

RESEARCH

Open Access



Burnout and anxiety among parents of children with neurodevelopmental disorders: a cross-sectional study in Saudi Arabia

Nader Alrahili^{1*}

Abstract

Background Neurodevelopmental disorders (NDDs) are disabilities in brain functioning that cause impairments in cognition, communication, behavior, and sometimes motor skills. The goal of this study was to measure burnout and anxiety among parents of children with neurodevelopmental disorders compared to parents of children with typical development in Saudi Arabia.

Results Four hundred twenty-five parents of healthy and parents of children with NDDs, including attention deficit hyperactivity disorder (ADHD), autism spectrum disorder (ASD), and intellectual disability (ID), and their parents. Parents of children with NDD had more anxiety and burnout relative to parents of typically developing children, and parents of children with ADHD experienced higher levels of anxiety and depression than parents of children with ASD or ID.

Conclusion Parents of children with various neurodevelopmental disorders face a greater degree of psychological distress than parents of typically developing children. Parents of children with NDDs should be provided with interventions and resources to reduce stress and enhance their standard of living.

Keywords NDD, Anxiety, Depression, Parenting stress, ADHD, ASD, Intellectual disability

Background

Parental burnout, a syndrome that has serious effects on both parents and children, causes high levels of stress in the parenting domain [1]. It can also be described as a condition marked by extreme weariness from parenting, emotional distance from one's children, a lack of pleasure and efficacy in one's parental role, and a contrast between one's prior and current parental self [2]. The International Classification of Diseases (ICD-11) defines burnout as follows: "Burn-out is a syndrome conceptualized as resulting from chronic stress that has not

been successfully managed. It is characterized by three dimensions: feelings of energy depletion or exhaustion, increased mental distance, and reduced professional efficacy [3]. Parental burnout is created by a perceived disconnect between parenting resources and obligations, and it has a slew of negative repercussions for both parents and children [4]. Parental burnout includes the following symptoms and manifestations: emotional detachment from the child, the demoralizing feeling that one is not doing enough as a parent, and the overwhelming sense of continuous parental obligations toward a child with a neurodevelopmental disorder, including the necessity of expanding a great deal of time and effort above and beyond normal parenting responsibilities (including at the expense of other siblings and the parents' own time, career goals, and relationships) [5]. Neurodevelopmental disorders (NDDs) are disabilities in brain functioning that cause impairments in cognition,

*Correspondence:

Nader Alrahili
al.rahili@gmail.com

¹ Department of Clinical Neuroscience, College of Medicine, Imam
Mohammad Ibn Saud Islamic University, Riyadh, Saudi Arabia



© The Author(s) 2023. **Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

communication, behavior, and sometimes motor skills [6]. The Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5) defines several neurodevelopmental disorders in children, including attention deficit hyperactivity disorder (ADHD), autism spectrum disorder (ASD), various learning disabilities, and intellectual disability (ID) [7]. Neurodevelopmental disorders can be life-long conditions. The overlap between these disorders and their constituent symptom dimensions is extremely high [8]. The parents and developmental disabilities (DD) results of ADHD children suggest higher stress results compared to other diseases, i.e., HIV and special behavior children [9]. Recent studies suggest that parental burnout can be quite harmful and lead to suicide and escape ideations in children [2], which are far more common in parental burnout than in work burnout or even depression [10]. According to research, parenting stress is higher in parents of children with exceptional healthcare requirements than in parents of typically developing children, although the link between disability type and parenting stress is unclear [9]. These results were unsurprising considering that one cannot resign from a parental role or be placed on sick leave from one's children. Parental burnout is linked to psychological forms of escapism, such as alcohol usage, in addition an increased need to physically escape from the parenting environment [11]. Other studies also suggested that PB causes dysregulation in the hypothalamic pituitary adrenal (HPA) axis and somatic complaints and sleeping disordered reported by burned-out parents; however, in child-directed violence significantly increased [12–15]. Parenting stress is linked to parenting practices and child development more than other types of stress [16]. Parenting stress is natural [17]; however, high levels of parenting stress can severely impact the parent–child connection and parenting practices [18]. Due to large changes in routines and service availability, children with NDDs may be particularly prone to stress. This includes the inability to attend school and a decrease in the availability of formal and informal support, such as limited interaction with close or extended family members [19]. In addition, mental health was affected due to a lack of options for physical activity, and other health issues such as obesity and sleep disorders were reported among NDD child parents [20]. A prior study conducted using data from US children aged 3–17 years (i.e., National Health Interview Surveys, 1997–2008) [21]. Moreover, a systematic review and meta-analysis of 19 studies, which enrolled 3303 parents of children with neurodevelopmental disorders and 9519 parents of children without neurodevelopmental disorders, found that parents of children with NDDs were at a higher risk of depression and anxiety compared with parents of children without NDDs [22].

Managing self-injurious behavior in children with NDDs is often frustrating because of the refractory nature of the behaviors commonly associated with these disorders [23]. The lack of accessibility to services in public places is one of the myriad stressors faced by parents of children with moderate-to-severe neurodevelopmental disorders. The feeling of isolation or not being accepted as well as the stigma of not being within the “norm” is another form of stress commonly experienced by parents [24]. A qualitative study conducted in Australia reported that parents of children with ADHD frequently described their parenting life as a “war zone”, indicating the amount of stress they were facing daily [25]. Another study demonstrated that parents of children with ASD experience higher levels of stress compared with parents of typically developing children, and mothers of children with ASD suffer more anxiety than fathers of children with ASD [26].

Many experts conclude that parental burnout substantially differs from the parenting stress that is normally experienced by nearly all parents. Parental burnout can make it difficult for parents to cope due to its severity and chronicity [27, 28]. However, positive adaptations can help decrease stress and enhance the resilience of parents of children with neurodevelopmental disorders [29]. Overall, the research on this topic has been sparse among Saudi Arabia NDD parents and diagnoses. Therefore, there is a dire need to understand what causes these stresses to tailor interventions that help families cope and function better. Therefore, the first aim of this study to compare the levels of burnout and anxiety among parents of children with and without neurodevelopmental disorders. The second aim of this study is to compare the levels of burnout and anxiety among parents or children with various kinds of neurodevelopmental disorders (ADHD, ASD, and ID) as reported in the Arab literature. To the best of my knowledge, this is the first study in the Arab literature to investigate the anxiety and burnout experienced by children and parents with ADHD, ASD, and ID, combined with their relationships with various medical and demographic characteristics. It hypothesized that the parents of children with NDDs would report high levels of stress and burnout compared with parents of typically developing children and that this symptomology would differ across various NDDs.

Methods

Research design

A descriptive design was adopted to compare the levels of burnout and anxiety among parents of children with and without neurodevelopmental disorders, as well as the levels of burnout and anxiety among parents or guardians (these terms are used interchangeably throughout the

manuscript) of children with various kinds of neurodevelopmental disorders.

