



Autism Prevalence and Severity in Bedouin-Arab and Jewish Communities in Southern Israel

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Abstract

The vast majority of autism spectrum disorder (ASD) research focuses on Caucasian populations in western world countries. While it is assumed that autism rates are similar across ethnic groups regardless of genetic background and environmental exposures, few studies have specifically examined how autism prevalence and severity may differ between majority and minority populations with distinct characteristics. Therefore, we evaluated ethnic differences in ASD prevalence and severity of Bedouin-Arab and Jewish children in the south of Israel. We compared demographic and clinical characteristics of 104 children from a Bedouin-Arab minority with 214 Jewish children who were referred to the main ASD clinic in Southern Israel with suspected communication disorders. Data were obtained from medical records. Jewish children's referral rates were almost 6 times more than that of Bedouin-Arab referral rates (21:1000 and 3.6:1000, respectively). The percentage of high functioning children with ASD was much higher in Jewish than in Bedouin-Arab children (29.6 and 2.6%, respectively). Bedouin-Arab children showed more severe autistic manifestations. Moreover, Bedouin-Arab children were more likely than Jewish children to have additional diagnosis of intellectual disability (14.5 and 6.9%, respectively). Autism prevalence and severity differs markedly between the Bedouin-Arab and Jewish populations in the south of Israel. Most striking is the almost complete absence of children with high-functioning autism in the Bedouin community. A better understanding of the causes for autism prevalence and severity differences across ethnic groups is crucial for revealing the impact of multiple genetic and environmental factors that may affect autism development in each group.

Keywords ASD · Minority · Children

Introduction

Autistic spectrum disorder (ASD) is a heterogeneous neurodevelopmental disorder that has a multi-factorial etiology including autism risk genes as well as environmental, perinatal risk factors, influencing early brain development.

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Autism is a spectrum disorder, meaning that there is a wide range of variation of manifestation. ASD severity on this spectrum is based on social communication impairments and restricted repetitive patterns of behavior. In OECD countries the prevalence of ASD is rapidly growing. However, prevalence studies of ASD among minorities and immigrants in western cultures suggest that these populations have significantly lower rates of autism than the majority population (Pedersen et al. 2012). Previous research has shown differences in the presentation of symptoms between cultures, ethnic groups and nationalities (Matson et al. 2011). Furthermore, differences in the severity of ASD were found to be affected by cultural differences in the U.S, even after controlling for socioeconomic status (Jarquin et al. 2011). This pattern of findings gives rise to the question whether these differences reflect actual socio-cultural differences in risk of ASD and its manifestations, or rather differences resulting from differences in utilization of healthcare and likelihood of detection. The possible effect that ethnicity might have on referral, diagnosis and severity of ASD in Muslims and other ethnic minorities has not been studied in depth (Al-Farsi et al. 2011).

Bedouin-Arabs are a subgroup within the Arab minority in the State of Israel, with cultural, historical, social and political uniqueness. Infant mortality, birth defects and hereditary diseases are common among the Bedouin-Arabs, mainly due to consanguinity. The Bedouin-Arab population ($n = 222,400$) in 2013 (State of Israel 2014), comprised 32% of the citizens in the Southern Israel and accounted for more than half of the births in the district. Their total fertility rate is 6.8 children per family in comparison with 2.96 in Jews (State of Israel 2010). While legally prohibited, polygamy is prevalent within the Bedouin-Arab society. It is estimated that approximately 23% of marriages are polygamous (Daoud et al. 2014). Consanguinity is also common within the Bedouin-Arab society (44.8% of all marriages) (Na'amnih et al. 2014). The Bedouin-Arab population is ranked at the bottom of the socioeconomic ladder in Israel (Binyaminy et al. 2016). Reproductive patterns in the Bedouin-Arab society in southern Israel are characterized by high fertility, short inter pregnancies intervals, (Ratzon et al. 2011) deficiency of important micronutrients (Bilenko et al. 2014), and poor compliance with recommendations for folic acid and vitamin D supplements (Treister-Goltzman et al. 2015). As all Israeli citizens, Bedouin-Arabs' health care is covered by universal national Health Insurance Law in Israel since 1995. Maternal and child health clinics as well as curative primary health clinics are available and accessible. Tertiary care, as well as specialty clinics are available at Soroka University Medical Center. Soroka Preschool Psychiatric Unit (PPU) is the central clinic for preschoolers in Southern Israel, where most children with suspected communication disorders are referred. Evaluation process is done by a team

of clinicians, and final diagnosis by a Child Psychiatrist. Our study investigated differences in prevalence and severity of ASD in an ethnically mixed population, focusing on a comparison between children from an indigenous Muslim minority and children from the Jewish majority population.

