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# Individuals With Autism Spectrum Disorders In Jordan An Overview Of The LiteratureNBlogs of Civil Servants of the Republic of Tatarstan in Social

**By**

**Muna Abualhoul**
Student, Faculty Of Medicine, Universiti Sultan Zainal Abidin, Kuala Terengganu, Terengganu, Malaysia,

Email: M.abualhoul@yahoo.com,

**Abdallah Amayreh**
Registered Nurse, Emergency Department, Ministry of Health, Jordan
Email: aameera82@gmail.om

## Abstract

ASD is a lifelong neurodevelopmental disorder characterized by persistent impairments in social communication interactions (SCI) and restricted and repetitive behaviors or interests (RRBI), with a continuous prevalence rise globally. The Arab Nations consists of 22 member nations with numerous articles published on ASD. Jordan is one of the most notable Arab countries in the research field of ASD. This review aimed to locate and combine all Jordanian articles published on ASD in Jordan in the last five years and analyze them to shed light on the limitations and challenges of ASD research in Arab nations. Researchers in Jordan have published 17 articles in the last five years involving a total Jordanian sample of 2115 individuals, investigating various issues such as knowledge, etiology, therapy, and diagnosis tools. Consequence recommendations from this review suggest that Arabic scholars must collaborate to bridge the gap in research, particularly on the diagnosis of ASD, screening, prevalence, awareness, early detection, early intervention, and treatment. They recommend that centers follow the scientific-based guidelines to diagnose and manage the quality of service for ASD, increase their capacity to accept more children in their programs, and highlight the inclusion of ASD in educational streams.

**Index Terms**—Autism Spectrum disorder (ASD), Arab nations, Jordan.

## Introduction

Around 1910, the term "autism" was used for the first time to describe significantly reclusive schizophrenia patients [1]. Over the years, researchers from different disciplines have used terms like psychiatric, mental, developmental, or behavioral difficulties to define autism spectrum disorder (ASD).

Autism spectrum disorder (ASD) is considered a lifelong neurodevelopmental disorder characterized by persistent impairments in social communication interactions (SCI), as well as restricted and repetitive behaviors or interests (RRBI) [2]. Over the past three decades, ASD has affected about 1–2% of children globally [3], and ASD prevalence has increased across the world without exception, crossing all social, racial, and ethnic lines [4]– [7].

The Arab world consists of 22 member countries in the Middle East and North Africa, including Jordan is a country in Western Asia. According to the Department of Statistics, its

population will reach 11 million in 2022, making it the eleventh-most populous Arab country. In terms of overall research, it is one of the Arab nations with record studies on ASD [8]– [10]. Due to the research gaps in the field of ASD and the challenges that Arab nations face in conducting research [9]– [12] the authors thus aimed to gather all available articles published on ASD in Jordan in the last five years and analyze them to shed light on which areas of research need to emphasize the flaws and challenges in ASD research in Arab countries.

***Research Review On Arab Countries***

The number of studies on ASD is significantly low in Arab countries 13], despite years of progress in the ASD field [10] However, there are six reviews published on ASD research in Arab countries from 2013 until 2022 [11], [12], [14], [9], [10], and [15].

To begin with, Hussein and Taha (2013), found most of the research concerned the potential etiologies of ASD. After reviewing 75 articles on ASD published in all Arab countries between 1992 and 2012 [11]. In the second review in 2014, the reviewers specified their review of Arab Gulf countries (United Arab Emirates, Bahrain, Kuwait, Saudi Arabia, Qatar, and Oman), underlining the results of the restricted number of epidemiological studies [12]. After that, in 2015 third review found a lack of research on inclusive education in Arab countries. After reviewing 42 studies from 1990 to 2014 on the inclusion of children with developmental disabilities in Arab countries [14]. The fourth review revised 142 published publications in Arab countries in diverse fields and addressed the infrequent research focused on intervention and support for ASD [9]. Furthermore, the fifth review conducted a systematic scoping review of 70 papers on social, educational, and psychological research in Arab countries for individuals with ASD and their family members. The results show significant gaps in research related to ASD interventions and services [10]. Finally, a recent systematic review of 24 studies aimed at the impact of ASD on parents in 10 Arab countries found the majority had a significant negative consequence on the mental health and well-being of Arab parents. [15].

Some reviews covered all Arab countries, while others focused on a small number of countries or ASD-related issues. As a result, a gap necessitated collaborative efforts among Arab researchers to serve individuals with ASD and their families.

***Research On Jordan***

In Jordan, many researchers published articles on ASD involving 2115 Jordanian participants. They investigated a range of topics, including knowledge, etiology, treatment, and diagnostic studies. Table 1 contains a summary.

