

## Study of pervasive developmental disorders among students in Mosul city

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(Ann. Coll. Med. Mosul 2012; 38 (2): 52-61).  
Received: 12<sup>th</sup> Jun. 2011; Accepted: 7<sup>th</sup> Feb. 2012.

### ABSTRACT

**Objective:** To detect cases of pervasive developmental disorders among a sample of primary school students in Mosul city.

**Design and method:** A descriptive study including 137 students boys and girls of the second class in Al-Thawra, Al-Ghazali and Abi-Tamam primary schools.

A questionnaire paper was used which was filled by the teachers after discussing all the matters with them by the investigator. Rechecking was done and evaluation of the three categories involved in the paper (social interaction difficulties, language defects and conduct disorders). The students were divided into three groups according to the scores on the items of the scales. Group three with high marks in some questions (3, 4) were studied further including any risk factors for their defects, their midyear exam results and their marks in Arabic language. Statistical analysis was done to evaluate the collected data.

**Results:** No case of autism or related disorder was detected. Other problems were detected which were more among males. The commonest problems were being aloof with their own world and excessive fear of noises. Two boys in Al-Thawra school had some conduct disorders and another two had delay in language and speech. Those with language defects had low marks in Arabic language of midyear examination.

**Conclusion:** Problems in social interactions, speech and behavior were important to look for among students which may affect their progress at school.

### الخلاصة

**الهدف:** البحث عن حالات الاضطرابات النمائية واسعة الانتشار في نموذج من طلبة المدارس الابتدائية في مدينة الموصل.  
**التصميم مع الطريقة:** دراسة وصفية تضمنت ١٣٧ طالب وطالبة من طلبة الصف الثاني في المدارس الابتدائية وهي أبي تمام النموذجية، الثورة للبنين والغزالي للبنات.

تم استعمال ورقة استبيان ملئت من قبل مرشدات الصفوف بعد شرح كافة النقاط معهن من قبل الباحث ثم تم مراجعة النتائج وتقييمها بالنسبة للمجاميع الثلاثة من الأسئلة في ورقة الاستبيان والتي تضم صعوبة التفاعلات الاجتماعية، تأخر اللغة والكلام والتصرف الخيالي الشاذ. لقد تم تقسيم الطلبة إلى ثلاثة مجاميع حسب الدرجات التي تم تحصيلها من الاستبيان. كانت المجموعة الثالثة هي التي تضم طلبة بدرجات عالية (٣ و ٤)، وقد تم دراسة هذه المجموعة بتفصيل أكثر وتم البحث عن أي مسببات لهذه المشاكل، ولقد أخذت نتائج امتحانات نصف السنة ودرجات اللغة العربية لهؤلاء الطلبة. لقد أجري التحليل الإحصائي لتقييم المعلومات التي تم جمعها.

**النتائج:** أظهرت الدراسة عدم وجود أي حالة توحد أو ما يشابهها عند العينة المأخوذة من الطلبة ولكن وجدت بعض المشاكل وكانت أكثر عند الذكور. وكانت أهم وأكثر هذه المشاكل انتشاراً هو العالم الخاص بالطالب دون الاهتمام بما حوله بالإضافة إلى الخوف الشديد من الضوضاء. اثنان من الذكور في مدرسة الثورة كانا يعانيان من بعض التصرفات الشاذة واثنان آخران كانا يعانيان من مشاكل في اللغة والكلام. لقد حصل الطلبة الذين لديهم مشاكل في اللغة على درجات قليلة في اللغة العربية في امتحان نصف السنة.

**الاستنتاج:** المشاكل في التفاعلات الاجتماعية، الكلام واللغة والتصرفات الشاذة مهمة للبحث عنها بين الطلبة وقد تؤثر هذه المشاكل على تحصيل الطلبة دراسياً في المدرسة.

**P**ervasive developmental disorders are a spectrum of disabilities with childhood autism at the severe end and Asperger syndrome at the mild end<sup>(1)</sup>. First described by Kanner 1945, these disorders have 3 features that are essential to the diagnosis: general and profound failure to develop social relationships, language retardation and ritualistic and compulsive behavior; all should be manifested before 30 months of age<sup>(1)</sup>. These disorders can be seen in all socioeconomic groups, boys more affected than girls, the prevalence rate of all these disorders was 58.7/10000 children, but the incidence of the diagnosis of autism may have increased and information from the national institute of mental health and the center for disease control and prevention 2007 indicates that from 1 in 500 to 1 in 150 children have some form of pervasive developmental disorders, this increase is likely related to changes in the definition and diagnostic criteria for autism as well as improvements in the recognition of autism at younger ages<sup>(1,2)</sup>. Recurrence is 10-20% in subsequent siblings, genetic risk for second child with autism is 5%, there is 60-90% concordance rate for autism for monozygotic twins and 0% concordance rate for dizygotic twins<sup>(2,3)</sup>.

