

2022

## Exercise Interventions for Relieving Anxiety Symptoms for People with Autism Spectrum Disorder: A Systematic Review

Kathryn Riis  
*Old Dominion University*

Follow this and additional works at: [https://digitalcommons.odu.edu/gradposters2022\\_healthsciences](https://digitalcommons.odu.edu/gradposters2022_healthsciences)



Part of the [Exercise Science Commons](#), and the [Rehabilitation and Therapy Commons](#)

---

### Recommended Citation

Riis, Kathryn, "Exercise Interventions for Relieving Anxiety Symptoms for People with Autism Spectrum Disorder: A Systematic Review" (2022). *College of Health Sciences Posters*. 7.  
[https://digitalcommons.odu.edu/gradposters2022\\_healthsciences/7](https://digitalcommons.odu.edu/gradposters2022_healthsciences/7)

This Book is brought to you for free and open access by the 2022 Graduate Research Achievement Day at ODU Digital Commons. It has been accepted for inclusion in College of Health Sciences Posters by an authorized administrator of ODU Digital Commons. For more information, please contact [digitalcommons@odu.edu](mailto:digitalcommons@odu.edu).



# Exercise Interventions for Relieving Anxiety Symptoms for People with Autism Spectrum Disorder: A Systematic Review

Kathryn Riis MS, Brittany Samulski DPT, PhD, & Patricia Laverdure, OTD, OTR/L, BCP, CLA, FAOTA  
Old Dominion University, Norfolk, VA

## Introduction

Clinical anxiety is a common comorbidity in people with autism spectrum disorder (ASD)

CDC reported 1 in 44 children have been diagnosed with ASD in (2018)

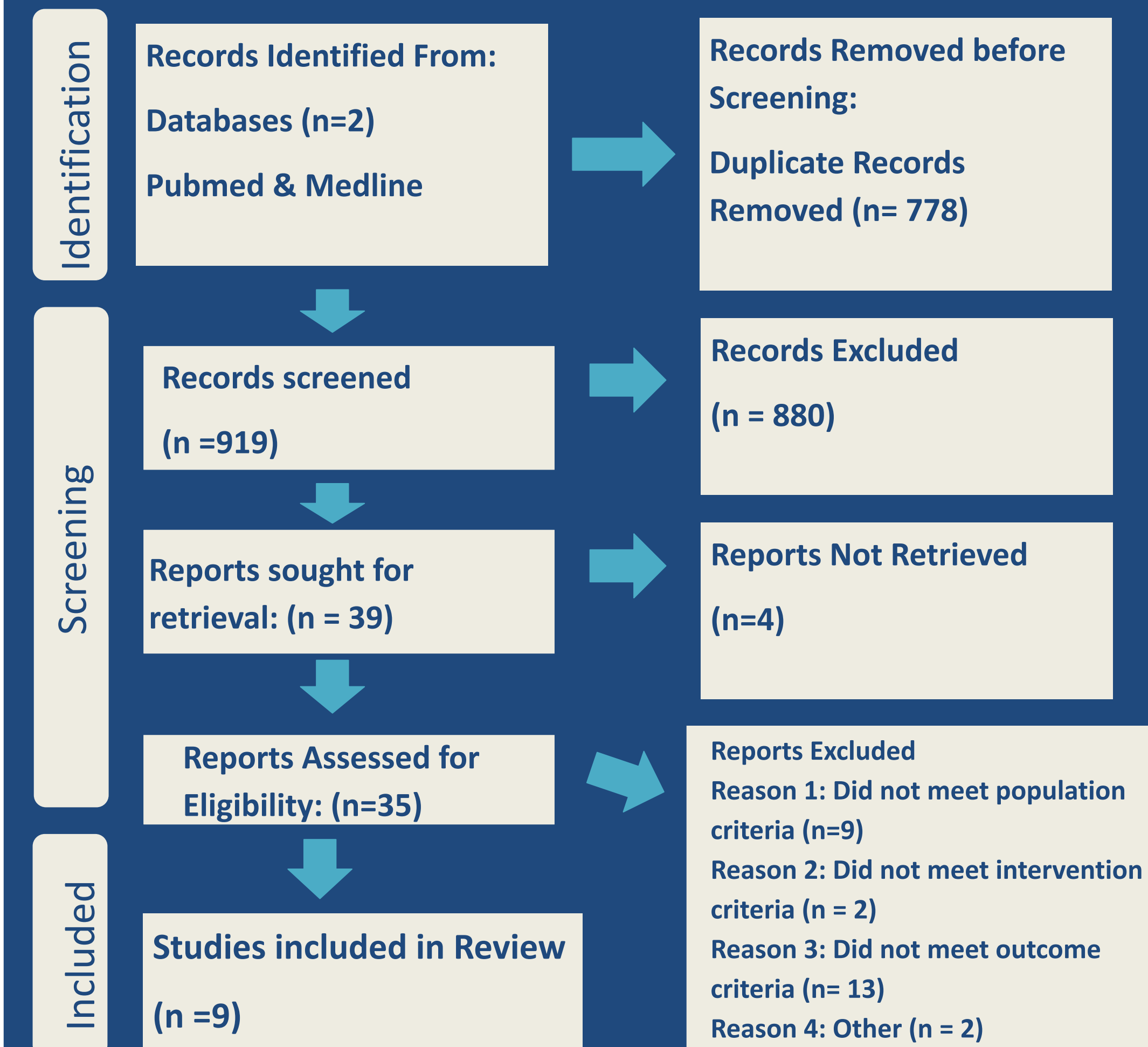
30-50% of young people with autism have anxiety