**Table 1:** *Summary of Research on Jordan*

| Field of research | Publications findings | Sample size | Publication Ref |
|---|---|---|---|
| Knowledge | 7 | 1185 | Alshatrat SM. et al., 2020 [16]Alshatrat SM. et al., 2021 [17]Masri AT. et al., 2020 [18]Alnazly & Abojedi., 2019 [19]Shattnawi KK. et al., 2021 [20]Alqhazo MT. et al. 2020 [21]Alkhalidy H. et al. 2021 [22] |
| Etiologic | 5 | 698 | Alzghoul L. et al. 2019 [23]Alzghoul L. et al. 2019 [24]Al-Omari, et al. 2020 [25]Rashaid, et al. 2021 [26]Rashaid. et al. 2022 [27] |
| Diagnostic tools | 2 | 72 | Hadoush et al. 2019 [28]Hadoush et al. 2019 [29] |
| Treatment | 3 | 160 | Hadoush et al. 2020 [30]Alkinj. et al. 2022 [31]Rayan & Ahmad 2018 [32] |
| Total | 17 | 2115 | |

***Research on knowledge***

Knowledge about a particular subject is a body of data made up of facts and abilities collected through education or experience. Therefore, we must create a solid foundation of knowledge for ASD to facilitate future consequences, support them, and provide appropriate and quality services. Seven studies in Jordan were published [16] - [22].

Two articles targeted dental services for children with ASD to determine the barriers that affect their access to dental care and parental perception of health quality of life in children with ASD [16], [17].

Begin with a case-control article among 296 parents/caregivers of individuals with and without ASD. This investigation aimed to address the challenges to oral care faced by individuals with ASD in Jordan. They discovered that toothaches were the leading cause of dental visits, despite several barriers such as stigma, a lack of dental specialists, and inadequate facilities [16].

Furthermore, the second article recognized children with ASD's oral health among 147 parents of individuals with ASD and 149 without ASD's oral health knowledge and dental behaviors. So, the results from a case-control study found a significant lack of oral knowledge that influenced their dental behaviors [17].

Two articles focus on the psychological impact and challenges faced by parents with ASD [19], [20].

The first article investigated psychological distress for 123 Jordanian parents of children with ASD. After conducting a cross-sectional design, they found mild levels of burden, negative life changes, and borderline depression and anxiety [19].

In 2021, the second article explored the perspectives of 14 Jordanian mothers with ASD children through semi-structured interviews to discover the mother's challenges. The findings emphasized three primary issues: the difficulty of diagnosis, the physical and psychologically devastating impact of care, and the financial and societal repercussions [20].

One article aimed to examine phonological and lexical skills. They used two tests the JISH Articulation Test (JAT) and the JISH School Readiness Screening Test. They evaluated 39 Jordanian children with ASD who fulfilled the inclusion criteria (functions ranging from very high to very low using the Diagnostic and DSM-5) and compared them to 40 children with typical development. They discovered that children with ASD had phonological and lexical abilities below age-appropriate levels [21].

An additional article investigated the parental use of conventional therapies and complementary and alternative medicine (CAM) by interviewing 274 parents in Jordan. They found that 129 parents used CAM; the most common medications used were those to treat associated symptoms (such as hyperactivity and sleep aid); dietary modification was a casein-free diet; the supplement was fish oil (Omega-3) [18].

The last article investigated the nutritional status of children with ASD in a case-control study that included 52 children with ASD and 51 without ASD. After cases met the inclusion criteria of no chronic disease or intake of supplements (vitamins and minerals) for the last two months, they analyzed weight and height, dietary intake for three days, and blood samples. After data analysis, they found a slight difference in children with ASD. But there were significant

gender-based differences (i.e., girls with ASD had a higher risk of inadequate carbohydrate intake, while boys were at a higher risk of vitamin E, vitamin K, and fluoride) [22].

***Research on etiology***

Five articles have been published on this topic in Jordan and address various significant issues [23] - [27].

Two Jordanian studies explore the etiology of ASD; both papers compare the plasma levels of individuals with ASD with those without ASD [23], [26]. The first article aimed to identify a possible association between interleukin-6, -8, -9, and -10 and tumor necrosis factor-alpha in ASD among Jordanian children; they compared 80 samples of plasma for children with ASD with unaffected 51 siblings and 86 unrelated healthy individuals. The results showed that interleukin-8 and tumor necrosis factor-alpha were elevated only in children with ASD [23]. The second article targeted two biomarkers in plasma biomarkers (thiamine and histamine) for 43 children with ASD who met inclusion criteria (diagnosed by DSM-5 and CARS, Jordanian, with no chronic illness or medications, and on a Mediterranean diet) compared to 42 control children. The result showed that thiamine was significantly lower in the plasma of children with ASD [26].