The exact cause of autism is unknown but it is believed to be multifactorial with a strong genetic influence, the genetic abnormalities have been identified in mitochondrial genes and in all chromosomes except 14 and 20<sup>(1,2)</sup>.

Many patients with autism are identified with specific genetic disorders<sup>(4)</sup>, non-specific EEG abnormalities are common even without seizures<sup>(5)</sup>, as well as with non specific abnormalities on brain scan<sup>(3)</sup>. In rare cases, it is strongly associated with agents that cause birth defects<sup>(6)</sup>. Controversies surround other proposed environmental causes for example heavy metals as lead, pesticides, certain foods, alcohol, smoking, infectious disease, increase in several growth hormones and diminished growth factors and MMR vaccine, although excellent studies found no association between the administration of MMR and development of autism<sup>(2,7,8)</sup>. Autistic

behavior occurs in some patients with a diverse group of conditions including the fragile X-syndrome, congenital rubella, phenylketonuria, tuberose sclerosis, neurolipidoses, infantile spasms, hearing defects and language disorders.<sup>(1,2,5)</sup>

During infancy the child is slow to smile, lack of recognition of mother voice, unresponsive and passive with dislike of physical contact and affection with failure to use eye to eye gaze and rarely seeking others for comfort or affection<sup>(1)</sup>. Babbling may be absent or if present it is of lower quality and frequency than in peers<sup>(9)</sup>. Most children have normal appearance other than macrocephaly in about 25%<sup>(3)</sup>.

Some children seem totally aloof, others may show intermittent engagement with their environment, smile and hug. They may be nonverbal or they may have advanced speech and imitate songs and TV commercials. The speech may have an odd prosody and may be characterized by echolalia and idiosyncratic forms, there is failure to orient to name and failure to use gestures to point to wave or to show<sup>(2)</sup>.

There may be mental retardation (70%), some have hyperlexia where the child has a reading age beyond their peers but with trouble in understanding the meanings of words used, some show strength in art, music and puzzles<sup>(2,9)</sup>. Stereotypical body movements, marked need for sameness and a very narrow range of interest, tantrum like rages may accompany disruptions of routine<sup>(2)</sup>. Visual scanning of hand, mouthing of objects and rubbing of surfaces may indicate sensitivity to some stimuli. Hypersensitivity explains the child who clamps his hands over his ears every time the phone rings or who refuses to eat certain texture of food. Hyposensitivity is displayed in the child oblivious to temperature or with a high pain threshold. The senses of smell and taste may be used to inspect new objects and people<sup>(2,9)</sup>. Sleep problems affect about 2/3 of individuals with autistic spectrum disorders at some point in childhood<sup>(10)</sup>. Autistic children often exhibit a variety of stereotypes including rocking, finger twirling, spinning and tiptoe walking. Of

others self stimulatory behaviors are hand flapping, teeth grinding, jumping from foot to foot <sup>(1,9)</sup>. About 20% will develop epilepsy during adolescence although not usually severe, common co-morbidities are anxiety, hyperactivity and obsessive compulsive disorders <sup>(1,5)</sup>.

Although there is no known cure but early behavioral intervention can help autistic children gain self care, social and communication skills, this therapy should begin before 3 years of age <sup>(2,11)</sup>. The prognosis is guarded, there are no known methods of primary prevention but delayed diagnosis may lead to poor outcome. Special diets can be helpful sometimes for some children but not for all <sup>(12)</sup>. Some children may grow up to live self sufficient employed albeit isolated lives and many adults develop impressive talents, even many children do improve to the point where they lose the diagnosis <sup>(12)</sup>. But many others remain dependent on their family and may require placement in facilities outside home. There is no increased risk of schizophrenia in adulthood but the symptom profile may change as the child grows older and seizures or self injurious behavior become more common <sup>(2,5)</sup>.

