

# Stress, anxiety, and depression among parents of children with autism spectrum disorder in Oman: a case–control study

Omar A Al-Farsi<sup>1</sup>  
Yahya M Al-Farsi<sup>1,2</sup>  
Marwan M Al-Sharbati<sup>3</sup>  
Samir Al-Adawi<sup>3</sup>

<sup>1</sup>Department of Family Medicine and Public Health, College of Medicine and Health Sciences, Sultan Qaboos University, Muscat, Sultanate of Oman;

<sup>2</sup>Department of Epidemiology, School of Public Health, Boston, MA, USA;

<sup>3</sup>Department of Behavioural Medicine, College of Medicine and Health Sciences, Sultan Qaboos University, Muscat, Sultanate of Oman

**Abstract:** Previous studies carried out in Euro-American populations have unequivocally indicated that psychological disorders of the CASD (caregivers of children with autism spectrum disorder) are marked with high levels of stress, anxiety, and depression. This finding has been attributed to the reaction of having to care for a child with neurodevelopmental disorders. While there have been reports on autism spectrum disorder in Arab/Islamic countries such as Oman, there is no study from this region, to our knowledge, reporting the performance of indices of stress, anxiety, and depression among CASD. This study aimed to examine whether there is variation in the performance of indices of stress, depression, and anxiety explored via Depression, Anxiety and Stress Scale 21 among CASD, caregivers of children with intellectual disabilities, and caregivers of typically developing children. All indices of stress, depression, and anxiety were higher in CASD compared to other caregivers in the control group. This study corroborates with other studies carried out in other populations that caring for children impacts the mental health status of caregivers. Therefore, there are strong grounds to contemplate the mechanism to help such a vulnerable group of family caregivers.

**Keywords:** stress, anxiety, depression, caregivers, autism, Oman

## Introduction

Previous studies from many parts of the world have indicated that the presence of a child with special needs such as autism spectrum disorder (ASD) in the household is likely to trigger “psychological burden” among significant others.<sup>1–5</sup> Psychological burden often manifests as anxious and catastrophic thinking, as well as various somatic complaints such as breathing difficulties, pounding of the heart, and sweatiness of the palms. These complaints have been encapsulated as symptoms of anxiety disorders. Foody et al<sup>6</sup> have examined the biological counterpart of anxiety among CASD (caregivers of children with ASD) such as adrenal and cardiovascular functions which in turn reflect the integrity of the hypothalamic–pituitary–adrenal axis. This study clearly has indicated that the indices of anxiety are higher among CASD compared to caregivers in the control group. Other studies, using various symptom checklists relevant for soliciting the presence of anxiety, as well as biological markers of anxiety, reported that such distresses are more common among CASD.<sup>7</sup> Indeed, from existing literature, it appears that psychological disorders of 15%–54% of CASD may be marked with symptoms of anxiety.<sup>8</sup>

In addition to an anxiety disorder, there is ample evidence that psychological distresses of CASD tend to be marked with gloomy mood, pessimism, anhedonia, and tendency

Correspondence: Yahya M Al-Farsi  
Department of Family Medicine and Public Health, College of Medicine and Health Sciences, Sultan Qaboos University, PO Box 35, 123 Al-Khoudh, Muscat, Sultanate of Oman  
Tel +968 2414 1134  
Fax +968 2441 3300  
Email ymfarsi@squ.edu.om

for lack of initiative. In psychiatric diagnosis, such distresses often fall under the umbrella of depressive illness. Studies have reported that CASD tend to exhibit a higher magnitude of various spectra of depressive symptoms. The prevalence of depression appears to be skewed toward higher magnitude among CASD, compared to caregivers of other developmental anomalies, or the general public.<sup>9–11</sup> While it is widely reported that CASD have more mental distress than caregivers of other groups, one empirical question stands as to whether psychiatric disorders stem from preexisting mental distress or trigger from the burden of caring for the child with ASD. Fairthorne et al<sup>12</sup> have reported that rather than preexisting mental illness, the burden of caring for the child with ASD has direct bearing on the development of psychological disorders among CASD. There is a vast research database comparing psychological distress among CASD compared to caregivers of children with other intellectual disabilities (CID). Yirmiya and Shaked<sup>13</sup> have reported that psychological distress is higher among CASD compared to other parents.

Davis and Carter<sup>14</sup> have examined the level of stress among CASD and reported a high level of “parenting stresses”. There are strong indications that the severity of impairment is strongly associated with parenting-specific stress.<sup>15,16</sup> Such parental stress is not effectless as some studies have indicated that it has implications on the quality of life.<sup>17,18</sup> Some studies have indicated that compared to the general population, CASD are likely to submit to the impulse of mental illness.<sup>19</sup> Furthermore, it appears that caring for a child with ASD has other negative repercussions. Fairthorne et al<sup>20</sup> have examined the records of mothers with liveborn children in Western Australia from 1983 to 2005 and reported that CASD not only have an elevated level of stress but are also likely to succumb to inflexibility and debilitating conditions such as cancer, and an increasing tendency toward early death. Such finding would warrant further investigation on the psychosocial variable for CASD in other parts of the world since ASD appears to be a global challenge.<sup>21</sup>

Mothers are usually the primary caregiver for children.<sup>22</sup> Nowadays, fathers also share the task of care responsibilities with their spouses.<sup>14</sup> It is worthwhile to note that father’s support leads to significant improvement in maternal well-being and lower levels of psychological distress.<sup>14</sup> Thus, including fathers in further research is necessary to give a complete picture about parental mental health. Recently, some studies included fathers to compare psychological distresses such as depression, anxiety, and stress between both parents in families having a child with ASD.<sup>16</sup>