Participants

This is a cross-sectional study enrolling Arabic-speaking parents of children between the ages of 3 and 17 years who were either diagnosed with a range of neurodevelopmental disorders (ADHD, ASD, and ID) or were typically developing. Sampling was implemented to obtain a sample size of up to 400 participants according to our statistical power calculations. For that purpose, a power analysis was used to determine the confidence interval (95%) and probability (5%) value [30]. The sole study inclusion criterion was as follows: the involvement/cooperation of parents of children with and without neurodevelopmental disorders who speak Arabic.

Procedures

Questionnaires were administered to participants using an online platform via various types of social media (Twitter, Snapchat, and WhatsApp groups). Participants were informed of their right to confidentiality and consent at all stages of the investigation. The questionnaire was briefly explained to the participants, clarifying the purpose of the study and instructing the participants to respond accurately. The total session time was estimated to be approximately 20 min. The research relied on two questionnaires (described below) that collected data on four different parameters relevant to this study. Demographic questions included questions regarding parents' and children's sociodemographic information (age, education, marital status, income level, nationality), as well as medical/clinical information about the child's condition (age, sex, diagnosis, comorbidities, and other associated problems).

Parental burnout inventory

An Arabic version questionnaire was translated and validated [31]. It is a 22-item self-report questionnaire consisting of three subscales: emotional exhaustion (eight items), emotional distancing (eight items), and the loss of parental accomplishment (six items). The items were rated on a seven-point Likert scale: never (0), a few times a year or less (1), once a month or less (2), a few times a month (3), once a week (4), a few times a week (5), and every day (6). The Cronbach's alphas were 0.86, 0.77, and 0.89 for sub-scales and 0.98 for the total scales, respectively, as a measure of reliability at a 5% probability value.

Generalized Anxiety Disorder Assessment (GAD-7)

An Arabic questionnaire was translated and validated [32]. It is a 7-item instrument used to measure or assess the severity of generalized anxiety disorder (GAD). This

instrument evaluated the following seven items: (1) feeling nervous, anxious, or on edge; (2) ability to stop or control worrying; (3) worrying too much; (4) trouble relaxing; (5) restlessness; (6) being easily annoyed or irritable; and (7) feeling afraid (as if something awful might happen). The Cronbach alpha (0.892) for GAD-7 was set as a measure of reliability.

Statistical analysis

Demographic characteristics were analyzed and presented as percentages (%) and frequencies for categorical variables and as mean values (means \pm standard deviations [SD]) for continuous variables. Analysis of variance (ANOVA) and chi-square tests were implemented to conduct statistical comparisons across groups and diagnostic categories. Statistical Package for the Social Sciences (SPSS) software (Chicago, IL, USA) was used to analyze and display study data.

Results

Demographic characteristics

Neurodevelopmental disorders were present in (59%) of the enrolled children, while 41% did not have a development disorder (i.e., were typically developing). The age and sex of the children are shown in Fig. 1. A total of 83 (19%) participants were diagnosed with ASD, while 152 (36%) of the enrolled participants were diagnosed with ADHD. ID was diagnosed in 190 (45%) of the enrolled participants (Fig. 2). Approximately 59% of the participants were enrolled in primary schools or day-care centers, while 41% were not enrolled in any school or daycare programs. A total of 57% of the participants were enrolled in various therapies (i.e., modification sessions); whereas 43% were not enrolled in any therapies outside of their school setting. With respect to guardian age, only 1% of the participants were between the ages of 18 and 25 years, while 58% were between the ages of 26 and 39 years, and 40% were between the ages of 40 and 55 years; 1% of the enrolled participants were older than 55 years of age (Fig. 3b). A total of 95% of the enrolled participants were married, while 5% were divorced (Fig. 3c). Guardian educational attainment was also considered in this study. A total of 66% of the enrolled parents had achieved a bachelor's degree, 2% had a middle school educational attainment, 14% had a secondary school educational attainment, 12% had earned a master's degree, and 6% had earned a Ph.D (Fig. 3d). The total number of children in each family was as follows: 15% of the enrolled families had one child only, 25% had two children, 28% had three children, 13% had four children, 12% had five children, and 7% had more than five children (Fig. 3e).

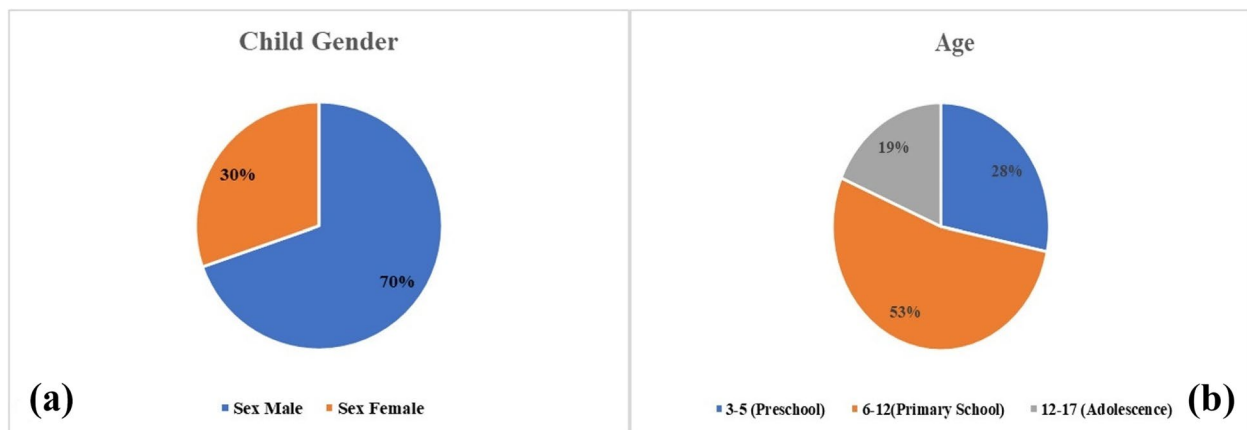


Fig. 1 Demographic characteristics child gender (male; female) and age (preschool, primary school, adolescent)

