# Evaluation of oral health status in a sample of autistic male children

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## ABSTRACT

Background: Autism is a severe neurodevelopmental disorder, presents in early childhood, characterized by severe impairments in socialization, communication and behavior. Autism is considered a multi-factorial disorder that is influenced by genetic, environmental, and immunological factors with oxidative stress as a mechanism linking these factors. Assessment of any oral manifestations has to be discovered, evaluated and measured in autistics to be used as a potential diagnostic.

Materials and methods: Oral health status:(DMFT) for permanent teeth, (dmft)for deciduous teeth and gingival indices were estimated for 58 individuals aged (2-13) years, twenty nine of them were autistics and twenty nine were sex and age matched healthy controls.

Results: The results of this study showed that Iraqi autistic children sample was more likely to be caries-free compared with healthy sample.

Conclusion: Children with autism spectrum disorder (ASD) were more likely to be caries-free, had lower DMFT\ dmft and GI scores than did their unaffected peer and can be used in autism spectrum disorder prediction to a limited extent.

Key words: Autism spectrum disorder; Oral health status. (J Bagh Coll Dentistry 2012;24(2):62-65).

## INTRODUCTION

Autism spectrum disorders (ASDs) are prevalent neurodevelopmental disorders that affect an estimated 6 per 1,000; with male to female ratio averages 4.3:1, which means that boys are at higher risk for ASD than girls [(1)].Characterized by severe impairments in socialization, communicat-ion and behavior. Children diagnosed with an ASD may display a range of problem behaviors such as hyperactivity, poor attention, aggression and self-injury. In addition, to unusual responds to sensory stimuli such as hypersensitivities to light or certain sounds, colors, smells or touch and have a high threshold for pain[(2)].Finally, common co-morbidity conditions often associated with ASDs include gastrointestinal and autoimmune disease [(3)].

Investigators suggested that ASDs may result from an interaction between genetic, environmental and immunological factors, with oxidative stress as a mechanism linking these risk factors [(4)].

Oral health and dental needs of children withautism have been evaluated by very few investigators. The studies conducted on this topic reported nostatistically significant differences in the prevalence of caries, fillings, gingivitis and degree of oral hygiene in comparison with non-autistic individuals8, and even a lower incidence of caries in some of the reports[(5)].

Given the well-established fact that mercury (Hg) is known to significantly increase oxidative stress and that fetuses and infants are routinely exposed to Hg from environmental sources (fish, dental amalgams, etc.), investigators have described that many ASDs may result from a combination ofgenetic/biochemical susceptibility, specifically areduced ability to excrete Hg, and exposure to Hg at critical developmental periods.Further, it was reported that Hg can cause immune, sensory, neurological, motor, and behavioraldysfunctions similar to traits defining/associated with ASDs, and that these similarities extend to neuroanatomy, neurotransmitters, and biochemistry. Also, it was reported when reviewing the molecular mechanisms of Hg intoxication that it can induce death, disorganization and/or damage to selected neurons in the brain similar to that seen in recent ASD brain pathology studies, and this alteration may likely produce the symptoms by which ASDs are diagnosed[(6)].

## MATERIALS AND METHODS

Sixtyindividuals from Central Pediatric Teaching Hospital in Al-Iskanwere enrolled in this study. They were categorized into two groups:

Autistic group**:** Composed of 31 children (29 males and 2 females) who were diagnosed as autistic children, their ages range between 2-13 years. Because the female sample very small, it was excluded from the current study.

Healthy control group**:** Composed of 29 age and gender matched male children.

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All individuals were evaluated by full medical history and clinical examination to exclude any other systemic disease that may affect the parameters examined in this study. Oral and periodontal examination was done for each individual and any child with symptoms and signs of any active oral inflammation and advanced periodontitis were excluded.

All parents were supplied with informed consent and the purposes of the study wereexplained to them.All the children subjected to extra-oral examination for any scars or trauma to the head, neck, hands and fingers; taking medical, family history and previous dental history.Intra-Oral assessment of caries experience through the application of decayed, missing and filled teeth Index (DMFT) and (dmft) for permanent and primary teeth respectively; and assessment of gingival health status through gingival index [7].

All data were statistically analyzed using SPSS version 13 (Statistical Package for Social Sciences). Non-normally distributed quantitative variables (DMFT\dmf score) are described by median and interquartile range. The remaining quantitative variables (age and gingival index) were normally distributed and thus conveniently described by mean ± standard deviation. Correlation assessment was performed using the Spearman correlation analysis. The ROC analysis was used to rank the quantitative parameters from those with highest difference between Autism cases and healthy controls to lowest difference. This is done by ranking the ROC area of different parameters. Statistical significance was defined as $p< 0.05$.

# RESULTS

The mean age for autistic children was about 5.9±3.4 years. Autistics and their controls showed homogeneity and there were no significant difference between the two groups.

Extra-Oral Examination: out of 29 autistics only 2 (6.9%) showed signs of trauma due to self-injury habit. Parents' responses to the questionnaire regarding dental visits indicated that 28 (96.6%) of autistic children never visited dental clinic and had a negative history of treatment and follow up as shown in table (1).

