



Validity of the Modified Checklist for Autism in Toddlers (M-CHAT): Preliminary Study in Eastern Province of Saudi Arabia

Mahmoud M. Rashad^{1,2*}, Ghada Abd Razek^{2,3}, Ghada Reffat^{2,3}

¹Department of Psychology, South Valley University, Qiena, Egypt

²Al-Amal Complex for Mental Health, Dammam, Saudi Arabia

³Institute of Psychiatry, Ain Shams University World Health Organization Collaborative Centre for Training and Research, Abbasia, Cairo, Egypt

Email: mmrashad@hotmail.com, ahmedsaed20042010@yahoo.com, ghadarefaat@gmail.com

Received 27 November 2015; accepted 11 December 2015; published 17 December 2015

Copyright © 2015 by authors and OALib.

This work is licensed under the Creative Commons Attribution International License (CC BY).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

Objective: To examine the concurrent and criterion validity of The Modified Checklist for Autism in Toddlers (M-CHAT) in Eastern Province, Saudi Arabia. **Methods:** Two groups, comprising 35 Autistic children previously diagnosed with autism, 113 children without Autistic Disorders. They were selected from different clinical settings: Primary care Clinic, Shumua Al Amal Private Day Care Central for Mental Disable-Dammam and the child psychiatric Clinic of AL Amal Complex for Mental Health-Dammam. To determine the Concurrent validation, ANOVA and discriminate analysis were used to compare the significant different between samples, Control group (normal) and the experimental group (autistic). The Correlation Matrix was used to establish the internal consistence of the (M-CHAT) items and to examine the criterion validity. **Results:** The mean total score was significantly higher in the group of autistic children than in the other group. In the items of swing, interesting, climbing, playing peek-doo, pretending, Asking, using fingers, Playing with toys, Bringing objects, Over sensitive auditory, Reactive response, Response, Imitation, Pointing, looking, Attention, Deaf, Understanding, Staring & wandering, and Reaction checking. The Reliability Coefficients of items by Alpha = 0.8123 indicates high sensitivity and specificity of M-CHAT, while the content Validity (internal consistence) shows 162 correlation coefficient between the items indicating high validity of M-CHAT. **Conclusions:** The Modified Checklist for Autism in Toddlers (M-CHAT) shows promise as an instrument for identifying children with autistic disorders, in primary care clinic for early detection.

Keywords

Autistic Disorder, The Modified Checklist for Autism in Toddlers (M-CHAT), Diagnosis, Differential, Validation Studies

*Corresponding author.

How to cite this paper: Rashad, M.M., Razek, G.A. and Reffat, G. (2015) Validity of the Modified Checklist for Autism in Toddlers (M-CHAT): Preliminary Study in Eastern Province of Saudi Arabia. *Open Access Library Journal*, 2: e1951.

<http://dx.doi.org/10.4236/oalib.1101951>

Subject Areas: Neurology, Psychiatry & Psychology, Public Health

1. Introduction

Autism is a developmental disorder characterized by impairment in social Interaction, communication, and the presence of stereotyped behavior and Restricted interests. Autism is one of the four major developmental disabilities. It occurs in 5 per 10,000 (Low functioning) and approximately 18 per 10,000 [1].

Autistic disorder occurs at a rate of 2 to 5 cases per 10,000 children (0.02 to 0.05 percent) under age 12. If severe mental retardation with some autistic features is included, the rate can rise as high as 20 per 10,000. In most cases, autism begins before the age of 36 months. Parents, depending on their awareness and the severity of the disorder, however, may not notice any symptoms.

Autistic disorder is found more frequently in boys than in girls: Three to five times more boys than girls have the disorder. However, autistic girls tend to be more seriously affected and more likely to have family histories of cognitive impairment than do boys [2].

It is difficult to detect in very young children who have pervasive developmental disorders (PDD). This may be due to several factors: presentation of symptoms varies from one to another; the overlapping between different symptoms, language and social deficits and delays may not be identified until the child is given the opportunity for peer interaction in preschool; low incidence leads to a low index of suspicion; and motor milestones are usually unaffected. There is no standard and easily administered screening instrument for young children to identify autism before the age of four. Furthermore, there is a limited opportunity to predicted autistic in primary care clinic due to a large number of patients and the poor clinical experience of GP physicians in the field of child psychiatry.

