

## AUTISM SPECTRUM DISORDERS IN IRAQ: A REVIEW OF LITERATURE

### اعتلالات طيف التوحد في العراق: مراجعة منهجية

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#### ملخص البحث

**هدف البحث:** أصبح مصطلح التوحد (والذي يعرف حديثاً باعتلالات طيف التوحد) من المواضيع المهمة في العالم العربي، وخاصةً خلال السنوات الخمس والعشرين الأخيرة. أجرى المؤلفون بضع دراساتٍ سابقة عن اعتلالات طيف التوحد في العالم العربي (من ضمنها العراق) ولكن في إطارٍ عام لهذه الحالة وتم رصدها ولكن لوحظ أنها أعمال قليلة وليست واضحة المعالم. لا توجد دراسات مرجعية تم إجراؤها في العراق. في معظم الحالات تم تقديم بيانات تلك الدراسات من كل محافظة بصورة منفردة، مما مثل عقبة رئيسية في إعطاء الخدمة المثلى لهذه الشريحة من المرضى في هذا البلد. تهدف هذه الدراسة إلى أولاً: تسليط الضوء على حجم هذه المشكلة في العراق. ثانياً: التركيز على البحوث في هذا المجال، ثالثاً: التعرف على الخدمات المقدمة للمرضى وعوائلهم.

**طرق البحث:** استعراض للأعمال المنشورة في المجالات الأكاديمية العراقية حسب الكلمات المفتاحية «التوحد»، «اعتلالات طيف التوحد». تم تحليل البيانات من بحوث تم انقائها بصورةٍ مستقلة باستعمال صيغة أخذ البيانات التي تشمل اسم الدراسة، تاريخ النشر، موضوع البحث، عدد المرضى والنتائج الرئيسية له.

**النتائج:** تم جمع البيانات من الدراسات المجراة في مختلف المحافظات على حقولٍ متنوعة في بحوث اهتمت باعتلالات طيف التوحد، وشمل ذلك الدراسات السريرية، الجينية، المناعية وتلك التي تدرس الموضوع من وجهة نظر الكيمياء الحيوية، وكذلك الدراسات التي تتناول سوء التغذية، خلل الاستقلاب، الدراسات التصويرية الشعاعية والدراسات التي تتناول النتائج العلاجية له، وكذلك الخدمات المتوفرة لمرضى اعتلالات طيف التوحد. تم جمع كل هذه الدراسات ومراجعتها بين عامي 2011 و2018، تم خلالها نشر 23 بحثاً من العراق، معظمها نشر في السنوات الأربعة الأخيرة. معظم هذه الدراسات ناقشت الأسباب المحتملة لهذا المرض. كانت الدراسات السريرية هي الأكثر تكراراً (العدد=9)، بينما شكل عدد الدراسات التي ناقشت الجانب الجزيئي الأكثر تكراراً في عام 2017. كانت 4 دراسات على صحة الفم والأسنان. من جانبٍ آخر فقد كانت النظرية المناعية واحدة من المواضيع التي تم إجراؤها في العراق (العدد=2). حسب أفضل معلوماتنا، لا توجد دراسات مراجعة حول هذا الموضوع ولا أبحاث عنيت بنتائج العلاج له.

**الاستنتاجات:** هناك تزايد ملموس في الاهتمام بحالات اعتلالات طيف التوحد في العراق وخاصةً في بغداد، وكذلك كان هناك دليل على زيادة البحوث في هذا المجال في السنوات القليلة الماضية وخاصة في الجانب الجزيئي منها. لا تزال البحوث حول اعتلالات طيف التوحد في العراق في مراحلها المبكرة وتحتاج لجهودٍ تنظيمية لتكون مثمرة. نحتاج لبحوثٍ أخرى لتحديد وتحسين الجانب التشخيصي للمرض وكذلك لتوفير الخدمات في العراق عامة وتعزيز الجانب الثقافي والجانب التركيبي للمحافظات.

