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AUCD-AIR-P Presents: Rujuta Wilson-(Zoom)

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>> Hi, everyone. My name is Kashia, and I want to welcome you to the Autism Intervention Research series. Thank you, all, for joining us today. Before we begin, I like to address few of the logistical details. I'll provide a brief introduction for our speaker and also reserve time to answer questions at the end of the presentation. Your audio will be muted throughout the call. However, you can submit questions at any point during the presentation via the chat box on your webinar consul. The entire webinar is being recorded. And will be available on the AIR-P website. And there will also be a short evaluation survey at the close of the webinar, and we invite you to provide feedback on this webinar and also to provide suggestions for future webinars. In the interest of time, let's get started. We first want to acknowledge the health resources and HRSA as the funding source for the AIR-P. And now I want to introduce our speaker for the AIR-P, Dr. Rujuta Wilson. Dr. Wilson is an assistant professor in pediatric neurology and psychiatry at the UCLA Geffen School of Medicine and research and treatment. Please join me in welcoming Dr. Wilson.

>> RUJUTA WILSON: I'm delighted to be speaking to you about brain and body and motion. Understanding and supporting motor dysfunction in autism. Kashia, thank you AUCD, and the support of the project, and of course, that kind of introduction. Briefly here are my disclosures. And we can move on now to what we're going to cover

in today's talk. So first, we're going to talk about motor function or dysfunction in autism. And I'll say we use motor dysfunction and impairment interchangeably on the context which we're discussing on the DSM and other study. And now I'm going to be talking about measuring motor function and autism. And how that's been done, gaps in that, and what we're doing here at UCLA. And then we're going to move over to specifically talk about targeting motor dysfunction using organized physical activity. Given the fact it is something that's clinically available, community available and all of which overlooked for individuals with autism. So we're going to talk about why autistic individuals participate in organized are physical activity, and the benefits of those, outcomes of organized physical activity for Autistics individuals and clinical individuals referring them to organized activity. And I'll also use OPA as shortened acronym for organized physical activity. And I'll be using person first if identity first throughout the talk because there's study that utilize personal approaches and I acknowledge the fact it's individual before using identity first. So let's move over to diagnosis of autism, and I won't spend tremendous amount of time in this slide as many of you are familiar with the diagnostic criteria. But what we're going to talk about today, we know autism is a highly prevalent neurodevelopmental disability with the estimate of CDC that affects 1 in 54 children. We know there are core diagnostic criteria focused on social impairment which you can see here on the top left. And repetitive behavior and restricted interest which you can see here as well and we also know there's specifiers used in the diagnosis, including level of expressive language and support needed. Furthermore, we know there's numerous co-occurring conditions with high rates of epilepsy. 20 to 30% of higher levels of epilepsy. Liar levels of sleeping difficulties up to 80%, and higher rates of psychiatric co-occurring conditions such as anxiety, ADHD, depression, and OCD. And of course there's others. Gastrointestinal issue, language disorder, and intellectual disabilities. And what I'm going to focus on today is motor impairment. And in the DSM these are listed as associated deficit. And specifically, it's listed as odd gait, clumsiness and other motor signs. And recognize this is a common co-occurring deficit. So, why is motor function important in autism and in general? Well, motor development is one of the earliest benchmarks of developmental progress and is crucial in driving multiple cognitive processes. So many of us as caregivers or clinicians or other providers are looking for things like sitting, rolling, walking, as key markers of typical development. And these advances allow an infant and a toddler to gauge with the environment, manipulate objects, engage with other caregivers, and develop spatial perception. This is the foundation of many cognitive processes. Process deposited to be first typical development leading to a whole field of study in earlier diagnosis and treatment. We also know that motor development can be observed and measured overtime. And that it can serve as a target for intervention, predominantly using things like physical and occupational therapy. And of course in this talk we're going to consider other avenues as well.

