



**A FINAL REPORT OF RESEACRH ARTICLE**

**Childhood Autism: the internal consistency  
Childhood Autism Rating Scale for use in Indonesia and  
descriptive study of autism clinical variance**

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**Childhood Autism: the internal consistency of  
Childhood Autism Rating Scale for use in Indonesia and  
descriptive study of autism clinical variance**

Stefani Harum Sari <sup>1</sup>, Tri Indah Winarni<sup>2</sup>

**Abstract**

**Background:** DSM IV is the gold standard to diagnose autism. However, the DSM IV also needs other instrument to measure the severity of autism such as the CARS. The CARS as autism screening diagnostic instrument is used worldwide and has been translated into many languages. The CARS translation into Indonesian could be more useful and adaptable to diagnostic autism in Semarang.

**Objectives:** To find out the internal consistency reliability of CARS Indonesian version and the clinical variance of children with autism who assessed by CARS Indonesian Version.

**Material and Methods:** The translation of DSM IV and CARS were administered by two bilingual medical doctors and discussed in team to reach the term language agreement. We administered 27 children, age between 2 until 18 years old. The research was done in interval January until August 2009.

**Results:** The internal consistency (Cronbach's coefficient alpha) of CARS which translated into Indonesian was 0.819 (95% CI 0.701 – 0.905). The highest frequency of normal behavior was adaptation to change (n = 7, 25.9%). The highest frequency of mild behavior abnormality was non verbal communication (n = 17, 63.0%). The highest frequency of moderate form was general impressions (n = 16, 59.3%). The highest frequency of severe form was relating to people (n = 6, 22.2%) and verbal communication (n = 6, 22.2%).

**Conclusion:** The CARS Indonesian version has good internal consistency.

**Keywords:** Autism, internal consistency, clinical variance, Childhood Autism Rating Scale, Indonesia

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**Autisme Anak: konsistensi internal dari  
Childhood Autism Rating Scale untuk penggunaan di Indonesia dan  
studi deskriptif tentang variasi klinik anak-anak dengan autisme**

Stefani Harum Sari<sup>1</sup>, Tri Indah Winarni<sup>2</sup>

**Abstrak**

**Latar belakang :** DSM IV adalah standar baku emas untuk penegakan diagnosis autisme. Namun, DSM IV membutuhkan instrumen lain untuk mengukur tingkat keparahan autisme seperti CARS. Sebagai alat untuk skrining autisme, CARS telah digunakan secara luas di dunia dan telah diterjemahkan ke berbagai bahasa. Penerjemahan CARS ke bahasa Indonesia dapat meningkatkan kegunaan dan kesesuaian CARS untuk mendiagnosis pasien autisme di Semarang.

**Tujuan :** Untuk mengetahui reliabilitas konsistensi internal CARS versi terjemah bahasa Indonesia dan variasi klinik anak-anak dengan autisme yang didiagnosis menggunakan CARS versi terjemah bahasa Indonesia.

**Subyek dan Metode :** Penerjemahan DSM IV dan CARS ke bahasa Indonesia dilakukan oleh dua orang bilingual dokter dan didiskusikan dalam tim untuk mencapai kesepakatan makna. Subyek yang masuk dalam penelitian ini sebanyak 27 orang dengan usia antara 2 sampai 18 tahun. Penelitian berlangsung sejak Januari hingga Agustus 2009.

**Hasil :** Konsistensi internal dari CARS versi terjemah bahasa Indonesia (koefisien Cronbach's alfa) adalah 0.819 (95% CI 0.701 – 0.905). Frekuensi tingkah laku normal yang paling sering muncul adalah butir adaptasi terhadap perubahan (n = 7, 25.9%) sedangkan tingkah laku abnormal ringan adalah komunikasi non verbal (n = 17, 63.0%) serta tingkah laku abnormal berat adalah hubungan dengan orang lain (n = 6, 22.2%) dan komunikasi verbal (n = 6, 22.2%). Sebagian besar kesan umum anak nampak abnormal sedang (n = 16, 59.3%).

**Kesimpulan :** CARS versi terjemah bahasa Indonesia mempunyai konsistensi internal yang baik.

**Kata kunci:** Autisme, konsistensi internal, variasi klinik, Childhood Autism Rating Scale, Indonesia

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## CHAPTER I

### INTRODUCTION

#### 1.1 BACKGROUND

Autism is cognitive and neurobehavioral disorder which is characterized by qualitative impairments in social interaction, verbal and non verbal communication and social imagination with restricted interest and repetitive patterns of behaviors.<sup>1-4</sup> Epidemiology studied by Wignyosumarto S, Mukhlas M and Shirataki S in Yogyakarta reported the prevalence of autism between June 1984 and May 1991 was 12 per 10,000.<sup>5</sup> Prevalence of autism also has been reported by CDC (Centers for Disease Control and Prevention) in 2007. CDC's Autism and Developmental Disabilities Monitoring (ADDM) Network found about 1 in 150 8-year-old children in multiple area of United States had an ASD.<sup>6</sup> The prevalence also reported higher than spina bifida, cancer or Down syndrome in pediatric cases.<sup>7</sup>

Although autism is behaviorally defined, the exact etiology is still unclear. The etiologies are about genetic and non genetic (prenatal and postnatal evidence, metabolic, and neurologic) factors related.<sup>4,7-9</sup> Since the clinicians/researchers have no agreement in deciding the definitive biological evidence which is play key role in promoting autism, the diagnostic of autism is hard to be defined through the biological examination.<sup>8,9</sup> Basically, impairment of communications and social

interactions, and stereotypes behavior lead screening of autism must focus on behavior. The gold standard diagnostic is performed by ICD 10 (International Classification of Diseases, 10<sup>th</sup> revision) and DSM IV.<sup>8,10</sup>

However the diagnosis of ASD is well defined by DSM IV, the diagnostic decision-making process is also need a screening device to evaluate symptoms in qualitative manner and refine the differential diagnostic such as CARS (Childhood Autism Rating Scale).<sup>11</sup> The CARS have 15 items structured built by Schopler et al which lead to measure the severity levels of individuals with autism as the point that DSM IV fails to describe.<sup>11-13</sup>

Since the study conducted in Semarang, Indonesia, the original English version of CARS had to translate to Indonesian version to ease the parent interviews. The objectives of this study were to evaluate the CARS Indonesian Version internal consistency reliability and to know the clinical variance of autism patient who assessed by CARS Indonesian Version.

## **1.2 RESEARCH QUESTIONS**

- Is the CARS Indonesian has good internal consistency reliability?
- How are the clinical variance of individual autism who assessed by CARS Indonesian Version?

### **1.3 RESEARCH PURPOSES**

#### **1.3.1 General Purpose**

- To find out the internal consistency reliability of CARS Indonesian version
- To find out the clinical variance of children with autism who assessed by CARS Indonesian Version.

#### **1.3.2 Specific Purposes**

- To find out the CARS Indonesian Version sensitivity compare to DSM IV.
- To find out the distribution of severity level of children with autism who assessed by CARS Indonesian Version.
- To find out the Cronbach's coefficient alpha of 15 items of CARS Indonesia version.
- To find out the inter-item correlation mean of CARS Indonesian version.
- To discuss the accuracy of CARS diagnostic in children under 3 year and adolescents group.
- To find out the specific interests pattern in children with autism.

#### **1.4 RESEARCH ADVANTAGES**

- Provide a data about behavior abnormality deviation in different outcome of autism.
- Provide a data about sample behavior deviance in different items of CARS Indonesian version
- Provide a data about CARS items distribution in different outcome of autism.
- Provide preliminary study about the internal consistency reliability of CARS Indonesian version.
- Provide a data about autism outcome in the different age of group.
- Provide a data about the interest patterns of individual with autism.
- Promoting the awareness of parent and clinician/researcher in identify children with autism.
- Promoting the awareness of clinician/researcher in autism at the early age for early intervention treatment due to get a better result.
- Promoting the awareness of the parent in autism at the early age for early intervention treatment due to get a better result.
- Promoting the awareness of the parent in autism to identify the children interest to encourage their talents and confidence.

## **CHAPTER II**

### **LITERATURE REVIEW**

#### **2.1 AUTISM**

##### **2.1.1 Description**

The first description about autism was offered by Leo Kanner in 1943. The description of what he called infantile autism was observed in 11 children who have a similar pattern behavior.<sup>1</sup> Kanner concluded that abnormal language development, social deficits, insistence on sameness, stereotyped pattern of behavior, echolalia and obsessive behavior, as a disorder which differentiated infantile autism from other disorders in childhood.<sup>3</sup>

In 1994 The DSM IV introduces new view of autism named Autism Spectrum Disorders (ASD) including the classification into: Autistic Disorder, Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS), Asperger's Disorder, Rett's Disorder and Childhood Disintegrative Disorder.<sup>1-3,14</sup>

The intellectual levels of autism have a wide range.<sup>4,15</sup> Individuals with autism could be profound mental retardation to average or even superior cognitive skills. However, the degree of mental retardation is positively correlated to the degree of autism.<sup>15</sup>

The risk of autism between male and female is different, male have 3.4 times risk higher than females.<sup>2</sup> Although, Pilowsky et

al (1998) studied the symptoms of autism according to the ADI-R (Autism Diagnostic Interview-revised) and CARS revealed no significant findings between males and females when matched for chronological and mental age.<sup>16</sup>

### **2.1.2 Etiology and Pathogenesis**

The exact etiology of autism has been not clearly enough, except for the Rett's syndrome which has mutations of the methyl-CpG-binding protein 2 (*MeCP2*) gene, located at the Xq28 locus.<sup>7-9</sup> Since there are many factor play different key role in autism, the medical conditions found in minority of people with autism (less than 10% of cases).<sup>7,8</sup> However, there is agreement to autism is a syndrome with multiple non genetic and genetic etiologies.<sup>4,7-9</sup>