While there is abundant literature on psychosocial variables related to ASD in various parts of the world, such undertakings are apparently rare in the Arabian Gulf countries, except in Saudi Arabia and Kuwait.<sup>23,24</sup> However, studies conducted in these countries did not include symptoms of anxiety in Kuwait; or stress in Saudi Arabia. Therefore, involving all symptoms in the Depression, Anxiety and Stress Scale (DASS) instrument is needed to have a complete picture regarding these psychological distresses in the region. Sultanate of Oman is one of the Arabian Gulf countries, lying on the tip of the southern end of Arabian Peninsula, and has an area of 309,500 sq km with a population estimated to be 3.8 million people; the country is classified by the World Bank as a “high-income economy” among the emerging economies.<sup>25</sup> Oman is one of the countries that fulfill the definition of the second phase of “epidemiology in transition”.<sup>26</sup> This implies that the country has moved from the “age of pestilence and famine” to the “age of receding pandemics” characterized by the onset of improved standards of living and quality of life. The fallout of such changes is an increased birth rate and pyramidal population structure with youth the majority in the population. The predominance of youth (below 18 years) in the population would mean that there is a high chance of having children with special needs. Recent epidemiological surveys indicate the emergence of various types of neurodevelopmental disorders including ASD.<sup>27,28</sup> Al-Farsi et al<sup>29</sup> have surveyed the prevalence rate of autism among all children aged 0–14 years in Oman. The study reported a prevalence rate of 1.4 per 10,000 of children detected to exhibit ASD, as quantified by the Childhood Autism Rating Scale (CARS). A possible explanation of this low prevalence rate is that the estimates are based on retrospective data. Many factors may contribute to substantial underdiagnosis and underreporting of ASD cases. The estimated prevalence is based on the reporting of symptoms of ASD by psychiatrists and parents. Previously, studies in Oman have examined various psychosocial variables relevant for the well-being of ASD. One study examined family CASD (n=150) from all the strata of society in terms of their perception of remedial services, utilization and perception of psychiatric services, and existence of financial strain, if any, for having ASD.<sup>30</sup> The study indicated that CASD tend to harbor negative views toward remedial and mental health services and many admitted to have financial stress. Other studies were conducted to explore the role of malnutrition, heavy metals, trace elements, and dietary factors in the etiology and manifestation of ASD in Oman.<sup>31–35</sup> In general, the etiology of autism remains unknown; however, there is

a consensus about the nature of the abnormalities related to brain structure or function.<sup>36</sup> Some researchers reported that the causes of autism are related to the genetic factors and others reported environmental factors.<sup>37,38</sup>

In another study, CASD were surveyed on their quality of sleep. Compared to other family caregivers, CASD were noted to report a high level of poor quality sleep.<sup>39</sup> It is not clear whether such predicaments translate into the psychological well-being such as indices of stress, anxiety, and depression. It is imperative that the performance of these indices is explored in Oman so that evidence-based interventions could be contemplated.

In order to lay groundwork for contemplating psychosocial interventions for CASD in Oman, researchers had three aims. The first aim of this study was to compare the sociodemographic indices between CASD and parents of non-ASD children. The second aim was to explore the performance of indices of stress, depression, and anxiety among CASD and parents of non-ASD children. The third aim was to delineate the relationship between ASD and indices of stress, depression, and anxiety after adjusting for potential confounders.

## Methods

The present case-control study was designed to examine stress, anxiety, and depression among parents of children with and without diagnosed ASD. The study was conducted over the period from November 2013 to June 2014. The study was approved by the Medical Research Ethics Committee at the College of Medicine and Health Sciences, Sultan Qaboos University. All the participants provided their written informed consent to be included in the study.

Parents in the current study were selected by convenience sampling from various places; the same sampling method was used at the schools and social centers. Three major locations were used to enroll the sample: Sultan Qaboos University Hospital (SQUH), schools, and social centers. Ascertainment of ASD diagnosis was made according to the CARS, Second Edition (CARS-2), which was developed using gold-standard criteria based on the *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition, Text Revision (DSM-IV-TR). Application of CARS-2 was first tested on randomly selected sample of 20 ASD children. The sample used for the development of CARS-2 was representative of the sample used in the study. The psychiatrist diagnosed all the ASD and ID cases and psychologists administered the CARS-2. Accordingly, all participants fulfilled the eligibility for diagnosis of ASD, exhibiting symptoms within

the triad of typical autistic traits: communication impairment, social deficits, and ritualistic interests. The ascertainment of clinical diagnosis was further corroborated with cross-checking the medical records of each of ASD and ID cases. The agreement between the clinical evaluations and medical records was high (Cohen's Kappa coefficient was 0.92), which reflected high reliability indices. Of a total of 122 ASD cases, 46 (37.7%) were labeled as Asperger's Syndrome, 42 (34.4%) were labeled as pervasive developmental delay not otherwise specified, and the remaining 34 (27.9%) were labeled as autism.

The majority of parents of children with ASD were from SQUH – Behavioural Medicine Clinic. SQUH is a tertiary care hospital that receives children with ASD from different secondary care hospitals. Most cases of ASD in Oman are referred to the SQUH. The remainder of parents of children with ASD were selected from Al-Wafa rehabilitation centers, Muscat Autism Center, Early Intervention Association, and the Association of the Welfare of the Handicapped Children. The total number of parents who were included in this study was 220 (107 fathers and 113 mothers).

Parents of children with other intellectual disabilities were selected as control subjects from Al-Wafa rehabilitation centers that are located in different regions in Oman (50 fathers and 59 mothers). The second control group was obtained from public and private schools and were parents with typically developing children (58 fathers and 67 mothers).