The detection of autism and other general developmental disorders in very young children is quite difficult since delayed development may not be identified until the child is given the opportunity to interact in social environments other than the family setting. In addition, at the most severe levels, the differential diagnosis between autism and mental retardation is more difficult, especially among children of preschool age [3].

Many children do not receive diagnoses until much later. Several studies have suggested that diagnoses of autism made at age two years are stable through age three years and diagnoses made by age five years are stable up to late adolescence [4].

Early diagnosis is very important since the sooner the recommended orientation of procedures is carried out, the more likely it is that such children will develop social and communicative skills, and the less stereotyped their behavior will be [5].

Although there are several tools available in the western countries there are no available instruments that have been validated in the Arabic countries to evaluate autistic symptoms, none has yet been found to be appropriate to detect signs of autism of the young children, also it is not require setting up structured interactions, which is not possible in the primary care clinic. Furthermore it is easy to administer and score and that will alert physicians to the need for further evaluation in children with the early signs of autism, we agree that it is most important to examine child in the early phases and detected the Autistic child in that phases Therefore, to further research and clinical treatment, it is necessary that protocols for the evaluation of these groups of children be systematized in KSA.

The authors revised a lot of screening tools for autistic and they decided to use the Modified Checklist for Autism in Toddlers (M-CHAT) as an appropriate tool for many reason, for Example The M-CHAT consists of a list of atypical behaviors characteristic of the pathology and is designed for the triage of children suspected of having this disorder, contributing to the differential diagnosis and the referral of such children to early intervention. Due to its easy application and low cost, it has been used by health professionals in various countries, in research and in clinical practice. Some studies have used the questionnaire in interviews with the parents of such children.

The M-CHAT is a simple screen that can be given to all children during regular visits of vaccination. It does not rely on the physician's observation of the child, but on parents' report of current skills and behaviors. So it is an appropriate tool of autistic screening of the age from 18 months up to 36 months. That is the advantage of being perhaps the earliest reasonable age for large scale autism screening and providing the earliest opportunity

for intervention, as a conclusion of Empirical studies of toddlers with autism spectrum disorders (ASDs) have Found that intensive, specialized early intervention has resulted in quantifiable gains [6]-[10].

In order to maximize the opportunity for specialized early intervention, the early identification and diagnosis of Autism spectrum disorders are especially important. Recently, one research suggested that it is important for children suspected of Autistic to begin intervention services [11].

2. Method

2.1. Aims

The aim of this study is to assess the sensitivity and specificities of *the Modified Checklist for Autism in Toddlers (M-CHAT) In* Eastern Province in Saudi Arabia.

It must be taken in consideration that the field of study is considered a recent one in Arabic countries, due to lack of practical and theoretical background of diagnostic and management in Developmental Disorder, Especially in Autism among the General Physician and other mental health professionals.

2.2. Participants

The participants included 148 children selected from different setting, the first group was selected from the primary care clinic, the control group (normal) included 113 children, and sixty-two of the participants were boys (54.86%). they ranged in chronological age from 18 to 72 months and fifty-one were Girls (45.13%) they ranged in chronological age from 18 to 60 months. Twenty-one Children were excluded the sample due to their parents were not completed all items of M-CHAT, or answered yes and no of one items at the same times. Only 4 children were show significant score of M-CHAT and evaluate them thought out the structure interview and clinical setting, which mean that the percentage of autism spectrum disorder from the primary care clinic were 3.42%

In the second group 35 children diagnosed with autism spectrum disorder were selected from the Child Psychiatric clinic at Al Amal Complex for Mental Heath-Dammam, Saudi Arabia and the Shmuuaa Al Amal Private Day Care Central For Mental-DAMMAM , all autistic children had no physical disorders, and no co-morbidity with any other psychological disorder, Twenty-seven of the participants were boys (77.14%) they ranged in chronological age from 28 to 87 months and eight were Girls (22.85%) they ranged in chronological age from 28 to 87 months

Relevant demographic information is described below in **Table 1**.

Regarding the differences between the normal and autistic group there is no significant different in the variable of chronological age (**Table 2**).

2.3. Materials

Due to the high Validation of the Modified Checklist for Autism in Toddlers (M-CHAT; Robins *et al.*, 2001) in different countries and different language for identifies the early signs of autism at 18 months by assessing the child's attainment of developmental milestones [12].

Table 1. Demographics data of the sample.

Sex	Diagnosis		Total
	Autistic	Normal	
Boys	27	62	89
Girls	8	51	59
	35	113	148

Table 2. The comparative data between autistic and normal of the age.