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## ABSTRACT

**Objective:** The term of Autism (which is recently called as autism spectrum disorders-ASD) became a subject of concern in the Arab world especially during the last 25 years. The authors have previously published several articles about autism in the Arab societies (including Iraq) in which a general handling of this condition was shown, but they found that the works are little and not characterized. There were no previous review articles that have been discussed on the ASD in Iraq. In the most reports data are discussed from each governorate in Iraq separately, which provide a major obstacle to obtain administration of services properly to those children in this country. The goals of this work were to: (1) concentrate on the volume of this issue; (2) identification of the research performed in this project; and (3) focus on the services given for these cases and for members of their families.

**Methods:** A review of the published works in Iraqi Academic Scientific Journals (IASJ) according to the keywords: "autism", "Autism spectrum disorders-ASD". Authors independently analyzed selectively the data of reports by extracted from the site of IASJ in which including the title of the article, date of their publishing, place of study, scope of study, number of cases enrolled, and major results.

**Results:** Information from reports performed by different governorates on spectrum of topics in ASD researches including clinical studies, genetics, immunologic, biochemical, nutrition, metabolic errors, radiologic, management, and availability of services for autistic cases, were collected and reviewed. Throughout a period from 2011 to 2017, 23 articles were conducted in Iraq, the majority of these publications were in the last four years. Most of them analyzed the possible cause of this disease. Clinical studies represented the frequent one (n=9), while that which discussed on the molecular aspect constituted the most addressed topic in 2017. Four articles on oral health. On the other hand, immune theory was one of topics investigated in Iraq (n=2). To our best knowledge, no review articles nor that addressed on treatment outcome.

**Conclusions:** A raising concern of autistic cases in Iraq was shown, markedly in Baghdad, with an evidence of increasing in the rate of researches on this topic in

*the last few years especially for the molecular aspect. Works on ASD in Iraq still in its early period and there is a need for organized efforts to be beneficial. More researches are essential to characterize effectively the suitable ways to improve the diagnosis and services in the context in Iraq from cultural view and that concerning the structure of governments.*

## INTRODUCTION

Autism spectrum disorders (ASD) are sort of neuro-developmental disorders that are represented by impaired verbal and/or nonverbal communication, in addition to repetitive stereotypical behaviors and it is a lifelong condition for which there is no known cause or cure.<sup>1</sup>

According to the American Psychiatric Association's Diagnostic and Statistical Manual, Fifth Edition (DSM-5), the child must have deficits that persistently present in each of 3 areas of social communication and interaction. Autism spectrum disorders are highly variable, the most prominent difficulties of which include aberrant behavior, poor social skills and disrupted communication skills.

Evidence suggests that the prevalence of ASD is constantly increasing and this has led to extensive speculation and research interesting the etiologies of this disorder. After fifty about years of intensive studies, scientists recently conclude that ASD are complex disorders whose core facets have definite causes that sometimes co-occur.<sup>2</sup>

Autism spectrum disorders have been the focus of many studies based on several different perspectives. These may vary from genetic and neurologic correlates<sup>3,4</sup> to social and emotional impact,<sup>5</sup> or educational issues,<sup>6</sup> family perspectives<sup>7</sup> and different intervention proposals.<sup>8</sup>

In the developing countries and specifically in the Arab world (and in Iraq), the field of child psychiatry is relatively new. Big efforts are needed to increase the orientation of policies makers to provide fruitful services and researches planning to make bridges to

diminish gap between the requirements and the applied services for autistic children.<sup>9</sup> Furthermore, there were no previous review articles that have been discussed on the autism in Iraq, the majority of patients' information are obtained from separate governorate in Iraq, which makes main problem for presentation of services properly to this category of cases in Iraq.

This work tried to discuss in details the published articles on ASD in Iraq especially that focuses on its frequency, clinical aspects, etiologies, services presented, and outcomes. The researches then concerned to collect the published works on ASD in Iraq and make an analysis to highlight the regions that need to be taken in consideration in future.