The study received ethics approval from the Soroka Medical Centre Research Ethics Board. The authors certify that they have no affiliations with or involvement in any organization or entity with any financial or non-financial interest in the subject matter or materials discussed in this manuscript.

Methods

Study population included all children born between 2006 and 2012 who were referred to the PPU with a suspected communication disorder, between the years 2007 and 2014 ($n = 321$). Data were derived from the PPU database. Three children from mixed families of Jewish and Bedouin-Arab origin were excluded, resulting in a study population of 318 children. Diagnoses were made according to 4th ed., text rev.; DSM-IV-TR; American Psychiatric Association Diagnostic and Statistical Manual of Mental Disorders 2000, and verified according to Diagnostic and Statistical Manual for Mental Disorders (5th ed., DSM-5; American Psychiatric Association 2013).

Demographic data included birth date, ethnicity, gender and consanguinity. Clinical data consisted of the following:

1. Using the Diagnostic and Statistical Manual for Mental Disorders (5th ed., DSM-5; American Psychiatric Association 2013) Severity level of ASD rated in 3 categories according to the required support: "Requiring very substantial support", i.e. severe deficits in verbal and non-verbal social communication skills causes severe impairments in functioning, very limited initiation of social interactions, and minimal response to social overtures from others. "Requiring substantial support". Marked deficits in verbal and nonverbal social communication skills; social impairments apparent even with supports in place; limited initiation of social interactions; and reduced or abnormal responses to social overtures from others. "Requiring support" i.e. Without supports in place, deficits in social communication cause noticeable impairments. Difficulty initiating social interactions, and clear examples of atypical or unsuccessful response to social overtures of others.
2. Age at diagnosis.
3. Prevalence of behavioral symptoms (nominal definition).
4. Comorbidity.

The analysis is based on comparison of the two ethnic groups (Bedouin-Arabs and Jews).

All population data are based on the Israeli statistical abstract (State of Israel 2015). The statistical Abstract of Israel is an annual formal publication of the Israeli Central Bureau of Statistics based on mandatory birth and death notifications. All statistics were performed using SPSS version 18.0. Categorical variables were analyzed using 2-sided chi-squared tests. Continuous variables were compared using two-tailed, t tests. Statistical significance was set at $P < 0.05$.

Results

Referral rates to the PPU from the Jewish society were almost six times higher than referral rates from the Bedouin-Arab society. Of 52,214 Bedouin-Arab children born between 2006 and 2012 only 189 children were referred to the PPU, i.e. 3.6/1000 while of 51,908 Jewish children born in those years, 1091 were referred to the PPU, i.e. 21/1000.

Demographic characteristics of the Jewish and Bedouin-Arab children who were diagnosed with ASD are shown in Table 1 and reveal group similarities. Of referred children with a suspected communication disorder, 73% of Bedouin-Arab and 74% of Jewish children received an ASD diagnosis. Mean age at diagnosis was slightly higher among Bedouin-Arab than Jewish children, but the difference was not statistically significant. However, the two ethnic

groups significantly differed in the levels of ASD severity ($P < 0.01$) (Fig. 1). The majority of children (73.7%) from Bedouin-Arab origin got the most severe diagnosis: “requiring very substantial support”, and only 2.6% of them were diagnosed as high functioning ASD with the “Requiring support” category. Of the Jewish ASD children the level of support needed is evenly divided over the continuum, so that each category of required support is approximately one-third. Moreover, more Bedouin-Arab than Jewish children had an additional diagnosis of intellectual disability (14.5 and 6.9%, respectively; Table 1). Furthermore, the number