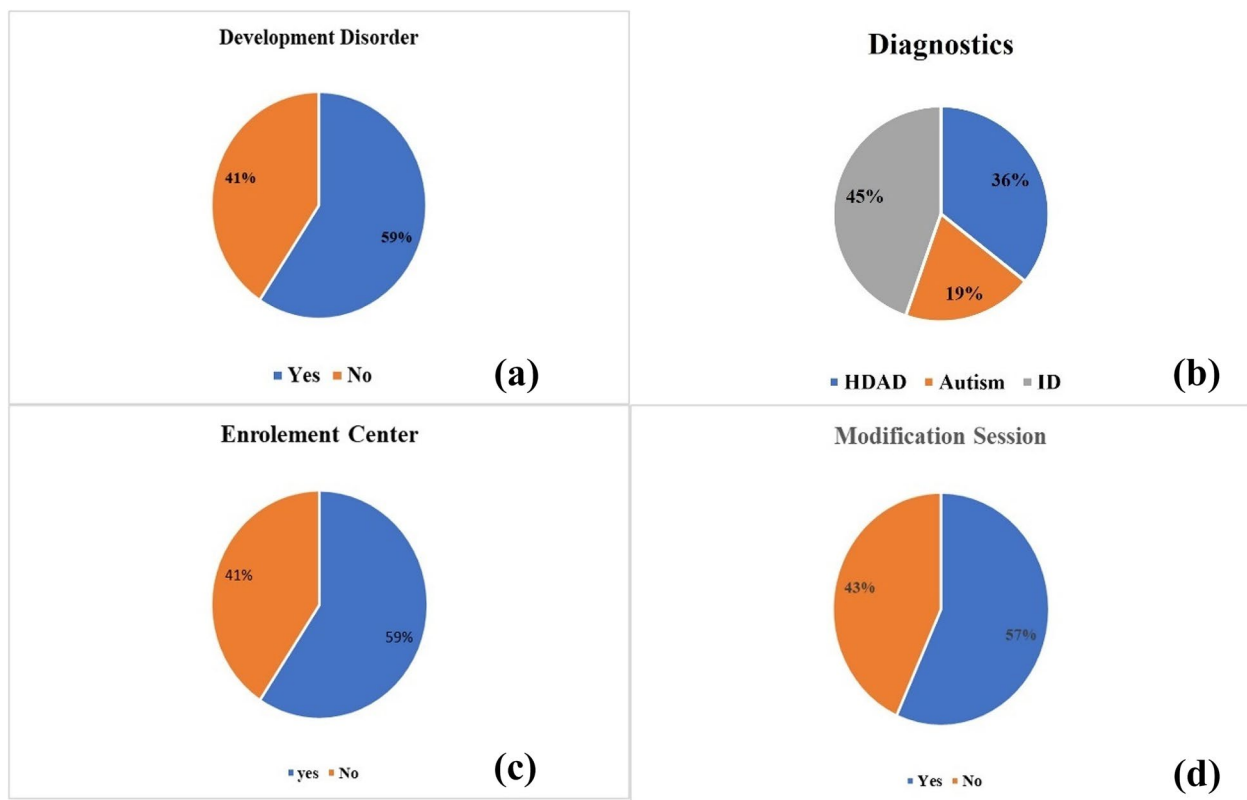


Fig. 2 Socio-demographic characteristics. **a** Development disorder, **b** diagnostic, **c** enrolment center, and **d** modification center

The sociodemographic and Generalized Anxiety Disorder assessment was conducted, and all the characters and variables are summarized in Table 1. Statistical differences were observed among the diagnosis ($P=0.00$), modification session ($P=0.00$), relationship with child ($P=0.00$), social status ($P=0.00$), guardian age ($P=0.00$), number of children ($P=0.00$), and GAD assessment indicators ($P=0.00$) as shown in Table 1. The chi-square

test was utilized to establish the relationship between the groups, including gender (child), age, developmental disorder, diagnosis, number of children, and guardian relationship, as presented in Table 2. All the groups displayed highly significant relationships with each other ($P=0.00$) based on chi-square test statistics analysis. Additionally, an analysis of variance (ANOVA) was performed to determine the relationship between gender

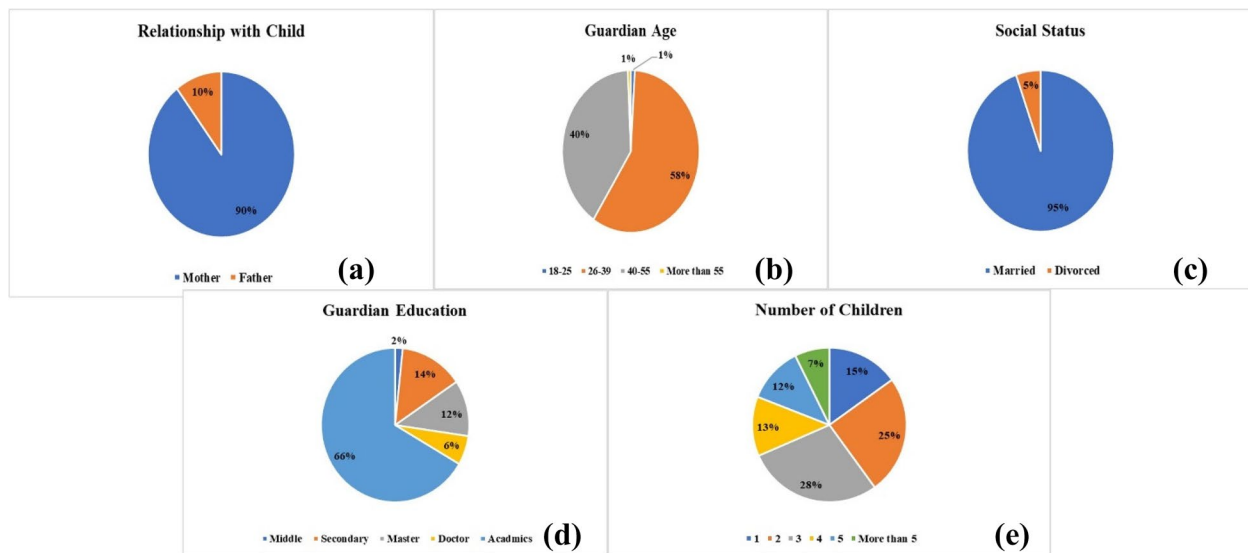


Fig. 3 Socio-demographic characteristics of child guardian: **a** Mother, father; guardian age (**b**), social status; (**c**); guardian education (**d**); and number of children (**e**)

Table 1 One-way analysis of sociodemographic and GAD assessment

Variables	t	Sig. (2-tailed)
Diagnosis	43.30	.000
Modification session	44.10	.000
Relationship with child	52.24	.000
Social status	69.47	.000
Guardian education	52.78	.000
Children	33.72	.000
Anxiety control	32.97	.000
anxiety over concerns	30.60	.000
How frequently disturbed	31.41	.000
Easy irritable	38.79	.000

(child) × neurodevelopmental disorder, diagnosis (HDAD, autism, and ID) × developmental disorder, and number of children × developmental disorder (Table 3). The results indicated a highly significant relationship between gender (child) × neurodevelopmental disorder, diagnosis

(HDAD, autism, and ID) × developmental disorder ($P=0.00$), except for Children * Development Disorder, which displayed an insignificant relationship among the groups ($P=0.58$) (Table 3).