#### Aims of the study

1. To identify any case of pervasive developmental disorders among a sample of primary school students in Mosul city.
2. To correlate between some variables and the academic progress at school.

#### METHODOLOGY

A descriptive study of 137, second class students from three primary schools in AL-Tayaran and AL-Ghazlany areas of Mosul city, they were Abi-Tamam AL-namothyjia, AL-Thawra for boys and AL-Ghazlany for girls, they were chosen randomly using PDD scale <sup>(13)</sup>. Both sexes were included; their ages ranged 7-12 years. It was conducted over three months from 15<sup>th</sup> January until 30<sup>th</sup> march 2011. A questionnaire form was used which included the demographic characters of the students, as well as 15 questions for impairment in social interactions, 14 questions about language and speech delay and 15 ones for conduct disorders (**Appendix 1 & 2**). Scoring was done on sports scale and scores <2.5 was regarded abnormal. Each mark had meaning as follows:  
0= perfectly normal, never had such problem.

1= perfectly normal, but used to belong to one of the categories.

2= features minimally found or skills only minimally impaired.

3=features present frequently or skill significantly impaired.

4= feature present almost all the time.

The investigator had visited the three schools several times, and meetings were conducted with the guider teachers. Full discussion of the questionnaire paper was made with them explaining every point clearly. They were told to ask the mother help if needed. Data were collected from the three schools separately, rechecked by the investigator and re-evaluated with the teachers if needed. Personal meeting with some students was carried on to define the problem more clearly. For each school the studied sample was divided in to three groups, group (1) were those with zero marks in all the questions, group (2) were those with two marks in most of the questions, and group (3) were those with (3) & (4) marks in some of the questions. The characters of each group was studied and comparison was done between them, any risk factor for any problem was looked for including the demographic characters, also the commonest problems for those with group (3) from the three schools were studied. The results of the midyear examination of those in group (3) and their marks in Arabic language were taken from their schools to correlate these marks, and delay in speech and language if present. Those students with zero scoring in all the questions, those with zero in some questions and one in others, as well as those with marks two in most of the questions were considered within the normal range.

Statistical analysis was used by finding P-value to evaluate the results, it was considered abnormal if it was <0.05.

#### RESULTS

One-hundred thirty seven students were studied from the three schools. The total number of boys was 69, of girls 68, and male to female ratio was about 1/1. Being of the of the 2<sup>nd</sup> class their ages ranged from 7 - 8 years, few of them were repeaters for one time or more and their ages ranged 9-12 years. After analysis of the results of the questionnaire paper, no case with full blown picture of autism or related disorder was

discovered but some problems had been found in the three schools in communication skills, language or behavior. The number of students with zero in some questions and one in others was 30, (17♀ and 13♂); they were not studied further. The remaining 107 students were of group (1, 2 and 3), were further studied regarding age, sex and risk factors for their problems if present.

**Table 1** shows sex distribution of the groups. There was a difference between number of males and females in the three groups; in group (1) there were more girls and in group (2) and (3) there were more boys. As number of brothers, number of sisters, father job and mother job besides sex could be considered as risk factors for these problems they were put in **Tables 2 and 3** with comparisons between the three groups regarding these points where p value was significant for some data.

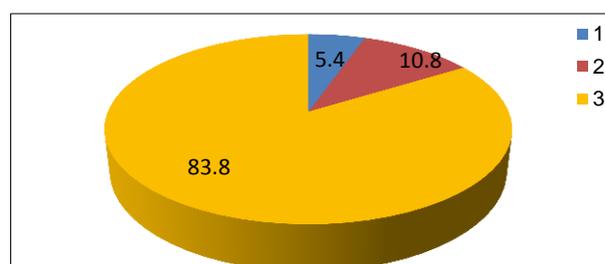
As group (3) was considered abnormal more study of their problems were done, **Table 4 (A, B, C)** shows these problems for the three schools, where a common problem was present, excessive fear of noises was seen in (25%) of students especially in girls, while being aloof with their own world was seen in (38%) of students especially boys.

