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Brief Report

Effects of Risperidone in Children with Autism Spectrum Disorder: A Retrospective Study

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Abstract

Background: Autism spectrum disorder (ASD) is a complex neurodevelopmental condition associated with various cognitive and behavioral impairments that can significantly affect daily functioning and quality of life. Affected children often receive combined rehabilitative and pharmacological interventions to address their diverse needs, including therapies aimed at improving social skills, communication, and adaptive behaviors. This retrospective study compares communication abilities and disruptive behaviors in children with ASD treated with risperidone (RIS) versus those without pharmacological treatment, shedding light on the potential benefits and drawbacks of medication in this population. Understanding these dynamics is crucial for developing effective treatment strategies that can enhance the overall well-being of children with ASD.

Objectives: This study constitutes a retrospective investigation designed to assess the impact of the medication RIS on the enhancement of communication skills and the reduction of disruptive behaviors.

Methods: In this retrospective study, 80 participants aged 4 to 13 years were categorized into two equal groups: Forty children diagnosed with ASD who had received RIS group and 40 who had not received any pharmacological treatment (non-RIS group). Participants were assessed at a rehabilitation center in Tehran using the Children's Communication Checklist (CCC) and the Aberrant Behavior Checklist (ABC). Data were analyzed using SPSS version 20. Independent samples *t*-tests were conducted to compare group differences, and Pearson correlation analyses were used to explore associations between communication and behavioral variables.

Results: Children in the RIS group demonstrated significantly lower levels of disruptive behaviors compared to the non-RIS group ($P < 0.05$). Communication skills scores were also significantly higher in the RIS group ($P < 0.05$). Subscale analysis supported these group-level differences. A moderate, non-significant inverse relationship was observed between communication and behavioral scores.

Conclusions: This study highlights the beneficial effects of RIS in children with ASD, particularly in enhancing communication skills and mitigating disruptive behaviors. Findings have clinical relevance for ASD rehabilitation professionals.

Keywords: Autism Spectrum Disorder, Communication, Disruptive Behavior, Medicine

1. Background

Autism spectrum disorder (ASD) is a complex neurodevelopmental condition characterized by persistent challenges in social communication and interaction, alongside restricted, repetitive patterns of behavior (1). Beyond these core symptoms, many children with ASD exhibit non-core behavioral manifestations such as aggression, irritability, and self-injurious behaviors, which significantly impair daily functioning and quality of life (2). The management of these challenging behaviors often necessitates a multimodal approach, integrating behavioral interventions and pharmacological treatments (3).

Risperidone (RIS), an atypical antipsychotic acting as an antagonist at serotonin 5-HT2A and dopamine D2 receptors, is one of the most commonly prescribed medications for addressing irritability and aggression in children with ASD (4). Evidence from pivotal trials and meta-analyses indicates that RIS is effective in

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reducing these disruptive behaviors, improving adaptive functioning, and enhancing social responsiveness in the short term (4, 5). However, its efficacy in ameliorating the core social communication deficits of ASD remains a subject of debate, with some studies reporting minimal improvements in these domains (6, 7).

Furthermore, the use of RIS is associated with significant adverse effects, including weight gain, metabolic disturbances, and sedation, necessitating careful risk-benefit analysis (8). This underscores the importance of prioritizing behavioral interventions, such as pivotal response treatment (PRT), as first-line approaches (9). Indeed, research suggests that combining PRT with RIS may yield superior outcomes in communication skills compared to pharmacotherapy alone, highlighting the potential for synergistic effects (9, 10).

Critical gaps persist in the literature. The long-term effects of RIS on core ASD symptoms are mixed and insufficiently explored (6). Moreover, its impact on specific cognitive domains, particularly executive functions which are often impaired in ASD, is not fully understood (11). There is also a need to identify which subgroups of children with ASD (e.g., based on family history or specific symptom profiles) are most likely to respond to RIS treatment (12). Most studies have focused on behavioral outcomes, leaving a relative paucity of data on its direct effects on functional communication abilities (13).

2. Objectives

Therefore, this retrospective study aims to systematically evaluate the effects of RIS on both disruptive behaviors and communication skills in children with ASD, comparing outcomes to a matched group of untreated children. By addressing these objectives, this research seeks to provide a more nuanced understanding of RIS's profile, informing more targeted and effective clinical management strategies for children with ASD.

3. Methods

A retrospective study design was employed, with participants chosen through purposive sampling. The research took place at the Centre of Rehabilitation between October 2024 and December 2024.

