# Intellectual Assessment of children with autism spectrum disorders

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**ABSTRACT**

Children with autism spectrum disorder (ASD) have a significant language and cognitive function deficiency. This study aimed to determine the cognitive strengths and weaknesses of children with ASD, as well as the influence of age on the Stanford Binet Intelligence Scale, Fifth Edition (SB-5). This type of study will aid in early detection and intervention in children with ASD. This cross-sectional study included 99 children with ASD according to "DSM-5, 75 males and 24 females, and their age ranged from 3-13 years. All participants were subjected to CARS scoring and full-scale IQ by SB-5 test. The results showed that the mean of full-scale IQ was $60.64 \pm 8.76$, and the mean of non-verbal IQ ($63.62 \pm 9.49$) was significantly higher than the mean of verbal IQ ($58.71 \pm 7.67$). Our study gives clinicians new insights into the intellectual functioning of children with ASD, demonstrating how intelligence is measured in these children matters and that caution is required when assessing their true intellectual potential. We stress that the importance of early identification and diagnosis of ID may have facilitated cognitive development in ASD children.

## 1. INTRODUCTION

Autism spectrum disorder (ASD) is one of the most frequent neurodevelopmental diseases in childhood. ASD is characterized by a wide variety of social and linguistic difficulties, as well as confined and repetitive patterns of behavior, interests, and activities [1], [2]. The reported prevalence of ASD has grown in recent years as a consequence of more reliable diagnostic procedures and the recognition of many grades of ASD, with the current incidence estimated to be around 1–2% of the entire human population [1], [2]. The evaluation of intellectual patterns in children with ASD is highly critical: The DSM-5 requires that ASD be accompanied by intellectual impairment [3], [4]. In this regard, research has revealed that intellectual disabilities are frequently linked to ASD [4], [5]. However, the incidence of ID in children with ASD is still unclear and varies significantly between different studies. One probable explanation for this disparity is that these studies use different psychological tests [4]. The purpose of this study was to examine the cognitive profile of children with ASD as well as the influence of age on the Stanford Binet Intelligence Scale, Fifth Edition (SB-5) [6].

## 2. Patients and methods

Ethics: The approval of the Ethics Committee of the Faculty of Medicine of Assiut University was obtained before initiating the study with IRB number 17101139. All patients' caregivers signed a written informed consent form after receiving a thorough description of the study.

Study design: A cross-sectional study was carried out from September 2019 to September 2020.

Patients: The study included 99 Egyptian children diagnosed with ASD according to "Diagnostic and Statistical Manual of Mental Disorders 5th edition (DSM-5) [3], performed by an experienced pediatric psychologist. All patients have been recruited from the pediatric neurology clinic at Assiut Children's University Hospital. We included all children with ASD with ages ranging from 3 to 18 years of both sexes with a confirmed autism diagnosis. Patients with one or more of the following were excluded from the study: age below three years or above 18 years, other neurological, metabolic, chronic liver and renal diseases, failure to thrive, and chronic systematic diseases.

### 2.1 Methods

All patients included in the study were subjected to full clinical history and thorough clinical examination with particular stress on neurological examination. The ASD diagnosis was established by the same psychologist for all patients, using the DSM 5th edition [3], with confirmation and classification, of patients were done using the Childhood Autism Rating Scale, 2nd edition (CARS II) [7]. Three meetings with parents were conducted. The first interview was for ASD diagnosis by DSMV, the second was to assess disease severity using CARS, and the third session was for SB-5.

### 2.2 Statistical analysis

Data analysis was done using SPSS version 20. Continuous data were expressed in mean ± SD, while nominal data were expressed in frequency (percentage). The correlation of age of the patients with CARS and SB-5 was determined by Pearson correlation. The confidence level was kept at 95%; hence a p-value < 0.05 indicated a significant association.

## 3. Results

A total of 99 children with ASD of whom 75(75.8%) patients were males and 24 (24.2%) were females with a mean age of enrolled patients was 4.89 ± 2.80 years with a range between 3 and 13 years. Table 1 summarized all demographic and psychological and cognitive data. Figures 1 to 3 demonstrated significant negative correlations between CARS and non-verbal SB-5 (r= -0.30, *p*< 0.001), verbal SB-5 (r= -0.32, *p*< 0.001), and total SB-5 (r= -0.33, *p*< 0.001).

