idea why this person was so tachycardic to which the nurse replied I inadvertently gave him a Ventolin treatment IV.

DR. LESLIE LUNDT:

Oh my!

DR. CHRIS BOJRAB:

You know, she had been just recently all night and again just an error that you know arguably she may not have made during the day if she was working her normal shift and was better rested, but look like that in doing something that seemed so grievous, but that kind of thing happens all of the times.

DR. LESLIE LUNDT:

I want to thank our guest, Dr. Chris Bojrab. We have been discussing the consequences of excessive daytime sleepiness.

I am Dr. Leslie Lundt. You've been listening to **The Clinician's Roundtable on ReachMD, The Channel for Medical Professionals**. We welcome your questions and comments. Please visit us at www.reachmd.com. Our new on-demand and pod cast features will allow you to access our entire program library. Thank you for listening.

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