Here in this slide, really represents a repeat study showing the prevalence of motor difficulties in autism. This was a population based cohort study. 2,000 individuals with autism. And they found based off of predominantly caregiver reports, the adaptive behavioral scale, 35,000 individuals met the criteria for motor difficulty, almost equal to the rate of intellectual disability which was 37%. Difficulty increased with age, and also with difficulty in non-verbal communication. Yet, diagnosing clinicians only reported motor difficulty in 1.3% of cases and we'll talk about why despite the fact these are prevalent, these often go under screened and under diagnosed. This next slide further highlights the prevalence of motor impairment. And I won't really go into detail in this text heavy table, but what I want to point out in the first column, it's been shown that motor dysfunction or impairment in multiple motor domain. So gross motor coordination, fine motor, and then what we call sort of higher level motor abilities, like posture, imitation, balance and Praxis. And in the following two columns what really highlights is the prevalence of motor dysfunction to adulthood. This slide also highlights the motor impact can impact motor development. So that cascading effect I discussed in the previous slide, how it drives other processes. And that impairment and impact can be on language, cognition, social communication, and physical activity. And this study really highlighting the interrelationships between these areas for individuals with and without intellectual and developmental disabilities including autism.

Despite this prevalence though, and understanding the importance of motor function, and motor dysfunction and autism, they do often go under-recognized in under screened. And that's predominantly there remains major gaps and research in clinical avenues or diagnosis in this area. First, we don't really have good motor assessments that can be utilized in individuals with a range of cognitive and behavioral abilities. And second, we lack sensitive and specific measure that can yield reject active results of regarding the nature and relationship to neurodevelopmental outcomes with severity of developmental delays. So I'm going to move on to the work we're doing here at UCLA that allowed us to identify some of these gaps and addressing them.

But first, how do we measure motor function? As a child neurologist, one of the big things we do is a neurological examination. And we have caregiver questionnaire with the Vineland adaptive behavioral scales or the DCQ and MABC checklist. And as I've mentioned we have neurological examination, and standardized developmental assessment, and then we have standardized motor assessments, which gives us views to different motor domains we discussed earlier. And so now I'm going to move into how we use one of these standardized motor assessments and in one of our study. And they leverage really important motor domains and many of our study did not include evaluation of motor, we first chose to go to the movement assessment battery for children to see whether or not we could better characterize the motor difficulties these children were having.

And so what you'll see here is the movement assessment battery gait and balance task. And I want to show you the video of the first child doing this. He's about 6 years of age. This was actually in the study of genetic syndrome. Which is highly penetrative for autism for motor delays. And we'll talk about that a little bit more. But as you saw him try to attempt to walk across that line, it's unclear whether or not he's unable to, doesn't quite understand the task or can't really generate the strength or maybe has low tone to get up on his tip toes to across the line. And he has to do this in 3 different ways. He has to across the line one foot in front of the other. Tandem gait, casual gait, and upon his toes. So now here's the other young girl same age doing the same task. And what we see here she crossed the line. Did a great job, but as a neurologist, one of the first things I'm seeing is the fact that she's not only up on her toes, but she's sort of inverted like this. Indicating to me perhaps there's some stiffness or difficulty or plasticity there leading her to have that gait. Her arm was less postured and these questions yield more information to me as a neurologist and clinician on what I might want to be screening for or test I want to get versus the fact whether or not they can or cannot do this task. And they scored similarly in this area because they were not able to complete all the 3 components. And I won't go into detail here, but it was a whole line of work that we did, once we completed the movement battery assessment for children and large cohort of children, we found many of them with autism and duplication 15Q syndrome, many of them scored floor of the testing and it wasn't because they were necessarily unable to do the items. But oftentimes they couldn't comprehend the tasks, couldn't complete it in the allotted time. Or couldn't quite do all of the different tasks necessary. Leading to the fact they really hit the floor score and we didn't see very much variability. But when we looked at the videos, we really saw key areas that were affected such as manual dexterity, gaming and catching, and gait and balance. And so given that, I went back over to the literature to really do a deep dive as to see what measures we could use. And it became increasingly clear there were some major gaps. The majority of the study are in individuals with higher IQ who have no verbal or expressive language. And many of these, partly because many of our measures are not made to measure individuals with cognitive function. And furthermore, the assessment doesn't move beyond capturing mild stones and skill acquisition. They can't objectively quantify some of these qualitative differences and motor function that are really important for us to understand what might be going on.

