



Conversations
That
Matter



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Imagine this, someone clutches their chest and collapses from a heart attack.

What did you envision? Did you imagine a middle aged overweight guy?

Probably, did you for even a nanosecond imagine a woman? Probably not. Why didn't you imagine a

woman? Well, let's face it, we're sexists when we think about heart attacks and strokes. We think it's a male problem. As a result of this stereotyping, heart disease research is focused primarily on men.

The other side of that stereotyping is that women are not as vulnerable to heart disease. And that is simply not true. Heart disease is an equal opportunity affliction that manifests itself

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differently in women than it does in men. So not only has female heart disease been under-researched, it is also frequently misdiagnosed, and as a result, women are over-dying. Dr. Lara Boyd of the Center for Brain Health says this misconception has created a gap in how women are treated when they complain of symptoms, and there is a chasm in the amount of research devoted to women's cardiovascular health.

We invited Dr. Boyd to join us for a Conversation That Matters about the facts and myths of heart disease and women, and where we go from here.

- [Narrator] Conversations That Matter is a partner program for the Centre for Dialogue at Simon Fraser University. The production of this program is made possible thanks to the support of the following, and viewers like you.

- Welcome.

- Thank you.

- Very interesting topic, women's heart health. When we take a look at the body of research that has gone into understanding heart disease and stroke in North America, we think we've come a long way. Until you start to dig in and you realize, we've come a long way with men's heart health. Where exactly are we at, in understanding the causes of women's heart health, how it manifests itself, what are the things that we need to do, and what do we need to do to ensure that we protect women from not being misdiagnosed and going home and having a stroke, or worse, dying?

- Right, so a lot of this comes from these old ideas that, We think about heart disease and stroke being old men's disease, right? That's who gets these types of problems, and it turns out that women have strokes, for example, at absolutely the same rate as men, but they look quite different, and we have them at different points in our lives, and to different degrees of severity. So because really, medical research has kind of failed to look closely at these male versus female differences, and it comes from many different factors, some of them gender and sexism in research, some of them because animal models are a lot easier, if you just use male mice and rats, and that's a very common thing in research, or it had been until very recently. And so we've just kind of failed to build the body of evidence, both from a research perspective and a clinical perspective, to understand what's going on there.

- Okay, a little point of clarification, so does heart disease manifest differently in a female mouse than it does a male mouse?

- You know what, I don't know if we've even done enough research to answer that question yet, because most of the very basic neuroscience around this, the basic heart and stroke type of neuroscience has been largely done in animal models that are only male, because you don't have to deal with fluctuating estrogen cycles. So it's much simpler, because we look different.

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Women change quite a bit over a 30-day span, and so it's just a much simpler model.

- Is that not short cutting research?

-And half the population, absolutely! It absolutely has, and it's something that now, in the last few years, really, maybe in the last five to 10 years has become absolutely unacceptable, in medical research.

- What are some of the things that we are learning about how heart disease starts to manifest itself inside a female body--

- [Lara] Right.

- Versus that of a male body?

- It may look very different depending upon where you are in your life. So the easiest, or the simplest place to start is, women live significantly longer than men. And so women have more time to get their heart disease, and to let it manifest itself, so what we see is more severe heart disease and stroke in women as they age, and then the net result is, if you do, for example, then have a stroke, and you're an older woman, you tend to have a more severe stroke, because you've just had the accumulation of these risk factors for longer. If you think just about stroke, then, women are more susceptible to strokes at very different points in their lives than men. So women are at high risk for stroke at three particular places in their life. When you're pregnant, you have a very increased risk of stroke, because your heart is working harder, your blood pressure's much higher in that point in time. And it's not uncommon for women to suffer from very high blood pressure during pregnancy, that they would normally never actually experience. So that's your first really risky time. The second time is when you go through menopause, so early menopause, so in your mid-50's, typically for most women, is a very big spike in your risk for stroke and also for heart disease. And then lastly, as I've already mentioned, as we age. So as women get older, and then we have just more time as an older adult, and we know that our risk factors for heart disease and stroke increase with age. So if a woman's having a stroke and she's 32, and in her early pregnancy, she goes to the emergency room, stroke is not the first thing that those emergency room docs are going to think about, when they're trying to consider what's going on, and so often, stroke and also heart disease gets missed quite early in women, because we're seeing it at these funny places in time, and we're not thinking about these as being women's health issues as well.

- We did an interview with a young woman who was in her late 20's, and she went to emergency, she went to walk-in clinics, she went to a variety of different places. Ultimately, constantly misdiagnosed, sent home, you've got a migraine, it's something else.

- [Lara] Right.

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- It was always something else. Ultimately, it was determined that she had had more than 20 mini-strokes.