3.1. Participants

Information was collected from the parents of 80 children diagnosed with ASD at the Autism Rehabilitation Center located in Tehran. The participants, aged between 4 and 13 years, were formally diagnosed with ASD by a licensed psychiatrist based on the criteria specified in the Fifth Edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5). Forty of these children were receiving RIS group for a mean duration of 3.0 ± 0.5 years (range: 2.5 - 3.5 years) with a mean daily dosage of 1.5 ± 0.8 mg/day (range: 0.5 - 3.0 mg/day) and had no comorbid medical conditions, while the remaining 40 had not received any pharmacological treatment (non-RIS group). Adherence to RIS treatment was monitored through caregiver reports during regular clinical follow-ups at the rehabilitation center. Children with neurological disorders or sensory impairments were excluded. The researcher explained the objectives of the study to the parents in a one-on-one session. In a calm environment, each parent completed the Communication Checklist and the Aberrant Behavior Checklist (ABC), which took approximately 30 minutes. Children with neurological disorders or sensory impairments were excluded.

3.2. Instruments Used

3.2.1. Children's Communication Checklist

The Children's Communication Checklist (CCC) was developed to assess communicative impairments, particularly pragmatic abnormalities in social communication often overlooked by conventional language assessments. It also evaluates qualitative dimensions of speech and language across 70 questions (14). All items, except for four, attained a Content Validity Index (CVI) greater than 0.85. After revisions, the overall CVI was above 0.75. Internal consistency ranged from 0.66 to 0.74, and test-retest reliability exceeded 0.90 (7).

3.2.2. Aberrant Behavior Checklist

The ABC is a widely used instrument for assessing disruptive behaviors in individuals with developmental disabilities. It evaluates behaviors across several domains, including irritability, hyperactivity, stereotypy, and lethargy. The scale is validated and reliable for use in outpatient clinical settings and research.

3.3. Data Analysis

The data were analyzed using IBM SPSS Statistics for Windows, Version 20.0 (IBM Corp., 2016, Armonk, NY). Descriptive statistics were used for continuous and categorical variables. Group comparisons were performed using independent samples *t*-tests, and

Table 1. Comparison of Disruptive Behavior Subscales Between Groups [a]

Groups	RIS	Non-RIS	P-Value [b, c]
Stereotype	22.40 ± 7.69	8.76 ± 4.76	0.0001
Self-injury	78.12 ± 9.98	78.72 ± 18.24	0.0012
Obsessive	38.88 ± 4.46	20.60 ± 9.78	0.0234
Routine behavior	9.44 ± 0.94	5.31 ± 0.58	0.0003

Abbreviation: RIS, risperidone.

[a] Values are expressed as means ± standard deviations (SD).

[b] P-values from independent samples *t*-tests.

[c] Significant differences ($P < 0.05$) indicate lower disruptive behaviors in the RIS group.

Pearson correlations assessed relationships between communication and behavioral variables.

4. Results

Children in the RIS group, treated with a mean RIS dosage of 1.5 ± 0.8 mg/day (range: 0.5 - 3.0 mg/day) for a mean duration of 3.0 ± 0.5 years, demonstrated significantly lower scores in disruptive behaviors ($P < 0.05$) compared to the non-RIS group. Furthermore, the communication skills of children in the RIS group were significantly better ($P < 0.05$). A detailed breakdown of the disruptive behavior subscales, highlighting significant differences between the groups, is provided in Table 1.

In addition to RIS treatment, participants in both groups received various adjunct therapies during the index period, which were assessed to evaluate their potential influence on outcomes. The distribution of these therapies across the RIS (n = 40) and non-RIS (n = 40) groups is presented in Table 2.

These differences were consistent across subscales of the ABC and CCC. The relationship between disruptive behaviors and communication scores for both groups is further explored in Table 3. Correlation analysis showed a moderate inverse relationship between disruptive behaviors and communication scores in the RIS group, though not statistically significant. However, subgroup analysis confirmed significant group-level differences.

5. Discussion

The present retrospective study aimed to evaluate the effects of RIS on communication skills and disruptive behaviors in children with ASD. Our primary findings indicate that children treated with RIS demonstrated significantly greater improvements in both communicative abilities and a reduction in disruptive behaviors, such as aggression and irritability, compared to the untreated control group. These results contribute to the existing body of evidence supporting the therapeutic role of RIS in the pharmacological management of ASD (4, 12).