Diagnosis	N	M	Std. Deviation	Std. Error	95% Confidence Interval for Mean	F	Sig
normal	113	37.6	15.55	1.46	3.01		
Autistic	35	56.3	15.46	2.61	2.99	0.804	0.37

DF = 146.

We decided to use it as an important screening tool of Autism in Toddlers.

The primary goal of the M-CHAT was to identify children at risk for any ASD, not just autism. The M-CHAT retained the 9 parent-report items from the CHAT and added 14 additional items, based on a survey of the literature and clinical judgment. The observation section was eliminated, in part due to feasibility issues in the US health care system. The removal of the observation items was also supported by the literature suggesting that parent-report is more accurate than a brief observation by a professional, particularly in a setting where a child may be anxious or behave in an atypical manner, such as the pediatrician's office [13].

2.4. Procedure

All of the children participating in the intervention were attending in the primary health care during the vaccination periods for three months. After administration of the M-CHAT, children were categorized into two groups due to the result of the M-CHAT, (positive/negative) or Autistic/Normal.

The Modified Checklist for Autism in Toddlers (M-CHAT; Robins *et al.* 2001) is a 23-item yes/no parent report screener for ASD. Screening positive "failing" on the screener is defined as failing any three items, or any two of six critical items (items 2, 7, 9, 13, 14, 15). The M-CHAT [14].

A total of 23-item yes/no parent report checklist (see original screening)

Failed items are reviewed in a follow-up interview; if the child still fails the screening, he was referred to the child clinic in Complex For Mental Health for confirming the Autistic diagnosis, by Clinical Team, whose were applied a various of Diagnostic instruments such as objective Clinical Observation, Psychiatric Examination, the Childhood Autism Rating Scale (CARS) and the Autistic Rating scale.

2.5. Statistical Analysis

Statistical analysis was done using SPSS version 16. Data were collected of Sample and analysis for the Characteristic of Autistic and non Autistic sample. (Descriptive Statistic). In addition to use the T-test and ANOVA for comparison between the Control and experimental group in the different items of M-CHAT, and using the Correlations coefficient between items with their significance levels for internal consistent.

3. Results

3.1. Reliability

Reliability analysis was determined using Cronbach's alpha for the 23-item checklist as well as for the total sample of children = 148 (The control sample and the autistic spectrum disorders) Internal reliability was found to be adequate for both the entire checklist and for the critical items ($A = 0.812$).

3.2. Validity

In our study, we tried to reduce the age bracket of the children in order to minimize the Variability in the behavioral manifestation.

3.3. Concurrent Validity

After it had been confirmed that the data followed a normal distribution, the mean and Standard Deviation of the total score were calculated for each group of participants. The percentage of children correctly identified by discriminate analysis was also calculated for each group.

Table 3 presents the means and SDs found for the total scores of the as well as the discriminate Analysis of Variance (One-way analysis of variance) indicated that there was a significant difference between Autistic group and Normal group based on all items and the total score of three summary scores M-CHAT, to show the differences of each group of children.

3.4. Sensitivity, Specificity

The Calculation of sensitivity and specificity were showed in our Sample when we compared between the Autistic children and the normal children, were statistical significant in the majority of items, especially the **6-Critical item score**, No (2, 7, 9, 13, 14, 15) $P < 0.000$. The results that the autistic children Fall on that critical

Table 3. The ANOVA between autistic and normal group.