In Abi-Tamam, more problems were found, being a school of higher number of students, 11 students being aloof with their own world, 7 lack the curiosity about the environment, 6 ignore when called and 5 hate crowds. No significant defect in language and speech had been seen, but some conduct disorders were more common than others, including being obsessed with objects (25%), and having interest in toy parts (25%). Being a school of boys and girls the investigator tried to see if sex had any effect on the types of the problems. In girls their main problems were in social interactions, while boys had problems of conduct more than girls, beside their social interaction difficulties. The main language and speech problems for Abi –Tamam boys were producing unusual noises with loss of acquired speech, while for Al-Thawra school the problems in language were more serious including difficulty in understanding basic things, and in expressing needs with monotonous speech, and absence of imitation of communication. The main conduct disorders in boys of Abi-Tamam were being

obsessed with objects, with interest in toy parts, while in Al-Thawra boys the behavior problems were more in types and seen in more students. Two boys in this school in group (3) had all the defects in language and speech in the assessment questionnaire paper, and another two students had conduct disorders in most of the questions of the imaginary behavior.

The students midyear examination results for group (3) were recorded from their schools, to find how many had passed the examination successfully, and how many had failure in one or more subjects, which could be due to their problems (**Figure 1**).

Also for group (3) the student's marks of midyear examination in Arabic language were recorded from the three schools to see the relation between their problems and their teaching, and understanding Arabic language - although all were arabic students -especially if there was a defect in language and speech. **Table 5** shows the comparison between the three schools on which statistical analysis was done to evaluate the data, and to find the students who need help, whether speech therapy or some medicine, or psychotherapy, this was discussed with their teachers especially for Al-Thawra school of boys.



1 = Failure in one or more subjects (5.4%).

2 = Total failure (10.8%).

3 = Had passed the examination successfully (83.8%).

**Figure 1.** Midyear examination results for group 3 students.

**Table 1.** The distribution of the 3 groups according to sex.

Group	Male	Female	Total no.	p- value
1	2 (7.1%)	26 (92.9%)	28 (26.1%)	0.001(S)
2	30 (71.4%)	12 (28.6%)	42 (39.1%)	0.005(S)
3	24 (64.9%)	13 (35.1%)	37 (34.6%)	0.070(NS)
	56	51	107	

p-value is significant if <0.05 using Z-test one preparation.

**Table 2.** The comparison of the risk factors between groups 2 and 3.

	Risk factor	Group 2 (No.=42)	Group 3 (No.=37)	p-value
1-	Age (years )	7-12 (9.5 ±1.9)	7-10 (8.5±1.3)	0.009 (S)
2-	sex	Male = 30 (71.4%) Female = 12 (28.6%)	Male= 24 (64.9%) Female= 13 (35.1%)	0.531 (NS)
3-	Number of brothers	2.1±1.7	1.6±0.9	0.113 (NS)
4-	Number of sisters	1.7±1.5	1.4±1	0.306 (NS)
5-	Job of Father -Government employee -Self employed	21 (50%) 21 (50%)	5 (13.5%) 32 (86.5%)	0.003 (S)
6-	Job of Mother -Employed -House wife	5 (11.9%) 37 (88.1%)	2 (5.4%) 35 (94.6%)	0.310 (NS)

Unpaired t –test was used for the mean and chi – square test was used for the %.

**Table 3.** The comparison of the risk factors between group 1 and group 3.

	Risk factor	Group 1 (No.=28)	Group 3 (No.=37)	p-value
1-	Age (ys )	7-8 (7.5±0.7)	7-10 (8.5±1.3)	0.001 (S)
2-	sex	Male =2 (7.1%) Female= 26 (92.9%)	Male= 24 (64.9%) Female=13 (35.1%)	0.001 (S)
3-	Number of brothers	2.3±1.8	1.6± 0.9	0.044 (S)
4-	Number of sisters	1.8±1.1	1.4±1	0.131 (NS)
5-	Job of Father -Government employee -Self employed	6(21.4%) 22(78.6%)	5 (13.5%) 32 (86.5%)	0.564 (NS)
6-	Job of Mother -Employed -Housewife	4 (14.3%) 24 (85.7%)	2 (5.4%) 35 (94.6%)	0.221 (NS)

Unpaired t –test was used for the mean and chi – square test was used for the %.

