



# Family Quality of Life Perceived by Mothers of Children with ASD and ADHD

Alyssa Romaniuk<sup>1</sup> · Michelle Ward<sup>1</sup> · Brenna Henrikson<sup>1</sup> · Karis Cochrane<sup>1</sup> · Jennifer Theule<sup>1</sup>

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## Abstract

Existing research has compared Family Quality of Life (FQOL) in autism spectrum disorder (ASD) populations and typically developing populations but has not yet explored differences in FQOL across ASD, attention-deficit/hyperactivity disorder (ADHD), and comorbid ASD and ADHD populations (ASD+ADHD). In the present study, 117 North American mothers of 92 sons and 25 daughters (ages 6–11) with ASD, ADHD, or ASD+ADHD completed an online survey exploring FQOL. An ANOVA failed to show group differences in overall FQOL, however, mothers of children with ASD+ADHD reported significantly lower family Emotional Well-being than mothers of children with ASD only. The results of this study provide insight into FQOL in families of children with ASD and/or ADHD. Greater research is needed in this area to understand how mothers of children with ASD, ADHD, or ASD+ADHD experience FQOL. The COVID-19 pandemic, which ran concurrent with this study, potentially influenced results.

**Keywords** Autism spectrum disorder · Attention-deficit/hyperactivity disorder · Family quality of life · Parenting · Motherhood

Parents of children with neurodevelopmental disorders, especially autism spectrum disorders and attention-deficit hyperactivity disorder, experience the natural stressors of childrearing while also experiencing additional stressors relating to raising a child with unique support needs [1]. These disorders place additional stressors on the entire family unit; necessitating an examination of how the family's overall wellbeing is impacted [1, 2]. Caring for a child with a neurodevelopmental disorder typically requires more time than caring for a typically developing child [3], as the caregiver needs to learn and adapt to the child's unique support needs. For example, time is restricted as children with neurodevelopmental disorders often have more medical and service appointments to attend in comparison to typically developing children [4]. Many parents also state that finding a childcare provider is difficult [5]. When childcare is found, providers may not have the required training to deal with

the unique support needs associated with caring for a child with exceptional needs, leaving parents with fewer external supports [5]. Research continues to show that mothers take on the majority of the caregiving responsibilities, especially in cases where the child is diagnosed with a disability [6]. In turn, mothers tend to experience poorer mental health outcomes in comparison to fathers [6, 7].

Family Quality of Life (FQOL), a measure of a family unit's satisfaction and overall wellbeing [2], is essential to examine in caregivers of children with neurodevelopmental disorders. Given the central role of mothers within the family unit—along with additional stressors and poorer mental health outcomes associated with raising a child with exceptional needs [6, 8]—the importance of examining FQOL amongst mothers of children of children with neurodevelopmental disorders is crucial. Families of children with ASD have been found to experience lower levels of FQOL than families of children with other disabilities, as well as children that are typically developing [1, 9].

Families of children with ASD or ADHD experience higher levels of parenting stress in comparison to families with typically developing children [10]. Further, children diagnosed with comorbid ASD and ADHD (ASD+ADHD) have been shown to have even higher rates of disruptive

✉ Alyssa Romaniuk  
romaniu3@myumanitoba.ca

<sup>1</sup> Department of Psychology, University of Manitoba, P439  
Duff Roblin Building, 190 Dysart Road, R3T 2N2, Winnipeg,  
Manitoba, Canada

behaviours in comparison to children diagnosed with only one of these disorders [11, 12], which may potentially increase parenting stress [10, 13]. Higher levels of parenting stress, along with exacerbated problem behaviours, may impact FQOL outcomes [12, 14, 15]. Research has studied FQOL in families of children with ASD and individual Quality of Life (QoL) in families of children with ADHD [1, 14–19]. This research, however, is limited in that no known studies have directly compared ASD and ADHD populations, making it unclear whether FQOL differs between these populations. Further, while ADHD symptomology frequently co-occurs with ASD [12], no known studies have examined FQOL in these comorbid populations. Greater study of this issue is needed, given previous research suggesting that externalizing behaviours exhibited by children with ASD+ADHD may be intensified in comparison to children with ASD or ADHD alone [12, 20]. As such, the current study sought to investigate whether mothers of children with ASD, ADHD, and/or ASD+ADHD significantly differ in their ratings of FQOL.