Many environmental factors influence in the non genetic factors caused of autism.<sup>4,7</sup> Prenatal and postnatal evidence has been linked to autism.<sup>7,8</sup> A bivariate analysis in risk factor of autism showed any significant relationship between antenatal bleeding (OR = 4.333; 95% confidence interval = 1.271-14.777) and infant asphyction (OR = 4.111; 95% confidence interval = 1.037-16.295). The interference in gas and oxygen transport in antenatal and delivery process leads the respiratory acidosis which produces the asphyction that may bother the children brain development.<sup>17</sup>

An exposed of anticonvulsant and teratogenic agents (eg, thalidomide and valproate) in pregnancy have been implicated to few



individual affected autism. Pre and postnatal infection was also reported in caused autism. Congenital rubella infection has 0.75% association to recent autistic population.<sup>7,8</sup> *Haemophilus influenza* and cytomegalovirus (CMV) infection to immature brain can also cause autism.<sup>7</sup> MMR (measles, mumps and rubella) vaccine have been blamed in promote autism.<sup>4,7,17</sup> However, a case-control study used in UK indicated no relationship between MMR vaccine and autism (OR = 0.86; 95% confidence interval = 0.68-1.96).<sup>18</sup>

Metabolic evidences also donate a role in promote autism such as mitochondrial disease or dysfunction, untreated phenylketonuria, and hyperuricosemia.<sup>7,8</sup> Cerebral palsy also present in individual with autism and mental retardation.<sup>7,15</sup> Epilepsy occurs commonly in autism leads the highest association in up to a third adulthood with autism.<sup>7,11</sup> The abnormal activity of both temporal lobes leads the infantile spasms in autism with nondevelopment language and mental retardation.<sup>7</sup>

Autism impairments in social interaction and communication may be related to cerebellum function.<sup>19,20</sup> The hypoplasia of cerebellar vermis and hemispheres which were assessed by MRI morphometry has significant correlation with behavior abnormality in individual with autism.<sup>19</sup>

Twin studies reported that monozygotic (MS) twins have above higher concordance for autism rather than dizygotic (DZ)

twins.<sup>4,7,8</sup> This is convincing evidence that indicate the autism is a heritable disorder. Another report that ensures the statement is that there is an increasing risk of recurrence in siblings of individual autism out of 2% up to 8% greater than the general population.<sup>7,15</sup> There are single gene disorders which have play role in autism: tuberous sclerosis complex, fragile X syndrome, Rett's syndrome, Sotos, neurofibromatosis I, Joubert syndrome, and Smith-Lemli-Opitz syndrome.<sup>20</sup>

The chromosomal disorder related to autism is involving the proximal long arm of chromosome 15 (15q11-q13) has been reported as most frequently occurs in autism cases (1-4% in autism population). The deletion of the chromosome 15q11-q13 manifests as Prader-Willi syndrome (PWS) and Angelman syndrome (AS).<sup>1,7,21</sup> The other chromosomal disorder involving *AUTSI* locus on 7q31-33 and microdeletion and microduplication at 16p11.2 has been postulated as the autism susceptibility locus.<sup>7,9,22</sup>

### 2.1.3 Autistic Disorders

The term of autistic disorders have essential feature including qualitative impairment in social interaction; qualitative impairment in communication; restricted, repetitive, and stereotyped patterns of behavior, interests, and activities. In addition, the onset of these abnormalities must be prior to three years of age and also the clinician or researcher should determine if the symptoms are not

better accounted for by Rett's Disorder or Childhood Disintegrative Disorder.<sup>1,3,14</sup>

#### 2.1.4 PDD-NOS

PDD-NOS also known as Atypical Autism since the affected individuals have autistic features but the manifestations do not meet any of the other subtypes. According to DSM IV, this subtype is preferable used when the symptom present severely in development of social interaction or verbal and non verbal communication skills, or when stereotyped behavior, interests and activities are present, but the criteria are not meet for a specific pervasive developmental disorder, schizophrenia, schizotypal personality disorder, or avoidant personality disorder. The onset usually present in late of age (more than 3 years) and the symptomatology is usually atypical or sub threshold.<sup>14</sup>

#### 2.1.5 Asperger's Syndrome

Asperger's syndrome also known as high functioning autism is characterized by language development at the expected age. Individual with Asperger's syndrome may have no mental retardation with average or above-average cognitive ability.<sup>23</sup> The common impairments in Asperger's syndrome are related to social interaction deficit and stereotyped behavior.<sup>14</sup>

### 2.1.6 Rett's Syndrome

The Rett's syndrome is the only subtype which has the exact etiology which is only affected to girls. The de novo mutation or microdeletions in X-linked *MeCP2* cause the genetic disorder of postnatal brain development in affected child.<sup>7-9</sup> But, the genetic mutation is not always found in all people with Rett's syndrome. In 5 percent of affected individual, the *MeCP2* mutation has been not detectable.<sup>24</sup>

### 2.1.7 Disintegrative Disorders

A normal development for the first 2 years of life presented age-appropriate verbal and non verbal communication, social relationships, play, and adaptive behavior. Significantly, people with Disintegrative disorders have very severe loss of social and communicative skills before age of 10.<sup>14</sup>

## 2.2 CARS

### 2.2.1 Introduction of CARS

The Childhood Autism Rating Scale (CARS) was set up by Schopler and Reichler in 1971. It was created as screening instrument and differentiation tool to fill the need for diagnosis autism. In the beginning, CARS was only used by the creator for the Treatment and Education of Autistic and Related Communication Handicapped Children at North Carolina's TEACHH program. Later,

in 1980, this instrument became available to others professional. The current version of CARS was first published in 1988.<sup>25,26</sup>

The CARS was developed at the time when the third edition of Diagnostic and Statistical Manual of Mental Disorder (DSM III) was in use (1980). In 1994, American Psychiatric Association (APA) launched the newer edition, DSM IV.<sup>1,3,25</sup> It provides detailed items criteria including qualitative impairment description which is exhibited by the patient. Compare with DSM III, the new version, DSM IV tries to define range of the impairments rather than define the absolute presence or absence particular symptom.<sup>1</sup> However, DSM IV fails to describe quantification of autism spectrum. It has no criteria which perform the quantitative scores to measure the severity points.<sup>25</sup>

Fifteen items of CARS were built by Schopler et al to measure the severity of clinical behaviors associated with autism. It is the reasons why CARS is recommended to the professional in the diagnostic of autism. Each item is rating from 1 (normal) to 4 (severely abnormal). The total score of CARS is 60 and the cut off point is 30. Autism is defined by score at or above 30. The interval from 30-37 indicates mild to moderate autism, and interval from 37-60 indicates severe autism.<sup>26</sup>

### **2.2.2 Reliability**

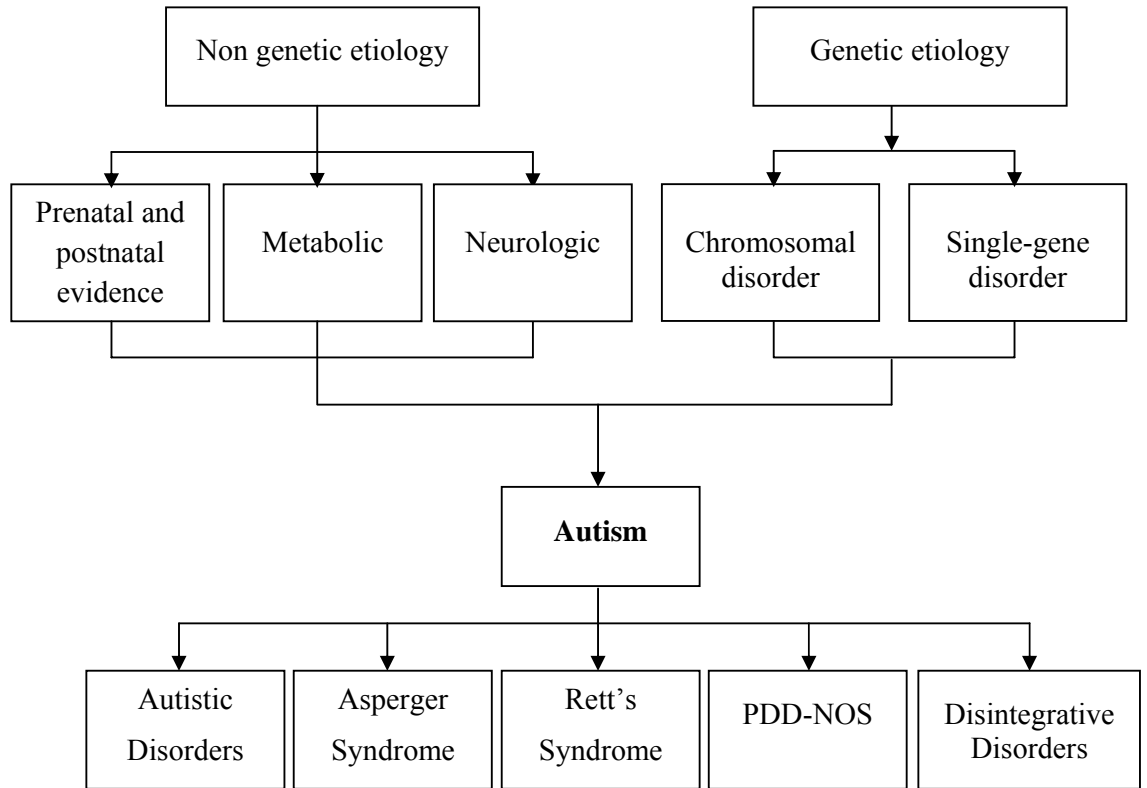
The CARS reliability as describe in manual are test-retest reliability, interrater reliability and internal consistency. The internal consistency (Cronbach's coefficient alpha) of CARS original version done by Schopler was 0.94. The CARS-TV (Tokyo version), the Cronbach's coefficient alpha was 0.87.<sup>11,25</sup> The Icelandic version had Cronbach's coefficient alpha closest to the original version at 0.94.<sup>13</sup> The Swedish version had an alpha of 0.91 and the CARS Brazilian Portuguese version (CARS-BR) had an alpha 0.82.<sup>11</sup>