The DASS-21 was employed for the present purpose to tap emotional distress of CASD, CID, and caregivers of typically developing children (CTD). In a nutshell, DASS is equipped to tap three types of emotional dimension. One sub-scale of DASS solicits the presence of depression with items on dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest/involvement, anhedonia, and inertia. The item from the anxiety scale measures autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect. The items on stress scale assess the present level of arousal as orthogonal to relaxation. This scale also includes agitation and irritability.<sup>40</sup> DASS has been translated into various languages, including the presently employed Arabic version, and its psychometric properties have been found to be adequate in various populations including Arabs.<sup>41-46</sup> Each item is measured on a four-point Likert scale ranging from 0 ("Did not apply to me at all") to 3 ("Applied to me very much"). The total sum for DASS-21 is derived by summing the total scores of all individual items as detailed elsewhere.<sup>46</sup> There are 21 questions in DASS-21,

seven questions for each one of stress, anxiety, and depression. The rate was divided into normal or having symptoms of stress, anxiety, or depression.

When DASS was compared with Beck's Depression Inventory by using normal sample ( $n=717$ ), it has been found that DASS has a good concurrent validity ( $r=0.74$ ) and anxiety inventories ( $r=0.81$ ).<sup>40</sup> It has also had good reliability ( $r=0.96$  and  $0.80$  for the depression and anxiety subscales, respectively). For the present sample, Cronbach's  $\alpha$  was high for the three subscales:  $0.91$  for the stress,  $0.87$  for anxiety, and  $0.94$  for depression and  $0.92$  for total scale.

Data were obtained by one method from all parents, who completed the DASS-21 questionnaire by self-administered method. Consent form was attached with a questionnaire to obtain the consent signature from parents who participated in the study. All parents having a son or a daughter with ASD were diagnosed according to criteria of the DSM-IV-TR, and corroborated by using the CARS. The questionnaire was distributed to both parents if they had an appointment for their child. The questionnaire was also sent from rehabilitation autism centers to the parents.

The first control group was parents with a son or a daughter diagnosed with other intellectual disabilities and they were asked to provide written documentation of the child's diagnosis at the center visit. Different kinds of disabilities were included in the study such as Down syndrome, cerebral palsy, attention deficit hyperactivity disorder, and intellectual disability. The questionnaire was sent from rehabilitation centers to the parents to be filled out. The second control group was parents with a typically developed son or daughter who were studying in a private or public school. After arrangement with the administration of the school, the teacher put the questionnaire in the bag of children to give it to their parents, who then filled in the questionnaire and returned it via the children. Families were excluded if the child had any type of developmental disorders identified by the health card. Regarding the illiterate participants in all groups, educated sons/daughters read the questionnaire to their parents and their responses were documented after obtaining their written consent.

Chi-square analyses were used to evaluate the statistical significance of differences among proportions of categorical data. The nonparametric Fisher's exact test (two-tailed) replaced the chi-square test in cases of small sample size, where the expected frequency was less than five in any of the cells in two  $\times$  two tables. For assessment of differences in means of continuous variables, the Student's  $t$ -test was performed as parametric tests. The odds ratios and

95% confidence intervals obtained from logistic regression modeling were taken as the measures of association between parameters of interest. In order to enhance the statistical precision of the study, the  $P$ -values for significance of difference between case and control groups were obtained by comparing the combined total of the control groups, rather than separate control groups, with that of the case groups.

Allowing an error rate of 2.5%, the level of significance (type 1 error) of 1%, and 99% confidence interval, and with a priori estimate that 20% of parents would have the psychological distress, the computer program indicated that a sample size of 450 participants was required to achieve the objectives of our study.

All statistical analyses were performed using the Statistical Package for Social Sciences (SPSS) software (Version 20.0, IBM Corporation, Armonk, NY, USA). A significant association is considered if the 95% confidence interval does not include the value 1.0; and a cutoff  $P$ -value of  $<0.05$  is used for all tests of statistical significance in this study.

## Results

Table 1 shows the sociodemographic data of CASD, CID, and CTD. The control group was composed of CID and CTD. All sociodemographic characteristics were not significantly different between parents in the two groups (case group and control group). Fathers constituted approximately 47.4%, which was less than that of mothers (52.6%). The mean age (SD) of all parents was 39.7 (4.2) years. The majority (56%) of total parents were  $<40$  years. The mean age (SD) for CASD was 34 (4.7) years, and for the CID and CTD was 39.9 (3.5) and 31 (3.9) years, respectively. Compared to CASD, CID were proportionately older in age, while CTD were proportionately younger.

CASD and CTD were more educated than CID. Illiteracy was more prevalent among CID (20%) than CASD or CTD. CID who graduated from university were only 12.4%, while CASD and CTD were 39.5% and 54.8%, respectively.

The majority of CASD and CTD had an occupation, 60% and 70.4%, respectively. However, only 37.6% CID were employed. Therefore, the family monthly income for CID was less compared to the other two groups. CID who had monthly income  $>500$  Omani Rial (OMR; 1 OMR = 2.6 USD) were 43.8%, whereas parents with CASD and CTD were 73.2% and 83.9%, respectively.

Table 2 shows the data of CASD, CID, and CTD who have indicated psychological distress (stress, anxiety, and depression) or otherwise as measured by DASS-21.