So as we move on, as we begin looking at this sort of limitations there, we went on to really think about how could we address these gaps here at UCLA? And first, I just highlighted couple of study highlighted in spectrum, one in which we started thinking about how quantitative test of motor skills could improve are the way we evaluate motor function and care in autism if we were able to identify these things. And so, as we moved on, I'll sort of highlight that I can get to the other portion of this talk. I'll highlight sort of the crux of some of the developmental quantitative measures that we used and

some of the data that we've shown here in terms of better characterizing motor difficulties. And what you'll see here on to the right are essentially the two children undergoing quantitative gait analysis. And after a use of variety of methods, it was really important for me to develop and utilize something that could be used in children with an individual I should say because we do it in adulthood with autism in a very intellectual and behavioral ability. And also, a test that can be scalable and that can really yield some information and an important motor domain which is balance and gait particularly seem to be effected with duplication 15Q syndrome and those what we term in the paper non-syndromic paper without a known genetic condition. And so here to the right, you'll see this gait map. If this is composed of 3 layers. And one layer is series of pressure sensors which allows us to further sort of detail kinematic and spatial temporal matter based on pressure that the child uses during walking.

This bottom video shows an example of that. And what you'll see down here at the bottom are his footsteps, the green line is the center of mass. And over here to the right-hand side, you'll see what we call the foot falls, the heel to toe, heel to toe and on bottom is the gram. And with utilization of this method, we were able to quantify the qualitative nature or features of gait in these individuals and when we did that study, we were able to study about 39 individuals with duplication 15q syndrome. And we used an age map cohort of 20 individuals with non-syndromic gates to make a comparison and children without autism and without duplication 15q syndrome otherwise known as typical development. And we looked at 3 important domains of gait that looked at other neurologic, adult neurologic condition which is pace, and posture, and control and variability. And ultimately in this summation of this work, we found we were able to successfully evaluate individuals with autism with a wide range of behavioral of intellectual disabilities. What I'll say is in this somewhat rare genetic syndrome, we phenotype overall cognitive measures 44 individuals, and it was only 5 individuals who were not able to do the gait portion. And that was because 3 of those individuals were not ambulatory and the other were for other reasons. But otherwise, something that could be really be utilized to evaluate a wide range of individuals and give us a better sense of what their motor abilities and difficulties may be.

We also found certain features such as poor postural control and availability in gait that were found in duplication 15q syndrome and non-syndromic, and allowed us to better understand the underlying neurologic mechanism leading to these issues. And perhaps, there is a common deficit or abnormality in cerebellar function which has been shown in pre-clinical model and clinical imaging study of individuals with duplication 15q syndrome and syndromic autism spectrum disorder. And from that, we expanded this work to numerous other works of individuals with genetic syndrome as well as those without genetic syndrome to better understand and characterize gait. We found differences as early as 12 months of age and moving through adulthood. And I highlight

this study because it made what I feel it made an impact on clinical diagnosis and screening. This was a study, the lead author is a medical student I work with here. Emma Burdekin and we used this to evaluate co-occurrences with something called spinocerebellar ataxia. And they had a mental phenotype as well, particularly developing with neural disability and autism and intellectual disability. And in our study, using these quantitative and objective measures we found there's a co-existence of ataxia, motor impairment, and neurodevelopmental disorders, suggesting a common role for cerebellar pathways. So better understanding what's going on in the brain and we found greater motor difficulty correlated with greater severity of neurodevelopmental diagnosis including IQ. So going back to the motor impairment may drive the other developmental domains. And soon after we published this paper, I received this email. A medical geneticist, a fellow in North Carolina. This neurodevelopmental and phenotype SCA21 and I saw a child with autism and odd movements. And I expand on that email without providing the detail of the parent. But at the time, this was something they might see and the child was developed with developmental delay, and then later, the behavioral issues weren't recognized and diagnosed with autism. And then ultimately, genetic testing was pursued due to the fact she looked more ataxic and they found this mutation. And I think it's important for us to be thinking about, because as we improve our screening techniques, include individuals across the spectrum and be able to provide better needs of the screening and diagnosis and treatment.

So with that, I'm going to move on to the other half I should say or maybe larger component of my talk. I want you to get a sense of prevalence and importance of motor function and dysfunction in autism. Some of the gaps that exist in evaluation and care. And how we're addressing them even through this as director of neurology here at UCLA. And now really shifting over to the second half which is targeting motor function and physical health with organized physical activity. And again, I focus on organized physical activity because it's really sort of a community and clinically available thing we can do right now to target some of these things.