### **2.2.3 Specificity and Sensitivity**

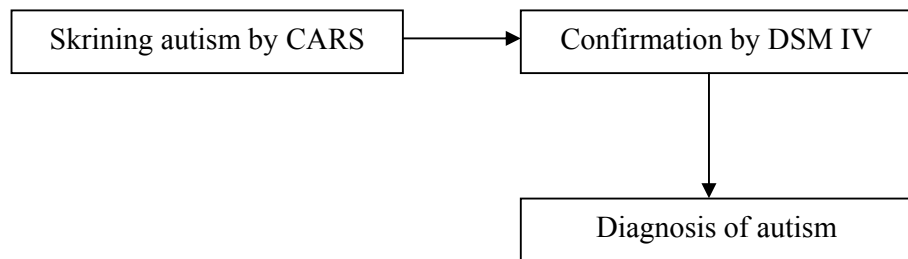
Several study had been measured the sensitivity and specificity of CARS. Rellini et al (2004) revealed the sensitivity of CARS was 100%. Another study did by Perry et al (2005) revealed the sensitivity of CARS was 94% and the specificity was 85%.<sup>27</sup>

The CARS is more effective in differentiate individual exclusively into Autistic disorder than another related diagnostic such as PDD-NOS from non-autistic individuals.<sup>28</sup> The other hand, the CARS also failed in diagnostic Asperger's disorder and Rett's disorder. But, it should not surprisingly, since the CARS was developed before the formulation of Asperger's disorder, and Rett's disorder was included in Autism Spectrum Disorders in DSM IV (1994).<sup>3,25</sup>

### 2.3 THEORETICAL FRAMEWORK



### 2.4 CONCEPTUAL FRAMEWORK



## **BAB III**

### **RESEARCH METHOD**

#### **3.1 RESEARCH SCOPE**

##### **3.1.1 Field of Research**

Research is Pediatric and Psychiatry

##### **3.1.2 Research Place**

The research places in Center for Biomedical Research Faculty of Medicine Diponegoro University.

##### **3.1.3 Research Schedule**

Research will be done in interval of January until August 2009.

#### **3.2 RESEARCH DESIGN**

We use cross-sectional study to observe the internal consistency of CARS Indonesian version and the autism clinical variance.

#### **3.3 POPULATION**

##### **3.3.1 Target Population**

Children with autism in Central Java, Indonesia.

##### **3.3.2 Source Population**

Samples are autism patient of Central for Biomedical Research of Faculty of Medicine of Diponegoro University, Semarang.



### 3.4. SAMPLES

#### 3.4.1 Samples Size

**Required information and notation:**

P = Anticipated population proportion

d = Absolute precision required on either side of the proportion (in percentage points)

$100(1 - \alpha)\%$  = Confidence level

**Notes:**

P = 0.8

d = 0.15

$z_{1-\alpha/2}$  = 1.96 (if confidence level = 95%)

**Minimal samples size:**

$$n = z_{1-\alpha/2}^2 P(1 - P)/d^2$$

$$n = (1.96)^2 (0.8)(0.2) / (0.15)^2 = 27$$

#### 3.4.2 Sampling

Samples will be assembled through consecutive sampling.

#### 3.4.3 Inclusion Criteria

- Individual who suspected autism whose age bellow 18 years.
- Individual who suspected autism and has been diagnosed as autistic disorder thorough DSM IV.

#### 3.4.4 Exclusion Criteria

- Individual who suspected autism whose parent does not agree to follow this study.

### **3.5 VARIABLES**

Item of CARS:

- |                             |                                     |
|-----------------------------|-------------------------------------|
| 1. Relationship with people | 9. Taste, smell, and touch response |
| 2. Imitation                |                                     |
| 3. Emotional response       | 10. Fear or nervousness             |
| 4. Body use                 | 11. Verbal communication            |
| 5. Object use               | 12. Non verbal communication        |
| 6. Adaptation to change     | 13. Activity level                  |
| 7. Visual response          | 14. Intellectual inconsistency      |
| 8. Auditory response        | 15. General impression              |

### **3.6 TOOLS AND MATERIALS**

- Sheet of CARS Indonesian version
- Sheet of DSM IV Indonesian version

### **3.7 TRANSLATION PROCESS**

The DSM IV and CARS translation process were administered by two bilingual medical doctors (Cytogenetic and Molecular Unit of FMDU and Pediatrics Department of FMDU). The original English version directly translated to Indonesian version. The raw translation was discussed in team to reach the term language agreement.

### **3.8 DATA COLLECTION**

This study was a part of autism research project which has been doing in Cytogenetic and Molecular Unit of FMDU. The initial seminar about autism was directed in November 2008 by CEBIOR of FMDU in Semarang to introduce our autism project to the society. This is an opportunity to collect data about parents whose autistic children and also the autism centers or communities in Semarang. The day after, the schedule of parent interviews was arranged. The first interview was done in November 2008. The retrospective study done while the interview predates our study and the prospective study done while the interview done in January until August 2009. The diagnosis of autism was done thorough parent interviews and direct observation. Only patients which were Autistic Disorder based on DSM IV included to the next CARS diagnosis step.

### **3.9 OPERATIONAL DEFINITION**

1. Relationship with people is how children make a relationship to others, especially to adults.

Scale: Interval

2. Imitation is how well children imitate sounds, words, and movements which are appropriate for his or her skill level.

Scale: Interval

3. Emotional response is how children can manage an appropriate type and degree of emotional response as indicated by a change in facial expression, posture, and manner.

Scale: Interval

4. Body use is the term related to child movement with the same ease, agility, and coordination of a normal child of the same age.

Scale: Interval

5. Object use is related to appropriate use of, and interest in, toys and other objects.

Scale: Interval

6. Adaptation to change is child response or comment on changes in routine.

Scale: Interval

7. Visual response is related to children capability to use vision together with others senses as a way o explore a new object.

Scale: Interval

8. Auditory response is related to child's listening response capability together with other senses.

Scale: Interval

9. Taste, smell, and touch response is including child's normal use of, and response to, taste, smell, and touch.

Scale: Interval

10. Fear or nervousness is related to how children express their fear or nervousness to the danger.

Scale: Interval

11. Verbal communication is related to child's ability to perform speech meaningfully in appropriate age and situation.

Scale: Interval

12. Nonverbal communication is associated to child's ability in make point or gesture more specifically to indicate what they wants and understanding the nonverbal communication of others.

Scale: Interval

13. Activity level is associated to child's activity in movement whether more active or less active than a normal child of the same age in similar situation.

Scale: Interval

14. Level and consistency of intellectual response is related to child's intellectual skills compare with a normal child of the same age.

Scale: Interval

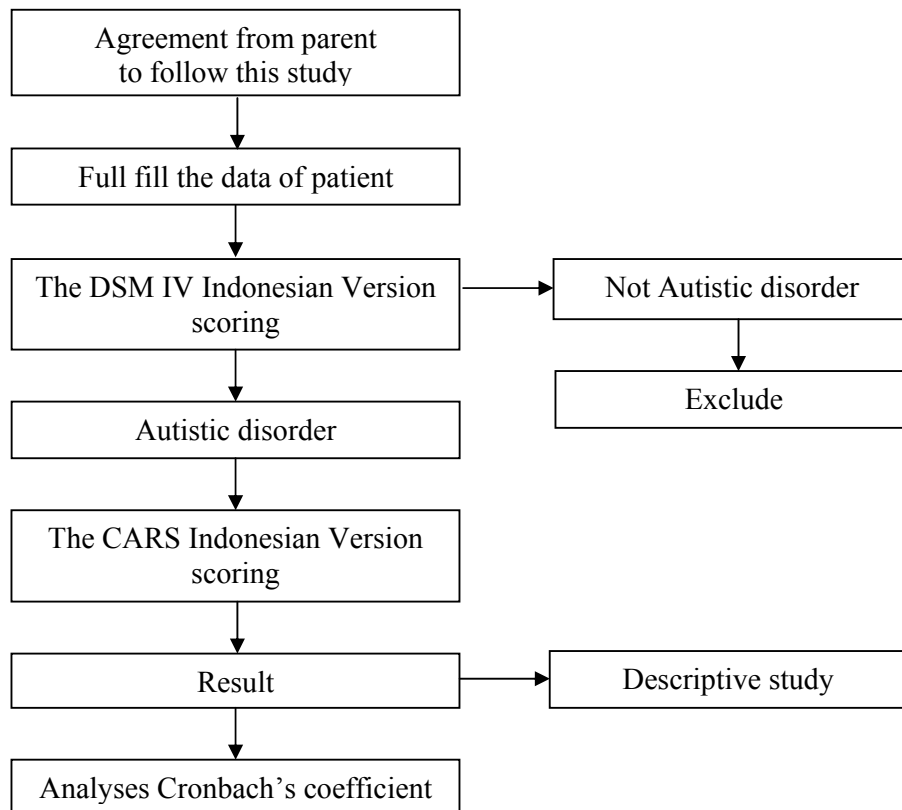
15. General impression is clinician/researcher objection to child's general appearance whether they are shows the symptom and characteristic of autism or not.

Scale: Interval

#### 4.0 DATA ANALYSES

The Cronbach's alpha was used to evaluate internal consistency. The descriptive statistic was used to show the clinical variance distribution. The result of data reported in table of frequencies and charts. All data were analyzed by statistical software SPSS 15.0 for Windows.

#### 3.10 RESEARCH SCHEME



## BAB IV

### RESULTS

The 27 patients were matched Autistic Disorder thorough DSM IV criteria. The 23 of 27 patients had total CARS Indonesian Version cut off above 30 therefore sensitivity of CARS was 85.2% (23/27). The severity of autism was preferred assess by CARS; 4 (14.8%) samples were non autistic, 8 (29.6%) samples were mild to moderate autistic and 15 (55,6%) samples were severe autistic. The highest score was 48.0 (severe) and the lowest score was 20.5 (not autistic). The 16 (59.3%) of 27 patients had at least one normal behavior for age level (lower = 1, upper = 9). All samples 27 (100%) had at least one mild behavior deviation for age level (M = 5.22, SD = 2.41). All children (15) with total score above 37 had more than 5 items with score above or equal to 3.