**Table 1** Sociodemographic characteristics of participants – caregivers of children with autism spectrum disorder (CASD), caregivers of children with intellectual disabilities (CID), and caregivers of typically developing children (CTD) – Oman, 2014

Characteristics	Total (N=454) N (%)	CASD (N=220) N (%)	Control (N=234)			P-value*
			Total (N=234) N (%)	CID (N=109) N (%)	CTD (N=125) N (%)	
Parent						0.6
Father	215 (47.4)	107 (48.6)	108 (46.2)	50 (45.9)	58 (46.4)	
Mother	239 (52.6)	113 (51.4)	126 (53.8)	59 (54.1)	67 (53.6)	
Age						0.8
<40 years	254 (56)	124 (56.4)	130 (55.6)	39 (35.5)	91 (72.7)	
≥40 years	200 (44)	96 (43.6)	104 (44.4)	70 (64.5)	34 (27.3)	
Education						0.4
Illiterate	45 (9.9)	17 (7.8)	28 (12)	22 (20)	6 (4.1)	
High school	241 (53.1)	116 (52.7)	125 (53.4)	74 (67.6)	51 (41.1)	
University	168 (37.0)	87 (39.5)	81 (34.6)	13 (12.4)	68 (54.8)	
Occupation						0.5
Employed	261 (57.5)	132 (60.0)	129 (55.1)	41 (37.6)	88 (70.4)	
Unemployed	193 (42.5)	88 (40.0)	105 (44.9)	68 (62.4)	37 (29.6)	
Family monthly income (OMR)						0.06
<500	140 (30.8)	59 (26.8)	81 (34.6)	61 (56.2)	20 (16.1)	
500–1,000	123 (27.1)	57 (25.9)	66 (28.2)	24 (21.9)	42 (33.9)	
>1,000	191 (42.1)	104 (47.3)	87 (37.2)	24 (21.9)	63 (50)	

**Note:** \*P-value has been calculated to compare total cases and controls.

**Abbreviation:** OMR, Omani Rial.

CASD endorsed higher mean scores on the anxiety and depression, compared with CTD. Depression and stress scores were significantly higher in CASD than those of CID and CTD. Although anxiety scores were not statistically significant among case (CASD) and control groups (CID and CTD), the scores of CASD were higher than parents' of children in the control group. Among CASD, equal proportion (45.9%) of caregivers reported for having stress and anxiety, while 48.6% reported having depression.

In general, the number of parents who did not have stress (58.8%) was greater than parents who was greater

stressed (41.2%). Stress was higher in CASD (45.9%) than CID or CTD. The results showed that CID and CTD had approximately the same level of stress, whereas CID had more anxiety and depression than CTD. The number of anxious parents were generally lower than parents without anxiety. Anxiety was higher in CASD (46.1%) than in the control group (41.8%). Depression was more prevalent in the CASD than the control group. Depression symptoms were more prevalent in the CASD group (48.6%) than the control group (38.7%). Of the total, 43% of the parents had depressive symptoms, as shown in Table 2.

**Table 2** Stress, anxiety, and depression according to the types of caregivers (CASD, CID, and CTD) – Oman, 2014

Characteristics	Total (N=454) N (%)	CASD (N=220) N (%)	Control (N=234)			P-value*
			Total (N=234) N (%)	CID (N=109) N (%)	CTD (N=125) N (%)	
Stress						0.04
No	267 (58.8)	119 (54.1)	148 (63.2)	69 (63.3)	79 (63.4)	
Yes	187 (41.2)	101 (45.9)	86 (36.8)	40 (36.7)	46 (36.6)	
Anxiety						0.5
No	255 (56.2)	119 (54.1)	136 (58.2)	62 (57)	74 (59.2)	
Yes	199 (43.8)	101 (45.9)	98 (41.8)	47 (43)	51 (40.8)	
Depression						0.04
No	259 (57.0)	113 (51.4)	146 (62.3)	64 (58.7)	82 (65.6)	
Yes	195 (43.0)	107 (48.6)	88 (38.7)	45 (41.3)	43 (34.4)	

**Note:** \*P-value has been calculated to compare between total cases and total controls.

**Abbreviations:** CASD, caregivers of children with autism spectrum disorders; CID, caregivers of children with intellectual disabilities; CTD, caregivers of typically developing children.

**Table 3** Relationship between the status groups (CASD, CID, and CTD) as indicated by the global (DASS-21), Oman, 2014

Outcome	Crude analysis		Adjusted logistic regression*	
	OR (CI)	P-value	OR (CI)	P-value
Stress				
CTD	1.0		1.0	
CID	1.1 (0.7, 1.6)	0.3	1.0 (0.7, 1.7)	0.4
CASD	1.6 (1.1, 2.3)	0.03	1.5 (1.1, 2.4)	0.04
Anxiety				
CTD	1.0		1.0	
CID	1.1 (0.7, 1.8)	0.3	1.2 (0.7, 1.9)	0.5
CASD	1.3 (0.8, 1.6)	0.5	1.3 (0.8, 2.0)	0.2
Depression				
CTD	1.0		1.0	
CID	1.4 (0.8, 2.3)	0.2	1.2 (0.7, 2.1)	0.03
CASD	1.8 (1.2, 2.7)	0.01	1.7 (1.1, 2.8)	0.03

**Note:** \*Adjusted for children's age, children's sex, parents' age, parents' education, family monthly income, and parents' job.

**Abbreviations:** CASD, caregivers of children with autism spectrum disorders; CID, caregivers of children with intellectual disabilities; CTD, caregivers of typically developing children; DASS-21, Depression, Anxiety and Stress Scale 21; OR, odds ratio; CI, confidence interval.

Table 3 depicts both crude and adjusted analysis for stress, anxiety, and depression according to DASS-21 among three groups. After adjustment for possible confounding factors (sociodemographic data) by using multiple logistic regression, the association was statistically significant with depression and stress among parents in the three groups while not with anxiety. CASD appear to have more risk of depression and stress by 1.8 and 1.6 times, respectively, compared to CTD group. No statistical difference has been observed with anxiety between the CASD and CTD groups.