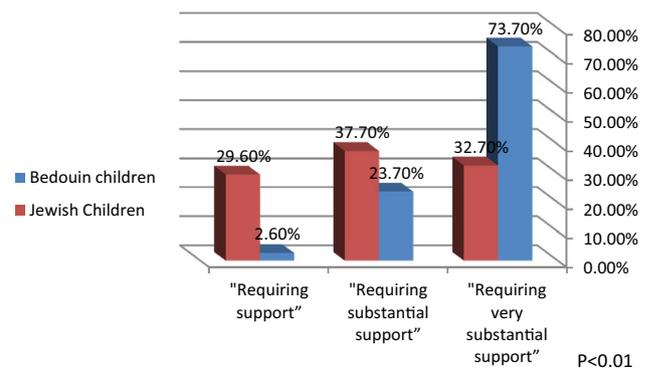


Fig. 1 Comparison of ASD severity, by ethnicity

Table 1 Characteristics of children referred to the PPU with suspected communication disorder by ethnicity

| | Entire cohort N = 318 | | | Children diagnosed with ASD N = 235 | | |
|-------------------------------------------------|-------------------------|-------------------------------|---------|-------------------------------------|------------------------------|---------|
| | Jewish children N = 214 | Bedouin-Arab children N = 104 | P value | Jewish children N = 159 | Bedouin-Arab children N = 76 | P value |
| Gender | | | | | | |
| Male | 175 (81.8%) | 75 (72.1%) | 0.049 | 136 (85.5%) | 59 (77.6%) | 0.132 |
| Female | 39 (18.2%) | 29 (27.9%) | | 23 (14.5%) | 17 (22.4%) | |
| Plurality | | | | | | |
| Singletons | 205 (95.8%) | 99 (95.2%) | 0.806 | 151 (95%) | 93 (96.1%) | 0.713 |
| Twins or triplets | 9 (4.2%) | 5 (4.8%) | | 8 (5%) | 3 (3.9%) | |
| Birth order | | | | | | |
| 1 | – | – | | 42% (67) | 18.5% (14) | 0.01 |
| 2–4 | – | – | | 56% (89) | 54% (41) | |
| 5+ | – | – | | 2% (3) | 27.5% (21) | |
| Age at diagnosis (months) | | | | | | |
| Mean (SD) | – | – | | 2.94 M 12.323 SD | 3.19 M 11.115 SD | 0.132 |
| Additional diagnosis of intellectual disability | – | – | | 11 6.91% | 11 (14.47%) | 0.063 |
| Severity | | | | | | |
| “Requiring very substantial support” | – | – | | 52 (32.7%) | 56 (73.7%) | 0.01 |
| “Requiring substantial support” | – | – | | 60 (37.7%) | 18 (23.7%) | |
| “Requiring support” | – | – | | 49 (29.6%) | 2 (2.6%) | |

of behavioral symptoms is significantly higher in Bedouin-Arab than in Jewish children (Table 2). More than half (56%) of the Jewish children with ASD had only two behavioral symptoms (the minimum required for an ASD diagnosis), while only 38% of the Bedouin-Arab ASD children had two symptoms and most of them showed three or four behavioral symptoms (43.4 and 18.4% respectively).

Consanguinity was found only in the Bedouin-Arab families in our study. When compared, to the estimates of consanguinity (44.8%) in the total Bedouin-Arab population in southern Israel (Na'amni et al. 2014), the prevalence found among the ASD families in our study Bedouin-Arab (73.3%) is significantly higher.

Discussion

This study compared Israeli Jewish and Bedouin-Arab children referred to the PPU clinic, serving most of the pediatric population of southern Israel. We found significant differences in referral rates, which were higher in Jewish than Bedouin-Arab children. Moreover, ASD severity was significantly higher in Bedouin-Arab—than Jewish children. Compared to Jewish children, Bedouin-Arab children had much less “high functioning ASD” and showed more severe autistic manifestations.

