

20 y/o M w/ hx of autism spectrum disorder, ADHD, and intellectual disability admitted after being found in parking lot breaking taillights. Since admission, pt has been increasingly agitated in response to sensory stimuli on the unit, particularly noise. Pt has limited verbal communication and becomes overwhelmed easily, with episodes of self-injury including head banging against the wall. Mother reports that at home pt uses an iPad to calm down. Unit protocol typically restricts electronic devices. However, the team is considering whether controlled access to the iPad may help reduce agitation and decrease the need for PRN sedative medications and physical restraints.

Search question: In patients with autism spectrum disorder and sensory-triggered agitation, does access to an iPad/tablet compared to standard care reduce episodes of agitation, self-injurious behavior, and the use of medications and restraints?

Question type: What kind of question is this?

Prevalence

Screening

Diagnosis

Prognosis

Treatment

Harms

Assuming that the highest level of evidence to answer your question will be meta-analysis or systematic review, what other types of study might you include if these are not available (or if there is a much more current study of another type)?

If systematic reviews or meta-analyses aren't available, useful evidence could come from randomized controlled trials comparing iPad/tablet use to standard care (quiet rooms, PRN sedatives, and physical restraints). Observational studies, like cohort or case-control designs, can also provide some useful insight, as can small case series describing individual patients using iPads to manage agitation.

PICO search terms:

Population	Intervention	Comparison	Outcome
Autism spectrum disorder	iPad/Tablet	Physical restraints	Reduced agitation
Sensory-triggered agitation	Mobile device	Medications	Self-injurious behavior
	Touchscreen device	Non-digital interventions (books, puzzles)	Use of physical restraints
	Digital device	Environmental modification (quiet room, dim lighting)	Behavioral outbursts
			PRN medication use

Search tools and strategy used: Please indicate what databases/tools you used, provide a list of the terms you searched together in each tool, and how many articles were returned using those terms and filters. Explain how you narrowed your choices to the few selected articles. For example, if your search

returned 25 articles among the several databases used, what was the process used to determine which articles to use?

Database	Search Terms Used	Number of Results	Filters Applied
PubMed	("autism spectrum disorder"[MeSH] OR ASD) AND ("iPad OR "tablet") AND (agitation OR "self-injury" OR "behavioral outburst") AND (sensory OR environment OR calming OR de-escalation)	15	Last 15 years (2011-2026), English Language, Humans
Google Scholar	autism spectrum disorder, agitation, iPad tablet, sensory, agitation, restraint, PRN medications	3	2022-2026, Review articles only
Cochrane	("autism spectrum disorder" OR ASD) AND (iPad OR tablet) AND (agitation OR behavioral outcomes)	33	2020-2026, English

For this PICO assignment, I searched three databases: PubMed, Cochrane Library, and Google Scholar. In PubMed, the initial search gave me around 50 results, but I was able to get it down to 15 after applying the filters listed above. The initial search for Google Scholar gave me hundreds of articles, but after limiting to review articles published between 2022-2026, only 3 highly relevant articles remained. The Cochrane search gave me 33 results after applying the filters, but most focused on communication interventions rather than directly addressing behavioral regulation in patients with ASD. For each database, I reviewed titles and abstracts to identify studies that specifically addressed agitation or behavioral outbursts in patients with ASD as well as interventions involving iPads and tablets and ended up choosing 2 articles from PubMed and 1 from Google Scholar.

1. Physical and Pharmacologic Restraint in Hospitalized Children With Autism Spectrum Disorder

Citation: Calabrese ME, Sideridis G, Weitzman C. Physical and Pharmacologic Restraint in Hospitalized Children With Autism Spectrum Disorder. *Pediatrics*. 2024 Jan 1;153(1):e2023062172. doi: 10.1542/peds.2023-062172.

Article Type: Retrospective cohort study

OBJECTIVES

Children with autism spectrum disorder (ASD) have high rates of cooccurring conditions and are hospitalized longer and more frequently than children without ASD. Little is known about use of involuntary physical or pharmacologic restraint in hospitalized children with ASD. This study compares use of restraint because of violent or self-injurious behavior during inpatient pediatric hospitalization in children with ASD compared with typical peers.

METHODS

This retrospective cohort study examines electronic health records of all children aged 5 to 21 years admitted to a pediatric medical unit at a large urban hospital between October 2016 and October 2021. Billing diagnoses from inpatient encounters identified ASD and cooccurring diagnoses. Clinical orders identified physical and pharmacologic restraint. Propensity score matching ensured equivalency between ASD and matched non-ASD groups on demographic factors. Logistic regression determined the odds of restraint in children with ASD compared with children without ASD, controlling for hospitalization factors and cooccurring diagnoses.

RESULTS

Of 21 275 hospitalized children, 367 (1.7%) experienced restraint and 1187 (5.6%) had ASD. After adjusting for reason for admission, length of stay, and cooccurring mental health, developmental, and behavioral disorders, children with ASD were significantly more likely to be restrained than children without ASD (odds ratio 2.3, 95% confidence interval 1.6–3.4; $P < .001$).

CONCLUSIONS

Hospitalized children with ASD have significantly higher odds of restraint for violent or self-injurious behavior compared with children without ASD after accounting for reason for admission, length of hospitalization and cooccurring diagnoses. Work is needed to modify the hospital environment for children with ASD to reduce behavioral dysregulation and restraint.

