Research Article

Early detection of autism: comparison of two screening tools

Sachin Darne*

Consultant and Associate Professor Department of Pediatrics, Terna Medical College, Navi Mumbai, India

*Correspondence:
Dr. Sachin Darne,
E-mail: sndarne@gmail.com

ABSTRACT

Background: The aim of the study was comparison of a newly developed test called Trivandrum Autism Behavioural Checklist (TABC) with gold standard test; Checklist for Autism in Toddlers (CHAT).
Methods: The study was done on 200 children over a period of three months between age group of 24 to 36 months. All the children were briefly evaluated for history and then the two tests were administered by two doctors.
Results: It was found that out of total 200 children only 3 children were suspected to have autism by the CHAT test and they failed in the scores by having more number of "no" answers. It was also observed that the same 3 children were also detected to have autism by the TABC scores in which one girl was suspected to have severe autism while two boys seemed to have mild to moderate autism. The prevalence of autism as per this study was seen to be around 1.5%.
Conclusions: Thus it can be inferred from this study that TABC test is an equally good option for screening children for autism.

Keywords: CHAT test, TABC test, Autism

INTRODUCTION

Autism is a developmental disorder that appears in first three years of life and is characterized by impaired social communication and interaction. Autism is also characterized by restricted and repetitive behaviour. It is also called as pervasive developmental disorder. Raina et al study shows the prevalence to be 0.9/1000 with highest prevalence rate in rural areas.[1] Studies conducted across the world have shown that the cases of autism have increased from 50% to 2000%.[2] This number could have increased partly due to improvement in awareness and clinical practice.[3]

Causes

The exact cause of autism is unknown. Autism is linked to genetic predisposition and also to infections occurring during prenatal, perinatal or postnatal phases.[4-7] Certain environmental factors could also act as trigger. Siblings of children with autism are at a higher risk of developing autism. Drugs like thalidomide and valproic acid taken during pregnancy are believed to be risk factors for autism.[8,9] High parental age is also believed to be one of the risk factors.[10] Despite profound research the pathophysiology of autism is still not well understood. There is alteration of brain system and this is believed to occur immediately after conception.[11]

Diagnosis

Several screening tools have been developed for successful diagnosis of autism. Adequate use of these tools requires training and experience.

Signs and symptoms

The signs and symptoms of the toddlers should be monitored for early diagnosis of autism. They primarily include impaired social interaction, language problems, repetitive behaviour, delayed developmental milestones, absent protodeclarative pointing and history of frequent infections.

Treatment

There is no known cure. These children can benefit with speech and behavioural interventions if started at early stage.

Prognosis

The prognosis of patients with autism is dependent on their intelligence quotient (IQ). Patients with low-functioning IQ may find it difficult to live independently throughout their entire life. Patients with high-functioning IQ may be able to carry out their responsibilities independently and even progress in life.

METHODS

The aim of the study was comparison of a newly developed test called TABC with gold standard test; CHAT. This was a descriptive crossover study done on 200 children over a period of three months between age group of 24-36 months. All the children were briefly evaluated for history and then the two tests were administered by two doctors.

Objectives

- Early detection of autism in age group of 2-3 years attending the outpatient clinic.
- To perform screening for autism by using a standard CHAT test.
- To perform screening for autism by a new test TABC.
- To compare both the tests for early detection of autism.

The children were divided into 2 groups. Both the groups were administered history format sheet initially. After completion of history format sheet one group was administered CHAT test and the other group was administered TABC test. Then the crossover took place and the children who were administered CHAT test were provided with TABC test and vice versa.

History format sheet:

Case No: Date:
Age in months: Sex: Male/ Female
Birth Order:
                                        1) 1st Child
                                        2) 2nd Child
                                        3) 3rd or more
Place of Residence:
                                        1) Rural 2) Urban

Age of Father: Age of Mother:

Education of Father
a) No Schooling   b) Primary c) Upper Primary
d) High School   e) HS School f) Degree
g) Post Graduation h) Technical i) Professional

Education of Mother
a) No Schooling   b) Primary c) Upper Primary
d) High School   e) HS School f) Degree
g) Post Graduation h) Technical i) Professional

Presenting complaints

Antenatal history:
Infertility: 1) Yes 2) No
Diabetes: 1) Yes 2) No
Drugs: 1) Yes 2) No
Radiation: 1) Yes 2) No
Dental caries: 1) Yes 2) No

Infection
1st Trimester: 1) No 2) Fever with rash 3) Fever without rash
2nd Trimester: 1) No 2) Fever with rash 3) Fever without rash
3rd Trimester: 1) No 2) Fever with rash 3) Fever without rash

Natal and neonatal history

Gestational age:
1) Pre-term <37 weeks 2) Term 37-42 weeks 3) Post-term >42 weeks
 Labour induction: 1) Yes 2) No
 Labour duration: 1) <2 hrs 2) 2-8 hrs 3) >8 hrs

Any other condition (Specify)

Birth weight:

Birth head circumference:

Immunization history:
DPT: 1) 1st dose 2) 2nd dose 3) 3rd dose 4) 4th dose
OPV: 1) 1st dose 2) 2nd dose 3) 3rd dose 4) 4th dose
Measles:1) Yes 2) No
MMR: 1) Yes 2) No