- Yes, yeah.

- And of course, the impact of that on her, from a neurological perspective, is severe. The consequences are potentially very, very dramatic and life-altering.

- Well absolutely, for a number of reasons. One, the best predictor of who's going to have a stroke is already having had a stroke. We also know that when you have a stroke, for example, we always have this saying, and that's time is brain. So as you're having a stroke, you have about 1.9 million brain cells die per minute. So as you're waiting, as you're waiting a day, and going back to Emerg, waiting a day, going to the walk-in clinic, the accumulation, the accumulated losses of neurons is highly significant. So you're looking at years of premature aging in that brain as well, so now you're also at higher risk for many other disorders, including dementia, would be the big one.

- We gotta get you to hang on for a second, while we take a quick commercial break.

- [Lara] Absolutely.

- We'll be right back.

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- So not only do those brain cells die, they also damage or weaken the ones that are in--

- [Lara] Yes.

- In that same vicinity, and now, it's my understanding that with the appropriate amount of neurological work, you can help to recover some of that lost brain function, in those damaged brain cells, but the ones that died--

- [Lara] They're gone.

- They're, no recovery there.

- Yeah, we don't have the technology, the understanding yet, to regrow lost brain cells, so what you're looking at is then trying to use existing cells to take over lost functions, but we also see that there's very widespread effects of a stroke across the whole brain, and you can

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think about it as being a big, interconnected network, just like any kind of wired network would be in your home, so if you were to go up and cut the wires in the ceiling, you might have a light that works perfectly well, but it's never going to turn on, because there's no input coming. And that's the same thing that happens in the brain, so you can have areas that are quite distant from the stroke that now have lost their function.

- The neural circuitry has been interrupted.

- Absolutely, so as I say, it's a very cascading effect.

- So I understand that when women get heart attacks, it also presents differently.

- [Lara] Yes.

- And almost as though it's in a different part of the heart, harder to detect, is that correct?

- Well, it can present very differently, in terms of the signs and the symptoms. So we think of a heart attack as, you're clutching your chest, terrible chest pain. Women will report things like nausea, an upset stomach, a shoulder that's sore, back pain, low back pain. So it can look and present really differently, even the same type of pathology within the heart will look quite, quite differently in terms of how a woman will feel, and then describe it to an emergency room physician. And so that becomes a real puzzle for those physicians to try to sort out and see something that they're not quite expecting, maybe look a little different, but still come back to being a heart attack. Heart attacks, in a way at least, we have an electrocardiogram, we can put that on and we can see changes in the electrical properties of the heart, and diagnose them a little bit more easily than stroke. Stroke is a little trickier. We may or may not have it the resolution to see, for example, very small strokes, sometimes they're slow to emerge.

- And, as you pointed out, time equals brain cells.

- So it's a massive emergency.

- So the introduction of a drug like Streptokinase, for instance, would help to diminish the impact of the stroke, but if you're uncertain of whether or not this person's going through a stroke, you're then gonna be reluctant to administer that drug.

- Absolutely, and the drugs for stroke, especially the clot-busting drugs, such as tissue plasminogen activator, tPA is the big one, they absolutely can't be administered unless you're confident a stroke is occurring, and that you're sure that it's a clotting stroke, and not a bleeding stroke, so there are two different kinds.

- Cuz you make the mistake, and then you're gonna exacerbate the problem, yeah.

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- Yeah, and in a very--

- Dramatically--

- Dramatic fashion, and so the risk there is that you've actually now killed your patient, so physicians need to be 100% sure before they administer those types of drugs. There are other, though, very effective acute medical interventions for stroke, and also for heart attack. So we call them these endovascular therapies. So you can actually thread a device up into the brain, or into the heart, and remove a clot. Conventionally, these have looked like little corkscrews, you thread them up, you come in through the femoral artery, it's an amazing procedure--

- Up through the leg, and--

- You come up through the leg, all the way up, imagine coming all the way up into the brain.

- [Stuart] Wow.

- Localizing that stroke clot, and driving like a corkscrew into it and pulling it out, and releasing the blockage. So those are amazingly effective. They're so effective that, actually, 83% of people will survive the stroke now, but depending how quickly you access these therapies, you'll be left now with some degree of residual impairment.

- One of the other things that I've heard, and hopefully you'll give me some clarification around this is, that because a heart attack may present in a different part of the brain, for a female patient than a male patient, we don't necessarily have the equipment that is gonna be able for us to accurately determine that this is exactly what is happening to this patient when they present in emergency.