The study evaluated measures of association between diagnoses, child sex (male/female), and the number of children in each family. This study found that mothers of children with ADHD experienced higher levels of anxiety compared with mothers of children with ASD and ID (Table 4). ASD and ID were both associated with similar levels of anxiety. Similarly, it found that mothers with a female child with ID experienced more stress (i.e., depression and anxiety) compared with mothers of children (of either gender) with ADHD or autism, respectively. This study also determined the relationship between anxiety and burnout in parents of children with and without NDD (Table 5). The results suggest that anxiety levels differed at the level of statistical significance in parents of children with NDDs compared to parents of children without NDDs ($P < 0.01$). Similar results were

Table 2 Chi-square test results for gender (child), age, development disorder, diagnosis, number of children, and guardian relationship

Test statistics	Age	Development disorder	Diagnosis	Children	Relationship with child	Gender (child)
Chi-square	81.23 ^a	14.68 ^b	41.54 ^a	86.66 ^c	267.22 ^b	65.62 ^b
df	2	1	2	5	1	1
Asymp. Sig.	.000	.000	.000	.000	.000	.000

^a 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 141.7

^b 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 212.5

^c 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 117.5

Table 3 ANOVA results

Group	F	p
Gender (child) * development disorder	3.33	.000
Diagnosis * development disorder	241.92	.00
Children * development disorder	.304	.582

Table 4 Associations between the presence of neurodevelopment disorders, the affected child's gender, the number of children in the enrolled family, and the gender of the parental contact

Diagnosis	Gender (child)	Number of children	Mother/father (guardian)
ADHD	Female	3	Mother
	SD	0.42	1.35
ADD	Female	3	Mother
	SD	0.406	1.35
ID	Female	3	Mother
	SD	0.49	1.56

ADHD Attention deficit hyperactivity disorder, ASD Autism spectrum disorder, ID Intellectual disability, SD Standard deviation

Table 5 Measures of association concerning anxiety levels and burnout in parents of children with and without neurodevelopmental disorders (NDD)

Developmental disorder	N	Mean rank	Values-value (two-tailed)
Mother/father (guardian)			
Yes	252	217.14	0.112
No	173	206.97	
Anxiety level			
Yes	252	184.70	0.00
No	173	254.22	
Burnout			
Yes	252	189.80	0.00
No	173	246.80	

Table 6 Generalized anxiety disorder assessment

	Almost every day	More than half of the days	Several days	Never
Frequently disturb	159 (37.4%)	94 (22.1%)	150(35.2%)	22 (5.2%)
Anxiety control	121 (28.5%)	108 (25.4%)	142 (33.4%)	54 (12.7%)
Anxiety over concerns	158 (37.2%)	102 (24%)	129 (30.4%)	36 (8.5%)
How frequently disturb	123 (28.9%)	93 (21.9%)	147 (34.6%)	62 (14.6%)
Easy irritable	61 (14.4%)	77 (18.1%)	128 (30.1%)	159(37.4%)
Responsibility at home	Unbearably difficult	There is never any difficulty	Somewhat difficult	Very difficult
	41 (9.6%)	80 (18.8%)	202 (47.5%)	102 (24%)

recorded for the burnout inventory, with statistically significant differences detected between parents of children with and without NDD.

Generalized Anxiety Disorder (GAD)

Table 5 presents the assessment of Generalized Anxiety Disorder (GAD) for emotional exhaustion. The scale includes data on frequently being disturbed, anxiety control, anxiety overexpression, how frequently disturbed, easily irritable, and responsibility at home. The responses were recorded as follows: 37.4% were suggested to be frequently disturbed about almost every day, 22.1% for more than half of the days, 35.2% for several days, and 5.2% for never. For anxiety control, 28.5% reported almost every day, 25.4% for more than half of the days, 33.4% for several days, and 12.7% for never. Regarding anxiety over concerns, 37.2% reported almost every day, 24% for more than half of the days, 30.4% for several days, and 8.5% for never. The frequency of being disturbed was reported as almost every day (28.9%), more than half of the days (21.9%), several days (34.6%), and never (14.6%). As for being easily irritable, the responses were as follows: almost every day (14.4%), more than half of the days (14.4%), several days (18.1%), and never (14.6%). Finally, regarding responsibility at home, 9.6% found it unbearably difficult, 18.8% reported no difficulty at all, 47.5% found it somewhat difficult, and 24% responded never (Table 6).

Parental burnout inventory

The Parental Burnout Inventory is a 22-item self-report questionnaire consisting of three subscales: Emotional Exhaustion (8 items), Emotional Distancing (8 items), and Loss of Parental Accomplishment (6 items). The Emotional Exhaustion subscale includes a question about feeling as though one has lost their status as a parent. Of the mothers surveyed, 45.2% did not report feeling this way, while 14.1% reported feeling it a number of times per year. An equal number of mothers (20.7%) reported feeling it a number of times per month, a number of times per year or less, or never feeling tired and not sleeping enough. Regarding complaints about energy for taking care of

their children, 35.8% of mothers reported never feeling this way, followed by 17.4% reporting feeling it once a year and 12.74% reporting feeling it a number of times per month. For the question about no longer being a good mother, 35.5% of mothers responded with “never,” 19.5% reported feeling it a number of times per year or less, and 14.1% reported feeling it a number of times per month. Pearson’s correlation characteristics were used to explore the relationship between sex, age, development disorder, diagnosis, enrollment, modification session, relationship with the child, guardian age, social status, guardian education, number of children, and child gender. The number of children was found to have no effect on development disorders (Autism, ADHD, and intellectual delay). The Parental Burnout Inventory also included questions about self-care, feeling exhausted, feeling as though one no longer has a role as a mother, feeling ashamed, no longer feeling proud, no longer feeling love for one’s children, feeling tired about thinking for one’s children, sleeping, and fighting for survival. For all of these questions, the response “never” was recorded by the majority of mothers. It appears that mothers are strong enough to withstand difficult situations such as anxiety and depression to ensure the betterment of their child’s life and future (Table 4). Moreover, covariance analysis was conducted to evaluate anxiety, burnout, and relationships with children among parents with and without children with NDD (Table 7). Parents of children with NDD reported statistically significantly higher levels of anxiety, burnout, and stress in their daily lives. Moreover, this study found a positive and statistically significant correlation between parental anxiety ($r=0.257$) and burnout ($r=0.207$) in parents of children with and without NDDs. A negative though the statistically insignificant correlation was recorded with respect to these parents’ relationships with their affected children (-0.077) (Table 6).

I also calculated Pearson’s correlation coefficients between various medical and demographic variables, including sex, age, having a child with a neurodevelopmental disorder, the child’s specific diagnosis, attendance of modification sessions, the guardian’s relationship with the child overall, and accordance with parental (guardian) sex, guardian age, marital status, guardian educational attainment, and the number of children in the affected family. This study found that the child’s sex showed a statistically insignificant correlation with the age of the enrolled child (0.026) and a positive and highly statistically significant correlation with the presence of any development disorder (0.193), as well as specific types of NDD (Table 8). This study also found a negative correlation with the attendance of modification sessions.

Non-statistically significant correlations were recorded for enrollment, attendance of modification sessions, guardian age, marital status, and the number of children in the affected family (Table 8).