## Autism Spectrum Disorder (ASD)

Individuals with ASD experience difficulties with reciprocal communication, initiating social interactions, forming and maintaining relationships, and using and understanding nonverbal behavior [21]. Restricted and repetitive behavior patterns are another core feature of ASD, and may include repetitive motor movements, repetitive use of objects (e.g., lining up toys), and echolalia (i.e., word/phrase repetition or imitation). Individuals with ASD may also demonstrate greater resistance to change, insistence on routine, and abnormal sensory interests (e.g., fixation on lights, sounds, or textures). Recently, the Public Health Agency of Canada [22] reported that 1 in 66 Canadian children and youth have ASD. Most children are diagnosed with ASD after age 4, with a higher prevalence among boys than girls [23]. A recent study suggested a male to female ratio of 3:1 [24]. One of the most commonly co-occurring disorders with ASD is ADHD [25].

## Attention Deficit Hyperactivity Disorder (ADHD)

ADHD is one of the most common pediatric disorders with a prevalence rate in children of approximately 5% [21]. Most children are diagnosed with ADHD during elementary school years, typically around the age of 7 [21, 23]. ADHD is more common in males than females, with a gender ratio of 2:1 in children [21]. Symptoms of inattention can include

difficulty focusing on details, tasks, and activities; listening and following instructions; completing tasks due to distractibility; as well as organizing and remembering materials required to complete tasks. Hyperactive and impulsive symptoms can include fidgeting and squirming; getting out of a seat when required to remain seated; running or climbing in places where not appropriate; talking excessively; having trouble waiting patiently; and interrupting others in conversations or activities [21].

## ASD and ADHD

ASD and ADHD are highly comorbid [12, 25, 26] meaning that common symptoms of ASD are often present in ADHD populations, and vice versa [12]. Approximately 14% of children with ADHD have ASD, and more than half of individuals with ASD have ADHD [23]. ADHD is the most common co-occurring disorder in children with ASD [23]. Individuals with ASD can meet full diagnostic criteria for ADHD or may only exhibit subsyndromal symptoms [27]. Children diagnosed with ASD+ADHD have been shown to have poorer daily functioning in comparison to children with ASD or ADHD alone [20]. For example, children with ASD+ADHD have higher rates of tantrum behaviours [11, 12], which can consist of a variety of disruptive externalizing behaviours, such as crying, yelling, aggression, destruction of property, and noncompliance [11].

## Quality of Life (QoL)

Parents who raise a child with special health and support needs are extensively involved in the family unit, more so than parents in families of children without disabilities [1, 2]. In particular, mothers are very involved in the direct care of their children with developmental disabilities [1, 2]. This increased familial involvement places additional stress on the family unit [1, 2], thus impacting QoL. QoL has been defined as “the degree of need and satisfaction within the physical, psychological, social, activity, material, and structural areas” (28, p.171). Essentially, QoL is the degree to which an individual perceives their expectations/needs being met or not in each of these domains in their life. While QoL focuses on an individual’s wellbeing, FQOL looks at the family as the unit of consideration [2].

## Family Quality of Life (FQOL)

FQOL is defined as “a dynamic sense of well-being of the family, collectively and subjectively defined and informed by its members, in which individual and family-level needs interact” (2, p. 262). FQOL is an extension of individual QoL. For example, individual QoL measures ask questions such as “How important to you is support from others?” [29], whereas FQOL measures include items such as “My family members have friends or others who provide support” [30]. The shift in focus from individual needs and satisfaction to the family’s perspective as a whole is what makes FQOL unique from individual QoL [2]. To achieve high FQOL, families need to be satisfied with various domains such as their family interaction, parenting, emotional well-being, physical/material well-being, and disability-related support, which also represent the domains on the dominant measure of FQOL [30, 31]. The family interaction domain consists of interpersonal connections with members of the family unit, while the parenting domain consists of how parents teach their children about independence, schoolwork and activities, good judgement, and relationships. The emotional well-being domain relates to the family’s satisfaction with multiple supports, such as friends and other supports that help relieve stress. The physical/material well-being domain relates to the family’s access to transportation, medical supports, dental care, safety in the community, and the family’s ability to handle expenses. Lastly, a family’s access to disability related services is a key domain in achieving high FQOL, which includes having access to supports across school, work, home, and interpersonal contexts [31]. By considering the quality of life of the family unit, a wider range of insight can be gained in terms of the family’s satisfaction in similar domains of QoL than could be obtained by examining individual QoL alone [2].