**Table 4 (A).** Al-Thawra school for boys (9 students).

Social interaction difficulties	Speech and language delay	Conduct disorder
Aloof, own world **	Pulls parents aside when want something***	Attachment to unusual objects (hair, stings)***
Temper tantrum*	Monotonous speech with wrong pausing**	Stubborn about rituals and resist changes***
Abnormal joy expressions on seeing parents *	Difficulty of understanding basic things**	Difficulty in stopping repetitive boring conversation ***
Poor eye contact*	Difficulty of expressing needs **	Hand flapping ***
Ignores when called *	No spontaneous imitation of speech and communication **	Spinning objects **
Lack curiosity about the environment *	Produces unusual noises *	Restricted interest **
Lack of ability to imitate*	Voice louder than usual *	Head banging **
	Uses language inappropriately *	Obsessed with objects *
	Loss of acquired speech *	
	Cannot sustain conversation*	

\* = 1 student, \*\* = 2 students, \*\*\* = 3 students.

Table 4 (B). Al –Ghazaly school for girls (7 students).

Social interaction difficulties	Speech and language delay	Conduct disorder
Excessive fear of noises and covers ears frequently *****	Difficulty in understanding basic things *	Nil
Aloof, own world *	Cannot sustain conversation *	
Ignores when called and not turning head to voice*	Uses language* inappropriately	

\*=1 student ,\*\*\*\*\*= 5 students (about 75% of students).

Table 4 (C). Abi-Tamam school (21 students).

Social interaction difficulties	Speech and language delay	Conduct disorder
Aloof, own world (7M, 4F)	Loss of acquired speech (3 M)	Obsessed with objects (numbers & weather) (4M, 1 F)
Lack of curiosity about the environment (4M, 3F)	Produces unusual noises (3 M)	Interests in toy parts (3M , 2 F)
Ignores when called (5M,1F)	Difficulty of understanding basic things (2 M, 1 F)	Arranging toy in rows (2M)
hates crowds (4M,1F)	Repetitive language (2 M, 1F)	Restricted interest (2M)
Excessive fear of noises (2M, 2F)	Cannot sustain conversation (2 M)	
Facial expression not fit the situation (3M)	Pulls parents aside when wants something (1 M, 1 F)	
Abnormal joy expressions on seeing parents (2M,1F)	No spontaneous imitation of speech or communication (1M )	
Ignores pain (1M ,1F)	Monotonous speech wrong pausing (1M)	
Lack of ability to imitate (1M, 1F)	Repeat heard words (1F)	
Poor eye contact (2M)	Difficulty of expressing needs (1M)	
Inappropriately anxious (1M,1F)		
Temper tantrum (1M)		
Inappropriately laughing(1M)		

Table (5): Marks in Arabic language of midyear examination for group 3 students.

Al- Thawra (1) no. = 9	Al-Ghazaly (2) no. =7	Abi –Tamam (3) no. =21	p- value
6	3	10 9 10	
5	3	8 10 10	
9	10	10 10 10	
9	8	10 8	
5	10	10 8	
2	7	10 2	
2	10	8 10	
10		10 8	
3		8 8	
( 5.7±3.1)	(7.3±3.2)	(8.9 ± 1.8)	0.007 (S)

Anova test was used  $F=5.725$  and then post Hoc test (Duncan), which had shown the significant difference was between 1 and 3 (0.007), but no significant difference between 1 and 2, or between 2 and 3.

## DISCUSSION

The prevalence of pervasive developmental disorders is increasing, the availability of professionals trained in childhood development disorders has greatly increased the capacity to identify and treat children with these problems<sup>(2)</sup>. The results of this study indicate that no students in the three schools had any of these disorders, although some symptoms in social interactions, defects in language, and conduct disorders had been detected among the studied sample.

There were predominance of males in all problems; also students from different social classes were involved as discussed elsewhere.<sup>(1,2)</sup> If sex, number of brothers and sisters and job of father and mother could be considered as risk factors for these defects, significant results had been shown for some variables as in **Table 2 and 3** after doing comparison between the three groups. Different problems had been found in this

sample involving different number of students, but the commonest one was in social relationships, and that was being aloof with their own world, with little care for their surroundings. No important defect in language and speech, or in behavior could be found apart from those four students in AL-Thawra school with many problems whom their school was told to refer these students to the psychiatric research unit for further evaluation, and to help their families to cover their father absences from home, as one had married another woman, and the other two were drivers outside Mosul city. Although most of the students in the study had passed the midyear examinations successfully (about 84%) but the interesting point in the study was the marks in Arabic language of midyear examination for some boys of AL-Thawra school who were in group (3), and this probably reflected the effect of the delay in language and speech. One of the 2 students with language problem in this school had failure in all the lessons with mark 3 out of 10 in Arabic language of the midyear examination. The other who was repeater of two years in the second class had passed the examination successfully with 5 out of 10 marks in Arabic language.