The aims of this work were to: (1) shed light on the volume of these disorders in Iraq; (2) focus on the researches conducted on this subject; and (3) discuss on the applied services for these patients with their families.

## METHODS

Reviewing of the publications were conducted in accordance of that already described.<sup>9,10</sup> Identification of available articles were done via applying search on Iraqi Academic Scientific Journals (from January 2010 to September 2018). The keyword of 'autism' was used in the search. A review of all characterized articles was performed in an eligible manner by both authors. Comprehensive full text articles in English were enrolled, while those published locally in periodic journal were excluded as there they were difficult to access them. Data extraction from selected publications were done in an independent manner via specialized design including the title of the study, the date of publication, area of research, topic of research, number of cases enrolled, and major results. Data were then analyzed in SPSS, version 17 for further analysis.

## RESULTS

This study enrolled reviewing of 23 articles which were published in different Iraqi Academic Scientific Journals from 2010 to 2018; most of these works were

published in the last 4 years. Majority of them were in Baghdad province (n=18, 78.0%). This review revealed that articles that concerned with the etiological aspects of ASD were the most frequent ones (n=14, 60.0%), Table 1.

The present work revealed that there were about 5 (21.0%) out of 23 studies in Iraq were highlighted the molecular aspect of ASD. All were published in the last 4 years,<sup>11-15</sup> Table 2.

On the other hand, two articles were focused on the immunological topic in ASD.<sup>16,17</sup> Four researches discussed the oral health and salivary glands physicochemical characterizations in autistic persons,<sup>18-21</sup> while few articles were discussed on the biochemical view of these disorders in Iraq.<sup>22-24</sup> Only one research discussed on feeding problems in cases of ASD.<sup>25</sup>

Fortunately, and unlike articles in the Arab world, there are about 9 (60%) out of 23 researches were concerned with clinical conditions of autistic patients,<sup>26,27</sup> Table 3.

Al-Shimery *et al.* have published a descriptive study on 208 children was performed in Baghdad using ICD-10 criteria (autistic children were determined by a pediatric psychiatrist at the clinic of pediatric psychiatry). They found that autistic children constituted about 15% of them. Male: female ratio was 5.5:1. In addition, the language delay was the hallmark and present in 85% of those patients, while the sleep disorders present in 21% of these cases. Nine percent of them were suffered from seizures. Features of macrocephaly constituted about 12%.<sup>26</sup>

Another work in Mosul tried to discuss the behavioral appearance of autistic child from the point of view of their parents. Language delay was the frequent feature of these patients while features of over activity were the second frequent one.<sup>27</sup> Lazamand Al-Hemiary have conducted a descriptive analysis of data collected from 80 mothers of autistic patients in Baghdad via a questionnaire. They revealed that 47% of those patients were aged between 3-6 years, while the age of 37.5% of them ranged between 7-10 years. Finally, those who aged from 11-14 were constituted 15%. In addition, the percentage of patients who came from urban regions was 91%, while cases that belonged to rural areas

represented 8.8% of the study sample.<sup>28</sup> Moreover, that descriptive analysis showed that 56% of cases were belonged to higher educated mother, and the higher percentage of patients were those of mothers who aged from 20-29 years.<sup>28</sup>

On the other hand, Dawood and Khudhair were performed another descriptive correlational study in Baghdad using Indian measures on 78 patients. They reported that age at diagnosis was frequent at 3 years or more (61%), with mean age of 5.7 year. However, they found no relation between the severity of autism and the age and sex of the patient.<sup>29</sup>