## 4. Discussion

In our study, 75(75.8%) patients were males, and 24 (24.2%) were females. This agreed with previous studies [1], [2] that found a predominance of males in ASD patients; also, multiple publications approved that a male to female ratio ranges from 1.4:1 to 15.7:1. Some theories have been labored to explain the lower prevalence of ASD in females than males, such as the theory of the highly masculine brain, the female protection factor, cerebral plasticity variants, and genetic and epigenetic factors [5].

In our results, the mean of CARS scores was 33.52 ± 4.32, with a range between 30 and 48. These results agreed with previous studies [8], [9] who found that CARS total scores were 35.72 ± 4.10, respectively.

In our results, the mean total SB-5 was 60.64 ± 8.76, ranging between 46 and 90. Mean non-verbal SB-5 was

63.62 ± 9.49 with a range between 51 and 91 and mean verbal SB-5 was 58.71 ± 7.67 with a range between 45 and 88. This agreed with [10], who found that the mean of full-scale IQ was 68.58±18, and the mean of non-verbal IQ (73.5±17.5) was significantly higher than the mean of verbal IQ (65.46±17.6). There is evidence for a higher VIQ profile, especially in ASD children with higher levels of social impairment [11]. Regarding sex, we found no insignificant differences in CARS, non-verbal SB-5, verbal SB-5, and total SB-5. In line with our finding, a recent study12 found no significant differences between males and females in parent-rated summary behavioral symptom scales on "Child Behavior Checklist," ADOS-2, and CARS. [10] also found that the male-female with ASD differences in IQ levels were statistically insignificant. [12] also found no significant differences in age or non-verbal IQ between females and males.

The present study showed a positive correlation of the age of patients with CARS. This is inconsistent with [13], who found that early diagnoses of autism in toddlerhood are largely stable, both in the short- and longer-term in children prospectively detected via community developmental surveillance. This disagreement may be due to low socioeconomic status in Egypt and low family support of children with ASD, which leads to deterioration of the cases.

In our study, there was a negative correlation between age with non-verbal SB-5, verbal SB-5, and total SB-5. This agreed with [14], who found a significant association between intelligence and social cognition in children with ASD, and older children with ASD had higher social cognition sub-scale scores. Another study13 found that the incidence of developmental disability was high at 24-months (68%). Most children diagnosed at 24-months with ASD made apparent cognitive gains over time, both in their verbal and non-verbal abilities, despite some having ID criteria in toddlerhood. It appears that early identification and diagnosis may have facilitated cognitive development over time [13]. In the present study, we found a negative correlation between CARS and SB-5 scores. This is in line with [15], who found strong relations between intelligence quotient and DSM-5 severity ratings in both domains, suggesting that doctors consider cognitive functioning in their overall severity detection.

## 5. Conclusion

Our study gives clinicians new insights into the intellectual functioning of children with ASD, demonstrating how intelligence is measured in these children matters and that caution is required when assessing their true intellectual potential. We stress that the importance of early identification and diagnosis of ID may have facilitated cognitive development in ASD children.