Key points:

- Children with ASD are more than twice as likely to experience involuntary physical or pharmacologic restraint for violent or self-injurious behavior compared to their typically developing peers
- Children w/ ASD have significantly higher average number of restraint orders (9.47) compared to those without (2.30)
- Hospitalized children w/ ASD tend to have longer lengths of stay (205 hours compared to 167 hours)
- While children w/ ASD made up only 5.6% of total pts hospitalized during study period, they accounted for 24% of all pts who experienced restraint

While this article doesn't directly answer my PICO question, it serves as a good foundation for how challenging hospital stays can be for children with ASD. It shows that these kids are much more likely to experience physical or medication-based restraints and often stay in the hospital longer than their peers. This really underscores why finding alternative ways to help them manage agitation like using iPads or tablets could make a big difference. Not only could it help keep the children safer and calmer, but it might also reduce stress for caregivers and staff, and even shorten hospital stays.

2. Effect of a social script iPad application for children with autism going to imaging

Citation: Johnson N, Bree O, Lalley EE, Rettler K, Grande P, Gani MO, Ahamed SI. Effect of a social script iPad application for children with autism going to imaging. J Pediatr Nurs. 2014 Nov-Dec;29(6):651-9. doi: 10.1016/j.pedn.2014.04.007.

Article Type: Randomized controlled trial

This randomized controlled trial feasibility study tested the effectiveness of an iPad® application (app) social script intervention for children with autism spectrum disorder (ASD) going to imaging and their parent ($n = 32$ parent/child dyads). Parents of the children exposed to the app ($n = 16$) had lower state anxiety compared to the parents whose children were not exposed to the app ($n = 16$) (effect size 0.33). Children exposed to the app had fewer externalized challenging behaviors than the control group (effect size 0.56). The results demonstrate feasibility and efficacy of the intervention. Further study of the iPad app is warranted.

Key points:

- Children w/ ASD who used iPad exhibited fewer externalized challenging behaviors (tantrums, hitting, or damaging property) during imaging than those receiving standard care (held down or placed in wrist/hand restraints).
- iPad group had a decrease in HR and systolic BP whereas standard care group showed an increase
- Parents of children who used iPad had lower state anxiety compared to parents in standard care group

I chose this article because it is an RCT (which is one of the highest levels of evidence) that directly assesses iPad use to reduce challenging behaviors in children with ASD. It shows how tablet interventions can decrease agitation, reduce the need for restraints, and improve both child and caregiver outcomes during stressful situations (in this case it's getting imaging done). While this article does not explicitly examine inpatient settings, the findings suggest that controlled iPad use may be a practical strategy to manage sensory-triggered agitation in similar clinical environments.

3. Effects of Interventions Involving Tablet-Based Speech-Generating Devices for Individuals with ASD: A Meta-analysis

Citation: Muharib R, Walker V, Dunn W. Effects of Interventions Involving Tablet-Based Speech-Generating Devices for Individuals with ASD: A Meta-analysis. J Autism Dev Disord. 2024 Dec;54(12):4496-4514. doi: 10.1007/s10803-023-06173-6. Epub 2023 Nov 29. PMID: 38019361.

Article Type: Meta-analysis

The purpose of this review was to assess the effectiveness of tablet-based speech-generating devices (SGDs) in improving communication skills for individuals with autism spectrum disorder (ASD). A total of 31 single-case design intervention studies involving 84 individuals with ASD were reviewed and included in the analysis. We calculated Tau-U to evaluate the impact of interventions involving tablet-based SGDs on four different communication responses: specifically, mands, intraverbals, tacts, and vocalizations. To explore potential moderating variables for mand outcomes, we used the Kruskal-Wallis one-way test. The analysis revealed that interventions utilizing tablet-based SGDs led to improvements in communication responses. Specifically, large to very large changes were observed in mand and intraverbal responses, whereas moderate changes were noted in tact responses and vocalizations. The findings of this review underscore the potential of tablet-based SGDs in enhancing communication among individuals with ASD. We discuss the findings and provide implications for future research and practice.

Key points:

- Large to very large improvements were observed in mand and intraverbal responses, indicating that tablets significantly enhanced participants' ability to request and respond.
- Improved expressive communication through SGDs could reduce frustration and potentially related challenging behaviors

This meta-analysis examines the use of tablet-based speech-generating devices in individuals with ASD and shows that these interventions significantly improve communication skills, particularly in requesting and responding. While not explicitly stated in the article, the author suggests that improved communication helps to reduce frustration and agitation. This may in turn decrease episodes of self-injury and decrease the need for medications or physical restraints.

What is the clinical “bottom line” derived from these articles in answer to your question?

For patients with autism spectrum disorder who become agitated from sensory triggers, using iPad tablets can be a helpful way to calm them and reduce challenging behaviors. Research shows that children with ASD who used an iPad during stressful situations, such as medical procedures, had fewer outbursts, lower heart rates and blood pressure, and their caregivers felt less anxious compared to standard care with restraints. Meta-analyses also suggest that helping these children communicate through tablets can reduce frustration, which may lower episodes of agitation and self-injury and decrease the need for medications or physical restraints. Hospital data show that children with ASD are much more likely to be restrained and stay in the hospital longer than their peers, which highlights the need for better strategies. Overall, giving children controlled access to tablets in clinical settings may make hospital stays safer, less stressful, and more supportive for both patients and caregivers, though more research in inpatient settings would be valuable.