40-50% of adults with autism have anxiety

## Purpose

The purpose of this systematic review was to examine the effectiveness of the use of exercise as an intervention to reduce anxiety in people with ASD.

## Methods



## Results

Author/ Year	Participants	Intervention	Results
Peters, B Caitlin; Wood, Wendy; Hepburn, Susan; Moody, Eric J (2021)	24 participants with ASD, ages 6-13	10 weeks of occupational therapy in an equine environment	significantly reduced irritability significant improvements in social motivation (p = 0.03)
Tse (2020)	27 participants with ASD, ages 8-12	12-week jogging intervention 4 sessions per week; 30-min per session	significant improvement in emotion regulation (p=0.03)
Howells, Sivaratnam, Lindor, Hyde, McGillivray, Whitehouse, Rinehart (2020)	61 participants with ASD, Ages 5-12	29 - program at local Auskick clubs - practicing football 6090 minutes a week for 12 weeks 32 in control group	on the DSM-oriented anxiety problems the intervention group showed a significant decrease in scores (p=.001)
Spratt, Mercer, Grimes, Papa, Norton, Serpe, Mueller, Eckert, Harris, Blackmon, Durant & Newton (2018)	12 participants with ASD, ages 15-27	90 minute sessions twice week for six weeks : 45 min of exercise, 15-30 minutes of stress reduction or mindfulness strategies, 15-30 min of nutrition education	significantly decreased PHQ-9 depression scores (p=0.000063).
Caputo, Ippolito, Mazzotta, Sentenza, Muzio, Salzano, & Conson (2018)	26 children with ASD	Intervention - 13, 10 month swimming program & conventional language therapy and psychomotricity Control: 13 - conventional language therapy and psychomotricity	significantly lower scores than controls on Emotional Response (p = .003) on the CARS
Duffy, Baluch, Welland, Raman (2017)	8 males with severe ASD ages 13-29	6 months 2 hour weekly physical activity sessions	significant changes in emotional response behaviors scored by the GARS-3.
Morales, Fukuda, Garcia, Pierantozzi, Curto, Martinez-Ferrer, Gomez, Carballeira, and Guerra-Balic (2021)	11 participants with ASD, ages 9-13	8 weeks of Judo Classes, 75 minutes, once a week (N=11) Control: 8 weeks of no intervention, (N=110)	Significant improvement (p < 0.05) following the 8-week adapted Judo training intervention at T3 in the emotional responses' subscale of the GARS-3.
Brand, Jossen, Holsboer-Trachslar, Puhse, & Gerber (2015)	10 kids with ASD, mean age 10	60-minute sessions of aerobic exercise training and motor skills training , 3 times a week for 3 weeks	sleep efficiency increased, sleep onset latency shortened, and wake time after sleep onset decreased
Keino, Hiromi; Funahashi, Atsushi; Keino, Hiroomi; Miwa, Chihiro; Hosokawa, Masanori; Hayashi, Yoshihiro; Kawakita, Kenji (2009)	4 kids, two with ASD and two with Pervasive developmental disorders	2 sessions of Procedure of Psycho-Educational Horseback Riding Program (PEHR)	Fear of nervousness' decreased measured by the HEIM scale