At Psychiatry Unit of Al-Hakeem General Hospital in Al-Najaf, a study was performed on 100 children with different psychiatric disorders using DSM-IV classifications. Autism spectrum disorders were found in 59% of them. Authors reported that the frequency of high father education was in 65% of them, while that of mother education was in 79% of them with a good association between the high family outcome and frequency of ASD in these children.<sup>30</sup> Moreover, a good association between the history of consanguinity and frequency of these disorders was reported among these children, language delay, and mental retardation. Beside a relation between the language delay, mental problems, and poor perinatal outcomes was found.<sup>30</sup>

Al-Dujaily have reported 61% of them were belonged to family of less than 5 persons (nuclear family).<sup>30</sup> Another work in Baghdad conducted on 120 parents of autistic patients via a constructed questionnaire. Author found that the majority of these children was 1<sup>st</sup> baby in the family and reported that the age of diagnosis was 3-6 years.<sup>31</sup>

A strong association between ASD and increased paternal age (more than 40 years) was found in a work of Tawfeeq *et al.* on 200 children from Baghdad. Authors reported that autistic features are related with history of maternal unhappiness (odd ratio=7). On the other hand, another risk factor of ASD were reported as history of postdate pregnancies (was found in 14% of autistic patients), history of neonatal jaundice, history of bottle feeding, history of diabetes in mother, family

history of ASD, and history of worked mother. All these were significantly associated with ASD.<sup>32</sup>

Finally, Dawood and Khudhair have conducted an assessment of quality of life of families of autistic children depending of data of 78 fathers and 78 mothers in Baghdad with reporting a decrease in their psychological wellbeing and environmental comfort.<sup>33</sup>

In fact, the current review revealed a paucity of researches on the autoimmune studies, imaging studies, environmental toxins researches and those concerning with the mitochondrial dysfunction in cases of ASD.

To the best of our knowledge, there is no review article that discussed the ASD in Iraq. In addition, our search revealed that there is no article that focused the prevalence of these disorders in Iraq (in general or in any province in Iraq). Beside the fact that there is no research that concerned with the treatment outcome of these disorders.

Field of article	No. (%)
Molecular	5 (21.0%)
Immunological	2 (8.6%)
Oral health	4 (17.3%)
Biochemical	5 (21.0%)
Feeding and nutrition	1 (4.3%)
Clinical	9 (60.0%)
Review	0 (0.0%)
Mitochondrial dysfunction	1 (4.3%)
Imaging	0 (0.0%)
Total	23 (100%)

Table 1. Distribution of studies according to their topics across Iraq.

## DISCUSSION

Scientific works are crucial to obtain effective approaches to eliminate the magnitude of diseases. Majority of publications concerning with ASD has been performed in societies that used English language in their communications, which have excellent support services.<sup>34</sup> Primary diagnostic researches have been done while those discussing on the presented services in developing societies are still in their early stages.

Authors	Type of study	Method	Main results
Karmeet <i>et al.</i> <sup>11</sup>	A case-control study	Polymerase Chain Reaction (PCR)	Two common SNPs (rs3779031 and rs3779032) in CNTNAP2 were markedly associated with ASDs, where the frequencies of these SNPs were relatively high.
Al-Jashammy <sup>12</sup>	Case series study	Polymerase Chain Reaction (PCR)	Observations do not support the presence of association between the 5-HTT gene variant and ASD
Yassin <i>et al.</i> <sup>13</sup>	A case control study	Polymerase Chain Reaction (PCR)	An association of the shown SNPs with autism, particularly the SNP located in exon 2 with consideration that it changed the polypeptide 3-dimensional structure, thus it could possibly alter its function
Kareem <i>et al.</i> <sup>14</sup>	Case series study according to DSM-5	Fluorescent HPLC amino acid analysis	Phenylketonuria is one of the causes of ASD
Al-Ansari <sup>15</sup>	Case series study	Polymerase Chain Reaction (PCR)	Absence or deletion of GSTM1 genotype in autistic children is more than presence. GSTM1- null genotype is associated with the ASD but not as a risk factor for them

Table 2. The main characteristics of the studies on molecular aspect in Iraq.