Mothers tend to take on a higher proportion of parenting responsibilities in heterosexual relationships [1]. Bourke-Taylor and colleagues [6] interviewed mothers of children with ASD, intellectual disabilities, and other co-occurring conditions. During this study, mothers reported stress relating to new responsibilities as well as restricted and highly structured schedules. Mothers described feeling like they were missing out on their daily activities and time for themselves, struggling with social isolation, and facing stigma from others in the community. Mothers also described services as difficult to reach and expressed “a lack of availability, consistency and funding for needed services and supplies” (6, p. 134). Many mothers felt that their partner and extended families were absent and did not provide adequate support. They further found that mothers who had a child with a disability experienced numerous challenges that could impact their mental health and leave them feeling

alone in their caregiving role. These additional stressors and poorer mental health outcomes, such as depression, anxiety, and restriction of time, have all been shown to increase parenting stress levels [6, 10, 32].

Parenting stress can be defined as the negative emotions a parent feels toward themselves and/or their child, due to the weight felt in their caregiving role [33] and can impact the family unit as a whole [14]. ASD and ADHD are linked to increased parenting stress and general stress within the family unit [10, 32]. Hsiao and colleagues [14] explored the link between FQOL and parenting stress and found that the relationship functioned in two directions. Specifically, they found that higher levels of parenting stress negatively impacted FQOL, and that lower levels of FQOL seemed to increase parenting stress.

Mothers are extremely informative respondents. Research continues to show that mothers tend to take on greater caregiving responsibilities, especially in cases where the child is diagnosed with a disability [6, 8]. Furthermore, research has shown that maternal reports on their child’s psychopathology are both reliable and accurate [34]. Given their central role in the family unit, and the additional and unique stressors mothers of children with neurodevelopmental disorders face, examining maternal perspectives of FQOL is a good starting point for this research.

Disabilities such as ASD and ADHD are of increasing prevalence [23], yet little research has measured the impact of these disorders on FQOL. There are a few studies that have examined ASD and FQOL [1, 14, 15, 17], however, no known studies have examined ADHD and FQOL. Further, no known studies have compared families of children with ASD and/or ADHD on FQOL. It is essential to study FQOL in both ASD and ADHD populations for numerous reasons. Studies that have measured FQOL in families of children with ASD have shown that they experience lower levels of FQOL in comparison to families of typically developing children [17]. This is thought to be due to increased pressure and stress, which impacts family interactions and relationships [17]. Externalizing behaviour problems that often accompany ADHD [35], can increase stress in the family and decrease individual QoL [18, 19, 36]. ADHD is also highly comorbid in ASD populations [23], and studies have shown an increase in maladaptive behaviours in children with ASD+ADHD, in comparison to those with ASD or ADHD alone [12]. It is important to understand whether families of children with ASD, ADHD, and ASD+ADHD experience differences in FQOL, given the similar stressors experienced. This may help in understanding contributors to FQOL, and thus where to focus intervention efforts.

**Table 1** Continuous Demographic Characteristics by Child Diagnostic Status

	ASD	ADHD	ASD + ADHD		
Demographic Characteristics	M( <i>SD</i> )	M( <i>SD</i> )	M( <i>SD</i> )	<i>F</i>	<i>p</i>
Mother's Age (years)	38.5 (3.7)	37.9 (5.7)	40.8 (6.0)	2.8	0.07
Child's Age (years)	7.9 (1.7)	8.3 (1.7)	8.6 (1.5)	1.5	0.24
AQ-Child	99.4 (14.3)	65.8 (6.5)	103.2 (13.9)		
ADHD Rating Scale-IV					
Total	28.0 (11.0)	37.0 (8.3)	41.8 (7.0)		
Inattentive	14.1 (6.1)	19.6 (6.0)	21.1 (4.0)		
Hyperactive/Impulsive	13.9 (5.9)	17.4 (6.0)	20.7 (4.0)		

*Note.* Due to missing data, mean and standard deviation for maternal age was calculated based on ASD ( $n = 36$ ), ADHD ( $n = 21$ ), and ASD + ADHD ( $n = 38$ ), and the child's age ASD ( $n = 45$ ).