	Diagnosis	Mean	S.D	Std. Err Mean	Mean Square	F	Sig
Swing	Normal	9.735E-02	0.2977	2.80E-02	0.460	4.073	0.043
	Autistic	0.2286	0.4260	7.20E-02	0.110		
Interest	Normal	1.770E-02	0.1324	1.24E-02	11.925	83.1	0.000
	Autistic	0.6857	0.4710	7.96E-02	6.512E-02		
Climbing	Normal	6.195E-02	0.2421	6.86E-02	8.333E-02	6.112	0.015
	Autistic	0.2000	0.4058	6.86E-02	8.333E-02		
Playing peek-doo	Normal	6.195E-02	0.2421	2.27E-02	3.592	34.643	0.000
	Autistic	0.4256	0.5021	8.48E-02	0.104		
Pretending	Normal	0.115	0.3205	3.01E-02	5.566	40.479	0.000
	Autistic	0.5714	0.5021	8.48E-02	0.138		
Asking	Normal	6.195E-02	0.2421	2.27E-02	4.799	75.766	0.000
	Autistic	0.4857	0.5071	8.57E-02	0.105		
Using finger	Normal	0.115	0.3205	3.01E-02	4.259	30.714	0.000
	Autistic	0.5143	0.5071	8.57E-02	0.139		
Playing with toys	Normal	3.540E-02	0.1856	1.74E-02	3.017	36.621	0.000
	Autistic	0.3714	0.4902	8.28E-02	8.24E-02		
Bringing objects	Normal	7.080E-02	0.2576	2.42E-02	10.105	98.506	0.000
	Autistic	0.6857	0.4710	7.96E-02	0.103		
Eyes contact	Normal	0.2743	0.4482	4.21E-02	5.597E-02	.285	0.594
	Autistic	0.2286	0.4260	7.20E-02	0.196		
Over sensitive auditory	Normal	0.7080	0.4567	4.29E-02	1.320	6.003	0.015
	Autistic	0.4857	0.5071	8.57E-02	0.220		
Reactive response	Normal	8.850E-03	9.41-02	8.85E-03	0.976	21.629	0.000
	Autistic	0.2000	0.4058	6.86E-02	4.514E-02		
Imitation	Normal	0.1593	0.3676	3.45E-02	5.885	36.869	0.000
	Autistic	0.6286	0.4902	8.28E-02	0.160		
Response	Normal	1.770E-02	0.1324	1.24E-02	1.920	30.772	0.000
	Autistic	.2857	0.4583	7.74E-02	6.238E-02		
Pointing	Normal	2.655E-02	0.1615	1.51E-02	7.124	89.613	0.000
	Autistic	.5429	0.5054	8.54E-02	7.949E-02		
Walking	Normal	1.770E-02	0.1324	1.24E-03	8.371E-03	0.622	0.432
	Autistic	0.000	0.000	0.000	1.346E-02		
Looking	Normal	0.1681	0.3757	3.53E-02	7.159	44.764	0.000
	Autistic	0.6857	0.4710	7.96E-02	0.160		
Unusual movements	Normal	0.8319	0.3757	3.53E-02	0.369	2.350	0.127
	Autistic	0.7143	0.4583	7.74E-02	0.369		

Continued

Attention	Normal	0.115	0.3205	3.01E-02	11.513	95.098	0.000
	Autistic	0.7714	0.4260	7.20E-02	0.121		
Deaf	Normal	0.6549	0.4775	4.49E-02	2.147	9.298	0.003
	Autistic	0.3714	0.4902	8.28E-02	0.321		
Understanding	Normal	0.2124	0.4108	3.86E-02	5.987	33.053	0.000
	Autistic	0.6857	0.4710	7.96E-02	0.181		
Staring & wandering	Normal	0.6460	0.4803	4.51E-02	4.041	18.139	0.000
	Autistic	0.2571	0.4434	7.49E-02	0.223		
Reaction checking	Normal	7.965E-02	0.2720	2.55E-02	3.253	28.183	0.000
	Autistic	0.4286	0.5021	8.48E-02	0.115		
Total	Normal	4.557	2.821	0.2655	4.041	7.910	0.006
	Autistic	10.457	3.845	0.6499	0.223		

DF = 147 - 1 = 146.

items at cutoff point, we observed that the instrument presented 1 sensitivity = (57.01%) and high specificity (87.08%) in identifying children with autistic disorder in the Population. At cutoff point 48/49, the sensitivity of the instrument increased (92.11%), and the specificity remained high (92.63%).

We observed that the total mean score for the Autistic children was significantly higher than that for children in the Control group ($P < 0.001$), 11.04% of the Normal children were get point cutoff of the test. Which mean they obtained that score as a false positive, there are a significant items could not distinguish between the autistic and normal children No 1. (“Does your child enjoy being swung, bounced on your knee, etc?”), 3. (“Does your child like climbing on things, such as upstairs?”), 10. (“Does your child look you in the eye for more than a second or two?”), and 16. (“Does your child walk?”). That results may be indicates too many elements, likewise misunderstanding the items of parents, or intention of seeking help of other Psychiatric or medical problems and of those items were related the Aging Developmental milestones (Motor Skills e.g., walking, climbing, sitting on Knee & swung) more than Diagnostic criteria, like as items No 1, No 3 and 16.