Table 1. Behavior abnormality deviation for Non Autistic Disorder

	Normal	Normal to mild	Mild	Mild to moderate	Moderate	Moderate to severe	Severe	Total
012	6	-	8	1	1	-	-	25.0
020	9	1	5	-	-	-	-	20.5
023	4	-	8	-	2	1	-	29.5
025	5	1	6	-	2	-	1	28.5
Total	24	2	27	1	5	1	1	103.5
Mean	6.00	0.50	6.75	0.25	1.25	0.25	0.25	25.88

The non autistic had score ranging from 20.5 to 29.5 (M = 25.88). All patients had normal behavior (M = 6 item) and mild behavior abnormality for age of level (M = 6.75 item). The 3 of 4 patients had moderate behavior abnormality

(M = 1.25 item) and only one patient had severe behavior abnormality for age level (Table 1).

Table 2. Behavior abnormality deviation for Mild to Moderate Autistic

	Normal	Normal to mild	Mild	Mild to moderate	Moderate	Moderate to severe	Severe	Total
004	1	-	9	-	5	-	-	34.0
007	1	-	7	-	7	-	-	36.0
015	2	1	7	1	3	-	1	33.0
016	3	1	6	2	3	-	-	30.5
017	2	1	4	1	6	-	1	36.0
022	3	4	2	1	4	-	1	31.5
024	-	-	10	-	4	-	1	36.0
027	2	2	3	-	8	-	-	35.0
<b>Total</b>	14	9	48	5	40		4	272
<b>Mean</b>	1.75	1.13	6.00	0.63	5.00		0.50	34.0

The mild and moderate autistic had score ranging from 30.5 to 36.0 (M = 34.0). The 7 of 8 patients had normal behavior for age level (M = 1.75 item). All patients had mild behavior abnormality (M = 6.0 item) and moderate behavior abnormality for age level (M = 5.0 item). The severe behavior abnormality showed in 4 of 8 patients (M = 0.5 item) (Table 2).

The severe autistic had score ranging from 38.0 to 48.0 (M = 41.53). The 5 of 15 patients had normal behavior for age level (M = 0.4 item). All patients had mild behavior abnormality (M = 4.4 item) and moderate behavior abnormality for age level (M = 7.53 item). The 13 of 15 patients had severe behavior abnormality for age level (M = 2 item) (Table 3).



Table 3. Behavior abnormality deviation for Severe Autistic

	Normal	Normal to mild	Mild	Mild to moderate	Moderate	Moderate to severe	Severe	Total
001	-	-	7	-	8	-	-	38.0
002	-	-	7	-	6	1	1	39.5
005	-	-	8	-	6	-	1	38.0
006	-	-	5	-	9	-	1	41.0
003	-	-	6	-	6	-	3	42.0
008	-	-	1	-	10	-	4	48.0
009	-	-	5	-	8	-	2	42.0
010	1	-	5	-	7	-	2	40.0
011	-	-	3	-	10	-	2	44.0
013	1	-	4	-	5	-	3	39.5
014	1	-	4	-	7	2	1	41.0
018	1	-	3	1	7	-	3	42.5
019	-	1	1	-	10	1	2	45.0
021	2	-	2	-	6	1	4	43.5
026	-	-	5	2	8	-	-	39.0
<b>Total</b>	6	1	66	3	113	5	30	623
<b>Mean</b>	0.40	0.13	4.40	0.20	7.53	0.33	2.0	41.53

The highest frequency of normal behavior was adaptation to change (n = 7, 25.9%). The highest frequency of mild behavior abnormality was non verbal communication (n = 17, 63.0%). The highest frequency of moderate behavior abnormality was general impressions (n = 16, 59.3%). The highest frequency of severe behavior abnormality was relating to people (n = 6, 22.2%) and verbal communication (n = 6, 22.2%) (Table 4).

Table 4. Behavior deviance in different items of Childhood Autism Rating Scale Indonesian Version

	Normal		Normal to mild		Mild		Mild to moderate		Moderate		Moderate to severe		Severe		TOTAL	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Relating to People	2	7.4	3	11.1	7	25.9	-	-	8	29.6	1	3.7	6	22.2	27	100
Imitation	2	7.4	3	11.1	10	37.0	-	-	7	25.9	-	-	5	18.5	27	100
Emotional Response	3	11.1	1	3.7	9	33.3	-	-	12	44.4	1	3.7	1	3.7	27	100
Body Use	1	3.7	1	3.7	8	29.6	1	3.7	14	51.9	-	-	2	7.4	27	100
Object Use	4	14.8	1	3.7	5	18.5	-	-	15	55.6	-	-	2	7.4	27	100
Adaptation to Change	7	25.9	-	-	7	25.9	-	-	11	40.7	1	3.7	1	3.7	27	100
Visual Response	6	22.2	1	3.7	8	29.6	-	-	9	33.3	-	-	3	11.1	27	100
Listening Response	3	11.1	-	-	13	48.1	-	-	9	33.3	-	-	2	7.4	27	100
Taste, Smell, Touch Response and Use	6	22.2	1	3.7	10	37.0	-	-	8	29.6	-	-	2	7.4	27	100
Fear or Nervousness	3	11.1	-	-	13	48.1	-	-	9	33.3	-	-	2	7.4	27	100
Verbal Communication	-	-	-	-	6	22.2	2	7.4	12	44.4	1	3.7	6	22.2	27	100
Nonverbal Communication	2	7.4	1	3.7	17	63.0	-	-	7	25.9	-	-	-	-	27	100
Activity Level	2	7.4	-	-	8	29.6	2	7.4	15	55.6	-	-	-	-	27	100
Level and Consistency of Intellectual Response	4	14.8	-	-	13	48.1	2	7.4	6	22.2	-	-	2	7.4	27	100
General Impressions	-	-	-	-	7	25.9	2	7.4	16	59.3	2	7.4	-	-	27	100

Patients showed relating to people (M = 2.67), imitation (M = 2.50), emotional response (M = 2.44), body use (M = 2.63), object use (M = 2.54), adaptation to change (M = 2.28), visual response (M = 2.32), listening response (M = 2.37) taste, smell, touch response and use (M = 2.20), fear or nervousness (M = 2.37) and level and consistency of intellectual response (M = 2.26) had behavior deviance from normal to severe from. Verbal communication (M = 2.98) item showed mild to severe behavior deviance, no patients showed normal verbal communication in age level. Non verbal communication (M = 2.17) and activity level (M = 2.52) items showed normal to moderate behavior deviance, no patients showed severe form.

Table 5. The CARS Indonesian version items distribution in Non Autistic

LAB CODE	CARS ITEMS															TOTAL SCORE
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	
012	2	2	2	1	1	2	1	1	1	1	2	2	3	2	2	25
020	1.5	1	1	2	1	1	1	2	1	1	2	1	1	2	2	20.5
023	3	2	2	2	1	1	1	2	2	2	3.5	2	3	1	2	29.5
025	1	1.5	1	2	4	1	2	1	3	2	2	2	3	1	2	28.5

Table 6. The CARS Indonesian version items distribution in Mild to Moderate Autistic

LAB CODE	CARS ITEMS															TOTAL SCORE
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	
004	2	2	2	3	2	1	3	2	2	3	3	2	3	2	2	34
007	2	2	1	3	2	2	2	2	3	3	3	2	3	3	3	36
015	1.5	2	3	3	2	1	2	1	4	2	3	2	2	2.5	2	33
016	2	1.5	3	2	2	3	1	2	1	2	3	1	2.5	2	2.5	30.5
017	3	3	1.5	3	3	1	2	2	1	3	4	3	2	2	2.5	36
022	1.5	1.5	3	1.5	1	3	1	4	3	3	2.5	1.5	2	1	2	31.5
024	4	2	2	3	3	2	3	2	2	2	2	2	2	2	3	36
027	3	3	2	3	3	1	1.5	3	1.5	1	3	3	2	2	3	35

Table 7. The CARS Indonesian version items distribution in Severe Autistic

LAB CODE	CARS ITEMS															TOTAL SCORE
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	
001	3	2	2	3	3	3	2	3	2	2	2	2	3	3	3	38
002	2	3	2	2	3	3.5	4	3	2	3	3	2	2	2	3	39.5
003	4	4	3	2	3	3	4	2	2	2	2	2	3	3	3	42
005	2	2	3	4	3	2	3	2	2	2	3	2	3	2	3	38
006	3	4	2	3	3	2	3	3	3	2	3	2	3	2	3	41
008	4	4	3	4	2	3	3	3	3	3	4	3	3	3	3	48
009	3	4	3	2	3	3	3	2	2	2	4	2	3	3	3	42
010	1	4	2	2	3	2	2	3	3	2	3	3	3	4	3	40
011	4	3	3	3	3	3	3	3	2	2	3	3	2	4	3	44
013	2	1	3	3	3	2	2	3	4	4	4	2	2.5	1	3	39.5
014	3.5	2	3.5	3	3	3	3	2	1	3	4	2	3	2	3	41
018	3	3	4	3	4	4	1	2	2	3	2.5	2	3	3	3	42.5
019	4	3	3	3	1.5	3	4	3	3	3	3	3	3	2	3.5	45
021	4	3	3	3	3	3	2	4	1	4	4	3	1	2	3.5	43.5
026	3	2	3	2.5	3	3	3	2	3	2	3	2	2	2.5	3	39

**CARS items:**

- |                         |  |   |
|-------------------------|--|---|
| I. Relating to people   | VI. Adaptation to change                 | XI. Non verbal communication                        |
| II. Imitation           | VII. Visual response                     | XII. Activity level                                 |
| III. Emotional response | VIII. Listening response                 | XIII. Fear or nervousness                           |
| IV. Body use            | IX. Taste, smell, touch response and use | XIV. Level and consistency of intellectual response |
| V. Object use           | X. Verbal communication                  | XV. General impressions                             |

**Behavior deviance:**

- |                        |                          |
|------------------------|--------------------------|
| 1 = Normal             | 3 = Moderate             |
| 1.5 = Normal to Mild   | 3.5 = Moderate to severe |
| 2 = Mild               | 4 = Severe               |
| 2.5 = Mild to Moderate |                          |

General impressions (M = 2.74) item showed mild to moderate to severe behavior deviance, no patients seemed normal either severe behavior deviance for age level (Table 4). This item showed good association when predicted mild and moderate autistic (all patients showed mild to moderate deviance). When

predicted the non autistic, general impressions showed mild deviance in all patients. However, when predicted severe autistic, general impressions showed moderate to moderate to severe deviance (Table 5-7).