## Discussion

- Four out of the nine articles reported a decrease in behavioral issues/ problem behaviors for people with ASD who participated in an exercise intervention
- Four out of the nine articles reported improvements in emotion regulation as reported by the Childhood Autism Rating Scale (CARS) and the Gilliam Autism Rating Scale, third edition (GARS-3) for people with ASD who participated in an exercise intervention
- 30,000,000 individuals around the world have been diagnosed with both ASD and anxiety
- Anxiety for people with ASD can cause more isolation, avoidance of social interactions, and increased internalization of problems
- This systematic review provides moderate evidence that exercise could be an effective option for helping people with ASD reduce anxiety symptoms

## Conclusions

Anxiety affects nearly half of the adults diagnosed with ASD, therefore it is imperative that we investigate accessible, reliable interventions to help alleviate anxiety symptoms. Results from this systematic review suggest that exercise may be an effective intervention. Exercise interventions improved measures of mood, sleep quality, and emotion regulation which can all be related to an improvement in anxiety. However, more research must be done to fully understand the effects exercise can have on anxiety for people with ASD.

## References

- \*Brand, S., Jossen, S., Holsboer-Trachslar, E., Puhse, U., & Gerber, M. (2015). Impact of aerobic exercise on sleep and motor skills in children with autism spectrum disorders – a pilot study. *Neuropsychiatric Disease and Treatment*, 1911. <https://doi.org/10.2147/ndt.s85650>
- \*Caputo, G., Ippolito, G., Mazzotta, M., Sentenza, L., Muzio, M. R., Salzano, S., & Conson, M. (2018). Effectiveness of a multisystem aquatic therapy for children with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 48(6), 1945–1956. <https://doi.org/10.1007/s10803-017-3456-y>
- \*Duffy, L., Baluch, B., Welland, S., & Raman, E. (2017). Effects of physical activity on debilitating behaviours in 13- to 20-year-old males with severe autism spectrum disorder. *Journal of Exercise Rehabilitation*, 13(3), 340–347. <https://doi.org/10.12985/je.r.1734960.480>
- \*Howells, K., Sivaratnam, C., Lindor, E., Hyde, C., McGillivray, J., Whitehouse, A., & Rinehart, N. (2020). Can participation in a community organized football program improve social, behavioural functioning and communication in children with autism spectrum disorder? A pilot study. *Journal of Autism and Developmental Disorders*, 50(10), 3714–3727. <https://doi.org/10.1007/s10803-020-04423-5>
- \*KEINO, H., FUNAHASHI, A., KEINO, H., MIWA, C., HOSOKAWA, M., HAYASHI, Y., & KAWAKITA, K. (2009). Psycho-educational horseback riding to facilitate communication ability of children with pervasive developmental disorders. *Journal of Equine Science*, 20(4), 79–88. <https://doi.org/10.1294/jes.20.79>
- \*Morales, J., Fukuda, D. H., Garcia, V., Pierantozzi, E., Curto, C., Martinez-Ferrer, J. O., Gómez, A. M., Carballeira, E., & Guerra-Balic, M. (2021). Behavioural improvements in children with autism spectrum disorder after participation in an adapted judo programme followed by deleterious effects during the COVID-19 lockdown. *International Journal of Environmental Research and Public Health*, 18(16), 8515. <https://doi.org/10.3390/ijerph18168515>
- \*Peters, B. C., Wood, W., Hepburn, S., & Moody, E. J. (2021). Preliminary efficacy of occupational therapy in an equine environment for youth with autism spectrum disorder. *Journal of Autism and Developmental Disorders*. <https://doi.org/10.1007/s10803-021-05278-0>
- \*Spratt, E., Mercer, M. A., Grimes, A., Papa, C., Norton, J., Serpe, A., Mueller, M., Eckert, M., Harris, K., Blackmon, L., Durant, J., & Newton, J. (2019). Translating the benefits of exercise on depression for youth with autism spectrum disorder and neurodevelopmental disorders. *Journal of Psychol Psychiar*.
- \*Tse, A. C. (2020). Brief report: Impact of a physical exercise intervention on Emotion Regulation and behavioral functioning in children with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 50(11), 4191–4198. <https://doi.org/10.1007/s10803-020-04418-2>