The Autistic children were significantly higher than that for children in the Control group in the sub scale of next items. An interest in other children ($P < 0.000$), Playing peek-doo ($P < 0.000$), the child ever pretend, to talk on the phone or take care of dolls, or pretend other things ($P < 0.000$), the child ever use his/her index finger to point, to ask for something ($P < 0.000$), the child ever use his/her index finger to point, to indicate interest in something ($P < 0.000$), Can the child play properly with small toys (e.g., cars or bricks) without just mouthing, fiddling, or dropping them ($P < 0.000$), the child ever bring objects over to (parent) to show them something ($P < 0.000$), the child smile in response to Familiar face or their smile ($P < 0.000$), The child imitate others ($P < 0.000$), the child respond to his/her name when he was called ($P < 0.000$), If it was pointed at a toy across the room, does the child look at it ($P < 0.000$), the child look at things you are looking at it ($P < 0.000$), the child try to attract the attention to his/her own activity ($P < 0.000$), Have the child is deaf ($P < 0.003$), the child understand what people say ($P < 0.000$), the child sometimes stare at nothing or wander with no purpose ($P < 0.000$), and the child look at Familiar face to check the reaction when faced with something unfamiliar ($P < 0.000$).

Generally the results shows that all items were significantly different between the Autistic children compared to Normal children, 17 items were significant in ($P < 0.000$), items No (2, 4, 5, 6, 7, 8, 9, 12, 13, 14, 15, 17, 19, 20, 21, 22, 23) and other items significantly ($P < 0.05$), items No (1 & 11) except items No (10, 16, 18) were non significant, 10. (“Does your child look you in the eye for more than a second or two?”), 16. (“Does your child walk?”), 18. (“Does your child make unusual finger movements near his/her face?”)

Table 3 shows the different between Autistic and Normal Group, in each item.

For the internal consistently to confirmed the validity of “M-CHAT” by using the correlation matrix, the results showed that the correlations between each item and the total score was highly valid, there were 19th item were significant **Correlation is significant at ($P < 0.000$), and only one items was significant at ($P < 0.05$) items No 11, Does your child ever seem oversensitive to noise? (e.g., plugging ears). Also there were 3 items non significant No (16, 20, 22) 16. Does your child walk?, 20. Have you ever wondered if your child is deaf?, And 22. Does your child sometimes stare at nothing or wander with no purpose?

Table 4 shows correlations between each item of M-CHAT and its total score using correlation matrix.

Table 4. Correlations.