Discussion

The current study was conducted to compare anxiety and burnout levels among Saudi Arabic parents with different neurodevelopmental disorders (i.e., ADHD, ASD, and ID). Megreya et al. [33] suggested that mothers with autistic children experience higher levels of anxiety and depression compared with mothers of typically developing children; likewise, they used fewer positive adaptive strategies (i.e., positive reappraisal, positive refocusing, refocus on planning). Similarly, another study suggested that mothers of children with ASD experienced higher levels of anxiety compared with mothers of children with ID. A higher level of psychological suffering was recorded by parents of children with ASD compared with parents of typically developing children as evidenced by meta-analyses conducted in Western countries [34]. In addition, according to a systematic review of studies conducted in Japan, mothers of children with ASD face more psychological distress compared with mothers of typically developing children or of children with other disabilities [35]. Our findings appear to be consistent with previous studies reporting that mothers of children with ADHD and ASD had higher levels of parenting stress compared with mothers of typically developing children [36–38]. One probable explanation for these findings is that prolonged inadequate school performance and behavior has a negative impact on children’s peer and family ties as well as on social contacts. The current study reported that 90% of the enrolled mothers accompanied their children to rehabilitation centers, whereas only 10% of fathers did so. This is likely because mothers and fathers face unique challenges and stressors when caring for children with NDD. For example, mothers may be overburdened by the demands of caring for their child’s adaptive requirements, whereas fathers may be stressed by the need to earn more money to meet the higher financial needs of caring for a child with an NDD, including often exorbitant medical and rehabilitation expenses [39]. The current study also focused on demographic characteristics (i.e., the child’s sex, parents’ relationship with their child, parent’s marital status, specific NDD diagnosis, enrollment, attendance of modification sessions (therapies), and the number of children in each family). Cognitive dysfunction impairs adaptive functioning, causing an individual to fail to meet personal independence and social responsibility standards in one or more aspects of daily life, including communication, social participation, academic performance, and

Table 7 Parental Burnout Inventory

		Every day	Once a week	Number of times a week or less	Number of times per month	Once a month or less	Number of times per year or less	Never
1	I have a feeling I've lost my status as a mother	26 (6.1%)	28 (6.6%)	21 (4.9%)	54 (12.7%)	44 (10.4%)	60 (14.1%)	192 (45.2%)
2	I'm so tired of my role as a mother that I feel like sleep isn't enough	56 (13.2%)	31 (7.3%)	23 (5.4%)	88 (20.7%)	54 (12.7%)	87 (20.5%)	86 (20.2%)
3	I no longer have the energy to take care of my children	34 (8%)	33 (7.8%)	30 (7.1%)	54 (12.7%)	48 (11.3%)	74 (17.4%)	152 (35.8%)
4	I think I'm no longer the good mother I was before for my children	39 (9.2%)	26 (6.1%)	18 (4.2%)	60 (14.1%)	48 (11.3%)	83 (19.5%)	151 (35.5%)
5	I can't take being a mother anymore	36 (8.5%)	25 (5.9%)	17 (4%)	43 (10.1%)	43 (10.1%)	49 (11.5%)	212 (49.9%)
6	As a mother I have a feeling beyond my abilities	38 (8.9%)	32 (7.5%)	27 (6.4%)	70 (16.5%)	49 (11.5%)	84 (19.8%)	125 (29.4%)
7	I feel like I'm having a good time with my kids automatically	29 (6.8%)	31 (7.3%)	28 (6.6%)	54 (12.7%)	50 (11.8%)	81 (19.1%)	152 (35.8%)
8	I feel like I can't stand being a mother anymore	41 (9.6%)	26 (6.1%)	196 (46.1%)	41 (9.6%)	42 (9.9%)	62 (14.6%)	17 (4.0%)
9	I don't feel fun when I'm with my kids	50 (11.8%)	27 (6.4%)	20 (4.7%)	47 (11.1%)	51 (12%)	91 (21.4%)	139 (32.7%)
10	Being a mother makes me feel very tired	22 (5.2%)	24 (5.6%)	19 (4.5%)	53 (12.5%)	36 (8.5%)	63 (14.8%)	208 (48.9%)
11	I say to myself, I'm no longer the mother I was before	47 (11.1%)	27 (6.4%)	24 (5.6%)	62 (14.6%)	66 (15.5%)	96 (22.6%)	103 (24.2%)
12	I'm just doing what needs to be done for my kids no more	30 (7.1%)	20 (4.7%)	16 (3.8%)	49 (11.5%)	49 (11.5%)	65 (15.3%)	196 (46.1%)
13	[My role as a mother exhausted all my energies	33 (7.8%)	24 (5.6%)	14 (3.3%)	44 (10.4%)	49 (11.5%)	57 (13.4%)	204 (48%)
14	I can't take my role as a mother anymore	56 (13.2%)	36 (8.5%)	43 (10.1%)	70 (16.5%)	17 (4.0%)	83 (19.5%)	120 (28.2%)
15	I became ashamed of myself as a mother	33 (7.8%)	24 (5.6%)	44 (10.4%)	49 (11.5%)	14 (3.3%)	57 (13.4%)	204 (48%)
16	I'm no longer proud of myself as a mother	22 (5.2%)	24 (5.6%)	42 (9.9%)	30 (7.1%)	44 (10.4%)	12 (2.8%)	251 (59.1%)
17	When I'm having a day with my kids, I feel like I'm no longer me	28 (6.6%)	19 (4.5%)	12 (2.8%)	37 (8.7%)	46 (10.8%)	48 (11.3%)	235 (55.3%)
18	I can no longer show my children how much I love them	32 (7.5%)	24 (5.6%)	14 (3.3%)	45 (10.6%)	46 (10.8%)	74 (17.4%)	190 (44.7%)
19	I'm tired of thinking about everything I must do for my children	56 (13.2%)	37 (8.7%)	60 (14.1%)	73 (17.2%)	89 (20.9%)	20 (4.7%)	90 (21.2%)
20	I have the impression that except for routines (sleep, eating, ...) I can no longer make efforts with my children	35 (8.2%)	26 (6.1%)	39 (9.2%)	33 (7.8%)	54 (12.7%)	17 (4%)	221 (52%)

Table 7 (continued)

		Every day	Once a week	Number of times a week or less	Number of times per month	Once a month or less	Number of times per year or less	Never
21	In my role as mother, I'm so tired that I'm able to fight for survival	33 (7.8%)	24 (5.6%)	14 (3.3%)	44 (10.4%)	49 (11.5%)	57 (13.4%)	204 (48%)

personal independence at home. Consequently, the traits and behavior of children with NDDs may contribute to greater levels of parental stress. However, in children with ASD, the cognitive function was not linked with parental stress in prior research [40].

Moreover, parents (especially mothers) may lose faith in their children's potential to acquire academic competency and consequently become irritated and engage in hostile conduct toward their children [41]. In addition, some parents describe experiencing continual disagreements with and noncompliance from their children in prior qualitative research; this could be a result of the child's frustration with his or her inability to express themselves [42]. All the above findings show that caring for a child with ASD is linked to significant levels of psychological distress (anxiety and depression) in people from all cultures. As a result, therapies for families of children with ASD should focus on reducing parents' psychological distress to improve families' social functioning and mental health. This is beneficial and may also facilitate an improvement in children's NDD symptomology [43, 44]. However, the psychological pain experienced by parents may not be entirely attributable to their children's ASD. Instead, some of their reported problems can be explained by different traits evident among parents of children with ASD [45]. For example, several individual resources, including personality qualities and cognitive-emotional regulation (ER) techniques, are shown to modulate the influence of caring for children with ASD on parental psychological distress, according to a previously published stress model among parents of children with ASD [46].

