

Exercise May Improve Communication in Children With Autism

Liam Davenport | November 23, 2016

A physical exercise program administered at school may improve not only fitness but also communication in children with autism spectrum disorder (ASD), preliminary research suggests.

Investigators at New York Medical College, in New York City, found that a 4-month exercise program led to significant improvements in scores on a measure of social responsiveness, as well as gains in physical endurance.

Lead researcher Susan Ronan, DPT, PCS, assistant professor of clinical physical therapy, said in a release that the results "are encouraging and warrant further exploration in future research."

There was, however, a large amount of missing data, making a comprehensive analysis of the impact of the exercise program impossible.

"It continues to be a major challenge for researchers to be able to study populations of children with autism in real-world settings like schools," Dr Ronan said.

Nevertheless, she added that her team was "thrilled to have conducted one of the largest studies of its kind, particularly since many of the students who participated are from historically underrepresented communities."

The study was presented at the Academy of Pediatric Physical Therapy's Association Section on Pediatrics (SoPAC) 2016 Annual Conference.

At-Risk Population

Children with autism have an increased risk of developing obesity and diabetes, as well as metabolic syndrome, which is in part associated with decreased peer interaction and impairments in balance, endurance, and motor execution.

There are a number of challenges in implementing a fitness program for young people with ASD, including access to sports programs, the availability of transportation by parents/carers, and the fact that some patients with ASD experience anxiety in group situations.

To examine the impact of a 4-month school-based running and walking program on endurance, socialization, communication, and quality of life, the researchers enrolled students with ASD from three schools. Healthy students from two schools served as controls.

The exercise program was embedded within an adaptive gym class and was carried out by physical educators during the fall term. It consisted of twice-weekly 20-minute classes. Students were given certificates and written encouragement when milestones were reached. Data collection was performed by research assistants at baseline, midterm, and at final assessment.

Outcome measures included the Gilliam Autism Rating Scale (GAR)–3, the Social Responsiveness Scale (SRS-2), and the Pediatric Quality of Life Inventory, in addition to fitness indices such as body mass index (BMI), blood pressure, heart rate, 6-minute walking (6MW) test, and the Energy Expenditure Index.

Initially, 94 students were recruited from across the schools. The mean age of the students was 9.2 years, and 80 were boys. From the two control schools, 39 students were recruited (mean age, 8.6

years), of whom 24 were boys. It is notable that many baseline data points were missing, particularly for fitness indices.

On the basis of an analysis of 40 patients, the researchers found that, following the exercise program, there were significant improvements in the 6MW distance between baseline and final assessments. Distances walked increased from 416.0 m to 467.8 m ($P < .001$); ambulation velocity increased from 69.3 m/min to 78.0 m/min ($P < .001$).

Those results held when the analysis was restricted to students with the most severe levels of autism, as assessed using the GAR-3, and when analyzing the results by school.

Complete data on changes in SRS scores between baseline and final assessments were available for only 18 students. Nevertheless, there were significant improvements in SRS t-scores during the study period ($P = .01$), as well as on the awareness ($P = .005$), cognition ($P = .005$), communication ($P = .003$), motivation ($P < .001$), and restrictive/repetitive behavior ($P = .01$) subscales.

Again, the results remained significant when the analysis was restricted to students with more severe autism and those from School 3. Students from this school also showed a significant improvement between baseline and final assessments on item 16 of the SRS, "Avoids eye contact or has unusual eye contact" ($P = .02$; $n = 13$).

Missing Data

Dr Ronan told *Medscape Medical News* that the reason the investigators were unable to analyze data from the two control schools was because not enough information was collected during the term.

"I think that we asked for a lot of information from physical educators, and not all of them completed all of the data collection tools," she said.

"We were only able to report on students where we had the communication data tool collected at least at the baseline data and final [assessment]. The other children either only had a baseline data collection or may have only had a final [collection] or didn't hand it in."

Dr Ronan added that, assuming the findings are reproducible in further studies, it is not clear why a physical exercise program would improve communication in students with ASD. "I don't think anyone really understands," she said. "From the studies and the literature review that we read, there's conjecture in the discussions, but I don't think anyone really understands what the mechanism is."

Dr Ronan believes that the findings are encouraging, not least for demonstrating that a regular exercise program is achievable in this patient population.

She said: "It's encouraging that for families who may not be able to have their children in additional sports after school or be able to get them safely to outside venues for sports, a program twice a week, 20 minutes per week might be feasible to conduct in the regular physical education classes in school."

Megan Lombardo, director of development at Achilles Kids, which devised the exercise program, said, "The results are extremely encouraging, as millions of parents, caregivers, and medical professionals grapple with how to best support children on the autism spectrum."

Strong Placebo Effect

Commenting on the study for *Medscape Medical News*, Eric Hollander, MD, director, Autism and Obsessive Compulsive Spectrum Program, and clinical professor of psychiatry and behavioral Sciences, Albert Einstein College of Medicine and Montefiore Medical Center, New York City, said interpretation of the findings is limited by the study's relative small size and the high dropout rate.

However, "the biggest problem" is the use of the SRS. "Across a whole series of different studies, patients with autism seem to have an improvement in those scales scores irrespective of whether they were on drug or on placebo, so there's a high overall placebo response rate on that outcome measure," he said.

Consequently, although "there's a little bit of a hint that maybe there's some improvement in eye gaze or some social measures," the findings have to be taken "with a grain of salt," at least in part owing to the missing data.

Nevertheless, Dr Hollander noted that the researchers were able to show that "individuals who got more exercise had better endurance," although he pointed out that there were no significant changes in BMI or blood pressure, "so maybe they need a more intensive program over a longer period of time.

"Ultimately, what you'd like to do is get an improvement in the overall BMI, because many patients with autism are overweight or in the obese range, and then that increases your risk for metabolic syndrome and type 2 diabetes," he said.

Taken together, Dr Hollander believes that the current study "suggests that it's not that easy to do this work, and it requires a certain level of funding."

He added: "I do think that the general idea is good and that this type of work is important. And I do think that obesity in this particular population is commonplace and is a big challenge and that physical exercise is a good idea."

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