	Swing	Interest	Climbing	playing peek-doo	Pretending	Asking	Use finger	Play with toys	Bringing objects	Eyes contact	Sensitive auditory	Reactive response	Imitation	Response	Pointing	Walking	Looking	Movements	attention	Deaf	Understanding	Staring wandering	Reaction checking	Total
Swing	.	0.001	0.005	0.089	0.000	0.136	0.001	0.824	0.000	0.158	0.941	0.030	0.002	0.153	0.311	0.173	0.564	0.164	0.181	0.573	0.262	0.098	0.000	0.205
Interest	0.001	.	0.001	0.000	0.000	0.000	0.000	0.017	0.000	0.777	0.050	0.000	0.000	0.000	0.000	0.314	0.000	0.078	0.000	0.005	0.000	0.003	0.000	0.000
Climbing	0.005	0.001	.	0.000	0.000	0.000	0.000	0.025	0.001	0.161	0.031	0.011	0.161	0.006	0.030	0.120	0.020	0.262	0.011	0.941	0.004	0.502	0.000	0.000
Playing peek-doo	0.089	0.000	0.000	.	0.000	0.000	0.000	0.001	0.000	0.265	0.844	0.000	0.002	0.000	0.000	0.007	0.006	0.073	0.000	0.207	0.001	0.325	0.005	0.000
Pretending	0.000	0.000	0.000	0.000	.	0.000	0.000	0.000	0.000	0.117	0.991	0.000	0.000	0.000	0.000	0.029	0.000	0.133	0.000	0.815	0.000	0.499	0.000	0.000
Asking	0.136	0.000	0.000	0.000	0.000	.	0.000	0.000	0.000	0.072	0.740	0.001	0.000	0.000	0.000	0.297	0.000	0.767	0.000	0.030	0.000	0.152	0.000	0.000
use finger	0.001	0.000	0.000	0.000	0.000	0.000	.	0.000	0.000	0.032	0.487	0.000	0.000	0.000	0.000	0.414	0.000	0.353	0.000	0.046	0.000	0.209	0.000	0.000
Play with toys	0.824	0.017	0.025	0.001	0.000	0.000	0.000	.	0.000	0.017	0.649	0.000	0.000	0.000	0.000	0.137	0.001	0.580	0.000	0.705	0.001	0.082	0.000	0.000
Bringing objects	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	.	0.117	0.042	0.000	0.000	0.000	0.000	0.000	0.001	0.338	0.000	0.070	0.000	0.002	0.000	0.000
Eyes contact	0.158	0.777	0.161	0.265	0.117	0.072	0.032	0.017	0.117	.	0.004	0.003	0.006	0.013	0.105	0.538	0.008	0.003	0.008	0.019	0.001	0.007	0.641	0.000
Sensitive auditory	0.941	0.050	0.031	0.844	0.991	0.740	0.487	0.649	0.042	0.004	.	0.376	0.350	0.603	0.003	0.405	0.295	0.000	0.766	0.001	0.660	0.000	0.973	0.091
Reactive Response	0.030	0.000	0.011	0.000	0.000	0.001	0.000	0.000	0.000	0.003	0.376	.	0.000	0.000	0.000	0.031	0.000	0.659	0.000	0.257	0.000	0.019	0.000	0.000
Imitation	0.002	0.000	0.161	0.002	0.000	0.000	0.000	0.000	0.000	0.006	0.350	0.000	.	0.000	0.000	0.538	0.000	0.525	0.000	0.085	0.000	0.556	0.000	0.000
Response	0.153	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.603	0.000	0.000	.	0.000	0.087	0.000	0.845	0.000	0.021	0.000	0.036	0.000	0.000
Pointing	0.311	0.000	0.030	0.000	0.000	0.000	0.000	0.000	0.000	0.105	0.003	0.000	0.000	0.000	.	0.007	0.000	0.635	0.000	0.030	0.000	0.001	0.000	0.000
Walking	0.173	0.314	0.120	0.007	0.029	0.297	0.414	0.137	0.000	0.538	0.405	0.031	0.538	0.087	0.007	.	0.073	0.581	0.060	0.032	0.002	0.900	0.279	0.740
Looking	0.564	0.000	0.020	0.006	0.000	0.000	0.000	0.001	0.001	0.008	0.295	0.000	0.000	0.000	0.000	0.073	.	0.611	0.000	0.996	0.000	0.950	0.000	0.000
Movements	0.164	0.078	0.262	0.073	0.133	0.767	0.353	0.580	0.338	0.003	0.000	0.659	0.525	0.845	0.635	0.581	0.611	.	0.795	0.000	0.611	0.000	0.718	0.001
Attention	0.181	0.000	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.766	0.000	0.000	0.000	0.000	0.060	0.000	0.795	.	0.002	0.000	0.061	0.000	0.000
Deaf	0.573	0.005	0.941	0.207	0.815	0.030	0.046	0.705	0.070	0.019	0.001	0.257	0.085	0.021	0.030	0.032	0.996	0.000	0.002	.	0.153	0.000	0.292	0.189
understanding	0.262	0.000	0.004	0.001	0.000	0.000	0.000	0.001	0.000	0.001	0.660	0.000	0.000	0.000	0.000	0.002	0.000	0.611	0.000	0.153	.	0.315	0.000	0.000
staring & wandering	0.098	0.003	0.502	0.325	0.499	0.152	0.209	0.082	0.002	0.007	0.000	0.019	0.556	0.036	0.001	0.900	0.950	0.000	0.061	0.000	0.315	.	0.000	0.205
Reaction checking	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.641	0.973	0.000	0.000	0.000	0.000	0.279	0.000	0.718	0.000	0.292	0.000	0.000	.	0.000
Total	0.205	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.091	0.000	0.000	0.000	0.000	0.740	0.000	0.001	0.000	0.189	0.000	0.205	0.000	.

**Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at the 0.05 level (2-tailed).

4. Discussion

As a first step toward earlier detection, guidelines call for the monitoring of early signs of autism during regular health visits as an adjunct to ongoing surveillance or monitoring of development. Evidence on the early signs of autism derives largely from parents’ retrospective reports [15] so the aim of the present study was to validate the M-CHAT as a screener for autistic spectrum disorder of young children in the Eastern province, KSA. The results show that the M-CHAT be able to distinguish ASD from other forms of developmental delay, the majority of items were statistical significant between children with Autistic disorder and the other children (normal), item score, No (1) enjoyment of being swung, bounced; (2) the interesting in other children; (3) the child like climbing on things; (4) that the child enjoy playing peek-a-boo/hide-and-see, (5) that the child ever pretend, to talk on the phone or take care of a doll, (6) that the child ever use his index finger to point, to ask for something, (7) child ever use his/her index finger to point, to indicate interest in something, (8) playing properly with small toys, (9) Bringing objects, (11) Over sensitive auditory, (12) Appropriate response to faces and smile, (13) Imi-

tation, (14) Appropriate response when the child call, (15) Appropriate attention when you Pointing at a toy, ...etc., (17) Looking at things you are looking, (19) seeking Attention, (20) Deaf, (21) understanding what people say, (22) staring & wandering with no purpose, (23) looking at the face to check the reaction when faced with something unfamiliar. This might explain why many children with autism can only perform specific tasks in the particular setting and manner may have difficulty generalizing learned skills is that the children were taught skills they were not developmentally prepared to learn. That is, the skills were too far out of the range of the zone of proximal development [16].

Although the previous items are very crucial to assist and detect the autistic child, there reflex that the Autism spectrum disorder (ASD) is a serious neurodevelopment disorder encompassing severe deficits in social communication, language development, and associated with repetitive, stereotypic behaviors and the main symptom, which can be reliably identified, is impairment in verbal and nonverbal communication. That why the Autistic toddlers may not be enjoyment of being swung, bounced, playing or... Etc, not interesting in other children is one of the most significant sign in young autistic children.

Therefore the children with ASD tends to withdraw from participation in physical activity due to the negative social and behavioral outcomes associated with the symptoms [17] which was showed in the items (No. 2) that the ASD child did not take an interest in other children, and item (No. 4) which measure that interest the child enjoy playing with others.

The Modified Checklist for Autism in Toddlers (M-CHAT) could be distinguish the Autistic children and the normal children, were statistical significant in, especially the 6-Critical item score, No (2, 7, 9, 13, 14, 15) $P < 0.000$. The results that the autistic children Fall on that critical items at cutoff point, we observed that the instrument presented sensitivity = (57.01%) and high specificity (88.08%) in identifying children with autistic disorder in the Population.

However, the discriminate function analysis gives values for sensitivity and specificity consisting of the statistical significance of the classification based on current diagnoses.

These values are reported, in addition to positive predictive power, which can be determined at this time. Based on sensitivity and specificity the M-CHAT has a sensitivity of 57.01, specificity of 88.08.

Given a conservative cutoff score Calculation of sensitivity for this initial study presumes that all children with autism would fail at least three critical or four total items on the checklist and would therefore be caught by interview of parents or evaluation after referral to the child psychiatric Clinic of AL Amal Complex For Mental Health-Dammam.

Clinical Data

Analysis of variance showed that the children who received diagnoses on the autism spectrum ($N = 35$) were significantly more impaired on all items used in the developmental evaluation of The Modified Checklist for Autism in Toddlers (M-CHAT), especially in the Joint attention which refers to the ability to coordinate attention between a person and an object for the purpose of sharing. Young children with autism are characterized by impairments in responding to and initiating joint attention (Mundy *et al.*, 1986). This was confirmed by the significant clinical observation between the autistic children and other normal children in the item domains of an interest in other children, enjoy playing peek-a-boo/hide-and-seek, using his/her index finger to point, ask for something, use his/her index finger to point, indicate interest in something, and looking in the eye of others for more than a second or two. The skills such as pointing and showing of autistic children were sophisticated skills because they were based on different skills as joint attention skills and coordinated joint looking skills which explain us the reason of the difficulties of Autistic child did not engage in interactions with others (their parents, sibling, etc.) so that autistic children did not enjoy being swung, bounced, and not playing properly with small toys (e.g. cars or blocks) which mean that they have a low playing skills

Acknowledgements

We are grateful to Dr. Diana L. Robins for her early permission of using M-CHAT, and Dr. Mohamed A Al Zahrani for his helpful comments on earlier drafts of this paper. And Dr, Abd Al Rahman Abu Dahsh consultant We would also like to thank staff, children and families who participated in the study and to the clinical teams in AL Amal Complex For Mental Health and the Miss Amal Tash the Clinical Psychologist of whose collaboration made the study.