The association was highly significant between CASD and psychological morbidities such as depression and anxiety as shown in Table 4 ( $P=0.001$ ). In terms of sex, mothers suffer more of psychological morbidities than fathers among CASD. Odds ratio has been calculated after adjustment for sociodemographic data using multiple logistic regression such as sex and age of children, parents' age, job, education, monthly family income, and number of children. In the case group, mothers who suffered from depression were 3.4 times higher compared to that among fathers. Depression symptoms were more common than anxiety in CASD.

## Discussion

Examination of psychological burden and other psychosocial variables in nonwestern society has been hampered by various conceptual and cultural issues. It has been widely speculated that people living in nonwestern societies such as those in Oman do not express their distress as encapsulated in

**Table 4** Logistic regression analysis for CASD after adjustment for sociodemographic data, Oman, 2014

Outcome	Crude analysis		Adjusted analysis*	
	OR (CI)	P-value	OR (CI)	P-value
Stress				0.001
Father	1.0		1.0	
Mother	2.4 (1.6, 3.5)	0.0001	2.8 (1.6, 4.8)	
Anxiety				0.001
Father	1.0		1.0	
Mother	2.0 (1.3, 2.9)	0.001	3.0 (1.7, 5.2)	
Depression				0.001
Father	1.0		1.0	
Mother	2.7 (1.8, 3.9)	0.0001	3.4 (1.9, 5.8)	

**Note:** \*Adjusted for children's age, children's sex, parents' age, parents' education, family monthly income, and parents' job.

**Abbreviations:** CASD, caregivers of children with autism spectrum disorders; OR, odds ratio; CI, confidence interval.

psychiatric nomenclature as DSM and ICD-10.<sup>47</sup> One hypothesis indicated that stress and distress in such population are often expressed in "somatopsychic" rather than "psychological" ways, a communication style that has been often thought to reflect the communal nature of Arabs/Muslims.<sup>48</sup> This would imply that the "western-style" psychological instruments are not likely to be endorsed in such populations. Despite such sociological cautions, this study clearly indicates that the symptoms of stress, anxiety, and depression are widely endorsed among CASD. Such distresses were present and quantified with DASS among CASD, CID, and CTD who were generally having similar demographic background except for the level of education. In this cohort, CASD appear to have acquired more education compared to CID and CTD. Such observation implies that ASD occurs across the board of socio-educational background as it has been shown in other populations.<sup>49</sup>

The first hypothesis of this study is to explore whether there is variation in symptoms of stress among CASD, CID, and CTD as defined by DASS. The symptoms of stress as defined in DASS are characterized as being "over-aroused, tense, unable to relax, touchy, easily upset, irritable, easily startled, nervy, jumpy, fidgety, and intolerant of interruption or delay".<sup>40</sup> As previously observed in other populations, the indices of stress appear to be highly exhibited among CASD compared to CID and CTD.<sup>50-52</sup> In terms of percentage, 46% of CASD had symptoms of stress. To our knowledge, this is the first study to document high stress in an Arab/Islamic population using this particular instrument, DASS. Other studies from the region and other parts of the world are congruent with the view that mental health issue is common among CASD.<sup>53-57</sup>

This study aimed to explore the performance of CASD, CID, and CTD on indices of anxiety as a subscale of DASS.

The symptoms of anxiety are characterized as being “apprehensive, panicky, trembly, shaky, aware of dryness of the mouth, having breathing difficulties, pounding of the heart, sweatiness of the palms, and worried about performance and possible loss of control”.<sup>40</sup>

Forty-six percent of the CASD were noted to have depression. On the whole, three cohorts of parents showed a trend ( $P=0.5$ ). This is surprising since there is strong indication that due to somatic impact, anxiety is more likely to be apparent in Arab/Islamic population than other psychological variables.<sup>58</sup> Almansour et al<sup>23</sup> have examined the level of anxiety using the Hospital Anxiety and Depression Scale, among family CASD compared to CTD in Saudi Arabia. They reported that CASD have a comparable mean anxiety score to controls. The ASD family caregivers were also noted to have utilized mental health services and some of them were instituted with psychotropic medications. The present lack of robust significant score on indices of anxiety could be stemmed from the fact that the present studies have utilized DASS rather than other symptoms’ checklist. Relevant to the Hospital Anxiety and Depression Scale as used in Saudi Studies, this scale has been found to have adequate psychometrics in individuals with physical health problems.<sup>59</sup> With such contradictory finding, future studies ought to scrutinize which instruments are more reliable for soliciting the presence of anxiety disorders.

The third cluster of distress which was solicited from the present CASD group study is depression. According to the progenitor of this presently used scale, depression is characterized by being “self-disparaging, dispirited, gloomy, blue, convinced that life has no meaning or value, pessimistic about the future, unable to experience enjoyment or satisfaction, unable to become interested or involved, slow, lacking in initiative”.<sup>58</sup>

The present quantification suggests that 48.6% of the present CASD group endorsed themselves to be depressed. In terms of group comparison, the three cohorts appear to differ significantly ( $P=0.04$ ). In a study conducted in Kuwait, using Beck’s Depression Inventory, Fido and Al Saad<sup>24</sup> reported approximately 32% of CASD to endorse symptoms of depression. The present results from the current study from this part of the world appear to merge with studies from other regions which show that depression is high among CASD.<sup>22</sup>