So why should autistic individuals participate in organized physical activity? Well, we reviewed how motor dysfunction is prevalent and affects developmental domains and also have a large impact on physical health and well-being. This motor dysfunction often leads to high rates of sedentary behavior in autistic individuals and reduce peer interactions. And sort of makes you think, you know, starting maybe at 5 or 6 years of age if not younger, what's the main thing these individuals are doing? They're engaging with their peers on the playground, running after one another. And these are really missed opportunities if this motor dysfunction is not recognized or perhaps leading to maybe decreased motivation to participate or try to keep up with these kids.

And ultimately, that can have a negative effect on both behavior because of reduced peer engagement, and also on health. And from that knowing that we have studies that show higher rates of sedentary behavior in awed stick individuals where they're not meeting the recommended 60 minutes of recommended activity a day for children, we've also found things like reduced bone mineral density leading to high rates of fracture. There was a large retrospective active study done at Massachusetts General Hospital. Looking at individuals who came comparing autistic individuals to those without autism, children who came to the emergency department for fractures if they found higher rate of fractures not only in areas you might expect arm, leg, and also hip fracture which you shouldn't see in children. That's what we see in elderly population due to mineral bone density. And this can lead to increase rate of obesity and other medical comorbidity such as high blood pressure and high cholesterol.

So what are the benefits of organized physical activity? What we know from numerous study in adults and children without autism that's done on the rest of the population, there are many benefits of organized physical activity. It's good for the brain, for memory, for cardiovascular health, it's good for mental health, and first study here in nature reviews, in psychiatry, they looked at 1.2 million individuals in the United States looking at the association of mental health and exercise. And, essentially, participation and team sports compared to individual physical activity provided the largest reduction in mental health burden. We have study like tennis shows benefits in cognitive function and children 6 to 11 years of age and they're important for building relationships. And this quote on the side. As fitness has been related to frontal parietal network, it would follow that children might derive benefits from school performance. And showing this relationship between motor and physical activity can drive important areas of the brain responsible for executive function.

But even though we know about these benefits in the larger population, why don't we often refer autistic individuals to organized physical activity? Well, one, I found both anecdotally in-clinic and research, we often under diagnosed or under recognize the fact that there can be long-term motor dysfunction. So we're often looking at developmental delays and capturing those early milestones. But not recognizing the fact these early delays can compound the development of fundamental motor skills. Whereas I showed in the earlier schematic where it can lead to more sedentary behavior and lack of communication, kids like jumping, learning, hopping, riding a bike, all those aspects important for higher level of motor ability. Coordination, motor control, balance, and imitation. Also, we're often unsure about the benefits for individuals with autism. So we know the benefits in the larger population, but do we know there's benefits within autistic individuals or individuals with other neurodevelopmental disabilities? We may be focused on other therapies like speech and behavioral therapy, which are very important. But a recognition that we need to look at the individual as a

whole and understand other areas that can promote and improve physical and health and well-being. Oftentimes the caregiver, as well as the clinician might be unsure about the child's ability because the child has never been given the opportunity. I should say adolescents or adults to participate in these activities. Thus, that leads to some apprehension. Or these programs aren't available and lastly, I've encountered anecdotally parental concerns how their child might participate or whether or not there might be injuries from the activities. So given some of these gaps or reasons we found we don't refer, we wanted to get a sense about what's happening nationally. What is out there in regard to organized physical activity for autistic individuals? So we were able to work with SPARK, a large organization to not only provide a webinar around these areas, but ultimately conduct a national survey of parents, caregivers, and adults with autism and caregivers of autistic individuals in the United States. And we're excited to see that about 50% of the responses that you show here indicated that there are physical activities or sports programs adaptive for individuals with autism or other neurodevelopmental disabilities in their community. But also, portion who said that they are not sure or that there aren't any. And this was total of 344 participants who, again, 174 said yes, 104 said not sure, and 66 said no. So then we asked what type of programs are available. And what I was excited to see here there's a range of programs. Everything from team sports such as basketball and soccer, to individualized activities like tennis. Or yoga. Some activities involve maybe more physical contact and others more coordination or memorization like dance. And the fact that autistic individuals have participated in these programs. So we're curious to know that how these programs have been adapted and what programs, what are these programs specifically doing for individuals with autism? And we'll get to that in a moment, but we then asked did you see during participation in this physical activity or sports program, did you observe improvements in any of the following areas? And really from the survey we found improvements across-the-board. We found not only motor skills, which is great. But also social skills, sleep, which as a neurologist is incredibly important. And overwhelm confidence. That's crucial for the child, the autistic individual participating and also for the family, because going back to those areas of apprehension or being unsure about the child's ability, it was a clear indication that if provided the opportunity, there could be positive effects and, hopefully, would lead to engagement in more of these activities.