## 6. References

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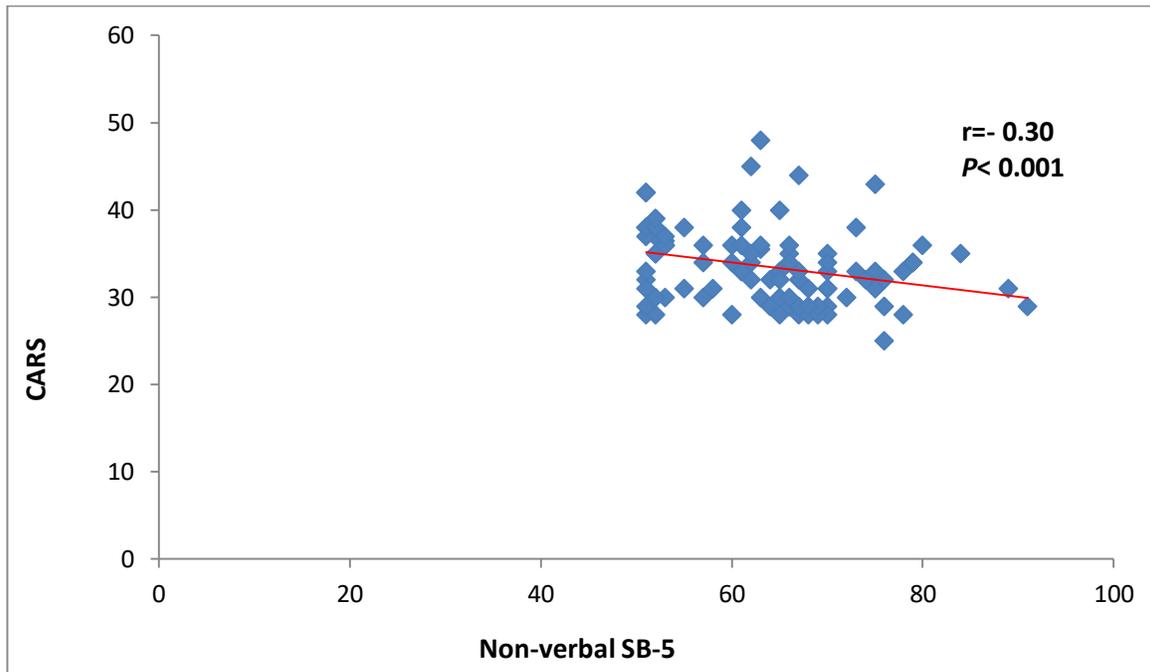
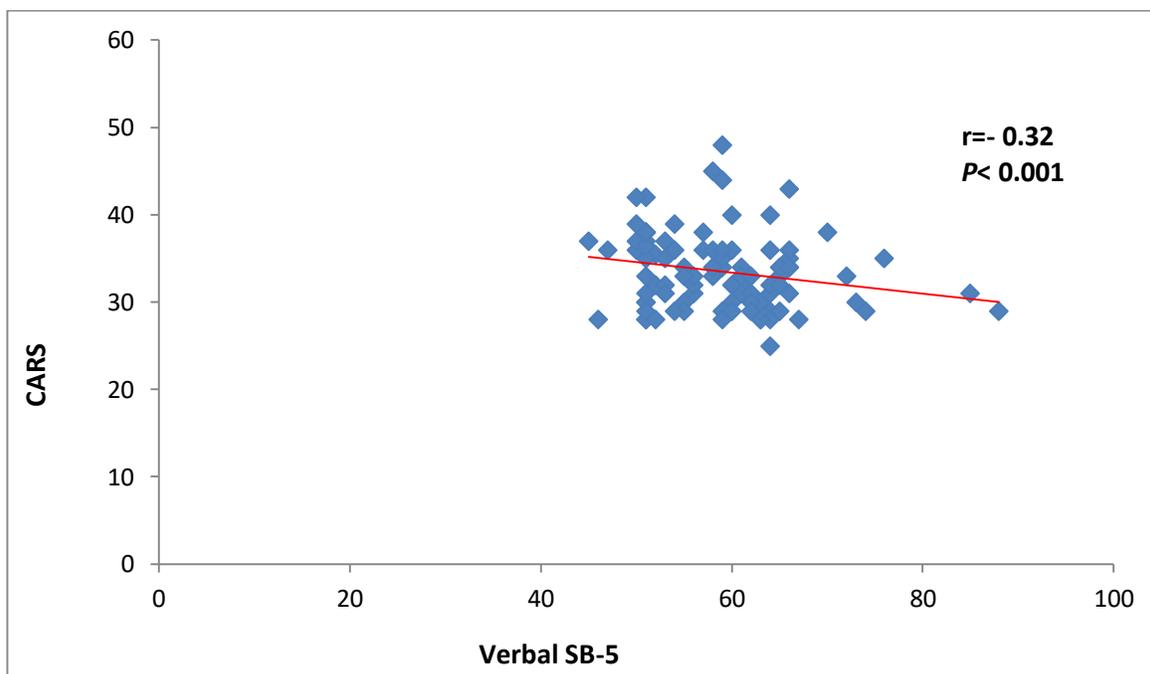**Figure 1:** Correlation between non-verbal SB-5 with CARS
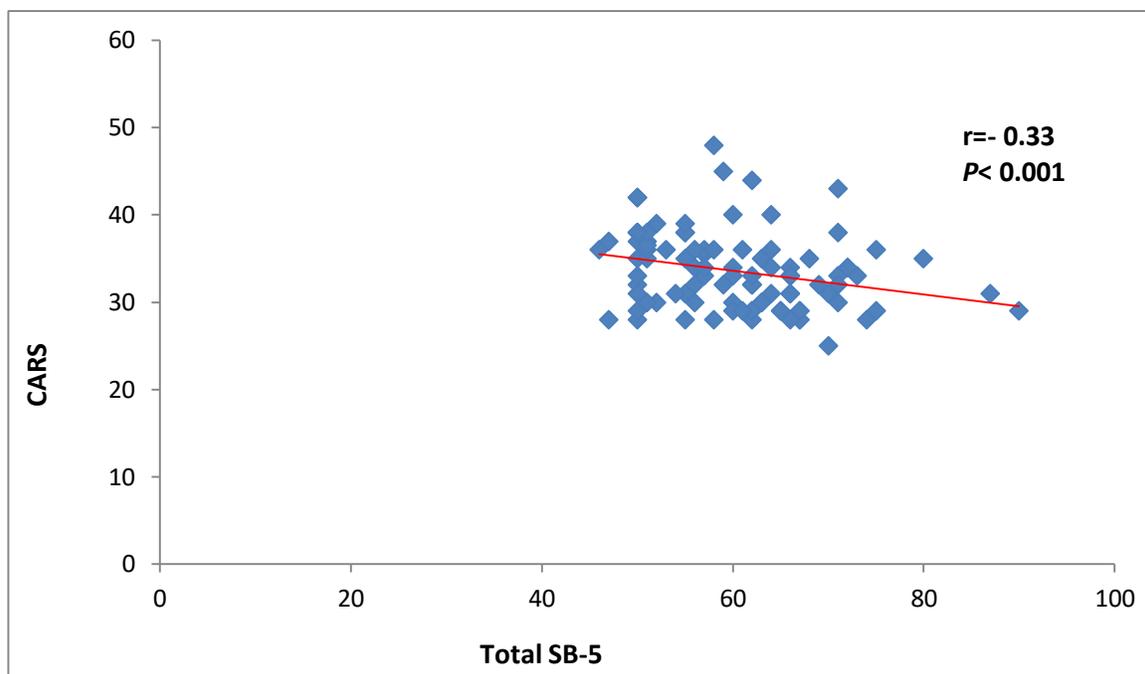


**Figure 2:** Correlation between verbal SB-5 with CARS

**Figure 3:** Correlation between total SB-5 with CARS

**Tables:** Demographic and psychological parameters of all studied patients:

|  | **N= 99** |
|---|---|
| **Age** (years) |  |
| Mean± SD | 4.89 ± 2.80 |
| Range | 3-13 |
| **Sex** |  |
| Male (N/%) | 75 (75.8%) |
| Female (N/%) | 24 (24.2%) |
| **CARS** |  |
| Mean± SD | 33.52 ± 4.32 |
| Range | 30-48 |
| **SB-5 (non-verbal)** |  |
| Mean ± SD | 63.62 ± 9.49 |
| Range | 51-91 |

| **SB-5 (verbal)** | |
| --- | --- |
| Mean ± SD | 58.71 ± 7.67 |
| Range | 45-88 |
| **SB-5 (total)** | |
| Mean ± SD | 60.64 ± 8.76 |
| Range | 46-90 |
| CARS: childhood autism rating scale; SB-5: Stanford-Binet scale | |