- Yeah, so strokes are really difficult. So there's a couple of ways that you can see them, you can look with a CAT scan, which is basically a lot of x-rays of the brain, very very poor resolution, so that may just tell you yes/no. You can inject a dye, and then do an image of the brain to see where blood flow is stopping, and then the real gold standard for seeing them would be an MRI, a magnetic resonance therapy. Unfortunately, here in Vancouver, we don't have very many MRI machines. And so there's very high demand on these, and they're not easily accessible. And that's here in the lower mainland. Now imagine you're having a stroke--

- In a remote or rural--

- In a remote or rural area. Now it's extremely difficult to diagnose, to understand where that is, how to intervene. But it's even a little bit more tricky if you're a woman and you have a stroke, because even once the stroke is diagnosed, women are less likely to be offered

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aggressive medical interventions, such as these endovascular therapies. And so you see that even poorer outcomes, because you don't have these aggressive medical interventions. The other thing is that, I told you time is brain, with a stroke. Women are terrible about getting themselves to the hospital. Women will wait, they'll think it's gonna go away, they have too much to do. For whatever reason, women wait significantly longer. In fact, on average, Canadian women will wait seven hours to go to the hospital.

- Why, why do they do that?

- I don't know, some of it may come from, they're not expecting it. I'm a 50-year-old woman, I shouldn't be having a stroke, right?

- So does stoicism play a role there?

- It may, it's hard to know, it's hard to get into the psychology of it, but women aren't very good about advocating for themselves, and they're not very good about going to the hospital when they are having a major problem.

- This is our second break. We'll be back in a moment.

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- So, when you sense that there might be a problem, you push for it.

- [Lara] Push for it, absolutely.

- But how do you do that, as an individual, I come into the hospital and I'm at the mercy of people, this is their specialty, and they go no no no, it's gonna be okay, go home, take two of this.

- [Lara] Right .

- How do you, then, come back and say no, I'm gonna demand that you do this. And 'til we say advocate--

- Right.

- How do you do it?

- I think that it's a multi-pronged approach. I think women have to understand the symptoms, of stroke, for example, we have this algorithm FAST, so if you have sudden changes in your

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face, your arm, your speech, and then time, is the T. So go quickly, and that's especially if they're just on one side of the body. That's just a classic stroke. Even if those occur and then go away, so they happen for a short period of time, and then resolve, that's a sign of these mini-strokes, or what we call transient ischemic attacks. On the other hand, we also have to do a better job of educating our physicians so that they understand that women are gonna look different, they might be crazy-young, you might think, there's no way, that 20-year-old shouldn't be having a stroke, can't be, must be a migraine. And then putting that together, then I think we'll see changes in outcome.

- I noticed that you tend to go towards stroke rather than saying heart attack. Whereas when I talk about a guy, I go, well, he's havin' a heart attack. Is there a reason for that, and do you then tend towards stroke over heart attack, when you're talking about female patients?

- Well, I hope that I'm not doing that. I think that part of that is, men do tend to have a higher incidence of heart attack, whereas stroke is more of an equal-opportunity player here, in terms of cardiovascular health.

- And so a heart attack would be cardiovascular failure.

- Yes, absolutely, so you've had a blockage of some sort in those vessels in your heart, and so now you have pieces of your heart that are dying, because they're failing to get the oxygen and the glucose that are being transmitted by the blood, that's our classic heart attack type of a symptom.

- And that present more in men than it does in women?

- It does tend to present more in men, but women are certainly quite good at having heart attacks as well, and we don't get to be excused from that, and so--

- And major contributors there would be lifestyle, would they?

- Yes, to both of these cardiovascular diseases, we see that there's a few factors that are high contributors here. So high blood pressure, high cholesterol, so you're accumulating fats inside those vessels, that line, inside the lining, or inflammation in those vessels and then something breaks free. Smoking is your number one risk factor for each of these, and so that's just, tobacco smoking, I have to now caveat on that, I don't really understand what smoking cannabis, how that will contribute, we don't actually know.

- Well we don't know, because none of that research has been done.

- [Lara] Right.

- Cuz it was illegal 'til now, yeah!

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- Absolutely, so you can see where there's a huge amount of work to be done there, cuz we don't understand what that's gonna do to cardiovascular health, but smoking tobacco is definitely a major risk factor. Diabetes, altering your sugar, and your insulin in your body, because that contributes to inflammation.

- So Type 1, Type 2, where there's gonna be--

- Type 2 is a more significant risk factor here, because it tends to sometimes exist and people don't even know.

- And it's an accumulated effect over decades.

- Absolutely, so you see it building over time. And then, a lack of physical activity and a lack of sleep. All of those things are modifiable. You can change them. There's two factors that are not modifiable, and that's your age and your sex.

- When it comes to research around heart attacks and stroke in women, what are the exciting new areas from your perspective, that we're now starting to dig into?