We then asked whether or not these improvements were sustained. So after participation that you continue to see these improvements. And again, we saw across-the-board that was the case in many different domains. But then we asked what are some of the gaps or needs of the programs that our respondents saw? And some things reported were how the programs can improve. And I used specific language by the respondents and not necessarily my language. But things like greater availability and accessibility. More informed coaches and instructors. Programs focused on the

specific needs of the child. More programs, there tend to be more programs for higher functioning children or those without intellectual disabilities, I would say. And there's other people who said there needs to be more programs for children with greater needs.

But then we asked even if these are available, why don't some individuals participate? So again, some of them still said there were no programs available. And we highlighted what we've seen anecdotally in the literature how their child might do. They're unaware of the program. The program may not meet the specific needs or specifically adapted or are hasn't been recommended. So how can we improve accessibility? How can we address these gaps? Well, we can better disseminate knowledge of the benefits of these activities. And we can also study organized physical activity for individuals and really put out these evidence-based data regarding the benefits so it can be more routinely recommended. So given that, let's talk about some of the benefits of organized physical activity for children with autism. Or I should say individuals with autism.

And what we found here with some early study is that there are improvements in both motor and non-motor symptoms in autistic children. In the second met analysis we found, this large meta-analysis found the efficacy of physical activity and physical interventions showed improvements in working memory, visuospatial coordination, and executive function. Some of these were small, but also other moderate effect sizes in these groups. So now let's look at some specific sports programs that have been looked at in the literature. And here I provide some examples of more vigorous exercise and both individual and group based exercises as well. The first one being more vigorous. This study by Toscano, et al. And this was a 40 week program based on coordination and sprint exercise versus a controlled group. This is children with autism 6 to 12 years of age. And ultimately what they found were improved lipid profile, perceived quality of life, and improvement on repetitive and stereotype behaviors. And second study I highlight are on for adults with Down Syndrome which we know has many co-occurring neurodevelopmental disabilities and autism. And I chose specifically to highlight this one because this is a remote exercise intervention. And during COVID, we have to think of about these. These are randomized to 2 or 3 times per week. And this led to significant improvement in memory. And non-significant improvement but still improvement in attention and reaction time. And this last program in more individualized sports, it's ten week swimming intervention versus controlled for children 6 to 9 years of age. They found improved social competence and reduced irritability. So you're seeing both non-motor and motor improvements as well as physical health and quality of life.

So giving these finding in the literature, and the fact here at UCLA we're really studying these motor difficulties and autistic individuals, and individuals with other neurodevelopmental disabilities, we want to do study this ourselves to see whether or

not we could capture these benefits with validated and standardized method and really disseminate this information. So the first group that we have been working with is aging autism. And it is a tennis program adaptive for kids with autism. The programs are 6 to 12 weeks in duration, and there are 80 programs sites across the United States. The goal is to really introduce movement and tennis to these children and an opportunity to engage in a program that's specifically adapted for autistic individuals. The first thing we did was utilize standardized caregiver questionnaire which I'll review, and then some surveys to evaluate program outcomes.

So first let me review this aberrant behavior checklist. It's a questionnaire that's been used in many clinical trials and intervention study for autistic individuals, hence, the reason why we want to do use it first as you start evaluating whether or not there's benefit from the tennis program. This represents a total of 77 participants. Largely in the Southern California area. And what we found in these different subscales is irritability, social withdraw, stereotypic behavior hyperactivity and inappropriate speech. And it should also be noted here there's also reported decline and no change regarding the decline. Likelihood that can be the case. But we think it's subject to the heterogeneity of the subject we are studying. And also given the fact we had some data collection difficulty with different caregivers responding pre and post, understandable, given the fact that time it might take to fill out one of these questionnaires.