In 2020, one article focused on the genetic variations in the human genome related to individuals with ASD. They tested the serum levels of oxidant and antioxidant status along with analysis of MTHFR C677T polymorphism (rs1801133) for 25 with ASD and 25 without ASD. According to the findings, people with ASD had significantly different serum levels due to the MTHFR C677T polymorphism, lower amounts of cysteine, folate, and vitamin B12, and higher levels of oxidative stress [25].

An additional article analyzed the effectiveness of vitamin D through both genomic and non-genomic mechanisms in children with ASD. They assessed the relationship between vitamin D deficiency and ASD by comparing 83 children with ASD and 106 without ASD. The final result displayed significantly low vitamin D levels in ASD, also gastrointestinal (GI) complaints [24].

The last article analyzed the scalp hair of 57 children with severe ASD and 50 children without ASD, two heavy metals (Al and Pb), and seven trace elements (Mg, K, P, Ca, Zn, Cu, and Fe). The results indicated that the ASD group had significantly higher levels of Al, Pb, and K and lower levels of Mg and Zn for children with ASD [27].

***Research on diagnostic tools***

This review included two articles on a diagnostic tool, which were part of numerous trials conducted globally looking for a sensitive tool to detect ASD by healthcare professionals [28], [29].

The first article examined electroencephalogram (EEG) to identify the severity of ASD through two papers. One paper uses EEG's multiscale entropy (MSE) to investigate the complexity of children with mild and severe ASD brains; in this cross-sectional study, 36 ASD children were 18 for two groups [28]. The second article in the same year specified the analysis of using empirical mode decomposition (EMD) and second-order difference plots (SODP) in EEG. The resting-state EEG data from 36 children, equally divided into two groups of mild and severe ASD, were collected and analyzed [29].

The results of both publications' studies validated using the EGG as a sensitive method for determining the degree of ASD severity by healthcare professionals [28], [29].

***Research on treatment***

Even though there is no evidence-based treatment for ASD, researchers continue to seek a cure for ASD in their articles. There are only three research articles on this topic; two focused on ASD children and one on ASD families [30] - [32]

The first article attempted to identify the potential therapeutic effect of bilateral anodal transcranial direct current stimulation (tDCS) for 50 children with ASD, randomly and equally divided. The children who attended ten sessions of 20-minute duration showed improvements in their sociability, behavior, health, and physical conditions [30]. The second article investigated the effectiveness of an academic program based on multiple methods, including social stories, animated video modeling, and video self-modeling, to improve the social communication skills of children with ASD. They showed a noticeable improvement in social skills for six Jordanian students with ASD [31].

The only article focused on supporting families with children with ASD families. The third article remarked on the role of trait mindfulness in Jordanian parents of ASD children. In this study, 104 parents of children with ASD indicated the possibility of trait mindfulness strategy to reduce their psychological suffering [32].

# Conclusion

Researchers in this review enrolled 2115 Jordanians who contributed knowledge, etiology, diagnostic tools, and treatment. The majority of publications were seven articles on knowledge research of ASD involving 1185 individuals from Jordan.

Autism spectrum disorder is a permanent neurodevelopmental disorder. For many reasons, ASD causes numerous difficulties for children and their parents. Arab researchers are more involved in and growing in ASD [11], which also highlights some limitations in [12], specific issues such as the preference for publishing in the Arabic language and the difficulty in accessing Arabic literature for electronic databases [33]. In addition, each Arab nation has a unique identity, with dietary and lifestyle practices that may play a preventative or possibly element role in developmental disorders [11].

Simultaneously, the researcher's preference to include specific issues without comparing them to others as etiology [11] leads to a significant gap in research, particularly on ASD treatment and services [10] as a single article in 2011 considered the prevalence in Jordan [34] with no any article about screening. Consequently, to bridge the gap in research, particularly on the diagnosis of ASD, screening, prevalence, awareness, early detection, early intervention, and treatment, Arabic researchers must work together due to the time gaps between studies and the diversity of topics on ASD.

Many articles highlight the challenges for individuals with ASD and their families. Nevertheless, the common barriers are a lack of specialized resources and physical, economic, and social welfare [20]. That might deteriorate the quality of life for individuals with ASD and their families if they are delayed in diagnosis or left without treatment.

Most parents prefer their children to attend schools for typically developing children rather than be referred to special schools [35]. Accordingly, the foremost recommendations are

to follow the scientific-based guidelines for centers, diagnose, and manage the quality of service for ASD, increase their capacity to accept more children in their programs, and highlight the inclusion of ASD in educational streams.

***Conflict of interest statement***

***This review is absent of any potential conflict of interest.***

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