The observed reduction in disruptive behaviors aligns consistently with the established efficacy of RIS for treating irritability, aggression, and self-injurious behaviors in children with ASD (2, 4, 12). This is a cornerstone of its clinical use, as these symptoms often present significant challenges to daily functioning and safety. Our findings reinforce the conclusions of major trials, such as the one by McCracken et al. (4), which established RIS as a first-line pharmacological option for these specific behavioral manifestations. The mechanism is believed to be linked to its potent antagonism of dopamine D2 and serotonin 5-HT2A receptors, which modulates the neural circuits involved in emotional regulation and aggression (3).

More notably, our study reported significant gains in communication skills within the RIS group. This finding is particularly important as it addresses a core domain of ASD that is often resistant to intervention. While some previous studies and reviews have suggested that RIS's benefits are primarily behavioral, with modest or inconsistent effects on core social communication deficits (1, 6, 7), our data suggest a positive flow-on effect. It is plausible that by effectively reducing disruptive and hyperactive behaviors, RIS may create a more receptive state for learning and social engagement. This reduction in interference may allow children to better benefit from inherent environmental interactions, therapeutic interventions, or even naturalistic learning opportunities, thereby indirectly fostering communication development. This concept is supported by Aman et al. (10), who noted improvements in adaptive functioning, which encompasses practical communication skills, following RIS treatment.

These findings can also be interpreted in light of RIS's mechanism of action. The RIS's action as a dopamine D2 and serotonin 5-HT2A receptor antagonist aligns with

Table 2. Distribution of Adjunct Therapies Received by Group During the Index Period [a, b]

Variables	RIS (N = 40), %	Non-RIS (N = 40)
Speech therapy	90 (36/40)	90 (36/40)
Occupational therapy	85 (34/40)	70 (28/40)
ABA	90 (36/40)	88 (35/40)
Parental training programs	80 (32/40)	78 (31/40)
Other behavioral interventions	0 (0/40)	0 (0/40)
Concomitant medications	0 (0/40)	0 (0/40)

Abbreviations: RIS, risperidone; ABA, applied behavior analysis.

[a] Percentages represent the proportion of participants receiving each therapy.

[b] Data based on caregiver reports.

reductions in disruptive behaviors and irritability, domains in which there is more consistent evidence of pharmacologic responsiveness in ASD. However, core social-communication deficits in autism (e.g., social interaction, pragmatic language) are associated with higher-order socio-cognitive networks that may not be directly modulated by D2/5-HT2A antagonism. Consequently, improvements in ABC-measured behaviors do not reliably translate into substantial gains in CCC-measured social-communication skills. Our findings of limited or non-significant changes in core ASD symptoms despite treatment with RIS are consistent with the pharmacodynamic profile, underscoring the need for complementary behavioral and communication-focused interventions to target core ASD features.

However, interpreting these positive findings requires caution and must be balanced against the known limitations of RIS. The significant metabolic side effects, including weight gain and potential for endocrine dysregulation, are well-documented (8). Furthermore, the long-term sustainability of these benefits remains a critical question. While our study showed meaningful improvements in the short to medium term, other studies have indicated that benefits may plateau or diminish over time, potentially necessitating dose adjustments that increase the risk of adverse effects (12, 13). This underscores the imperative that RIS be prescribed as part of a comprehensive treatment plan, rather than a standalone solution. Behavioral interventions, such as PRT, remain the foundation of ASD management and have demonstrated efficacy in improving communication (9, 15). The optimal approach likely involves a synergistic model where pharmacotherapy manages behaviors that impede learning, thereby enabling the child to more fully engage in and benefit from behavioral therapies (3).

Another key finding was the non-significant association between communication and behavioral outcomes. Although prior literature often reports a relationship between communication impairments and disruptive behaviors in children with ASD, the correlation between CCC (communication) and ABC (behavior) scores in our sample did not reach statistical significance. Several factors may contribute to this null finding. First, floor/ceiling effects in one or both measures could limit variance and obscure associations. Second, both instruments rely on parent report, which may introduce measurement error or shared-method bias, potentially attenuating true relationships. Third, the cross-sectional assessment during a short index period may not capture dynamic, time-lagged relationships between communication skills and behavior. Finally, sample heterogeneity (e.g., variability in language ability, comorbidities, or concurrent interventions) and modest statistical power (n = 80 total) may have reduced our ability to detect a meaningful association. Future prospective studies with multi-informant assessments (e.g., clinician-rated scales, teacher reports) and larger samples could clarify the nature and direction of this relationship.