- Really exciting areas in stroke is, the first one is that we've made stroke now into a chronic disease. So 83% survival rate, so that's the good news. The bad news is, you're now going to live with these deficits, and that's where, really, our efforts are centered right now, is trying to understand, how do we help that damaged brain recover? So this idea, which is not particularly new, but is still very exciting, of brain plasticity, is really driving the research in this area, so how do we manipulate, how do we harness brain plasticity to optimize recovery from stroke?

- Third and final break. We'll be right back.

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- Would that include longer periods of physical therapy or physiotherapy after the event?

- Absolutely.

- Because it had been a short period of time--

- [Lara] Right.

- Before, saying, okay, that's it, now--

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- [Lara] That's it, yeah.

- That's the final prognosis, whereas, as I understand, we're starting to find that no, you keep that physiotherapy going,

- [Lara] Yeah.

- You can then reignite or create new neurological connections.

- Yeah, so we're looking at creating those new connections, and really strengthening those connections, and we now know there are phases, so the most recovery you're gonna get will be very early after a stroke, but the recovery phase, though it will slow, it will continue for decades, if you will, if you continue to work on it. What we're looking at now are more adjunct therapies, so what could we pair with that therapy to speed it up, to make it more effective? So there's different things people are looking at. There's an antidepressant drug called fluoxetine, which has shown some promise, when it's paired with therapy, and it actually seems to not just be an antidepressant, but also a promoter of neuroplasticity. So that's very exciting. In my research group, we're looking at very short but very intense bouts of exercise, that actually, we show, increase the excitability of the brain, increase the plasticity of the brain, and that can lead to enhanced outcomes in terms of rehab.

- So high-intensity, short-burst exercise.

- Yes, we call them HIT, high-intensity training. We know that then, that translates into better brain plasticity, better neurotrophic profiles in the brain, so your brain is more capable, plasticity is more excitable, and we show that you learn more as a result of those.

- And through that neurotrophic response, you're generating more brain cells as well.

- Absolutely, the other therapy that we're looking at, and many others are as well, is can we stimulate your brain, noninvasively, and pair that with interventions, and look to see, will this now drive more neuroplasticity as well, so very targeted brain stimulation.

- Is that using light?

- It's actually using magnetic therapy, it's called Transcranial Magnetic Therapy, and there's another form called Transcranial Direct Stimulation, where you're actually passing an electrical current through the brain.

- What else do you need, to be able to accelerate and enhance research for women, when it comes to stroke and heart attack?

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- The big one is just this awareness, that we have this gap. That has been a big thing. I think that some of that has come from just having more women in the field, and those of us on panels sitting up and saying-- Some of it's being driven by legislation, so now to get federal funding, you have to have a plan for how you're going to consider both, how you're gonna test both. And then some of it is driven by this understanding that we're gonna see different response profiles, and women and men are both gonna have strokes and heart attacks, and they're gonna look different there, but they're also gonna recover differently, and so trying to now pull that out. The challenge here becomes, that now instead of having a study and saying, well, I need 50 people to understand the effect, I need 50 men and I need 50 women, so the price tag of that study just doubled.

- Well, and as I'm understanding through patient-oriented research, we're now saying we need 50 women who are of Asian descent, 50 women who are of Indian-Asian descent--

- Yeah, you can see--

- First Nations descent, because we all manifest things differently.

- Absolutely, and so the largest hindrance to this, moving forward, is research dollars, frankly. There are plenty of us willing to do the work, we just have really suffered, actually, in Canada, to be quite candidly, from a real constriction of the dollars that are available for this type of research, and that is going to lead to poorer health outcomes in Canadians.

- The number one resource that you need is money, which buys you time, which buys you talent, which buys us better health outcomes.

- That's exactly the way it happens, yeah. And you touched on something really important that I hadn't mentioned, and I wanna bring it up, and that is, these different demographics, and women do look differently, so indigenous women have more severe strokes, and obviously less access to good preventative healthcare, and Southeast Asian women do as well. And some of that may relate to cultural factors around access to exercise, for example, diet, rapidly-changing cultural, environmental factors, but there are two particularly vulnerable groups here in Vancouver that we need to think about, as probably needing more attention, and special attention, in thinking about, how do we help them be healthy? Best is to not have a heart attack or stroke, but if they do, then get the right kind of care afterwards.

- Yeah, and that targeted, specific research particular to those communities will help you determine what will be the appropriate course of action.

- Absolutely, and haven't pulled them out yet to really understand how that looks. We know they have poorer outcomes, we don't know exactly why.

- Thank you for coming in and sharing this with us.

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- It was really my pleasure, thank you so much.

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