## Current Study

The current study addresses an important gap in the literature by examining FQOL in ASD, ADHD, and ASD+ADHD populations. Specifically, this study examined FQOL in mothers of children with ASD, ADHD, and ASD+ADHD. The following research question was addressed: Do mothers of children with ASD, ADHD, and/or ASD+ADHD significantly differ in their ratings of FQOL? Due to past literature reporting exacerbated maladaptive behaviours and emotional problems in ASD+ADHD groups in comparison to ASD or ADHD alone [11, 12], it was hypothesized that the ASD+ADHD group would experience significantly lower levels of FQOL compared to ASD or ADHD groups alone.

## Method

### Sample Size

Prior to conducting the study, using G\*Power 3.1 software [37], a power analysis was conducted to ensure adequate power (0.80) would be achieved at an alpha level of 0.05. Using a medium effect size of  $f = 0.25$ , a sample size of at least 53 participants per group was required for the current study ( $N = 159$ ). This sample size was not achieved in the current study as unfortunately only 117 participants total were included in analysis ( $N = 117$ ).

### Participants

Participants were recruited from a variety of ASD and ADHD organizations. Online ads were posted on websites (e.g., The Autism Advocate, Autism Speaks Blog, Centre for ADHD Awareness Canada) to reach potential participants across North America. Social media was also used to reach potential participants through support blogs and Facebook groups (e.g., Autism Talks Page, Autism Speaks Page, ADHD Families Canada, ADHD Foundation Page). Medical and clinical institutions including local ASD service

organizations were contacted in order to distribute information about the study to the target population.

Eligibility requirements included being a mother of a child between 6 and 11 years old from Canada or the United States of America. Mothers were eligible if they had at least one child who had formally been diagnosed with ASD and/or ADHD by a qualified medical doctor or psychologist. Mothers were asked self-report their child's diagnosis. ASD and ADHD screening measures were used to substantiate the diagnoses (i.e., The Autism Spectrum Quotient—Child Version and The ADHD Rating Scale-IV: Home Version).

Of the 117 eligible participants, 46 mothers of children were included in the ASD group, 22 mothers of children were included in the ADHD group, and 49 mothers of children were included in the ASD+ADHD group. Of the 117 participating mothers, 92 were mothers of sons and 25 were mothers of daughters. Of this total sample, 33 of the mothers identified their child as having a co-occurring intellectual disability (ID). There were no significant differences were found between mothers of children with and without intellectual disability within both the ASD,  $F[1, 44] = 0.108$ ,  $p = .743$ , and ASD+ADHD groups,  $F[1, 47] = 0.825$ ,  $p = .368$ . Across groups, 99 mothers were Canadian, and 18 mothers were American. The mother's ages ranged from 25 to 52 years, with a mean age of 39.3 years ( $SD = 5.3$ ), while their child's ages ranged from 6 to 11 years, with an average age of 8.3 years ( $SD = 1.6$ ). There were no significant differences in mothers age across groups,  $F(2, 92) = 2.81$ ,  $p = .065$ . There were no significant differences in child age across groups,  $F(2, 113) = 1.45$ ,  $p = .238$ . The majority of mothers identified as married ( $n = 80$ ), others identified as either single ( $n = 18$ ), common-law ( $n = 4$ ), or divorced ( $n = 15$ ). There were no significant differences in partnered or unpartnered mothers across groups,  $\chi^2(2, N = 117) = 1.813$ ,  $p = .404$ . Mothers' ethnicity was primarily White ( $n = 94$ ). Tables 1 and 2 details descriptive statistics for demographic variables by group for the included participants.

**Table 2** Categorical Demographic Characteristics by Child Diagnostic Status

Demographic Characteristics	ASD <i>n</i> = 46 (39.3%)	ADHD <i>n</i> = 22 (18.8%)	ASD + ADHD <i>n</i> = 49 (41.9%)	$\chi^2$	<i>p</i>
Child Gender				1.5	0.5
Son	39 (84.8%)	20 (90.9%)	39 (79.6%)		
Daughter	7 (15.2%)	2 (9.1%)	10 (20.4%)		
Co-occurring Intellectual Disability	19 (41.3%)	0 (0%)	14 (28.6%)		
Marital Status				1.8	0.4
Partnered	36 (78.3%)	14 (63.6%)	34 (69.4%)		
Unpartnered	10 (21.7%)	8 (36.4%)	15 (30.6%)		
Household Income (\$)					
0-40K	11 (23.9%)	6 (27.3%)	8 (16.7%)		
40-60K	5 (10.9%)	6 (27.3%)	8 (16.7%)		
60-90K	13 (28.3%)	3 (13.6%)	9 (18.8%)		
90-125K	11 (23.9%)	3 (13.6%)	15 (31.3%)		
125K+	6 (13%)	4 (18.2%)	8 (16.7%)		
Country of Residence					
Canada	43 (93.5%)	17 (77.3%)	39 (79.6%)		
United States	3 (6.5%)	5 (22.7%)	10 (20.4%)		
Ethnicity					
Asian	2 (4.3%)	1 (4.5%)	2 (4.1%)		
Black	1 (2.2%)	0 (0%)	1 (2%)		
Indigenous	2 (4.3%)	2 (9.1%)	4 (8.2%)		
Caucasian	38 (82.6%)	19 (86.4%)	37 (75.5%)		
Other	3 (6.5%)	0 (0%)	5 (10.2%)		