But with this result, we had plan to then start an in-person program in spring 2020. I don't have to explain in detail. I think all of us know unfortunately why that couldn't happen. But despite that, we quickly shifted over to utilizing and disseminating a survey nationally so we can better understand the domains that might be benefits from the program and when we do launch an in-person program, fingers crossed for fall or winter 2021 to 2022. We can use the participants time, caregiver time to hone in on areas where we might see change or improvement. So we disseminated a survey with an attempt to create a non-biased approach, and we got respondents from 60 sites, using aging sites across the United States. And we looked at on task engagement, repetitive behavior and mood and social skills and general behavior and motor and tennis skills. But this is a sub-domain to give us an idea within that might show the best benefit. And we highlight the broad responses across-the-board, there was reported improvement pre and post season of aging autism in many of these categories. But what stuck out to us is motor skills, which is great to see in terms of physical activity. On task engagement, which largely includes things like attention and executive function. And even social skills and general behaviors. And it was nice to see there was an increase in social motivation, sort of increase and decrease in social anxiety and understanding we did see improvement. And subsequently, we can now hone in on better studying these things.

So given the benefits we saw on aging autism, and the recognition that many of these programs are maybe not readily accessible, particularly tailored to individuals with autism and neural adult mental disabilities. We wanted to start moving to create accessible opportunities at UCLA. And that leads me to talk about the expressive move initiative and I'll show highlighting the work we're specifically doing. And the autism intervention research network, physical health grant from HRSA. So the expressive movement initiative is a dance program. It was founded by Emily Colker, soon-to-be Dr. Coker. And due to the fact we had many shared interest, she's the founder of expressive movement initiative. And we discussed starting one of those programs at UCLA. And it really resonated with me, because the mission was to provide an expressive movement outlet for children with developmental disabilities. Foster mentorship and community who works with the individuals and also eliminate the stigma and reduce the challenges associated with developmental disabilities, and for us on the UCLA campus and beyond. So given this, in 2019, we founded the expressive movement initiative at UCLA. It's now a fully run UCLA student organization with 50 volunteers. Many of those volunteers being developmental disabilities study majors and minors. And aside from just providing the program, we've also now worked to build a curriculum which we're able to train the volunteers in neurodevelopmental disabilities and autism, disparities in care for the individuals, the benefits of organized physical activity for these individuals and specifically adapting skills to each of the children and individuals that they work with. We serve a large range. 4 to 17 years of aiming. And the picture here to the left was when we were in-person and here at the auditorium. The picture on the right is a highlight from the UCLA daily Bruin. And we can competent to serve the families and individuals and now we've served over 150 children in person and over 60 children virtually. And the neat aspect about the virtual is that we've now been able to provide this program nationally. So maybe other states or areas now have access to this.

And Emily actually, we worked on AOA grant which allowed us to develop pilot data on the benefits of this program. And that ultimately led to the really crucial support to study this program as an intervention, as I noted from the autism intervention research network on physical health. And an intersection our neurology focused on. We launched this winter a virtual intervention study with the waitlist control design. We have 18 in active group and 16 in the control group. Our participants are 4 to 17 years of age with a range of adult mental disabilities, and with the largest co-occurrence within development disabilities of Autism Spectrum Disorder. The program is 1 hour a week. They're virtual for total of ten weeks. And our measures both surveys, validated standardized questionnaires, and actually remote Zoom direct assessment, working with my colleague Dr. Kathy Lord here at UCLA and physical engagement, motor skills, adaptive skills, social communication, repetitive behaviors, quality of life and parental stress. And what we found, I'll say hot off the press, but I don't present here this data

