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The Relationship Between Repetitive Behaviors and Communication Skills in Autistic Children

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ABSTRACT

Aims Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by significant deficits in social interaction and cognitive abilities, along with atypical behavioral patterns, such as repetitive movements. These features often lead to communication impairments, resulting in social isolation and marginalization. This study aims to investigate the relationship between communication skills and repetitive behaviors among children with ASD.

Materials & Methods In the current study, a sample of 45 children with autism spectrum disorder (ASD group) was systematically selected from autism centers in Tehran, while 45 typically developing children (control group), matched for age and gender, were recruited from kindergartens. The Children's Communication Checklist (CCC) was administered to rigorously assess participants' communication competencies. Additionally, the Repetitive Behaviors Scale (RBS) was employed to quantitatively evaluate the prevalence and specific characteristics of repetitive behaviors exhibited by the subjects.

Findings According to the descriptive analysis, the participants' average age ranged from 5 to 12 years. Furthermore, the analytical results revealed a statistically significant association between communication skills and repetitive behaviors ($p < 0.05$, $r = 0.7$). The outcomes of this investigation suggest a significant correlation between communication abilities and repetitive behaviors in children on the autism spectrum.

Conclusion This study finds a significant relationship between communication skills and repetitive behaviors in children on the autism spectrum. Reducing behavioral issues may improve communication skills, thereby enhancing quality of life for these children and their families. The results can help rehabilitation professionals, especially speech and language therapists, improve their services.

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Introduction

Autism is a long-term neurodevelopmental condition that affects social interaction [1], communication [2], and behavior [3]. While restricted and repetitive behaviors [4] or interests (RBs) are essential for diagnosing autism, they are also found in other developmental disorders. RBs are generally characterized as repetitive, non-purposeful activities or interests that happen frequently and disrupt everyday activities.

Repetitive behaviors are a core characteristic of Autism Spectrum Disorder (ASD) [5] and significantly impact communication and social interactions. These behaviors, which include motor stereotypies [6-8] and insistence on sameness, are associated with social and communication impairments, leading to more severe presentations of autism when multiple forms are present [9] The motivation behind these behaviors is complex, involving mechanisms such as sensory reinforcement and stress reduction, and is linked to neurobiological alterations in brain regions like the basal ganglia [10].

Children with Autism Spectrum Disorder (ASD) often face substantial challenges in communicative behaviors, which can lead to significant difficulties in social interactions and adversely affect their quality of life. These children commonly experience impairments in both verbal and non-verbal communication skills, such as challenges in

emotional expression, interpreting body language, and sustaining eye contact [11]. These impairments may lead to social isolation, diminished learning opportunities, and difficulties in establishing friendships. Furthermore, these communication challenges can hinder their interactions with peers and adults, potentially exacerbating anxiety and depression [12].

These repetitive behaviors can exacerbate social isolation and hinder the development of social skills, further complicating communication with peers and adults. Addressing these behaviors through targeted interventions is crucial for improving social communication and reducing anxiety and depression in individuals with ASD [13].

Understanding the underlying mechanisms and impacts of repetitive behaviors is essential for developing effective treatments and enhancing the quality of life for those affected by ASD.

In this study, we explore the relationship between repetitive behaviors and communication skills in children with autism. Our hypothesis is that lower levels of repetitive behaviors are associated with better communication and social skills.

We hope that the findings of this research will enhance understanding of the communication challenges faced by these children and lead to the development of more effective educational and therapeutic strategies. Ultimately, this research can assist teachers, parents, and mental health professionals in designing better strategies to improve the social and communication skills of children with autism, considering their repetitive behaviors. It seems that the results of this study will contribute to improving the quality of life for children with autism and their families.

Despite the growing global body of research on the interplay between repetitive behaviors and communication skills in autism, there remains a significant gap in context-specific evidence within Iran. The cultural, linguistic, and healthcare system characteristics of Iran may influence both the manifestation of autistic traits and the accessibility and effectiveness of interventions. Furthermore, most existing tools and studies are validated in Western populations, and their direct applicability to the Iranian pediatric context requires empirical investigation. This study aims to address this critical gap by examining this relationship within a sample of Iranian children, using instruments adapted and validated for Persian speakers. By doing so, it seeks to generate locally relevant data that can inform the development of culturally sensitive assessment protocols and tailored therapeutic strategies. The findings are intended to directly contribute to refining diagnostic and intervention practices by Iranian rehabilitation specialists, speech-language therapists, and special educators, ultimately aiming to improve service delivery and outcomes for children with ASD and their families in Iran.

Materials and Methods

A cross-sectional study was conducted using a purposive (convenience) sampling method. The study included 45 children with a formal diagnosis of Autism Spectrum Disorder (ASD) based on DSM-5 criteria [14], recruited from the Autism Rehabilitation Center in Tehran. A control group of 45 typically developing (TD) children, matched for gender and age, was recruited from the kindergartens in Tehran. All children were aged between 6 and 12 years.