Several limitations of our retrospective study must be acknowledged. The non-randomized design introduces the potential for selection bias, as the decision to treat with RIS may have been influenced by the initial severity of symptoms or other confounding factors. Additionally, specific data on RIS adherence were not systematically collected, which may limit the interpretation of treatment efficacy. The lack of detailed dosage variability (e.g., adjustments over time) and precise adherence monitoring represents a limitation, as these factors could influence the observed outcomes. The similarity in baseline ABC (and CCC) scores between groups reduces concern about baseline severity as a confounder for between-group differences in outcomes.

Table 3. Pearson Correlation Coefficients Between Disruptive Behaviors and Communication Skills [a, b]

Variables	Communication SKILLS Correlation Coefficient	
	RIS	Non-RIS
Stereotype	0.012	-0.428
Self-injury	0.405	0.146
Obsessive	0.249	0.166
Routine behavior	0.212	0.10

Abbreviation: RIS, risperidone.

[a] Correlations based on Children's Communication Checklist (CCC) scores and Aberrant Behavior Checklist (ABC) subscales.

[b] None reached statistical significance ($P > 0.05$) in the RIS group, indicating a moderate but non-significant inverse relationship overall.

However, given the nonrandomized design and potential unmeasured confounders, residual selection bias cannot be completely excluded. The lack of blinding and a placebo control means that expectations of parents and clinicians could have influenced the outcome assessments. Furthermore, we relied on broader measures of communication; future research would benefit from using more specific, nuanced language assessments to pinpoint exactly which aspects of communication (e.g., pragmatics, vocabulary, syntax) are most affected. Finally, our follow-up period was limited; longer-term studies are essential to confirm the durability of these gains and to continue monitoring for adverse effects.

Based on the findings and limitations of the present study, several avenues for future research are recommended to further elucidate the role of RIS in the treatment of ASD. There is a critical need for large-scale, prospective, randomized controlled trials with long-term follow-up periods to confirm the causal relationship between RIS use and improvements in communication skills while rigorously monitoring the long-term trajectory of its benefits and potential adverse metabolic and neurological effects over extended periods. Such research would provide a more definitive risk-benefit profile for prolonged use and help establish evidence-based guidelines for treatment duration. Future investigations should also move beyond global measures by employing more nuanced, domain-specific assessments to determine which particular components of communication show the greatest responsiveness to RIS treatment, potentially leading to more targeted and personalized therapeutic approaches.

Additionally, research should explore combined intervention models that systematically evaluate the efficacy of RIS alone versus RIS integrated with structured behavioral therapies to test the hypothesis that pharmacotherapy creates a more receptive state for learning, potentially leading to synergistic and more sustainable outcomes than either approach alone. Further studies should focus on identifying biomarkers and predictive factors for treatment response by examining variables such as genetic profiles, family history of ASD, specific baseline behavioral phenotypes, and neurophysiological markers that could help clinicians identify which subgroups of children with ASD are most likely to benefit from RIS treatment. This line of investigation would contribute significantly to the development of personalized medicine approaches in autism treatment and optimize therapeutic outcomes while minimizing unnecessary medication exposure.

Moreover, it should be noted that both the CCC and ABC depend on caregiver reports, which may be influenced by expectations, mood, or social desirability. Future studies could benefit from incorporating multiple assessment methods, including direct observational and clinician-rated measures.

5.1. Conclusions

In conclusion, the results of this retrospective analysis suggest that RIS can be an effective agent for not only reducing disruptive behaviors but also for facilitating improvements in communication skills in children with ASD. These benefits appear to be clinically significant in the short term. Nevertheless, these positive outcomes must be carefully weighed against the well-established risk profile of the medication. The findings reinforce the notion that RIS is best deployed as an adjunctive component within a multifaceted, individualized treatment strategy for ASD, which prioritizes behavioral interventions and continuous monitoring for both efficacy and safety. Future prospective, randomized, and long-term studies are warranted to validate these findings and further

elucidate the relationship between behavioral management and core symptom improvement.

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Footnotes

Authors' Contribution: Study concept and design: M. R. and H. D.; Analysis and interpretation of data: H. D.; Drafting of the manuscript: H. D.; Critical revision of the manuscript for important intellectual content: M. R.; Statistical analysis: H. D.

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Data Availability: The dataset presented in the study is available on request from the corresponding author. The data are not publicly available due to privacy and ethical restrictions.

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