Another aim of this study is to compare the levels of burnout and anxiety among parents of children with and without neurodevelopmental disorders. A study conducted by McStay et al. [40] suggested that the mothers of children with neurodevelopmental disorders experience high levels of self-blame, negative cognition and self-talk, low levels of acceptance, various negative (subjective) assessments, and other linked forms of blame [34]. Previous research also indicated that parents of children with ASD more frequently use active avoidance as a coping strategy compared with typically developing children [47]. Parents of children with ASD are also more likely to use the following coping strategies: emotional

reflection, cognitive reframing problem-solving, and emotional reframing [48–50]. Moreover, prior research consistently established a link between psychological distress (i.e., anxiety, depression, and parental stress) and a coping strategy of active avoidance in parents of children with autism [51]. The current study recorded parents of children with NDD had more anxiety and burnout relative to parents of typically developing children, and parents of children with ADHD experienced higher levels of anxiety and depression than parents of children with ASD or ID. Similar results were reported by Accardo et al. [52] suggested that the prevalence of anxiety and depression among adolescents with autism or ADHD is much higher compared to those who do not have these conditions. Among autistic individuals, both males and females have a high chance of being diagnosed with ADHD. Autistic females with ADHD have the highest likelihood of having anxiety, followed by autistic males with ADHD. Furthermore, they also suggested that the prevalence of depression due to ADHD was reported for the first time in the literature. Similarly, another previous study suggested that behavioral challenges in neurodevelopmental disorders, such as ADHD and ASD, lead to an increase in parental distress, as well as parental exhaustion [53]. Moreover, some authors studied stress levels in children with NDD and found a high degree of self-reported parenting stress among these children [54]. Substantial evidence suggests that the severity of a child's impairment is closely linked to parenting-associated stress [55–57]. Further study suggested that parents of children with NDD face severe consequences in terms of their quality of life, both for themselves and for their children (especially with respect to their long-term quality of life in the future) [58]. The findings in this study are consistent with those of previous studies and did not show statistically significant cultural differences between Arab and non-Arab parents. The current study has clear practical implications. The study provides the foundation for early diagnosis of NDDs. For this purpose, when the amount of parental stress is low- to mid-stage, it is best to seek social support at an earlier stage [59]. Social support includes family, friends, and other community members and incorporates a broader ecological setting. As a result, enhancing social assistance should be a priority for Saudi Arabia's national government services,

Table 8 Pearson correlation coefficients between various medical and demographic variables

	Sex (child)	Age	Developmental disorder	Diagnosis	School enrollment	Modification session	Relationship with child	Guardian age	Social status	Guardian education	Children
Sex (child)	1										
Age	0.026	1									
Developmental disorder	0.193**	0.019	1								
Diagnosis	0.175**	0.030	0.845**	1							
School enrollment	0.065	-0.402**	0.00	-0.032	1						
Modification Session	-0.002	0.132*	0.00	-0.098	0.137*	1					
Relationship with child	-0.140**	0.026	-0.077	-0.095	-0.143*	-0.034	1				
Guardian age	0.065	0.264**	0.067	0.080	-0.146*	0.007	-0.019	1			
Social status	0.029	0.107*	0.001	<0.001	-0.057	-0.055	-0.043	-0.012	1		
Guardian education	-0.092	-0.052	0.035	0.036	-0.064	0.031	-0.024	0.103*	0.043	1	
Children	0.012	0.352**	0.027	0.038	-0.052	0.209**	0.095	0.308**	-0.060	-0.140**	1

* = significant at 5% probability level

** = significant at 1% probability level

including SAS and autism-related rehabilitation institutes. Surprisingly, the function of social media as an easily accessible venue for prospective answers should be explored [60]. Now, parents of children with ADHD, ASD, and ID should encourage them to join social media groups for social support of resilience and cure of diseases. Clinicians or experts could urge couples to seek help from friends, family, or their local communities to reduce stress and promote life satisfaction. Finally, future studies should focus on boosting the understanding of NDDs among healthcare professionals, particularly inexperienced physicians, and specialized therapists, to aid policymakers and relevant agencies in optimizing social support for these families. One limitation of this study is that the Parental Burnout Inventory employed in the current study is a subjective self-report questionnaire; therefore, it has substantial potential for bias. Furthermore, the demographic questionnaire did not include questions concerning the racial or ethnic background, which could have provided important context for evaluating the study's findings. The results found that significant regional differences were present when analyses of the incidence of parental burnout were conducted in 42 countries. Furthermore, the individual culture showed a significant prevalence and mean level of parental burnout during the analysis of cultural values [1]. Moreover, the current study did not provide consistent data on the correlations between parental stress and relevant features in children with NDDs, such as the severity of the child's symptomology and their developmental level, both of which could have a substantial impact on the degree of parenting stress associated with raising a child with an NDD. Various response styles may be more prevalent in different populations, providing more detailed information and more accurate results. As a result, a response-shift bias may have influenced the ratings. Furthermore, while this study included a highly representative set of predictors, several variables were excluded, including critical information on emotional and behavioral issues, parental coping strategies, and marital dysfunction, which are significant factors in determining parental stress as they are linked with having a child with an NDD [58]. Moderators might change depending on a person's life stage [61]. The protective factor, i.e., social support, is a conditioning effect depending on the individual's circumstances, which might change over time. Furthermore, the current study did not cover any social support data in the evaluation of NDDs. Therefore, the current cross-sectional study does not reflect the development change dynamic. Additionally, self-report data were used for analysis rather than social desirability bias, which could lead to response bias [62]. In the future, studies should introduce and evaluate different strategies to

determine NDD severity levels along with parental stress mitigation procedures using various emotion regulation strategies to inform effective interference with respect to ameliorating the frequently severe parenting stress linked with having a child with an NDD.

Limitations

The Parental Burnout Inventory employed in the current study is a subjective self-report questionnaire with substantial potential for bias. Similarly, the children aged between 7–18 years, however, the teenagers or young aged children with NDDs were not addressed during the study. Furthermore, the demographic questionnaire did not include questions concerning racial or ethnic background, which could have provided important context for evaluating the study's findings. Moreover, the current study did not provide consistent data about correlations between parental stress and relevant features in children with NDDs, such as the severity of the child's symptomology and the child's developmental level, both of which could have a substantial impact on the degree of parenting stress associated with raising a child with an NDD. Various response styles may be more prevalent in different populations providing more detailed information and accuracy of the results. As a result, a response-shift bias may have influenced the ratings.

Furthermore, while this study included a highly representative set of predictors, several variables were excluded, including critical information on emotional and behavioral issues, parental coping strategies, and marital dysfunction, which are significant factors in determining parental stress as linked with having a child with an NDD [57]. Moderators might change depending on a person's life stage [1]. The protective factor, i.e., social support, is a conditioning effect depending on the individual's circumstances, which might change over time. Furthermore, the current study did not cover any social support data for the evaluation of NDDs. Therefore, the current cross-sectional study does not reflect the development change dynamic. Additionally, the self-report data were used for analysis rather than social desirability bias which could lead to response bias [61]. Future, studies should introduce and evaluate different strategies to determine NDD severity levels along with parental stress mitigation procedures using various emotion regulation strategies to inform effective interference with respect to ameliorating the frequently severe parenting stress linked with having a child with NDD.