Table 8. Item – Total statistics

	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Relating to People	.538	.800
Imitation	.592	.796
Emotional Response	.486	.805
Body Use	.489	.805
Object Use	.383	.812
Adaptation to Change	.516	.802
Visual Response	.544	.800
Listening Response	.380	.812
Taste, Smell, Touch Response and Use	.106	.832
Fear or Nervousness	.427	.809
Verbal Communication	.392	.811
Nonverbal Communication	.553	.804
Activity Level	.132	.824
Level and Consistency of Intellectual Response	.380	.812
General Impressions	.811	.795

The CARS Indonesian Version internal consistency (Cronbach's coefficient alpha) was 0.819 (95% CI 0.701 – 0.905) and inter – item correlation mean was 0.244. The corrected item – total correlation showed 13 items were significant coefficients ( $> 0.30$ ) ranging from 0.380 to 0.811. Item taste, smell, touch response and use and activity level had no significant correlation to approach the close diagnosis ( $< 0.30$ ). If the taste, smell, touch response and use was omitted the Cronbach's coefficient alpha would be 0.832 and if the activity

level was omitted the Cronbach's coefficient alpha would be slightly lower at 0.824 (Table 8). However, if both criteria were omitted the Cronbach's coefficient alpha would be 0.841.

The sample age (M = 8.94, SD = 3.95) was classified into 3 groups: between 2 to 5 year, 6 to 9 year and 10 to 18 year. The youngest children was 2 years old had mild to moderate autistic, whereas the oldest was 17 years old also had mild to moderate autism. However, the difference in outcome between the ages was not statistically significant. The total number of individuals with mild to moderate autism were not enough high to show the statistical significance (Figure1).

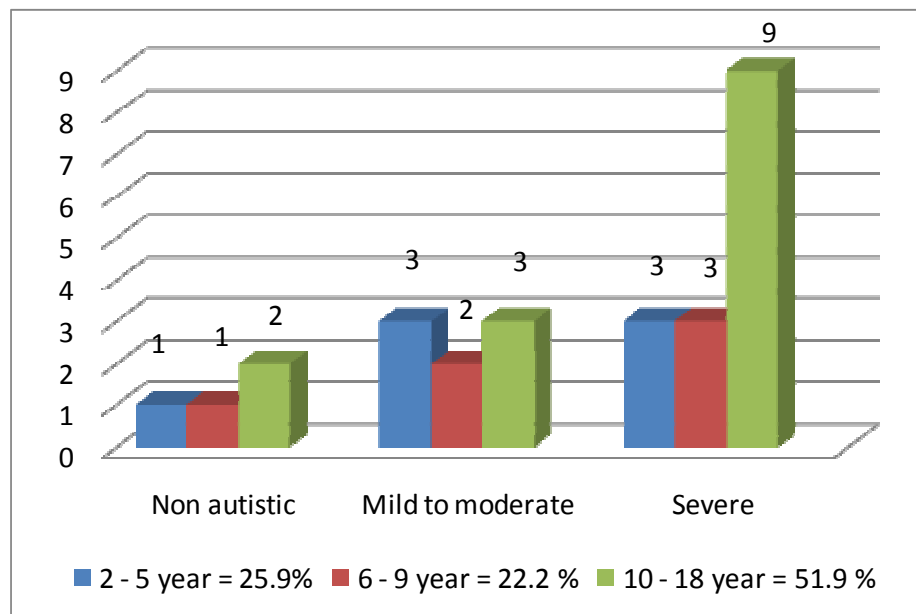


Figure 1. Outcome in different of age groups

At the time of diagnosis, the data of sample interests were collected by direct interview and parents full filled the informed consent. We only reported the complete data about sample interests (n = 25) to minimize the false prediction. The results were 16 (64.0%) samples had specific object interest, 18 (72.0%) samples had specific food interests and 11 (44.0%) samples had specific music interests. We compared the results to different outcomes of autism to show the distribution.

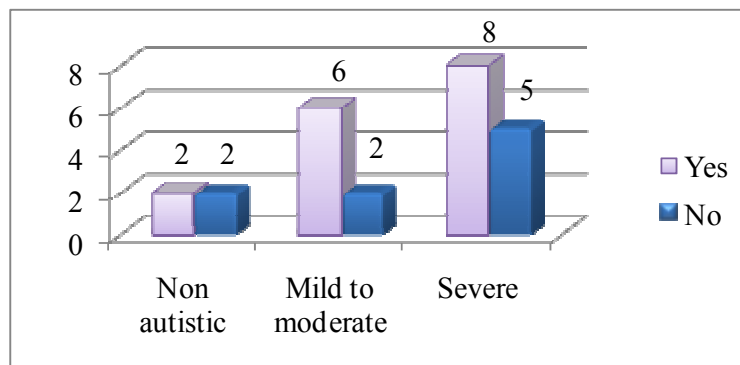


Figure 2. Object interests

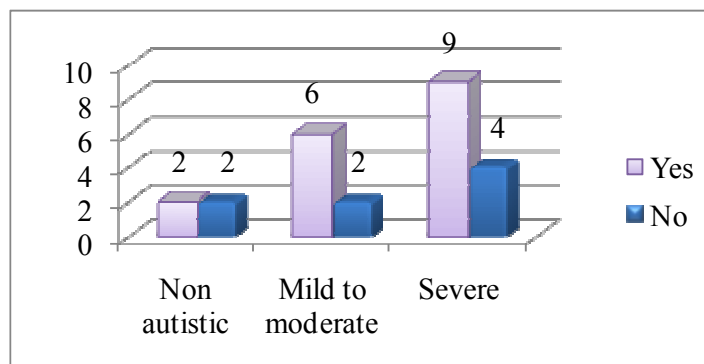


Figure 3. Food interests

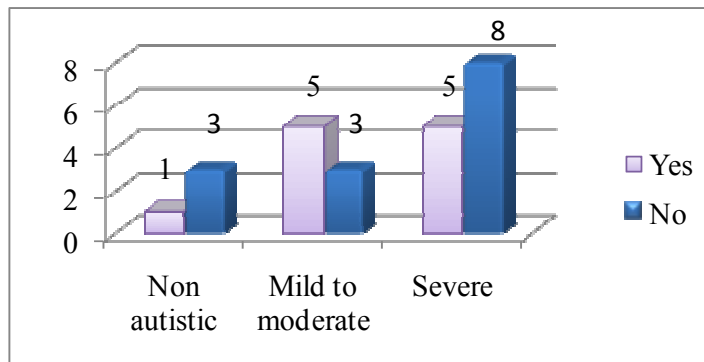


Figure 4. Music interests

Beside on the kind of object, we classified object interests into several groups. Two (8%) samples whose interests in computer game, play station or game watch were classified into electronic game. There were 7 (28.0%) samples whose interests in transportation toys, ball or bicycle were classified into moving objects. Five (20.0%) samples whose interests in book, pencil or color pencil were classified into stationary. Two (8.0%) samples whose interests in playing doll and kitchen set toys were classified into other. Nine (36.0%) samples who do not have specific interests were classified into not specific (Table 9). The classification of food interests faced difficulties since the large data variation. The sample interests in music then classified beside on the music genre (Table 10).



Table 9. Object interests

	Frequency	Percent (%)
Electronic game	2	8.0
Moving objects	7	28.0
Stationary	5	20.0
Other	2	8.0
Not Specific	9	36.0
Total	25	100.0

Table 10. Music interests

	Frequency	Percent (%)
Jazz	1	4.0
Pop	4	16.0
Jazz and pop	1	4.0
Religi	1	4.0
Music slow	2	8.0
Classic	1	4.0
Campursari and keroncong	1	4.0
Not specific	14	56.0
Total	25	100.0

## **BAB V**

### **DISCUSSION**

The CARS was chosen in Autism study in worldwide which is reliable instrument which possible to measure the degree of behavior abnormality.<sup>1</sup> The assessment of autism thorough CARS leads the classification into non autistic, mild to moderate autistic and severe autistic.<sup>3,13,26</sup> The author suggests the assessment of severe autistic should be enclosing count the number of behavior deviance items which score equal to or greater than 3. The diagnosis is appropriate when there are at least 5 items meet the criteria.<sup>27</sup>

The CARS is widely recognize in many country and has been translated into Japanese, Icelandic, Swedish, French, Portuguese and other language.<sup>11,13</sup> Since the study of autism arranged in Semarang, we should have to translate the CARS into Indonesian version for ease the parent interviews. Facing the great culture and language variation in Indonesia, translation and cultural adaptation of any scale need a linguistic care to meet the equivalence with the original version. It is also important in psychometric evaluation to determine the reliability in order to represent significant autism variability.<sup>29</sup>

The CARS reliability as describe in manual are test-retest reliability, interrater reliability and internal consistency. Test-retest reliability needs a series event to complete interview at two different points of time.<sup>11,29</sup> On the other hand, interrater reliability reported difficult to evaluate and compare.<sup>11</sup> Both reliabilities were not used in this study for thus reason.

Internal consistency represents the degree correlation between items and the scale construction. The most popular of this reliability measurement is Cronbach's alpha.<sup>29</sup> The alpha at 0.70 or higher indicates adequate scale. However, the alpha for good scale should be at least 0.80 or higher.<sup>30</sup> The CARS Indonesian version demonstrated Cronbach's coefficient alpha at 0.819 (95% CI 0.701 – 0.905). The reliability is dependent on the number of the items structured the scale.<sup>29</sup> Although, CARS Indonesian version had inter-item correlation mean at 0.244, the 15 items of CARS produced a high reliability.