Access to efficient therapy is relatively limited, with maximum burden of care rests on family members.<sup>35</sup> Published works on child psychiatry in the Arab region (including that concerned with ASD), were found to be limited,<sup>36</sup> which support the concept that autism is uncommon in these countries.<sup>37</sup> It is vital to consider the field of ASD as priority for research makers in Arab countries (including Iraq) in order to facilitate the characterization and services for the children suffered from this disorder of this region. For this reason, we tried to highlight the articles that discussed ASD in Iraq and to focus the topics that recommended for future.

This work revealed that autism in Iraq is still underestimated. In general, this could be also assumed for other Arab countries. The field of psychiatric disorders is considered as recent in Arab region. Moreover, the articles that recognized the prevalence of these disorders are lacking.<sup>9</sup> That could be due to the deficiency of funding support or due to war conditions (as in Iraq).

Iraqi culture and family is more accommodated to behaviors in children than that in western region and that play a role in the delay in diagnosis of their

disorders and in the paucity of research on them.<sup>38</sup> Arab societies are characterized by increased frequency of consanguineous marriages, high support for nuclear families by their extended families, and consequently high accommodation rate for looking after of mentally ill individuals, especially children.

To the best of our knowledge this is the first article that tried to gather the scientific works that discussed the autism in Iraq. There is a real need to focus and magnitude this problem because it represents a multiple problem medically, socially, and financially in this country. On the other hand, this review revealed that the majority of articles was concerned with the cause of autism in comparison to those discussed the applied treatment and services. These findings are similar to those of others. They attributed that to the advancement in the level of medical field (with consideration of this type of this disease) compared to that of education and rehabilitation.<sup>9</sup> There is a need for developing programs to prevent defects in practice. In general, there are no differences in the etiological factors (environmental or ethnic) between various countries. This is in accordance with previous research.<sup>39</sup>

Study	Type of study	Methods	Important results
Al-Kiki. <sup>26</sup> 2011	A descriptive analytical study (questionnaire)	Not mentioned	There are frequent behavioral appearances of children with ASD from their parent's opinion
Al- Shimeryet <i>et al.</i> <sup>27</sup> 2011	A cross-sectional study	ICD-10 criteria	Communication abnormality, social abnormality and behavioral abnormality are the main clinical features of ASD and the communication abnormality were the most frequent one
Lazam <i>et al.</i> <sup>28</sup> 2013	A descriptive analytical study (questionnaire)	Not mentioned	Planned problem solving protocol has the higher chance of use by parents of autistic children with seeking of social support. Educational level of parents was obviously related with using of positive coping strategies
Dawood and Khudhair. 2015 <sup>29</sup>	A descriptive correlational study (a parent-completed questionnaire)	Indian Scale (ISAA)	All autistic children suffering from similar behavioral disorders with different degrees of severity no marked relationship between the severity of autistic behavior and the child's age or gender
Al-Dujaily. 2015 <sup>30</sup>	A semi-structured questionnaire and structured diagnostic interview	DSM-IV classifications	frequent co-existence of ASD with other psychiatric disorders
Mohammed. 2015 <sup>31</sup>	A descriptive-analytical study	constructed questionnaire and the process of the self-administrative report.	A marked negative relationship between parents' ages with family type. A positive association between parenting stress, child's sex and birth order
Tawfeeq <i>et al.</i> 2016 <sup>32</sup>	A case-control study (questionnaire)	Not mentioned	ASD has related with paternal age, psychological maternal issues, postdate, neonatal jaundice and bottles-feeding
Dawood and Khudhair.2016 <sup>33</sup>	A self- administrative questionnaire	Not mentioned	Mothers were showed low levels of psychological, physical well-beings, and environmental comfort

Table 3. The main characteristics of the studies on clinical aspect in Iraq.