Assessment of Autism Severity, Cognitive Profile, and Comorbidities

The severity of autism symptoms was assessed using the Gilliam Autism Rating Scale–Third Edition (GARS-3). Children in the ASD group were required to have a score indicating moderate severity to be included. To further characterize the sample and ensure a baseline level of cognitive and language functioning — a prerequisite for meaningful participation in the communication assessment — we administered the Ages & Stages Questionnaires, Third Edition (ASQ-3). The ASQ-3 is a parent-completed developmental screening tool. Our focus was on the Communication domain of the ASQ-3 to confirm that participants possessed a fundamental level of language comprehension and expressive skills, thereby excluding children with profound language delays. Children with known co-occurring intellectual disability (based on prior medical/psychological records), neurological disorders (e.g., epilepsy), genetic syndromes, or significant sensory impairments (e.g., hearing loss, blindness) were excluded from the study. This was confirmed through a review of available medical records and a brief clinical interview conducted by the research team, which included consultation with a child psychiatrist.

Parent Training and Response Validation

Prior to data collection, a brief training session was conducted for all participating mothers to ensure consistent understanding of the questionnaire items. The training included a verbal explanation of each scale (CCC and RBS-R), examples of how to score behaviors, and an opportunity for questions. To monitor response accuracy, a researcher reviewed completed questionnaires with each mother immediately after submission to clarify any ambiguous responses and confirm consistency with observed behaviors.

Procedure

After explaining the study objectives and obtaining informed consent from the parents or primary caregivers, data were collected in a quiet, private room at the respective centers. Parents from both the ASD and the control groups completed the Children's Communication Checklist (CCC) and the Repetitive Behavior Scale (RBS). The questionnaire completion process took approximately 30 minutes per participant. The study was carried out between October 2024 and December 2024.

Instruments used

The Children's Communication Checklist (CCC)

The Children's Communication Checklist (CCC) was developed to assess communicative impairments, with a particular emphasis on pragmatic abnormalities in social communication that are frequently neglected by

conventional language assessments. Additionally, it encompasses qualitative dimensions of speech and language. The checklist for assessing qualitative dimensions of speech and language effectively integrates social relationships and restricted interests and it has 70 questions [15]. All items, except for four, attained a Content Validity Index (CVI) greater than .85. Subsequent to revisions, these four items demonstrated enhanced scores. The overall CVI was established to be above .75. The internal consistency of each item was evaluated and found to range from .66 to .74. Furthermore, the test-retest reliability, assessed after a two-week interval, was determined to exceed .90 [16].

Repetitive Behavior Scale (RBS)

The Repetitive Behavior Scale-Revised (RBS-R) is a newly developed questionnaire designed to assess restricted repetitive behaviors (RRB) in individuals with autism. A validation study involving 320 caregivers yielded a robust five-factor structure, encompassing "Ritualistic/Sameness Behavior," "Stereotypic Behavior," "Self-injurious Behavior," "Compulsive Behavior," and "Restricted Interests." The scale demonstrated high internal consistency and strong interrater reliability, indicating its effectiveness for use in outpatient settings. Overall, the RBS-R shows promise as a reliable and valid tool for assessing RRB in autism and it has 43 questions [9]. The Persian RBS-R showed excellent reliability (α=0.924) and validity (AUC=0.917), establishing it as a valid and reliable tool in Iran [19].

Gilliam Autism Rating Scale–Third Edition (GARS-3)

The Gilliam Autism Rating Scale–Third Edition (GARS-3) is a norm-referenced instrument used to assess the severity of autism spectrum disorder in individuals aged 3 to 22 years. It consists of 56 items grouped into six subscales: Restrictive/Repetitive Behaviors, Social Interaction, Social Communication, Emotional Responses, Cognitive Style, and Maladaptive Speech. The total standard score classifies autism severity as mild, moderate, or severe. The scale demonstrates strong psychometric properties. The internal consistency reliability coefficients for the subscales range from 0.84 to 0.91, and the test-retest reliability is reported to be 0.90. Content and criterion-related validity have also been well established, with the GARS-3 effectively differentiating individuals with ASD from those with other developmental disorders [20]. The scale has been validated in Persian, demonstrating high internal consistency (Cronbach's α ranging from 0.81 to 0.92) and good test-retest reliability (r = 0.89) in Iranian children with ASD [22].

Ages & Stages Questionnaires, Third Edition (ASQ-3)

The Ages & Stages Questionnaires, Third Edition (ASQ-3) is a parent-completed developmental screening tool designed to identify potential delays in children between 1 month and 5½ years of age. It assesses five key domains: Communication, Gross Motor, Fine Motor, Problem Solving, and Personal-Social. For the purpose of this study, the Communication domain was specifically utilized to confirm a foundational level of language comprehension and expression in participants. The ASQ-3 has demonstrated strong reliability and validity. Internal consistency coefficients for the domains typically range from 0.75 to 0.82, and test-retest reliability is reported at approximately 0.92. Concurrent validity with established measures like the Bayley Scales of Infant Development is high, with correlations ranging from 0.76 to 0.85 [21]. The Persian version of the ASQ-3 has shown strong reliability, with test-retest reliability coefficients between 0.85 and 0.93 and internal consistency ranging from 0.74 to 0.88 across domains [23].