The Cronbach's coefficient alpha of CARS original version done by Schopler was 0.94. The CARS-TV (Tokyo version), the Cronbach's coefficient alpha was 0.87.<sup>11,25</sup> The Icelandic version had Cronbach's coefficient alpha closest to the original version at 0.94.<sup>13</sup> The Swedish version had an alpha of 0.91. The closest coefficient alpha to our study was demonstrated by Brazilian Portuguese version of CARS (CARS-BR) which Cronbach's coefficient alpha was 0.82 (95% CI 0.71-0.88).<sup>11</sup>

Item taste, smell, touch response and use and activity level had no significant correlation to approach the close diagnosis ( $< 0.30$ ). Prizant (1989) also found the item of taste, smell, touch response and use was not being vital as other items.<sup>25</sup> There were no distinct explanation why activity level had no significant correlation. All of the patients showed normal to moderate activity level, no patients showed severe form even in severe autistic group. The cultural factor and education in school may be influence in. The cultural factor had a role in design the patterns of parents in caring their children. As thought universe,

family is the first step of someone character formation. The 23 of 27 patients were school age children who assumed already educated about appropriate attitude and social norm which obtained in the society.

Verbal communication showed mild to severe behavior deviance in all patients, no patients showed normal verbal communication in age level. It supports the term of autism which is neurobehavioral disorder characterized by impairment in verbal communication. However, item non verbal communication showed normal to moderate behavior deviance in all of patients. The sufficient verbal communication may help individual with autism to express their utterance. The individual autism can not always express the clear non verbal communication like normal children who may point or gesture specifically what they wants. Non verbal communication may appear subtle, for example eyes winking, finger flick or intently look to the roof. Usually, mother is the primary person who can understand the subtle expression.

The CARS possible to assess the severity of autism for the age above 2.<sup>1,31</sup> Diagnosis ASD in toddler (18 – 36 month) can be difficult because many toddlers with ASD usually do not yet display restricted, repetitive stereotyped behavior and interests domain, but we found about 2 child in our series diagnosed as Autistic disorders through DSM IV investigation.<sup>32</sup> However, only 1 child has CARS total score above 30 (CARS total score = 36), another has total CARS score 29.5. The first child (age = 28 month), even he is younger than the second child (age = 34 month), has interests domain compare with the second who does not display.

The adolescent (10 to 20 years old) group assessments meet the different challenge. Study by Mesibov, Schopler, Schaefer, and Michal (1989) showed a significant improvement in adolescent scores were found on the imitation, body use, object use, adaptation to change, listening response, sensory response and use (taste, smell, touch response and use), verbal communication, non verbal communication, and activity level scale. However, the only score with significant increase over time was the general impression scale. Thus was suggested to use a cutoff score of 27 when assessing the CARS to adolescents and adults to reach up the sensitivity.<sup>3</sup> In our study, there were 2 adolescents (12 year, total score = 25; 10.5 year, total score = 28.5) who classified into non autistic. When the procedure using the cutoff score of 27 was implicated in our study, there would be one adolescent who changed his classification into mild to moderate autistic.

Most of individual with autism have repetitive, stereotypic and lack of creativity. In their early development, they prefer to interests in hard items (e.g., ballpoint pens, flashlight, and keys).<sup>1,25</sup> Children with autism also tend to have persistent activity and hire peer play. Parents have to consider their children interests to increase their talent. In our study, there were samples whose have a talent in English subject, mathematic subject, drawing and singing. Autism children who prefer to pay interest in stationary object tend to have hobby in drawing or painting. However the autism children who have preference in electronic game tend to have higher understanding about computer software. One of our patients was able to play several advance level of game which children in the same age of level do not able. Other patient was able to memorize 400 songs

and had the MURI (*Museum Rekor Indonesia* – Indonesian Guinness Book) record for his capability in memorize a hundred songs. Because of that capability he could earn his own money from his own RBT (Ring Back Tone) which has been launched in several months ago in several cellular operators. From that information, it is suggestions to parents to encourage their children confidence and give them spiritual basic. Even they are autistic children, but they have something special rather than normal children. Parents also have to train their children self autonomous so they can adapt to their peers properly.

## **BAB VI**

### **CONCLUSION AND SUGGESTIONS**

#### **6.1 CONCLUSION**

This study show the sensitivity of CARS compare to DSM IV was 85.2%. The diagnosis results of CARS procedure were 4 (14.8%) samples were non autistic, 8 (29.6%) samples were mild to moderate autistic and 15 (55,6%) samples were severe autistic.

The internal consistency (Cronbach's coefficient alpha) of CARS which translated into Indonesian was good at 0.819 (95% CI 0.701 – 0.905) and inter – item correlation mean was 0.244.

There CARS also can be administered in children age 2 to 3 year. In our study, there was one of children in the age group of less than 3 years (3.7%) had mild to moderate autistic. The diagnosis autism adolescents thorough CARS in cutoff point of 30 also has good accuracy (12 of 14 adolescents, 85.7%). There were only 2 (14.3%) of 14 adolescents who categorized into non autistic.

This study also reported the preference of children with autism. There were 16 (64.0%) samples had specific object interest, 18 (72.0%) samples had specific food interests and 11 (44.0%) samples had specific music interests.

## **6.2 SUGGESTIONS**

1. Complete the reliability study (test-retest reliability and interrater reliability)
2. Perform continuous study for validating CARS Indonesian version.
3. Study the variance of every behavior deviance specifically.



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## APPENDICES

### 1. CHILDHOOD AUTISM RATING SCALE (INDONESIAN VERSION)

<b>CHILDHOOD AUTISM RATING SCALE (CARS)</b>		
<b>ID/Code lab number :</b>		
<b>I. Hubungan dengan orang lain</b>		
Skor		Skoring
1	Tidak terbukti adanya kesulitan atau abnormalitas dalam relasi dengan orang lain- Perilaku anak sesuai umurnya. Bisa diobservasi , beberapa pemalu, rewel atau mengganggu saat diberitahu apa yang harus dilakukan, tetapi tidak dalam tingkatan yang tidak sesuai standar.	
1,5	(jika berada diantara kedua point ini)	
2	Abnormalitas hubungan ringan – Anak mungkin menghindari menatap mata orang dewasa, atau menjadi rewel jika dipaksa berinteraksi, menjadi pemalu berlebihan , tidak responsif terhadap orang dewasa sesuai standar, atau mendekat orangtuanya kadang lebih daripada kebanyakan anak seusianya.	
2,5	(jika berada diantara kedua point ini)	
3	Abnormalitas hubungan sedang – Anak menyendiri pada saat tertentu (seperti tidak menyadari adanya orang dewasa). Diperlukan usaha yang kuat dan berulang-ulang untuk mendapatkan perhatian anak pada saat tertentu. Kontak minimal dimulai oleh anak.	
3,5	(jika berada diantara kedua point ini)	
4	Abnormalitas hubungan berat – Anak secara konsisten menyendiri atau tidak menyadari apa yang dilakukan oleh orang dewasa. Ia hampir tidak pernah berespon atau memulai kontak dengan orang dewasa. Hanya dengan usaha yang sangat persisten bisa mendapatkan perhatian dari anak.	
<b>II. Imitasi</b>		
1	Imitasi yang sesuai – Anak dapat meniru suara, kata-kata, dan gerak yang sesuai dengan tingkat ketrampilannya	
1,5	Jika berada di antara kedua poin ini	
2	Imitasi abnormal ringan – Anak menirukan perilaku sederhana seperti bertepuk tangan atau bersuara sepetah kata hampir sepanjang waktu, kadang-kadang menirukan hanya setelah didorong atau setelah tertunda.	
2,5	Jika berada di antara kedua poin ini	
3	Imitasi abnormal sedang – Anak menirukan hanya sewaktu-waktu dan membutuhkan usaha yang sangat kuat dan bantuan dari orang dewasa, seringkali meniru hanya setelah tertunda.	

3,5	Jika berada di antara kedua poin ini	
4	Imitasi abnormal berat – Anak jarang atau hampir tidak pernah menirukan suara, kata-kata, atau gerak bahkan dengan dorongan dan bantuan dari orang dewasa.	
<b>III. Respon Emosi</b>		
1	Respon Emosional yang sesuai situasi dan sesuai umur- Anak menunjukkan tipe dan tingkatan yang sesuai dengan respon emosional yang ditunjukkan dengan perubahan pada ekspresi wajah, postur dan sikap.	
1,5	Jika berada di antara kedua poin ini	
2	Respon emosional abnormal ringan – Anak kadang-kadang menampakkan tipe dan tingkatan reaksi emosional yang agak tidak sesuai dengan tipe dan tingkatannya. Reaksi kadang-kadang tidak berhubungan dengan obyek atau kejadian di sekelilingnya.	
2,5	Jika berada di antara kedua poin ini	
3	Respon emosional abnormal sedang – Anak menunjukkan tanda yang jelas dari tipe dan tingkatan respon emosional yang tidak sesuai . Reaksi bisa sedikit terhambat atau berlebihan dan tidak berkaitan dengan situasi, bisa menyeringai, tertawa, atau menjadi rigid (tidak dapat diubah-ubah) atau bahkan tidak menunjukkan emosi	
3,5	Jika berada di antara kedua poin ini	
4	Respon emosional abnormal berat – Respon jarang sesuai dengan situasi, sekali anak berada dalam suasana hati tertentu, maka akan sangat sulit untuk merubahnya. Sebaliknya emosi anak bisa menjadi sangat liar ketika situasi tidak berubah.	
<b>IV. Penggunaan Tubuh</b>		
1	Penggunaan tubuh sesuai umur – Anak bergerak dengan santai, lincah, dan terkoordinasi sesuai anak-anak seumurnya.	
1,5	Jika berada di antara kedua poin ini	
2	Penggunaan tubuh abnormal ringan – Beberapa keanehan bisa tampak, seperti kaku, gerakan repetitif, koordinasi yang buruk, atau gerakan yang tidak lazim lainnya , dengan frekuensi jarang.	
2,5	Jika berada di antara kedua poin ini	
3	Penggunaan tubuh abnormal sedang – Perilaku aneh yang nyata atau tidak lazim sesuai usianya termasuk gerakan jari jemari yang aneh, postur tubuh atau jari yang aneh, menusuk atau menatap tubuhnya, menyerang , mengayun-ayunkan, seperti memintal, jari bergoyang-goyang atau berjalan jinjit.	
3,5	Jika berada di antara kedua poin ini	
4	Penggunaan tubuh abnormal berat – gerak yang frekuen dan sangat dari tipe2 gerakan di atas merupakan tanda-tanda penggunaan tubuh abnormal yang berat. Perilaku ini bisa menetap meskipun sudah ada usaha untuk mengurangnya atau melibatkan anak dalam aktivitasnya.	