Intra – Oral Examination: The caries severity of children in the ASD group was statistically significantlower than that in the unaffected group for dmft($p = 0.013$) but insignificant for DMFT ($p = 0.73$). Regarding caries prevalence, a total of 15 (51.7%) childrenin the ASD group had a positive caries free history (DMFTand dmft=0), compared with9 (31%) children in healthy control group.

According to criteria, 96,6% of autistic children had mild gingivitis with mean value (0.55 ± 0.35) obviously lower in comparison to healthy controls (0.75 ± 0.48), but the difference failed to reach the level of statistical significance ($p=0.08$).

Tables2 and 3 summarize an assessment of DMFT, dmft and GI scores among the study subjects with ASD in comparison to the controls.Table 4 showing the tested variables ordered according to their significance in separating between autistics and healthy controls (ROC test).

# DISCUSSION

Boys are at higher risk for ASD than girls and this agreed with all other studies around the world [1, 3]. As part of the multiple unknown develop-mental abnormalities, children diagnosed with autism practice self-injurious behavior (SIB) at some stage in their lives. In the present study results of the extra oral assessment, types of habits, trauma and injuries revealed that out of the 29 examined children, only 2 (6.9 %) practice this behavior, and this result was in good agreement with many other studies [8,9]. Heritability contributes about 90% of the risk of a child developing autism,and this support the findings in the present study in which 21 (72.4 %) of autistic children have a positive family history of neuropsychiatric illness like schizophrenia, Alzheimer'sdisease, mental disorder and depression[10].

In the present study 28 children (96.6%) had never visited dental clinic or received dental treatment and follow upand this could be explained by the fact that people with ASD incapable of cooperating in the dentalsetting owing to their impaired social interaction and communicationskills. In addition to cognitive dysfunction, aggression and other associated psychiatric symptoms may impede the provision of dental care. This result was in good agreement with many studies [11-14].

The current study revealed that caries severity (but failed to reach statistical significant level) in autistics were lower than in unaffected children with autism, because of their ritualistic behaviorwhich characterized by unvarying pattern of daily activities, such as an unchanging menu so they are moreregular in their behavior at meals than are unaffected children.Therefore, a lower frequency of snacking between meals and lowerintake of carbohydrates could have contributed to the lowercaries rate observed and this finding agreed with several studies [9, 15].While disagreed with others who reported

higher scores in autistic groups [5, 16]. Caries prevalence lower in autistic children participating in the present study and this result were in good agreement with many previous studies [9, 5].

Gingival status of the autistic children in the present study showed that (96,6%) of the children had generalized mild gingivitis, which it was in good agreement with many previous studies [5,16]. While Ozdemir-Ozenenand Sandalli, 2007 [17], in their study reported that the gingival index records of the children with autism was found to be significantly higher than the healthy children.

All these findings could be related to many reasons such as the irregular brushing habits because of the difficulties the trainers and the parents encountered when they brushed the children's teeth. It could also be due to lack of the necessary manual dexterity of autistic children during brushing by themselves, which made their tooth brushing inefficient. Furthermore, the findings of this study reflect poor dental awareness, a lack of dental education and deficiency in receiving oral hygiene instructions from dental staff. Care-givers need to know the different techniques and materials of tooth brushing with emphasis on behavior modification to control the behavior of the children and regular dental visits.

In the present study, aim was directed to assess and measure any oral manifestations associated with ASD, which could be used for the early diagnosis and intervention with autism. Although there is no known cure, but early behavioral or cognitive intervention can help autistic children gain self-care, social, and communication skills.

Up to our knowledge, this study is the first of its kind that evaluate the usefulness of oral health status as diagnostic aid through measuring the DMFT, dmft and GI under condition of stress due to autism in a sample of Iraqi autistics.

The ROC test results of this study revealedthat the areas under ROC curve for DMFT (0.521) was not significantly different from 0.5 value of an equivocal test ($p = 0.79$).And for dmft was significantly higher (0.669) from 0.5 value of an equivocal test ($p = 0.027$). ), while the areas under ROC curve for GI was higher (0.669) from 0.5 value of an equivocal test, but statistically insignificant ($p = 0.11$).So dmft ranked number onefollowed by GI then DMFT as ranked third in order of importance in this study as shown in table (3).

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**Table 1: Extra-oral examination and case history of autistics**

| Conditions | No. of +ve cases | % | No. of -ve cases | % |
|---|---|---|---|---|
| self-injurious behavior and signs of trauma | 2 | 6.9 % | 27 | 93.1% |
| Family history of neuropsychiatric disorders | 21 | 72.4 % | 8 | 27.6% |
| Rubella Vaccine | 29 | 100 % | 0 | 0% |
| previous dental experience | 1 | 3.4 % | 28 | 96.6% |

**Table 2:Mean±SD for tested parameters**

| Markers | Cases | Controls | p |
|---|---|---|---|
| Gingival index | 0.55 ± 0.35 | 0.75±0.48 | 0.08 [NS] |

**Table 3: Median level for selected parameters**

| Markers | Cases | Controls | p |
|---|---|---|---|
| DMF | 0 | 0 | 0.73[NS] |
| dmf | 0 | 1 | 0.013 |

**Table 4: ROC analysis of testedparameters**

| parameters | Area under the curve | P |
|---|---|---|
| dmf | 0.669 | 0.027 |
| Gingival index | 0.622 | 0.11[NS] |
| DMF | 0.521 | 0.79[NS] |