References

- [1] American Psychiatric Association (2000) Diagnostic and Statistical Manual of Mental Disorders. 4th Edition n text rev. (DSM-IV-TR), APA, Washington DC.
- [2] Sadock, B.J. and Sadock, V.A. (2003) Kaplan and Sadock's Comprehensive Textbook of Psychiatry. 7th Edition, Lippincott, Williams and Wilkins, Philadelphia.
- [3] De Bildt, A., Sytema, S., Ketelaars, C., Kraijer, D., Mulder, E., Volkmar, F. and Minderaa, R. (2004) Interrelationship between Autism Diagnostic Observation Schedule-Generic (ADOS-G), Autism Diagnostic Interview-Revised (ADI-R), and the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) Classification in Children and Adolescents with Mental Retardation. *Journal of Autism and Developmental Disorders*, **34**, 129-137. <http://dx.doi.org/10.1023/B:JADD.0000022604.22374.5f>
- [4] Lord, C., Risi, S., DiLavore, P.S., Shulman, C., Thurm, A. and Pickles, A. (2006) Autism from 2 to 9 Years of Age. *Archives of General Psychiatry*, **63**, 694 -701.
- [5] Marteleto, M.R.F. and Pedromônico, M.R.M. (2005) Validity of Autism Behavior Checklist (ABC): Preliminary Study. *Revista Brasileira de Psiquiatria*, **27**, 295-301. <http://dx.doi.org/10.1590/S1516-44462005000400008>
- [6] Maldonado-Duran, J.M. (2002) Infant and Toddler Mental Health Models of Clinical Intervention with Infants and Their Families. American Psychiatric Publishing, Inc., Arlington, VA.
- [7] McClannahan, L.E. and Krantz, P.J. (1993) On Systems Analysis in Autism Intervention Programs. *Journal of Applied Behavior Analysis*, **26**, 589-596. <http://dx.doi.org/10.1901/jaba.1993.26-589>
- [8] Sallows, G. and Graupner, T. (2005) Intensive Behavioural Treatment for Children with Autism. *American Journal on Mental Retardation*, **110**, 417-438. [http://dx.doi.org/10.1352/0895-8017\(2005\)110\[417:IBTFCW\]2.0.CO;2](http://dx.doi.org/10.1352/0895-8017(2005)110[417:IBTFCW]2.0.CO;2)
- [9] Schreibman, L. (2000) Intensive Behavioral/Psychoeducational Treatments for Autism: Research Needs and Future Directions. *Journal of Autism and Developmental Disorders*, **30**, 373-378. <http://dx.doi.org/10.1023/A:1005535120023>
- [10] Dosreis, S., Weiner, C.L., Johnson, L. and Newschaffer, C.J. (2006) Autism Spectrum Disorder Screening and Management Practices among General Pediatric Providers. *Journal of Developmental & Behavioral Pediatrics*, **27**, S88-S94. <http://dx.doi.org/10.1097/00004703-200604002-00006>
- [11] Johnson, C.P. and Myers, S.M. (2007) American Academy of Pediatrics, Council on Children with Disabilities. Identification and Evaluation of Children with Autism Spectrum Disorders. *Pediatrics*, **120**, 1183-1215. <http://dx.doi.org/10.1542/peds.2007-2361>
- [12] Robins, D.L. (1999) Deborah Fein & Marianne Barton Official M-CHAT Website. http://www2.gsu.edu/~psydlr/Site/Official_M-CHAT_Website.html
- [13] Robins, D.L. and Dumont-Mathieu, T. (2006) Early Screening for Autism Spectrum Disorders: Update on the Modified Checklist for Autism in Toddlers and Other Measures. *Journal of Developmental & Behavioral Pediatrics*, **27**, S111-S119. <http://dx.doi.org/10.1097/00004703-200604002-00009>
- [14] Robins, D.L., Fein, D., Barton, M.L. and Green, J.A. (2001) The Modified Checklist for Autism in Toddlers: An Initial Study Investigating the Early Detection of Autism and Pervasive Developmental Disorders. *Journal of Autism and Developmental Disorders*, **31**, 131-144. <http://dx.doi.org/10.1023/A:1010738829569>
- [15] Bryson, S., Zwaigenbaum, L. and Roberts, W. (2004) The Early Detection of Autism in Clinical Practice. *Pediatric Child Health*, **9**, 219-221.
- [16] Vygotsky, L.S. (1962) Thought and Language. MIT Press, New York.
- [17] Pan, C.-Y. (2009) Age, Social Engagement and Physical Activity in the Children with Autism Spectrum Disorder. *Research in Autistic Spectrum Disorders*, **3**, 22-31.