<b>V.Penggunaan Obyek</b>		
1	Penggunaan obyek-obyek yang menarik misalnya mainan- Anak menampakkan minat yang normal terhadap mainan dan obyek lain yang sesuai untuk tingkat ketrampilannya dan menggunakannya dengan cara yang tepat.	
1,5	Jika berada di antara kedua poin ini	
2	Ketidaksesuaian minat yang ringan terhadap mainan dan obyek lainnya.- Anak bisa menunjukkan minat yang berbeda terhadap mainan atau bermain dengan cara yang tidak seperti anak-anak (misalnya membanting menghisap mainan)	
2,5	Jika berada di antara kedua poin ini	
3	Ketidaksesuaian minat yang sedang terhadap mainan dan obyek lainnya.- Anak bisa menunjukkan sedikit minat terhadap mainan atau obyek lainnya, atau mungkin asyik menggunakan obyek atau mainannya dengan cara yang aneh. Ia memusatkan pada beberapa bagian yang tidak bermakna dari sebuah mainan atau terpesona dengan cahaya yang keluar dari obyek, menggerak-gerakkan terus menerus salah satu bagian dari obyek atau bermain hanya dengan satu obyek saja.	
3,5	Jika berada di antara kedua poin ini	
4	Ketidaksesuaian minat yang berat terhadap mainan dan obyek lainnya.- Anak bisa terikat pada perilaku seperti di atas, dengan frekuensi yang lebih sering dan intensitas lebih besar. Anak sulit untuk dialihkan ketika tertarik pada aktivitas yang tidak sesuai ini.	
<b>VI.Adaptasi terhadap Perubahan</b>		
1	Respon terhadap perubahan sesuai umur – ketika anak diperhatikan atau dikomentari pada perubahan rutin , ia akan menerima perubahan ini tanpa stress yang tidak semestinya.	
1,5	Jika berada di antara kedua poin ini	
2	Adaptasi terhadap perubahan abnormal ringan – Ketika orang dewasa mencoba mengubah tugas/pekerjaan anak, anak akan melanjutkan aktivitas yang sama atau menggunakan material yang sama.	
2,5	Jika berada di antara kedua poin ini	
3	Adaptasi terhadap perubahan abnormal sedang – Anak secara aktif melawan perubahan terhadap yang rutin, berusaha melanjutkan aktivitas lamanya dan sulit untuk dialihkan. Ia akan menjadi marah dan tidak gembira ketika aktivitas rutin yang telah biasa dilakukan terganggu.	
3,5	Jika berada di antara kedua poin ini	
4	Adaptasi terhadap perubahan abnormal berat – Anak menunjukkan reaksi hebat terhadap suatu perubahan. Jika perubahan dipaksakan, ia akan amat sangat marah atau tidak kooperatif dan berespon dengan tantrum/kemarahan.	
<b>VII. Respon Visual</b>		
1	Respon visual yang sesuai umur – Perilaku visual anak normal	

	dan sesuai usianya. Penglihatan digunakan bersama dengan indra lain untuk mengeksplorasi obyek baru.	
1,5	Jika berada di antara kedua poin ini	
2	Respon visual abnormal ringan – Anak kadang-kadang diingatkan untuk melihat pada obyek. Anak mungkin lebih tertarik melihat cermin atau cahaya daripada teman sebayanya, kadang-kadang tatapannya kosong atau menghindari bertatapan dengan orang lain.	
2,5	Jika berada di antara kedua poin ini	
3	Respon visual abnormal sedang – Anak kadang-kadang diingatkan untuk melihat pada obyek. Anak mungkin lebih tertarik melihat cermin atau cahaya daripada teman sebayanya, kadang-kadang tatapannya kosong atau menghindari bertatapan dengan orang lain.	
3,5	Jika berada di antara kedua poin ini	
4	Respon visual abnormal berat – Anak secara konsisten menghindari menatap mata seseorang atau suatu obyek tertentu dan bisa menunjukkan bentuk yang amat sangat aneh seperti yang telah didiskripsikan di atas.	
<b>VIII. Respon pendengaran</b>		
1	Respon pendengaran sesuai usia – Perilaku mendengar normal dan sesuai usianya. Pendengaran digunakan bersama-sama dengan indra lainnya.	
1,5	Jika berada di antara kedua poin ini	
2	Respon pendengaran abnormal ringan – Mungkin terdapat respon pendengaran yang kurang atau sedikit reaksi berlebihan terhadap suara tertentu. Respon terhadap suara mungkin terlambat dan perlu pengulangan suara untuk mendapatkan perhatian anak. Anak bisa dialihkan dengan suara yang tidak berkaitan(asing).	
2,5	Jika berada di antara kedua poin ini	
3	Respon pendengaran abnormal sedang – Respon terhadap suara bervariasi, kadang tidak memperdulikan suara pada saat pertama kali dibuat, mungkin terkejut atau menutup telinga ketika mendengar beberapa suara yang sehari-hari ada.	
3,5	Jika berada di antara kedua poin ini	
4	Respon Pendengaran abnormal berat – anak bereaksi berlebihan atau tidak bereaksi terhadap suara dengan tingkatan yang amat berat, tidak peduli jenis suaranya.	
<b>IX. Penggunaan dan respon Sentuhan, Bau dan Rasa</b>		
1	Penggunaan dan respon sentuhan, pembauan ,rasa, dan sentuhan- Anak mengeksplorasi obyek baru sesuai dengan cara yang sesuai usianya, secara umum dengan merasakan dan melihat. Merasakan dan membaui digunakan sesuai. Ketika bereaksi terhadap nyeri yang ringan , anak menunjukkan reaksi	



	tidak nyaman tetapi tidak bereaksi berlebihan.	
1,5	Jika berada di antara kedua poin ini	
2	Penggunaan dan respon perabaan, pembauan, rasa dan sentuhan yang abnormal ringan- Anak bisa terus menerus meletakkan suatu obyek di mulutnya, mungkin mencium atau merasakan benda benda yang tidak bisa dimakan, bisa tidak bereaksi atau bereaksi berlebihan tetapi terhadap neri yang ringan dimana anak normal tidak akan memperlihatkan rasa ketidaknyamanan.	
2,5	Jika berada di antara kedua poin ini	
3	Penggunaan dan respon perabaan, pembauan, rasa dan sentuhan yang abnormal sedang – Anak bisa cukup asyik dengan menyentuh, mencium atau merasakan suatu obyek atau orang . Anak bisa juga bereaksi berlebihan atau terlalu sedikit.	
3,5	Jika berada di antara kedua poin ini	
4	Penggunaan dan respon perabaan, pembauan, rasa dan sentuhan yang abnormal berat – Anak asyik mencium, merasakan obyek lebih dari sensasi eksplorasi normal . Anak bisa sama sekali tidak merasakan nyeri atau bereaksi sangat kuat untuk rasa tidak nyaman yang ringan.	
<b>X. Ketakutan dan Kecemasan</b>		
1	Ketakutan dan kecemasan yang normal – Perilaku anak sesuai baik dengan situasi maupun usianya.	
1,5	Jika berada di antara kedua poin ini	
2	Ketakutan atau kecemasan abnormal ringan – Anak kadang menunjukkan terlalu sedikit atau terlalu banyak ketakutan atau kecemasan dibandingkan anak normal pada usia yang sama pada situasi yang sama.	
2,5	Jika berada di antara kedua poin ini	
3	Ketakutan atau kecemasan abnormal sedang – Anak menunjukkan ketakutan atau kecemasan yang lebih besar atau lebih kecil dibandingkan anak anak yang bahkan lebih muda usianya, pada situasi yang sama.	
3,5	Jika berada di antara kedua poin ini	
4	Ketakutan atau kecemasan abnormal berat – Ketakutan terus menerus bahkan setelah mendapatkan pengalaman berulang kali dengan kejadian atau obyek yang tidak membahayakan. Amat sangat sulit untuk menenangkan atau membuat nyaman anak. Sebaliknya, anak mungkin gagal menunjukkan pengamatan untuk suatu bahaya atau risiko yang dihindari anak-anak lain seusianya.	
<b>XI. Komunikasi Verbal</b>		
1	Komunikasi verbal normal, sesuai usia dan situasinya.	
1,5	Jika berada di antara kedua poin ini	
2	Komunikasi verbal abnormal ringan – Bicaranya secara umum mengalami keterlambatan. Kebanyakan bicaranya bermakna,	