because we're in the final couple of weeks of post data collection. But we've been looking at the early results, and our research coordinator Tabitha Safari put this together yesterday. We're starting to see improvements actually in areas of motor function, particularly, in dynamic sort of balance and movement. And we're also seeing some improvement in social motivation. Both nice areas to see and delivery of this program. My hope at the following webinar, I can present the result in total. And it will give us a better idea as we move on to the next phase what we might be able to tailor. So discuss clinical tips and referral for OPA, as you can see, I highly recommend screening for motor impairment and other developmental disorders. And taking a thorough developmental history, things like the DCDQ can be beneficial or the movement assessment battery checklist. I know earlier in the talk, I talked about limitation of the direct checklist. Other neurodevelopmental differences. And recommended activities for families that reduce sedentary behaviors. And another thing I find helpful whether you're a caregiver or autistic individual on this or a clinician is creating a medical profile for the child. So something that I do when I work with my families in my clinic, because it makes them feel more comfortable and also coaches in terms of organizing physical activity. So describing something like seizure or whether difficulties exist. Or language level, in ways which you can better communicate with the individual.

Here are some resources for adaptive programs and indoor programs. Our expressive movement initiative is on the virtual and we'll deliver nationally. We do hope to move in person. But we've discussed keeping a virtual community given the reach we've been able to have and how many families have expressed they would like to continue that so they can access the program for aging autism. Team primetime is more of a Los Angeles specific resource group that works with LAUSD. And also the Special Olympics. So with that, I'll go ahead and summarize. We reviewed today motor dysfunction are prevalent and pervasive in co-occurring condition of autism. Both quantitative and qualitative tools can improve identification of motor dysfunction in autism. And routine screening of motor dysfunction which is crucial and important for overall care. Motor dysfunction can impact health and physical activity. Thus thinking about organized physical activity and referral for autistic individual can be important for physical health and have improvement in both motor and non-motor areas. And that routine recommendations of these programs should be considered as we build evidence-based and increase accessibility to these programs. So with that, I like to thank you, all, for your time and attention. I like to very much thank all the families who generously donate their time and participate in our research. Of course my collaborators and mentors. The motor lab, which without whom I would not be able to do any of this work. And of course, our funders specifically HRSA and the Autism Intervention Research and physical health. Thank you so much for your time. And I'll go ahead and share here, although we might share at the end for questions. Anna, you

can let me know. But this is the links to the feedback survey I believe. Should I let you take over?

>> Perfect. You're good. Keep going, Dr. Wilson. That is perfect. And I'll also drop a link to the survey in the chat. And then we have a little bit of time for questions if anybody has any questions for Dr. Wilson. Please feel free to unmute or drop them in the chat.

>> RUJUTA WILSON: I'll stop share.

>> Either one is fine.

>> It does seem like if anybody has questions, it does seem like although it was obviously the timing with COVID, and not being able to run things in person was unfortunate. It does seem like you were able to reach a larger audience by being able to go virtual? And I also wonder during COVID times, the importance of getting people up and moving, right? So there was that kind of beautiful to have a dance intervention starting around this time. Right?

>> Exactly. Thank you for bringing that up. And I agree, I think originally, I'll be honest. We were a little, for lack of words, bummed. But once we started the virtual and disseminating recruitment, it was incredible the amount of individuals that reached out to us. Actually over 200 in order to participate in the study. And largely because of some of the things you mentioned. And some of the things I mentioned on the top today. Lack of accessibility to these programs. Particularly, lack of accessibility during COVID and the fact that they told us anecdotally we're not doing any physical activity and we're not engaged in that. And this is a fun activity. It's not therapy over Zoom. It's not school over Zoom. And the neat aspect of that, it resonated with the families. So we had siblings dancing in the background. We have family members reach out to us talking about moves they were practicing during the week. And one of our measures was specifically looking at whether there was an increase in the physical activity within the family, which we all know can have a profound effect on the children as well as on the child or individuals participating. And we've seen that. So I agree completely. I think in a way, similar to many of our other study, it's highlighted the fact this virtual component should stay. There are benefits to it.

>> I wondered that if you would -- I know you're hoping to collect more data. Having more study in the fall or winter that's in person, but I wonder if you would be able to keep some sort of virtual component with it. Getting the whole family up and moving too is wonderful. I know in our house, little ones, we have at least weekly dance parties. So getting the parents involved is amazing.

>> RUJUTA WILSON: Yeah.

>> There's a question, sorry?