No study in Iraq of the same design was found to compare our results to, but a study was conducted in USA on 4321 children younger than ten years, to estimate the prevalence of developmental delay in cognitive, language and adaptive skills and to identify the influence of age, sex, race, income and type of child maltreatment or placement as well to identify the prevalence of service use among children in the child welfare system. They found that the rates of developmental delay was high, and young children up to two years of age, had the higher rates of developmental delay and severe neglect emerged as the worst prognostic language indicator, while race, sex, income and type of child maltreatment did not have significant impact on developmental scores. It was difficult to compare my study with this one because of the different sample used and its small number.<sup>(14)</sup> Another study in Canada on 4987 children aged 1 to 5 years was conducted to evaluate social and environmental determinants of poor developmental attainment among preschool children, which were found to be male sex, maternal depression, low maternal education and household low income

adequacy, although this study involves a small sample, but still some social variables, like father's job and family size, could be considered as risk factors for developmental delay<sup>(15)</sup>. Thanoon MZ from Nursing College in Mosul tried to measure blood lead level among children who had been diagnosed as cases of pervasive developmental disorders in the psychiatric research unit, Collage or Medicine, University of Mosul, he found high blood lead levels in some of them<sup>(16)</sup>. A study done at 2004 in Mosul which was aiming to measure the point prevalence of mental disorders among children from 1-15 years in a sample from primary health care centers after interview, was conducted with the families visiting these centers, they had found only three cases with autism (2 boys and 1 girl) out of 3079 children studied (0.1%), while in this study no full blown case of autism was detected<sup>(17)</sup>.

## CONCLUSION

- 1- Although no case of pervasive developmental disorder was found, still these disorders are increasing and had to be studied more.
- 2- Some problems in the social interactions, language, speech and conduct disorders had been seen in the school students, especially boys, and need global solutions.
- 3- The presence of language and speech disorders in students may affect their examination results especially in Arabic language.

## RECOMMENDATIONS

- 1- Further wider studies of other schools in Mosul looking for any case with ASDs.
- 2- Working hardly with teachers of primary schools to look for problems in their students regarding social interaction, speech and behavior, after which the needed advices should be given to teachers and families including referral of these students to psychiatric unit to solve their problems.
- 3- Wide education programs in TV to increase awareness of people about ASDs.
- 4- Other wider screening questionnaire papers for other parts of the society for example Kindergarten to look for any case with developmental disorder.

### Acknowledgements

My grateful thanks, and appreciation to Prof. Dr. Elham Khattab, for her kind help, support and encouragement to continue this work. My thanks to the staff at the Psychiatric Research Unit in the College of Medicine, University of Mosul. My thanks as well to the managers and teachers of the visited schools for their help.

I would like to thank Miss. Muna M. Ahmad for her help in the statistical analysis.