	namun demikian beberapa ekolalia atau kata ganti yang terbalik bisa muncul. Beberapa kata yang aneh atau jargon kadang-kadang digunakan.	
2,5	Jika berada di antara kedua poin ini	
3	Komunikasi verbal abnormal sedang - Bisa tidak bicara. Ketika bisa, komunikasi verbal bisa bercampur dengan beberapa kata yang bermakna atau beberapa kata yang aneh seperti jargon, ekolalia atau kata ganti yang terbalik. Keanehan dalam bicara yang bermakna termasuk diantaranya pertanyaan yang berlebihan atau asyik dengan topik tertentu.	
3,5	Jika berada di antara kedua poin ini	
4	Komunikasi non verbal berat – kata-kata yang bermakna tidak digunakan. Anak bisa menjerit-jerit seperti bayi, kata-kata yang aneh atau seperti suara binatang, suara berisik/gaduh seperti bicara, atau bisa menunjukkan penggunaan aneh dari beberapa kata atau frase yang dikenal secara terus menerus.	
<b>XII. Komunikasi Non Verbal</b>		
1	Penggunaan Komunikasi non verbal secara normal, sesuai usia dan situasinya.	
1,5	Jika berada di antara kedua poin ini	
2	Penggunaan komunikasi non verbal secara abnormal ringan – bisa hanya menunjuk samar-samar atau mencapai yang dia inginkan, sedangkan pada situasi pada usia yang sama anak bisa menunjuk atau dengan gerakan isyarat lebih spesifik untuk menunjukkan sesuatu yang diinginkan.	
2,5	Jika berada di antara kedua poin ini	
3	Penggunaan komunikasi non verbal secara abnormal sedang – Secara umum anak tidak bisa untuk mengekspresikan keinginan atau kebutuhannya secara non verbal, dan tidak dapat mengerti komunikasi non verbal dari orang lain.	
3,5	Jika berada di antara kedua poin ini	
4	Penggunaan komunikasi non verbal secara abnormal berat – Anak hanya menggunakan kata-kata yang aneh atau gerakan isyarat yang aneh yang tidak jelas artinya, dan menunjukkan tidak menyadari arti sesuatu yang berhubungan dengan gerakan isyarat atau ekspresi fasial dari orang lain.	
<b>XIII. Tingkatan Aktivitas</b>		
1	Tingkatan aktivitas normal sesuai usia dan keadaan – Anak tidak lebih aktif atau kurang aktif dibandingkan anak-anak seusianya pada situasi yang serupa.	
1,5	Jika berada di antara kedua poin ini	
2	Tingkatan aktivitas abnormal ringan – Anak bisa menjadi agak tidak tenang atau beberapa tampak “malas” dan bergerak lambat pada saat tertentu. Tingkat aktivitas anak bertentangan sedikit dengan tindakannya.	
2,5	Jika berada di antara kedua poin ini	
3	Tingkat aktivitas abnormal sedang – Anak bisa sangat aktif dan	

	sulit dikendalikan. Ia bisa memiliki energi yang tak terhingga dan bisa tidak tidur semalaman. Sebaliknya, anak bisa benar-benar letargi dan memerlukan tindakan besar untuk mendorongnya keluar.	
3,5	Jika berada di antara kedua poin ini	
4	Tingkatan aktivitas abnormal berat – Anak menunjukkan aktivitas atau inaktivitas yang ekstrem dan bahkan penyimpangan yang ekstrem terhadap lainnya.	
<b>XIV. Tingkatan dan konsistensi dari Respon Intelektual</b>		
1	Kecerdasan normal dan secara masuk akal konsisten dalam area yang bervariasi - Intelegensi anak sama dengan anak lain seusianya dan tidak memiliki kemampuan intelektual yang tidak biasa atau bermasalah.	
1,5	Jika berada di antara kedua poin ini	
2	Fungsi intelektual abnormal ringan – Anak tidak secerdas anak-anak pada usia yang sama, kemampuan tampak agak terlambat di segala bidang.	
2,5	Jika berada di antara kedua poin ini	
3	Fungsi intelektual abnormal sedang – Secara umum, anak-anak tidak secerdas anak seusianya, namun demikian fungsinya mendekati normal pada salah satu bidang atau lebih.	
3,5	Jika berada di antara kedua poin ini	
4	Fungsi intelektual abnormal berat – Walaupun anak tidak tampak secerdas anak seusianya, ia bisa lebih baik dari anak-anak normal seusianya dalam salah satu bidang atau lebih.	
<b>XV. Kesan Umum</b>		
1	Bukan Autistik- anak menunjukkan tidak adanya karakteristik gejala dari Autism.	
1,5	Jika berada di antara kedua poin ini	
2	Autism Ringan – Anak menunjukkan hanya sedikit gejala atau tingkatan ringan dari Autism.	
2,5	Jika berada di antara kedua poin ini	
3	Autism Sedang – Anak menunjukkan beberapa gejala atau tingkatan sedang dari Autism.	
3,5	Jika berada di antara kedua poin ini	
4	Autism Berat – Anak menunjukkan banyak gejala atau tingkatan yang ekstrem dari Autism.	
<b>SKORING TOTAL</b>		
<b>15-30</b>	<b>Non-autistic</b>	
<b>30-37</b>	<b>Autistik ringan sedang</b>	
<b>37-60</b>	<b>Autistik Berat</b>	

**2. DIAGNOSTIC AND STATISTICAL MANUAL OF MENTAL DISORDERS FOR AUTISTIC DISORDER IV (INDONESIAN VERSION)**

**KRITERIA DIAGNOSTIK UNTUK AUTISTIC DISORDER  
SESUAI DSM IV**

**Nama :**  
**Tanggal lahir :**  
**Alamat/telp :**  
**Tanggal pemeriksaan :                      Pemeriksa :                      Tanda Tangan:**

<b>A. Paling sedikit 6 item dari total, dengan paling sedikit 2 dari item (1) dan satu dari masing-masing item (2) dan (3)</b>		
<b>JENIS GANGGUAN PERILAKU</b>	<b>√</b>	<b>JUMLAH</b>
<b>(1). Gangguan kualitatif dalam interaksi sosial (paling sedikit 2)</b>		
Gangguan nyata dalam penggunaan beberapa perilaku non verbal seperti kontak /tatapan mata ke mata , ekspresi wajah, dan isyarat dalam mengatur interaksi sosial		
Gagal dalam mengembangkan hubungan dengan kelompoknya sesuai tingkat perkembangannya		
Kurangnya usaha secara spontan untuk berbagi suatu kesenangan, minat, atau keberhasilan dengan orang lain (misalnya, kurangnya menunjukkan, membawa atau menunjuk obyek yang menarik)		
Kurangnya tindakan sosial atau emosional secara timbal balik		
<b>(2). Gangguan kualitatif dalam komunikasi (paling sedikit 1)</b>		
Terlambat atau tidak adanya perkembangan dari bicara dan bahasa ( tidak diiringi dengan usaha kompensasi melalui cara alternatif dalam		

berkomunikasi seperti isyarat atau mimik )		
Pada individu dengan bicara yang adekuat, terdapat gangguan nyata dalam kemampuan untuk mencapai suatu percakapan dengan orang lain		
Stereotipik dan repetitif dalam berbahasa atau berbahasa aneh (idiosyncratic)		
Berkurangnya variasi dalam bermain yang dibuat secara spontan, bermain sosial imitatif (meniru) yang sesuai dengan tingkat perkembangannya		
<b>(3). Pola perilaku stereotipik dan repetitif, minat dan aktivitas yg terbatas (paling sedikit 1)</b>		
Keasyikan yang mengandung satu atau lebih pola yang terbatas dan stereotipik dari suatu minat yang abnormal baik dalam intensitas atau fokusnya		
Secara nyata terdapat ketaatan yang tidak dapat diubah terhadap suatu ritual atau kegiatan rutin yang tidak ada gunanya		
Mannerism ( keanehan dalam tingkah laku) motorik yang stereotipik dan repetitif		
Keasyikan yang menetap dengan bagian suatu obyek		
<b>B. Terdapat keterlambatan atau fungsi yang abnormal pada paling sedikit dari 1 dari 3 hal berikut ini : (1).interaksi sosial,(2) bahasa yang digunakan dalam komunikasi sosial atau (3) simbolik atau permainan imajinatif</b>		

### 3. INFORMED CONSENT

AUT 003

#### INFORMED CONSENT

Yang bertanda tangan dibawah ini:

Nama :  
Orang tua dari :  
Alamat/Telpon :



Menyatakan kesediaan untuk dilakukan wawancara, pemeriksaan fisik, pengambilan gambar (apabila diperlukan), pengambilan darah terhadap anak saya tersebut diatas untuk diteliti **kemungkinan penyebab faktor genetik penyebab autis** tanpa dipungut biaya.

Demikian pernyataan ini saya tanda tangani dengan kesadaran penuh dan tanpa paksaan dari pihak manapun.

Semarang, 13 NOV 2008



#### Kesukaan anak

Mainan : GAME WATCH / KOMPUTER  
Makanan : SEMUA MAKANAN  
Jenis musik : KLASIK

#### 4. CRONBACH'S COEFFICIENT ALPHA

##### 1. Case Processing Summary

		N	%
Cases	Valid	27	100.0
	Excluded(a)	0	.0
	Total	27	100.0

a Listwise deletion based on all variables in the procedure.

##### 2. Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.819	.829	15

##### 3. Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Inter-Item Correlations	.244	-.285	.669	.954	-2.346	.037	15

##### 4. Intraclass Correlation Coefficient

	Intraclass Correlation(a)	95% Confidence Interval		F Test with True Value 0							
		Lower Bound	Upper Bound	Value	df1	df2	Sig	Lower Bound			
Single Measures	.231(b)	.135						5.517	26.0	364	.000
Average Measures	.819(c)	.701	.905	.388	5.517	26.0	364	.000			

Two-way mixed effects model where people effects are random and measures effects are fixed.

- a Type C intraclass correlation coefficients using a consistency definition- the between-measure variance is excluded from the denominator variance.
- b The estimator is the same, whether the interaction effect is present or not.
- c This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise.

**5. Item-Total Statistics**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Relating to People	34.315	33.868	.538	.689	.800
Imitation	34.481	33.625	.592	.737	.796
Emotional Response	34.537	35.768	.486	.675	.805
Body Use	34.352	36.343	.489	.645	.805
Object Use	34.444	36.237	.383	.479	.812
Adaptation to Change	34.704	34.524	.516	.865	.802
Visual Response	34.667	33.865	.544	.503	.800
Listening Response	34.611	36.699	.380	.658	.812
Taste, Smell, Touch Response and Use	34.778	38.968	.106	.417	.832
Fear or Nervousness	34.611	36.276	.427	.686	.809
Verbal Communication	34.000	37.135	.392	.615	.811
Nonverbal Communication	34.815	36.811	.553	.674	.804
Activity Level	34.463	39.537	.132	.375	.824
Level and Consistency of Intellectual Response	34.722	36.641	.380	.639	.812
General Impressions	34.241	35.988	.811	.807	.795

**6. Reliability statistic without item Taste, Smell, Touch Response and Use and Activity level**

Cronbach's Alpha	N of Items
.841	13