Several studies have shown higher proportions of low functioning children among those diagnosed with ASD in minority groups. The main question is whether this reflects different patterns of ASD incidence or rather a difference in referral pattern and utilization of services. In our study we found that while the difference in total ASD between Bedouin and Jewish children are compared there is a marked difference, but when referral rates of children diagnosed with severe ASD only are compared, the difference between Jews and Bedouin-Arabs is small. This reflect a marked difference in distribution of severity levels, suggesting that Bedouin-Arab children with less severe symptoms are probably less likely to come to medical attention, to be referred or to visit the PPU clinic.

Jarquin et al. (2011) that studied ASD in non-Hispanic black children in the US, suggested that the higher ASD severity found in ethnic minorities may be explained by

prevented or delayed intervention services that would have catered to their needs. A different viewpoint is expressed in a review examining a relationship between ethnicity, migration and prevalence of ASD, suggesting that the common denominator of higher incidence of low functioning autism might be maternal vitamin D deficiency during pregnancy which is common among women who customarily wear clothes that cover their bodies (such as Bedouin-Arab mothers), migrant women, and black women (Dealberto 2011). While this may be true, it seems more likely that cultural differences that do not recognize the child's difficulties as a medical problem or avoiding professional counseling for fear of stigma, may have influenced these results (Khowaja et al. 2015). It has also been postulated that mental health systems are seen among Arabs as representing Western values ignoring Islamic values (Al-Krenawi et al. 2009), which may affect Muslim families refraining from diagnostic and therapeutic services offered under the definition of “Psychiatry”, and lead to a pattern of seeking medical intervention only when the disorder is manifested in severe behavioral problems. It is therefore possible that the more severe presentation of ASD on the continuum in this ethnic group reflects social and religious preferences. Mahajnah et al. (2015) noted that despite the global rise in the prevalence of ASD, reports about the Arab world are still rare. This is underscored by our finding that only 15% of referrals to the PPU are from the Bedouin-Arab society, while Bedouin-Arabs comprise slightly more than half of children born in 2006–2012 in the district. We found higher percentage of comorbidity with intellectual disability among Bedouin-Arab children than in the Jewish group. This might be due to prevalent consanguinity that leads to a higher risk of genetic syndromes (Melamed et al. 2000), some of which are characterized by intellectual disability (Zlotogora and Shalev 2010).

Our research demonstrates that cultural factors must be considered in studies of ASD. Therefore more research is required to fully understand the impact of culture on autism prevalence. The Bedouin-Arab data available at the PPU database is an important source to studies such aspects of ASD. Our study is preliminary and has several limitations. The study population includes only children who were referred to the PPU and were diagnosed at this clinic. Such population does not necessarily constitute a representative sample of children with ASD as it is obviously biased in terms of the characteristics of children and families who chose to comply with medical recommendations. Furthermore, “Soroka” University medical center is a part of “Clalit” which is the largest HMO in Israel. “Soroka” provides medical services to the over one million residents of the region and The PPU is the only outpatient service of “Clalit” in Southern Israel. However, it is estimated that only 77.5% of the children in the southern districts are served by this HMO (State of Israel 2016). Another potential bias in

Table 2 Number of behavioural symptoms, by ethnicity

| Behavioural symptoms | Jewish children (N = 159) | Bedouin-Arab children (N = 76) | P value |
|---------------------------|------------------------------|-----------------------------------|---------|
| Two behavioral symptoms | 56% (18) | 38.2% (29) | 0.007 |
| Three behavioral symptoms | 30.8%(49) | 43.4%(33) | |
| Four behavioral symptoms | 12.6% (20) | 18.4% (14) | |

our sample may be caused by the characteristics of clinic's staff that is mainly composed of Jewish, Hebrew speaking professionals, and therefore results may not have captured adequately cultural nuances. Another limitation of the study is it's a retrospective, medical record-based study where only limited information is available on sociodemographic characteristic of the family.

In summary, our data demonstrate that Israeli Bedouin-Arab ASD children and Israeli Jewish children referred to a preschool psychiatry Unit and diagnosed with ASD exhibit differences in ASD severity. Our findings highlight the importance of contextual approach to differences in the study of ASD, and illustrate the need for training local professionals to help community-based screening and detection efforts, community education about ASD and available services to help children and their families, as well as culturally tailored supportive healthcare, particularly concerning milder ASD in minority groups.

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