Further, this study showed that there is an absence of imaging studies on this disorder in Iraq. These findings are in accordance with those in other Arab countries; this may be due to the obstacles in performing this type of research as the patients need anesthesia. Sometimes, patients could have MRI previously or computed tomography scan, but there is a defects in the organization of methods to services as well as in document system making losing of the information of majority of them.<sup>9</sup>

The present study showed that male to female ratio in Iraq was consistent with those of others from Arab Gulf countries and even from elsewhere showing male predilection.<sup>34,40</sup> In fact, no exact cause till now, however, female children may mask their behavioral problems compared to male.<sup>41</sup> In addition, cultural factor may play a role as Arabic societies may pay more attention to the male in comparison to females. There is difficulty to report the behavioral problems in females as the burden

of reporting falls on their parents who refuse such reports. There is a need to explain the causes behind the male dominance. However, a descriptive study in Iraq revealed no relation between the severity of autism and the sex of child.<sup>29</sup>

This review showed that language delay is the hallmark of autistic children in Iraq followed by features of hyperactivity. These findings are similar to those of other studies,<sup>42</sup> however, there is increased frequency of epilepsy in Saudi children, and that could be attributed to genetic factors, developmental and perinatal problems.<sup>35</sup>

On the other hand, the range of age of autistic children in Iraq was 3-6 years. These observations were in accordance with those of others.<sup>41,43</sup> The culture of the societies, variability in the orientation of these societies toward the issues of ASD may play a role in the differences of age at diagnosis of such complaint.

This review revealed that this disorder has significant relation with higher maternal age, educational levels of both parents, level of their employments, and increased family awareness. These findings are similar to those of others.<sup>44,45</sup> Presence of family history of ASD was shown to be markedly related with the liability for autism as reported in an Iraqi study. This finding is similar to those of others.<sup>40,46</sup> Moreover; this review revealed that frequency of autism is higher in children who had history of perinatal complications, postnatal factors, jaundice, and bottle feeding. These observations are in accordance with those of other studies.<sup>44</sup>

On the other hand, in the last 4 years there is overwhelming concern of genetic studies on autism in Iraq; however, they were characterized with limited sample size and that may be due to the difficulty to perform such works.<sup>9</sup> In fact, there is a real need to perform more extensive works on genetics in Iraq as there a history of autism among children who had a history of consanguinity as shown in a study from Iraq.<sup>30</sup> The raised frequency of autism among families represents the need for genetic screening.<sup>9</sup>

This study revealed that some study mentioned the scales used for the diagnosis of autism while other did not. In fact, there is a defect in performing this point. It is vital to prepare training programs for clinicians in the core sign and symptoms of autism, diagnosis and treatment as early detection is crucial.

In general, there is a defect in researches in different fields as those which concern with mitochondrial dysfunction, biochemical levels in Iraq in comparison to those of Arab Gulf societies,<sup>47</sup> may be due to the war conditions, paucity of official centers, and difficulty in sampling even for those of control groups.

## CONCLUSIONS

In conclusion, recently, there is raising concern in these disorders in Iraq, markedly in Baghdad. There is an evidence of increased frequencies of works on this field in the last four years. Authors must concentrate their efforts on the magnitude of such problem and increase public orientation to gain awareness of policies makers to the requirement to employ the concept of evidence-based services for autistic patients. Researches on autism in Iraq (as those of other Arab countries) are still in their infancy with great needs for organization efforts to be fruitful. Further works is necessary to determine the most effective policies to improve diagnosis and service delivery in the context of a given country, culture, and governmental structure.

We face difficulties to make access of articles on this disorder in Iraq in both local and international journals as there is a defect in pooling system. Efforts should target collaboratively the increasing awareness of the community toward this disorder to facilitate early consultation and diagnosis. Moreover, centers must be established to be available and accessible to diagnosis and treatment that comes in harmony of the burden of such disorder.

Specialized governmental agencies should provide supports for autistic children as there is scarce center for them. Ministry of higher education and scientific researches in Iraq should perform training programs for teachers with the essential skills needed.

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