Data analysis

Data analysis was performed using IBM SPSS Statistics version 20. Descriptive statistics (frequency, percentage, mean, and standard deviation) were used to summarize the demographic and clinical characteristics of the participants. An independent samples t-test was employed to compare the scores of repetitive behaviors and communication skills between the ASD and control groups. The relationship between communication skills and repetitive behaviors within each group was examined using Pearson's correlation coefficient. A p-value of less than 0.05 was considered statistically significant for all analyses.

Findings

Demographic and Group Comparisons

The study included 45 children in the ASD group and 45 children in the control group, matched for gender (18 girls and 27 boys in each group) and age. The mean age of the ASD group (9.02 ± 3.06 years) was comparable to that of the control group (9.68 ± 1.34 years), with no statistically significant difference ($p = 0.186$).

As shown in Table 1, independent samples t-tests revealed significant differences between the groups in the core variables of interest. Children with ASD exhibited significantly higher scores on repetitive behaviors and significantly lower scores on communication skills compared to the control group ($p \leq 0.001$ for both).

Correlational Analysis

A Pearson correlation analysis was conducted to examine the relationship between communication skills and repetitive behaviors within each group (Table 2). A strong and significant negative correlation was found in the ASD group ($r = -0.704$, $p \leq 0.001$), indicating that higher levels of repetitive behaviors were associated with lower communication skills. In contrast, no significant correlation was observed in the control group ($r = 0.077$, $p = 0.615$).

Table 1. Comparison of communication skills and repetitive behaviors between the control group and the ASD group.

Group	Control	ASD	P-value
	Mean±SD	*Mean±SD*	
Repetitive behavior	3.24±2.31	26.82±17.67	≤0.001
Communication skills	151.73±5.58	113.91±22.20	≤0.001

Table 2. Correlation Between communication skills and repetitive behaviors in the control group and the ASD group.

Variables	Repetitive behavior correlation Coefficient	
	ASD	control
Communication skill	-0.704	0.077

Correlation is significant at the 0.01 level.

Discussion

One of the studies that provided empirical support for our research was conducted by Autism and colleagues. This investigation focused on adolescents with autism, with a mean age of 13 years, and explored the interrelationships among emotion regulation, social communication skills, and repetitive behaviors. The findings indicated a robust correlation between emotion regulation and both social communication skills and repetitive behaviors, while a moderate correlation was observed between social communication skills and repetitive behaviors. In our study, the correlation between these two variables was found to be more pronounced; however, it is essential to acknowledge that our sample size was smaller in comparison to that of the referenced study. Nevertheless, our research involved a younger cohort, implying that the maturation of social skills at an older age and an enhanced comprehension of emotional states may serve as mediating factors influencing the relationship between social communication skills and repetitive behaviors [17].

In a separate investigation, it was demonstrated that a greater prevalence of autism symptoms correlates with an escalation in repetitive behaviors and a deficit in social communication skills, [18] findings that are consistent with the outcomes of our study

The strong negative correlation found in our study aligns with the core characteristics of ASD, where repetitive behaviors often serve as a barrier to social engagement and communication. Our findings are consistent with previous research, such as Tsai et al. (2020), who also reported that more severe autism symptoms, including social communication deficits, are linked to an increase in repetitive behaviors [18]. The lack of correlation in the control group further underscores that this relationship is specific to the autistic phenotype.

Several limitations of this study should be acknowledged. First, the use of a convenience sample and a relatively small sample size may limit the generalizability of the findings. Second, the cross-sectional design does not allow for causal inferences about the relationship between repetitive behaviors and communication skills. Future longitudinal research with larger, more diverse samples is needed to explore the directional nature of this relationship and the potential mediating role of factors like emotion regulation.

Despite these limitations, our results have important practical implications. They suggest that interventions aimed at reducing repetitive behaviors in children with ASD could potentially lead to improvements in their communication abilities. Rehabilitation professionals, especially speech-language therapists, can integrate strategies for managing repetitive behaviors into their therapy plans to enhance overall communicative outcomes and quality of life for these children.

Ethical Considerations

Adherence to research ethics principles:

The study was approved by Ethics Committee of Hamadan University of Medical Sciences & Health Services, Deputy of Research (Scientific Code : 140105043232). Informed consent was obtained from all parents or legal guardians of the participating children. They were informed about the study's purpose, procedures, and their right to withdraw at any stage without any consequences. The confidentiality of all collected data was strictly maintained throughout the research process.

Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflict of Interest

According to the authors' statements, there are no conflicts of interest regarding this article.

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The present study has been conducted without funding.

Authors' Contributions

Article search and writing: Hoorieh Darvishi; Article search and information categorization: Mohammad Rezaei; Initial idea presentation, scientific validation of sources, editing and final approval of the text: Mohammad Rezaei; Assistance in resource search and text editing: Hoorieh Darvishi.

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