Many studies have emerged examining who is likely to be more affected – mother or father – by caring for a child with ASD. Some studies appear to suggest that mothers are likely to bear the brunt of having a child with special needs. Others have pointed to orthogonal types of difficulties encountered by mother and father. In Oman, the present study appears to

endorse both parents as affected even when the child’s age, child’s sex, parents’ age, parents’ education, family monthly income, and parents’ job are taken into consideration. Various studies from different parts of the world have alluded to the view that caregivers’ burden and its consequences of the burden tend to fall mostly on the mothers.<sup>12</sup> As family is central to traditional Omani society, much of the leisure time is spent within the family circle, extended family, or clan members. As common social behavior in Oman is geared toward group affiliation and interdependence within one’s family circle, it should therefore be expected that both parents are likely to play a part in the welfare of their children. There is a dearth of studies that have examined the perception of children with special needs. It is likely that “special children” are considered God’s “gift” to challenge people’s resoluteness to Islam. It should therefore be expected that the challenges of raising a child with ASD will not be perceived as stressful for the caregiver. However, this study appears to suggest that despite socio-cultural prescription, caring for children with special needs is likely to increase the level of distress to the parent – an observation that resonates with studies reported elsewhere.<sup>50–52</sup>

There are likely to be various limitations of these types of studies. Here we highlight some of the obvious ones. First, time elapsed since autism diagnosis was not quantified. There is ample literature suggesting that stress and psychological distress tend to be magnified during the breaking news and diagnosis. This is consistent with studies on thanatology, where it was noted that initial “news of losses” tend to be occupied with various psychosocial dysfunctions including elevation of high emotional stress.<sup>60</sup> Future studies should therefore address the time of interplay between time since diagnosis and the onset of psychological distress. Second, there is an indication in the literature that the severity of social impairment tends to heighten psychological distress.<sup>61</sup> This issue was not addressed in this study; therefore, it would be imperative to take on board such issues in future studies. Third, the present study used DASS, which is simply a symptom checklist with all the limitations this may cause. It is well known that those symptom checklists are inferior to gold-standard interviews.<sup>62</sup> Therefore, future studies could utilize more robust instruments to explore the presence of psychological distress. Related to this, although the presently used instrument, DASS, has been translated into Arabic and its psychometric property has been found to be adequate, it is not clear what concept of stress follows the existing diagnostic nomenclature such as DSM and ICD-10. Similar critiques should be applied to anxiety and depression. Fourth,

the control group CID included a variety of diagnoses of intellectual disabilities, which might have resulted in an increase in heterogeneity of the level of parental stress within this control group. Although it is not definitely clear how such heterogeneity would have affected the summative level of stress within the group, it is most likely that it had increased the level of parental stress and, hence, obscured the size of difference in the level of stress between the CASD and the overall control group.

In conclusion, this study indicates that caregivers of ASD are noted to have adverse psychological states that manifest as stress, depression, and anxiety. This finding is consistent with previous studies from different populations. If the present finding will fare further scrutiny, effort should not be spared to readdress some of the unmet psychosocial needs of caregivers of children with ASD. Furthermore, with future studies improvements in standard methodology seem to be needed. For example, future studies are needed for the reliability and validity of present instruments such as DASS in soliciting the presence of anxiety disorders. In addition, future studies should address improving temporality by exploring the duration between time since diagnosis and the onset of psychological distress.

## Acknowledgments

This project was supported by funds from Sultan Qaboos University, His Majesty Strategic Research Grant Fund, grant number SR/MED/FMCO/11/01. The abstract of this paper was presented at the International Meeting for Autism Research (IMFAR 2014) as a poster presentation with interim findings.

## Disclosure

The authors report no conflicts of interest in this work.