>> RUJUTA WILSON: Yeah, I see a question. Can the results of these studies can be generalized for all levels of autism? That's a very good question. Since I'm not sure whether the attendee is asking about maybe the previous study I showed or the study I'm conducting, I'll go ahead and answer both. And what I'll say is that some of the literature that I showed really the large focus has been on individuals, again, without intellectual disabilities who has the verbal language. Maybe not on all levels of the spectrums you were noting on autism. It was really my goal to be able to study all of these individuals and develop measures that can actually show change or show benefits where these kids don't hit the floor. Or some of you might be weary of caregiver reports that might be hard to translate those with intellectual disabilities? So at UCLA, that's why we started broad and that's why in this first cohort, rather than limiting down to a subpopulation and saying it's just above this. We're going to serve a large range and we've spent quite a bit of time on measurement evaluation, creation, and implementation to better understand how we can best measure these individuals, and which ones work for different individuals. So my hope and plan is at least our dance study, and even the tennis study given the heterogeneity in the population that it serves can be generalized for all levels of autism, and not just individuals on one end of the spectrum. I see another question here. I appreciate your resource that is provide evidence for organized physical activity. Are you aware of any study that have shown benefits of weight training? I'm looking for heavy work recommendation that OT often make. That's a good question. I'm not actually as familiar with heavy work recommendation so I don't know if I'll answer this exactly. I have seen couple of study. They're small study and sample sizes on weight training. I nuanced that a little more. It's strength training, so whether that's heavyweight or not, it's strength and endurance training. And some of those shown benefits in particularly executive function. And some benefits in some of grip strength. And that's probably most of what I've seen in weight training specifically.

>> RUJUTA WILSON: Great presentation. Thank you very much. Creating virtual programs other than dance for clients who do not like dance but would benefit to access to programs like this. Good question. Yes. I thought about it a lot. I thought about all the different things we can create. It's an excellent suggestion. Partly limitation of starting, you know, with time and where we can. And what I'll mention about the dance program is the fact we refer it to the dance program but it's really called expressive move initiative. And it dance utilize a lot of dance feature but it's to move your body in an expressive way. And given that what I thought of other programs in terms of moving your body or stretching, or having an opportunity to get up and move, it's not rooted in a specific sport or specific area. So we consider that. We've also considered some yoga technique and how we can deliver that virtually. How thought

was, as we better understand some of the motor benefits of the expressive movement initiative, so I didn't go into this in detail for this talk and I probably should have in terms of the format. But I really wanted to show you guys the range of what we were doing is how the expressive movement initiative is set up. And really, what it does, it goes through a series of moves. And in those series of moves, it also goes through free moves, structured moves, it goes through challenge which the individual challenges themselves against what they've been previously able to. And it goes through an endurance set. So are they able to do more of those moves or greater speed of those moves? And that can target different areas of physical activity. And as we measured this area, if we see benefits in certain areas or certain expression from the individuals who really like those areas or felt it was beneficial for them to particularly do the free versus the not free, then we can start creating this program to be a little bit more tailored to that or other programs as well.

>> Thank you, again. Dr. Wilson. I also want to give a quick plug and invite you all to register and attend our upcoming June webinar hosted by the AIR-P community-based lifestyle intervention note leader Dr. Bianca Fernandez. And I'll drop that in the chat. Dr. Wilson, do you have a curriculum available for the EMI?

>> RUJUTA WILSON: Yeah, we have a curriculum here at UCLA. And part of the study is in discussion with the founder as we work in this organization as creating curriculum that can be more widely accessible once we really have more rigorous data on the benefits and what areas. So great question.

The goal is accessibility. And the goal is really impacting those individuals who would like to participate. So, yeah, we definitely want to disseminate that information.

>> It looks like, we're about at time. Thank you very much, Rujuta Wilson, information and answering the questions which has been helpful. And thank you for all of you for attending this webinar. The webinar is recorded and will be archived on the AIR-P website. Please take a moment to take the survey.

>> RUJUTA WILSON: Thank you very much.

>> The slides are posted on the event page and I shared with everyone if it's easier to go through the slides themselves. Thank you very much. Have a good day, everyone and happy Friday! It's almost the weekend. Have a good weekend, everyone!

>> RUJUTA WILSON: Thank you. Thank you for your time.