Conclusions

The findings of this study suggest that parents of children with various neurodevelopmental disorders face a greater degree of psychological distress compared with parents of

typically developing children. This study supports findings suggesting that parental support may be an essential component of intervention programs geared toward children diagnosed with neurodevelopmental disorders. Detecting and treating parental anxiety and reducing stressors that may lead to burnout could play a positive role in treating children with neurodevelopmental disorders, many of whom could have excellent prognostic trajectories with the right treatment. The study findings inform both future research directions and clinical guidelines.

Abbreviations

NDD	Neurodevelopmental disorder
ADHD	Attention deficit hyperactivity disorder
GAD	Generalized Anxiety disorder
ASD	Autism spectrum disorder
HPA	Hypothalamic pituitary adrenal
ID	Intellectual disability

Acknowledgements

Not applicable.

Author's contributions

Single author (design the questionnaire, analyzed the data, and writing the manuscript). The author(s) read and approved the final manuscript.

Funding

This research received no external funding.

Availability of data and materials

Not applicable.

Declarations

Ethics approval and consent to participate

The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of (Imam Mohammad ibn Saud Islamic University) (protocol code 122–2021 and date of 29/09/2021). Participants were informed of their right to confidentiality and consent at all stages of the investigation.

Consent for publication

Participants consent for publication of the data and the result.

Competing interests

The author declares no competing interests.

Received: 7 March 2023 Accepted: 7 May 2023

Published online: 17 July 2023

References

- Roskam I, Aguiar J, Akgun E, Arian G, Artavia M, Avalosse H, Aunola K, Bader M, Bahati C, Barham EJ (2021) Parental burnout around the globe: a 42-country study. *Affect Sci* 2:58–79
- Mikolajczak M, Gross JJ, Roskam I (2019) Parental burnout: what is it, and why does it matter? *Clin Psychol Sci* 7:1319–1329
- Organization WH (2019) Burn-out an “occupational phenomenon”: International Classification of Diseases
- Mikolajczak M, Gross JJ, Roskam I (2021) Beyond job burnout: parental burnout! *Trends Cogn Sci* 25:333–336
- Hubert S, Aujoulat I (2018) Parental burnout: when exhausted mothers open up. *Front Psychol* 9:1021
- Mullin AP, Gokhale A, Moreno-De-Luca A, Sanyal S, Waddington JL, Faudon V (2013) Neurodevelopmental disorders: mechanisms and boundary definitions from genomes, interactomes and proteomes. *Transl Psychiatry* 3:e329–e329
- Blackman JS (2016) Review of diagnostic and statistical manual of mental disorders, *Clinical handbook of psychological disorders: a step-by-step treatment manual, and essentials of psychiatric diagnosis: responding to the challenges of DSM-V*
- D’Souza H, Karmiloff-Smith A (2017) Neurodevelopmental disorders. *Wiley Interdiscip Rev Cogn Sci* 8:e1398
- Gupta VB (2007) Comparison of parenting stress in different developmental disabilities. *J Dev Phys Disabil* 19:417–425
- Mikolajczak M, Roskam I (2020) Parental burnout: moving the focus from children to parents. *New Dir Child Adolesc Dev* 2020:7–13
- Mikolajczak M, Raes ME, Avalosse H, Roskam I (2022) Exhausted parents: sociodemographic, child-related, parent-related, parenting and family-functioning correlates of parental burnout. In: *Key Topics in Parenting and Behavior*. Springer, Midtown Manhattan, pp. 57–69
- Brianda ME, Roskam I, Mikolajczak M (2020) Psychoneuroendocrinology research is needed on parental burnout: a response to Walther, Walther, and Heald’s comment on Hair cortisol concentration as a biomarker of parental burnout. *Psychoneuroendocrinology* 119:104786
- Sarrionandia-Pena A (2019) Effect size of parental burnout on somatic symptoms and sleep disorders. In: *Proceedings of the Psychotherapy and Psychosomatics*. pp. 111–112.
- Martorell GA, Bugental DB (2006) Maternal variations in stress reactivity: implications for harsh parenting practices with very young children. *J Fam Psychol* 20:641
- Moons P, Bovijn L, Budts W, Belmans A, Gewillig M (2010) Temporal trends in survival to adulthood among patients born with congenital heart disease from 1970 to 1992 in Belgium. *Circulation* 122:2264–2272
- Deater-Deckard K, Petrill SA (2004) Parent–child dyadic mutuality and child behavior problems: an investigation of gene–environment processes. *J Child Psychol Psychiatry* 45:1171–1179
- Crnicek KA, Greenberg MT (1990) Minor parenting stresses with young children. *Child Dev* 61:1628–1637
- Morgan J, Robinson D, Aldridge J (2005) Parenting stress and externalizing child behavior. *Soc Work Diagn Contemp Pract* 61:1998–2019
- Masi A, Mendoza Diaz A, Tully L, Azim SI, Woolfenden S, Efron D, Eapen V (2021) Impact of the COVID-19 pandemic on the well-being of children with neurodevelopmental disabilities and their parents. *J Paediatr Child Health* 57:631–636
- Costigan SA, Barnett L, Plotnikoff RC, Lubans DR (2013) The health indicators associated with screen-based sedentary behavior among adolescent girls: a systematic review. *J Adolesc Health* 52:382–392
- Boyle CA, Boulet S, Schieve LA, Cohen RA, Blumberg SJ, Yeargin-Allsopp M, Visser S, Kogan MD (2011) Trends in the prevalence of developmental disabilities in US children, 1997–2008. *Pediatrics* 127:1034–1042
- Scherer N, Verhey I, Kuper H (2019) Depression and anxiety in parents of children with intellectual and developmental disabilities: a systematic review and meta-analysis. *PLoS ONE* 14:e0219888
- Sabus A, Feinstein J, Romani P, Goldson E, Blackmer A (2019) Management of self-injurious behaviors in children with neurodevelopmental disorders: a pharmacotherapy overview. *Pharmacotherapy* 39:645–664
- Currie G, Szabo J (2020) Social isolation and exclusion: the parents’ experience of caring for children with rare neurodevelopmental disorders. *Int J Qual Stud Health Well Being* 15:1725362
- Leitch S, Sciberras E, Post B, Gerner B, Rinehart N, Nicholson JM, Evans S (2019) Experience of stress in parents of children with ADHD: a qualitative study. *Int J Qual Stud Health Well Being* 14:1690091
- Dabrowska A, Pisula E (2010) Parenting stress and coping styles in mothers and fathers of pre-school children with autism and Down syndrome. *J Intellect Disabil Res* 54:266–280
- Brianda ME, Roskam I, Mikolajczak M (2020) Hair cortisol concentration as a biomarker of parental burnout. *Psychoneuroendocrinology* 117:104681
- Lebert-Charron A, Dorard G, Boujut E, Wendland J (2018) Maternal burnout syndrome: contextual and psychological associated factors. *Front Psychol* 9:885
- Masten AS (2001) Ordinary magic: resilience processes in development. *Am Psychol* 56:227