## References

- van Steijn DJ, Oerlemans AM, van Aken MA, Buitelaar JK, Rommelse NN. The reciprocal relationship of ASD, ADHD, depressive symptoms and stress in parents of children with ASD and/or ADHD. *J Autism Dev Disord*. 2014;44(5):1064–1076.
- Prince M, Patel V, Saxena S, et al. No health without mental health. *Lancet*. 2007;370(9590):859–877.
- Bader SH, Barry TD. A longitudinal examination of the relation between parental expressed emotion and externalizing behaviors in children and adolescents with autism spectrum disorder. *J Autism Dev Disord*. 2014;44(11):2820–2831.
- Mitchell C, Holdt N. The search for a timely diagnosis: parents' experiences of their child being diagnosed with an Autistic Spectrum Disorder. *J Child Adolesc Ment Health*. 2014;26(1):49–62.
- Feinberg E, Augustyn M, Fitzgerald E, et al. Improving maternal mental health after a child's diagnosis of autism spectrum disorder: results from a randomized clinical trial. *JAMA Pediatr*. 2014;168(1):40–46.
- Foody C, James JE, Leader G. Parenting stress, salivary biomarkers, and ambulatory blood pressure: a comparison between mothers and fathers of children with autism spectrum disorders. *J Autism Dev Disord*. 2015;45(4):1084–1095.
- Kuusikko-Gauffin S, Pollock-Wurman R, Mattila ML, et al. Social anxiety in parents of high-functioning children with autism and Asperger syndrome. *J Autism Dev Disord*. 2013;43(3):521–529.
- Hastings RP, Brown T. Behavior problems of children with autism, parental self-efficacy, and mental health. *Am J Ment Retard*. 2002;107(3):222–232.
- Lajiness-O'Neill R, Menard P. Brief report: an autistic spectrum subtype revealed through familial psychopathology coupled with cognition in ASD. *J Autism Dev Disord*. 2008;38(5):982–987.
- Piven J, Chase GA, Landa R, et al. Psychiatric disorders in the parents of autistic individuals. *J Am Acad Child Adolesc Psychiatry*. 1991;30(3):471–478.
- Bolton PF, Pickles A, Murphy M, Rutter M. Autism, affective and other psychiatric disorders: patterns of familial aggregation. *Psychol Med*. 1998;28(2):385–395.
- Fairthorne J, Jacoby P, Bourke J, de Klerk N, Leonard H. Onset of maternal psychiatric disorders after the birth of a child with intellectual disability: a retrospective cohort study. *J Psychiatr Res*. 2015;61:223–230.
- Yirmiya N, Shaked M. Psychiatric disorders in parents of children with autism: a meta-analysis. *J Child Psychol Psychiatry*. 2015;46(1):69–83.
- Davis NO, Carter AS. Parenting stress in mothers and fathers of toddlers with autism spectrum disorders: associations with child characteristics. *J Autism Dev Disord*. 2008;38(7):1278–1291.
- Firth I, Dwyer R. The predictors of distress in parents of children with autism spectrum disorder. *J Intellect Dev Disabil*. 2013;38(2):163–171.
- Hastings RP. Child behavior problems and partner mental health as correlates of stress in mothers and fathers of children with autism. *J Intellect Disabil Res*. 2003;47(4–5):231–237.
- Suzumura S. Quality of life in mothers of preschoolers with high-functioning pervasive developmental disorders. *Pediatr Int*. 2015;57(1):149–154.
- Allik H, Larsson JO, Smedje H. Health-related quality of life in parents of school-age children with Asperger Syndrome or High-Functioning Autism. *Health Qual Life Outcomes*. 2006;4:1.
- Daniels JL, Forssen U, Hultman CM, et al. Parental psychiatric disorders associated with autism spectrum disorders in the offspring. *Pediatrics*. 2008;121(5):1357–1362.
- Fairthorne J, Hammond G, Bourke J, Jacoby P, Leonard H. Early mortality and primary causes of death in mothers of children with intellectual disability or autism spectrum disorder: a retrospective cohort study. *PLoS One*. 2014;9(12):e113430.
- Bailey AJ, Karr V. Autism as a global challenge. *Autism Res*. 2008;1(3):145–146.
- Firat S, Diler RS, Avci A, Seydaoglu G. Comparison of psychopathology in the mothers of autistic and mentally retarded children. *J Korean Med Sci*. 2002;17(5):679–685.
- Almansour MA, Alateeq MA, Alzahrani MK, Algeffari MA, Alhomaiddan HT. Depression and anxiety among parents and caregivers of autistic spectral disorder children. *Neurosciences (Riyadh)*. 2013;18(1):58–63.
- Fido A, Al Saad S. Psychological effects of parenting children with autism prospective study in Kuwait. *Open J Psychiat*. 2013;3:5–10.
- World Bank. Oman [updated February 10, 2016]. Available from: <http://data.worldbank.org/country/oman>. Accessed May 13, 2015.
- Omran AR. The epidemiological transition: a theory of the epidemiology of population change. *Milbank Quart*. 2005;83(4):731–757.
- Mokdad AH, Jaber S, Aziz MI, et al. The state of health in the Arab world, 1990–2010: an analysis of the burden of diseases, injuries, and risk factors. *Lancet*. 2014;383(9914):309–320.