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## APPENDIX 1

## مقياس تقييم الاضطراب اللماني واسع الانتشار / استبيان /

٤	٣	٢	١	٠	
					أ. صعوبات التفاعل الاجتماعية
					١. الاتصال العيني السيء، أو تحديق من الزاوية الغير عادية
					٢. الإهمال عند المناداة، إهمال واسع الانتشار، لا يدور وجهه الى الصوت
					٣. الخوف الشديد من الضوضاء (مكنسة كهربائية) يغطي اذنه كثيراً
					٤. له عالمه الخاص
					٥. قلة الفضول حول البيئة
					٦. التعبيرات الوجهية لا تلائم الموقف
					٧. البكاء أو الضحك غير الملائم
					٨. نوبات غضب مزاجية، يرد بانفعال عندما لا يحصل على حاجاته
					٩. تجاهل الألم (يضرب راسه عرضياً بدون رد)
					١٠. لا يحب ان يمس أو يحمل (جسم، راس)
					١١. يكره الازدحام، صعوبات في المطاعم والأسواق والاماكن العامة
					١٢. متلهف على نحو غير ملائم وخائف
					١٣. الاستجابة العاطفية الغير ملائمة
					١٤. تعبير البهجة الشاذ عندما يرى الابوين
					١٥. قلة القدرة على التقليد
					ب. تأخير الكلام واللغة
					١. خسارة الخطاب المكتسب
					٢. اصدار ضوضاء غير عادية أو الصنيل الطفولي
					٣. صوت اعلى من المطلوب
					٤. كلام مبهم متكرر او لغة غير مفهومة
					٥. صعوبة فهم الأشياء الأساسية
					٦. يشد ابويه حوله عندما يريد شيئاً
					٧. صعوبة التعبير عن الحاجات أو الرغبات، استعمال الايمانات
					٨. لا يوجد بداية تلقائية للخطاب والاتصال
					٩. إعادة الكلمات المسموعة، أجزاء إعلانات التلفزيون التجارية أو الكلمات
					١٠. اللغة التكرارية (كلمة أو عبارة نفسها مراراً وتكراراً)
					١١. لا يستطيع تحمل المحادثة
					١٢. الخطاب الرتيب، توقف خاطئ
					١٣. يتكلم بنفس الطريقة مع الاطفال، بالغون، الأشياء (لايستطيع التمييز)
					١٤. استخدام اللغة الغير ملائمة (كلمات أو عبارات خاطئة)
					ج. التصرف الخيالي الشاذ
					١. التصفيق بالأيدي أو الاصابع
					٢. ضرب الرأس
					٣. يشوه نفسه، يؤلم أو يجرح نفسه
					٤. المشي على اصابع القدم
					٥. ترتيب اللعب في صفوف
					٦. شم، ضرب، لعق أو استعمال غير ملائم للعب
					٧. اهتمام في اجزاء اللعبة، مثل عجلات السيارة
					٨. مهوس بالأشياء ( قطارات، طقس، اعداد، تواريخ)
					٩. يدور الأشياء، نفسه
					١٠. الاهتمام المقيد ( يراقب نفس الفيديو مراراً وتكراراً)
					١١. صعوبة التوقف عن تكرار نشاط أو محادثة مملة
					١٢. الارتباط بالأشياء غير العادية ( اعداء، احجار، خيوط، شعر)
					١٣. عنيد حول الطقوس والروتينيات، يقاوم التغيير
					١٤. الطعم المقيد بالقوام أو الشكل أو التكوين ( يرفض المواد الصلبة)
					١٥. قدرة عالم ويمتلك مهارة مقيدة اكبر من فنته العمرية ( يقرأ مبكراً، يحفظ كتب في ذاكرته)

**APPENDIX 2**

	0	1	2	3	4
1. social interaction difficulties					
Poor eye contact or staring from unusual angle					
Ignores when called, pervasive ignoring, not turning head to voice					
Excessive fear of noises covers ears frequently					
In his/her own world (aloof)					
Lack of curiosity about the environment					
Facial expressions don't fit situation					
Inappropriate crying or laughing					
Temper tantrums, overreacting when not getting his/her way					
Ignores pain (bumps head accidentally without reacting)					
Doesn't like to be touched or held ( body, head )					
Hates crowds, difficulties in restaurants and supermarkets					
Inappropriately anxious, scared					
Inappropriate emotional response					
Abnormal joy expression when seeing parents					
Lack of ability to imitate					
2. speech and language delay					
Loss of acquired speech					
Produces unusual noises or infantile squeals					
Frequent gibberish or jargon					
Difficulty of understanding basic things (just can't get it)					
Pulls parents aside when wants something					
Difficulty of expressing needs or desires, using gestures					
No spontaneous initiation of speech					
Repeats heard words or TV commercials					
Repetitive language					
Cannot sustain conversation					
Monotonous speech, wrong pausing					
Speaks like kids, adults, objects					
Uses language inappropriately ( wrong words )					
3. abnormal symbolic imaginary play					
Hand or finger flapping, self stimulation					
Head banging					
Self mutilation, inflicting pain or injury					
Toe walking, clumsy body posture					
Arranging toys in rows					
Smelling, banging, licking or other inappropriate use of toys					
Interest in toy parts such as car wheels					
Obsessed with objects or topics as trains , weather, numbers ,dates					
Spinning objects ,self, fascination with spinning objects					
Restricted interest, watching the same video over and over					
Difficulty in stopping repetitive " boring" activity or conversation					
Attachment to unusual objects, (sticks, stones, strings, or hair)					
Stubborn about rituals and routines, resistant to change					
Restricted taste by consistency, shape or form (refuses solids)					
Savant ability, restricted skill superior to age group (reads early, memorizes books)					