Developmental history:
Social smile by 2 months: 1) Yes 2) No
Head control by 4 months: 1) Yes 2) No
Sitting by 8 months: 1) Yes 2) No
Standing by 12 months: 1) Yes 2) No
Walking by 15 months: 1) Yes 2) No
Talking by 12 months: 1) Yes 2) No
Proto declarative pointing: 1) Yes 2) No
Wave bye-bye: 1) Yes 2) No

After completion of history format sheet the children were administered with CHAT or TABC screening test. The CHAT screening test is divided into two components; questions for parents followed by physician's observations. If the answer to the two sections has at least two or more "No" than "YES", then autism is suspected. The TABC screening test is divided into four components; social interaction, communication, behavioural characteristics and sensory integration. The scoring based on the responses of the four components are never (1), sometimes (2), often (3) and always (4). The severity of autism is graded on the basis of scoring: 20-35 >nonautistic, 36-43 >mild to moderate autism, 44 and above is severe autism. The parents were interviewed for CHAT questionnaire in the consulting room and the children were observed in the playroom near the consulting.

RESULTS

With the CHAT screening test, 3 children had more than 2 answers as "No" while the remaining 197 children passed the test (Table 1).

Table 1: CHAT Test.

CHAT test score	Autism (Screening)		
	Present	Absent	Total
Pass (<2 No)	0 (0.00%)	197 (98.5%)	197 (98.5%)
Fail (>2 No)	3 (1.5%)	0 (0.00%)	3 (1.5%)
Total	3 (1.5%)	197 (98.5%)	200 (100%)

In the TABC screening test, 2 children were suspected to lie in the mild to moderate category, while only 1 child was suspected to fall in severe autism category. The

remaining 197 children seemed to be normal as per the TABC test (Table 2).

Table 2: TABC Test.

TABC test score	Autism (Screening)		
	Present	Absent	Total
20-34	0 (0.00%)	197 (98.5%)	197 (98.5%)
35-43	2 (1.0%)	0 (0.00%)	0 (0.00%)
44 and above	1 (0.5%)	0 (0.00%)	0 (0.00%)
Total	3 (1.5%)	197 (98.5%)	200 (100%)

The prevalence of autism as per the study was 1.5% (Figure 1).
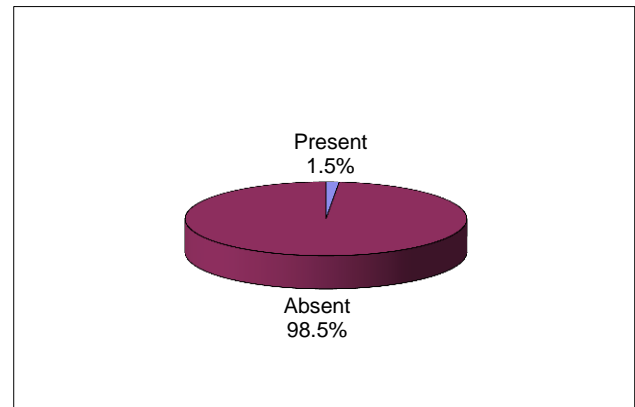

Figure 1: Prevalance of autism.

Out of total 3 children diagnosed, 2 were male and 1 was female. Though our study showed male preponderance of autism as 2:1, however, it was not found to be statistically significant (Table 3) as the P-value was not significant (P-value>0.05).

Table 3: Sex predominance.

	Autism (Screening)				
	Present	Absent	Total	Z-cal	Result
Male	2 (1%)	112 (56%)	114 (57%)	0.36	Not-significant
Female	1 (0.5%)	85 (42.5%)	86 (43%)	0.36	Not-significant
Total	3 (1.5%)	197 (98.5%)	200 (100%)		

Table 4: Paired sample statistics.

	Mean	N	Standard deviation	Standard error mean
CHAT	67.0000	3	11.00000	6.35085
TABC	50.0000	3	5.00000	2.88675

Age wise distribution was done in the study population forming two groups; first group of 24-30 months and second group of 30-36 months. It was found that all 3

cases detected belonged to first group of 24-30 months, which however did not give any specific significance.

Table 5: Paired sample correlations.

	N	Correlation	Significance
Pair 1 CHAT and TABC	3	1.000	0.000

When paired sample tests were applied, it showed a statistically significant difference (P-value and the CHAT screening test was considered to be significantly better than the two, though both were equally comparable for the diagnosis of autism in children (Table 4, Table 5 and Table 6).

Table 6: Paired sample test.

	Paired differences					T	Degrees of freedom (df)	Significance (2-tailed)
	Mean	SD	Std. Mean Error	95% Confidence Interval				
				Lower	Upper			
Pair 1 CHAT TABC	17.0000	6.00000	3.46410	2.0952	31.9048	4.907	2	0.039

DISCUSSION

The Trivandrum Autism Behavioral Checklist TABC test is one simple tool developed by the Child development centre, Medical College, Thiruvanthapuram, India which has been found to be equally good to screen the children for Autism. As per our study the frequency of occurrence of Autism is 1.5%. More and more children are currently being diagnosed for Autism then before.[1]

It has been observed after a study of 200 children between age group of 24-36 months attending two municipal general hospitals that only three children were screened positive by both the tests simultaneously. Out of the three children who were screened positive for autism disorder one was a female and two were male children. One child was found to have severe autism and the other two had mild autism on the screening test. Only one child had taken MMR vaccine and rest two had not received MMR vaccine.

As both the CHAT and the TABC test could detect equal number and same children to have Autism, it could be safely said that the newer TABC test is equally good test compared to CHAT test for screening Autism.

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