28. Al-Sharbaty MM, Al-Farsi YM, Ouhitit A, et al. Awareness about autism among school teachers in Oman: a cross-sectional study. *Autism*. 2015;19(1):6–13.
29. Al-Farsi YM, Al-Sharbaty MM, Al-Farsi OA, Al-Shafae MS, Brooks DR, Waly MI. Brief report: prevalence of autistic spectrum disorders in the Sultanate of Oman. *J Autism Dev Disord*. 2011;41(6):821–825.
30. Al-Farsi Y, Waly M, Al-Sharbaty M, et al. Variation in socio-economic burden for caring the children with autism spectrum disorder in Oman: caregiver perspectives. *J Autism Dev Disord*. 2013;43(5):1214–1221.
31. Al-Farsi YM, Al-Sharbaty MM, Waly MI, Al-Farsi OA, Al Shafae MA, Deth RC. Malnutrition among preschool-aged autistic children in Oman. *Res Autism Spectrum Disord*. 2011;5(4):1549–1552.
32. Al-Farsi YM, Waly MI, Al-Sharbaty MM, et al. Levels of heavy metals and essential minerals in hair samples of children with autism in Oman: a case-control study. *Biol Trace Elem Res*. 2013;151(2):181–186.
33. Ali A, Waly MI, Al-Farsi YM, Essa MM, Al-Sharbaty MM, Deth RC. Hyperhomocysteinemia among Omani autistic children: a case-control study. *Acta Biochim Pol*. 2011;58(4):547–551.
34. Al-Farsi YM, Al-Sharbaty MM, Waly MI, et al. Effect of suboptimal breastfeeding on occurrence of autism: a case control study. *Nutrition*. 2012;28(7–8):e27–e32.
35. Al-Farsi YM, Waly MI, Deth RC, et al. Low folate and vitamin B12 nourishment is common in Omani children with newly diagnosed autism. *Nutrition*. 2012;29(3):537–541.
36. Sparks BF, Friedman SD, Shaw DW, et al. Brain structural abnormalities in young children with autism spectrum disorder. *Neurology*. 2002;59(2):184–192.
37. Bailey A, Le Couteur A, Gottesman I, et al. Autism as a strongly genetic disorder: evidence from a British twin study. *Psychol Med*. 1995;25(1):63–77.
38. Windham GC, Zhang L, Gunier R, Croen LA, Grether JK. Autism spectrum disorders in relation to distribution of hazardous air pollutants in the San Francisco Bay area. *Environ Health Perspect*. 2006;114(9):1438–1444.
39. Lopez-Wagner MC, Hoffman CD, Sweeney DP, Hodge D, Gilliam JE. Sleep problems of parents of typically developing children and parents of children with autism. *J Genet Psychol*. 2008;169(3):245–259.
40. Lovibond SH, Lovibond PF. *Manual for the Depression Anxiety Stress Scales*. 2nd ed. Sydney: Psychology Foundation; 1995.
41. Al-Gelban KS. Depression, anxiety and stress among Saudi adolescent school boys. *J R Soc Promot Health*. 2007;127(1):33–37.
42. Al-Gelban KS, Al-Amri HS, Mostafa OA. Prevalence of depression, anxiety and stress as measured by the Depression, Anxiety, and Stress Scale (DASS-42) among secondary school girls in Abha, Saudi Arabia. *Sultan Qaboos Univ Med J*. 2009;9(2):140–147.
43. Vignola RC, Tucci AM. Adaptation and validation of the depression, anxiety and stress scale (DASS) to Brazilian Portuguese. *J Affect Disord*. 2014;155:104–109.
44. Apóstolo JL, Mendes AC, Azeredo ZA. Adaptation to Portuguese of the Depression, Anxiety and Stress Scales (DASS). *Rev Lat Am Enfermagem*. 2006;14(6):863–871.
45. Tonsing KN. Psychometric properties and validation of Nepali version of the Depression Anxiety Stress Scales (DASS-21). *Asian J Psychiatr*. 2014;8:63–66.
46. Taouk M, Lovibond PF, Laube R. Psychometric properties of an Arabic version of the Depression Anxiety Stress Scales (DASS21). Report for New South Wales Transcultural Mental Health Centre, Cumberland Hospital, Sydney; 2001.
47. Ohaeri JU, Awadalla AW, Gado OM. Relationship between symptoms of major depressive and generalized anxiety disorders in an Arab population using diagnostic criteria-based instruments. *Med Sci Monit*. 2010;16(12):103–115.
48. Dardas LA, Ahmad MM. Quality of life among parents of children with autistic disorder: a sample from the Arab world. *Res Dev Disabil*. 2014;35(2):278–287.
49. Durkin MS, Maenner MJ, Meaney FJ, et al. Socioeconomic inequality in the prevalence of autism spectrum disorder: evidence from a U.S. cross-sectional study. *PLoS One*. 2010;5(7):e11551.
50. Lai WW, Goh TJ, Oei TP, Sung M. Coping and well-being in parents of children with autism spectrum disorders (ASD). *J Autism Dev Disord*. 2015;45(8):2582–2593.
51. Russell G, Rodgers LR, Ukoumunne OC, Ford T. Prevalence of parent-reported ASD and ADHD in the UK: findings from the Millennium Cohort Study. *J Autism Dev Disord*. 2014;44(1):31–40.
52. Pozo P, Sarriá E, Brioso A. Family quality of life and psychological well-being in parents of children with autism spectrum disorders: a double ABCX model. *J Intellect Disabil Res*. 2014;58(5):442–458.
53. Al-Kuwari MG. Psychological health of mothers caring for mentally disabled children in Qatar. *Neurosciences*. 2007;12(4):312–317.
54. Al-Eithan MH, Al Juban HA, Robert AA. Alexithymia among Arab mothers of disabled children and its correlation with mood disorders. *Saudi Med J*. 2012;33(9):995–1000.
55. Al-Eithan M, Juban HA, Robert AA. Dissociative experiences and their relationship to mood problems among Arab mothers of disabled children. *Pan Afr Med J*. 2013;15:21.
56. Muammer R, Demirbaş S, Muammer K, Yildirim Y, Hayran O. The depressive symptoms and physical performance of mothers of children with different types of disability. *J Phys Ther Sci*. 2013;25(3):263–266.
57. Riahi F, Izadi-mazidi S. Comparison between the mental health of mothers of children with autism and control group. *Iran J Psychiatry Behav Sci*. 2012;6(2):91–95.
58. Al-Adawi S, Dorvlo AS, Burke DT, et al. Apathy and depression in cross-cultural survivors of traumatic brain injury. *J Neuropsychiatry Clin Neurosci*. 2004;16(4):435–442.
59. Al-Adawi S, Dorvlo AS, Al-Naamani A, et al. The ineffectiveness of the Hospital Anxiety and Depression Scale for diagnosis in an Omani traumatic brain injured population. *Brain Inj*. 2007;21(4):385–393.
60. Parker G, Paterson A, Hadzi-Pavlovic D. Emotional response patterns of depression, grief, sadness and stress to differing life events: a quantitative analysis. *J Affect Disord*. 2015;175:229–232.
61. Karp EA, Kuo AA. Maternal mental health after a child's diagnosis of autism spectrum disorder. *JAMA*. 2015;313(1):81–82.
62. George B, Padmam MS, Nair MK, Leena ML, Prasanna GL, Russell PS. CDC Kerala 11: diagnosis of autism among children between 2 and 6 y – comparison of CARS against DSM-IV-TR. *Indian J Pediatr*. 2014;81(2):125–128.

## Neuropsychiatric Disease and Treatment

### Publish your work in this journal

Neuropsychiatric Disease and Treatment is an international, peer-reviewed journal of clinical therapeutics and pharmacology focusing on concise rapid reporting of clinical or pre-clinical studies on a range of neuropsychiatric and neurological disorders. This journal is indexed on PubMed Central, the 'PsycINFO' database and CAS,

Submit your manuscript here: <http://www.dovepress.com/neuropsychiatric-disease-and-treatment-journal>

Dovepress

and is the official journal of The International Neuropsychiatric Association (INA). The manuscript management system is completely online and includes a very quick and fair peer-review system, which is all easy to use. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.