30. Greenland S, Senn SJ, Rothman KJ, Carlin JB, Poole C, Goodman SN, Altman DG (2016) Statistical tests, P values, confidence intervals, and power: a guide to misinterpretations. *Eur J Epidemiol* 31:337–350
31. Gannagé M, Besson E, Harfouche J, Roskam I, Mikolajczak M (2020) Parental burnout in Lebanon: Validation psychometric properties of the Lebanese Arabic version of the Parental Burnout Assessment. *New Dir Child Adolesc Dev* 2020:51–65
32. AlHadi AN, AlAteeq DA, Al-Sharif E, Bawazeer HM, Alanazi H, AlShomrani AT, Shuqdar RM, AlOwaybil R (2017) An arabic translation, reliability, and validation of Patient Health Questionnaire in a Saudi sample. *Ann Gen Psychiatry* 16:1–9
33. Megreya AM, Al-Attayah AA, Moustafa AA, Hassanein EE (2020) Cognitive emotion regulation strategies, anxiety, and depression in mothers of children with or without neurodevelopmental disorders. *Res Autism Spectr Disord* 76:101600
34. Hayes SA, Watson SL (2013) The impact of parenting stress: a meta-analysis of studies comparing the experience of parenting stress in parents of children with and without autism spectrum disorder. *J Autism Dev Disord* 43:629–642
35. Porter N, Loveland KA (2019) An integrative review of parenting stress in mothers of children with autism in Japan. *Int J Disabil Dev Educ* 66:249–272
36. Baker BL, Blacher J, Olsson M (2005) Preschool children with and without developmental delay: behaviour problems, parents' optimism and well-being. *J Intellect Disabil Res* 49:575–590
37. Harrison C, Sofronoff K (2002) ADHD and parental psychological distress: role of demographics, child behavioral characteristics, and parental cognitions. *J Am Acad Child Adolesc Psychiatry* 41:703–711
38. Walker LO, Cooney AT, Riggs MW (1999) Psychosocial and demographic factors related to health behaviors in the 1st trimester. *J Obstet Gynecol Neonatal Nurs* 28:606–614
39. Feizi A, Najmi B, Salehi A, Chorami M, Hoveidafar R (2014) Parenting stress among mothers of children with different physical, mental, and psychological problems. *J Res Med Sci* 19:145–152
40. McStay RL, Dissanayake C, Scheeren A, Koot HM, Begeer S (2014) Parenting stress and autism: the role of age, autism severity, quality of life and problem behaviour of children and adolescents with autism. *Autism* 18:502–510
41. Craig F, Operto FF, De Giacomo A, Margari L, Frolli A, Conson M, Ivnages S, Monaco M, Margari F (2016) Parenting stress among parents of children with neurodevelopmental disorders. *Psychiatry Res* 242:121–129
42. Spiliotopoulou B (2005) Expressive language disorder and how it connects with mood and behaviour disorder: a guide for parents
43. Enav Y, Erhard-Weiss D, Kopelman M, Samson AC, Mehta S, Gross JJ, Hardan AY (2019) A non randomized mentalization intervention for parents of children with autism. *Autism Res* 12:1077–1086
44. Fitzpatrick M, McCrudden E, Kirby K (2019) A pilot investigation of a parenting intervention for parents and children with neurodevelopmental disorders (NDD). *Child Care Pract* 25:129–145
45. Herring S, Gray K, Taffe J, Tonge B, Sweeney D, Einfeld S (2006) Behaviour and emotional problems in toddlers with pervasive developmental disorders and developmental delay: Associations with parental mental health and family functioning. *J Intellect Disabil Res* 50:874–882
46. Bluth K, Roberson PN, Billen RM, Sams JM (2013) A stress model for couples parenting children with autism spectrum disorders and the introduction of a mindfulness intervention. *J Fam Theory Rev* 5:194–213
47. Haytham A-O, Khuan L, Ying LP, Hassouneh O (2022) Coping mechanism among parents of children with autism spectrum disorder: a review. *Iran J Child Neurol* 16:9
48. Costa AP, Steffgen G, Ferring D (2017) Contributors to well-being and stress in parents of children with autism spectrum disorder. *Res Autism Spectr Disord* 37:61–72
49. Sivberg B (2002) Family system and coping behaviors: a comparison between parents of children with autistic spectrum disorders and parents with non-autistic children. *Autism* 6:397–409
50. Hirschler-Guttenberg Y, Golan O, Ostfeld-Etzion S, Feldman R (2015) Mothering, fathering, and the regulation of negative and positive emotions in high-functioning preschoolers with autism spectrum disorder. *J Child Psychol Psychiatry* 56:530–539
51. Ang KQP, Loh PR (2019) Mental health and coping in parents of children with autism spectrum disorder (ASD) in Singapore: an examination of gender role in caring. *J Autism Dev Disord* 49:2129–2145
52. Accardo AL, Pontes NM, Pontes MC (2022) Heightened anxiety and depression among autistic adolescents with ADHD: findings from the National Survey of Children's Health 2016–2019. *J Autism Dev Disord* 52:1–14
53. Seymour M, Wood C, Giallo R, Jelllett R (2013) Fatigue, stress and coping in mothers of children with an autism spectrum disorder. *J Autism Dev Disord* 43:1547–1554
54. Davis NO, Carter AS (2008) Parenting stress in mothers and fathers of toddlers with autism spectrum disorders: associations with child characteristics. *J Autism Dev Disord* 38:1278–1291
55. Firth I, Dryer R (2013) The predictors of distress in parents of children with autism spectrum disorder. *J Intellect Dev Disabil* 38:163–171
56. Hastings RP (2003) Child behaviour problems and partner mental health as correlates of stress in mothers and fathers of children with autism. *J Intellect Disabil Res* 47:231–237
57. Suzumura S (2015) Quality of life in mothers of preschoolers with high-functioning pervasive developmental disorders. *Pediatr Int* 57:149–154
58. Derguy C, M'bailara K, Michel G, Roux S, Bouvard M (2016) The need for an ecological approach to parental stress in autism spectrum disorders: the combined role of individual and environmental factors. *J Autism Dev Disord* 46:1895–1905
59. Khusaifan SJ, El Keshky MES (2021) Social support as a protective factor for the well-being of parents of children with autism in Saudi Arabia. *J Pediatr Nurs* 58:e1–e7
60. Saha A, Agarwal N (2016) Modeling social support in autism community on social media. *Network Model Anal Health Inform Bioinform* 5:1–14
61. Olsson M, Hwang C (2008) Socioeconomic and psychological variables as risk and protective factors for parental well-being in families of children with intellectual disabilities. *J Intellect Disabil Res* 52:1102–1113
62. Althubaiti A (2016) Information bias in health research: definition, pitfalls, and adjustment methods. *J Multidiscip Healthc* 9:211–217

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Submit your manuscript to a SpringerOpen® journal and benefit from:

- Convenient online submission
- Rigorous peer review
- Open access: articles freely available online
- High visibility within the field
- Retaining the copyright to your article

Submit your next manuscript at ► [springeropen.com](https://www.springeropen.com)