Note. Percentage for household income was calculated based on ASD + ADHD (*n* = 48).

## Procedures

Following approval by the University of Manitoba's Psychology/Sociology Research Ethics Board (PSREB), a between-groups, cross-sectional online study was conducted. Data was collected using Qualtrics [38]. After following the survey link, participants were brought to an informed consent form that outlined the study objectives. After mothers consented to participating in the study, they were prompted to complete a demographics questionnaire along with the measures described in detail below. As the current study was part of a larger project, several additional measures were included in the survey that are not described here. Once the survey was completed, all participants were given the opportunity to enter into a draw for the chance to win one of ten \$50 Amazon gift cards.

## Measures

**The Autism Spectrum Quotient—Children's Version (AQ-Child).** The Autism Spectrum Quotient—Child Version (AQ-C; 39) is a parent-completed questionnaire that was used to substantiate ASD diagnoses. The questionnaire consists of 50 questions that measures parents' perceptions of their child's behaviours in five domains: social skills, attention switching, attention to detail, communication, and imagination [39]. Items on the measure include "S/he

frequently gets so strongly absorbed in one thing that s/he loses sight of other things" and "S/he often notices small sounds when others do not". The AQ-C was designed to screen and measure "autistic like" traits in children 4–11 years old. Parents responded using a rating scale that ranged from 0 (*Definitely Agree*), to 3 (*Definitely Disagree*). Higher ratings correspond with a higher degree of autistic traits and behaviour [39]. Ratings resulted in a total measure of autism symptomology. A score of 76 was used as a cut off in the present study, due to its high specificity and sensitivity [39]. ASD group participants who scored below 76 were excluded from the current study as they did not meet ASD criteria. ADHD group participants (who had not been previously diagnosed with ASD) who scored above 76 were also excluded. The AQ has high internal consistency (Cronbach's  $\alpha$  = 0.97) as well as high test-retest reliability (Cronbach's  $\alpha$  = 0.85; 39).

**ADHD Rating Scale-IV: Home Version.** The ADHD Rating Scale-IV: Home Version [40] was used to substantiate ADHD diagnoses. This parent-completed measure consists of 18 items in total. Within the 18 items are two subscales; one measuring inattention and the second measuring hyperactivity-impulsivity. Parents respond using a 4-point Likert rating scale that ranged from 0 (*never or rarely*) to 3 (*very often*). Items on the measure include "Fidgets with hands or feet or squirms in seat" and "Has difficulty sustaining attention in tasks or play activities." The ADHD Rating Scale-IV:



**Table 3** ANOVA Results

Outcome Variable	ASD		ADHD		ASD + ADHD		$F(2,114)$	$\eta^2$
	$M$	$SD$	$M$	$SD$	$M$	$SD$		
Overall FQOL	3.85	0.39	3.84	0.45	3.66	0.76	1.44	0.02
Family Interaction	3.98	0.43	3.84	0.68	3.88	0.92	0.35	0.01
Parenting	3.80	0.52	3.88	0.60	3.71	0.80	0.53	0.01
Emotional Well-being	3.32	0.91	3.23	0.79	2.81	1.09	3.49*	0.06
Physical/Material Well-being	4.20	0.52	4.32	0.59	4.14	0.71	0.61	0.01
Disability-Related Support	3.84	0.54	3.78	0.61	3.52	1.15	1.88	0.03

Note. For all ANOVA results, the independent/predictor variable was child diagnostic status (ASD, ADHD, or ASD + ADHD). \*  $p < .05$ .

Home Version was developed for children ages 5–18 years [40,41]. To meet ADHD criteria, the parent would have to report at least six inattention and/or six hyperactive/impulsive symptoms in their child as occurring often or very often [40]. Children in the ASD only group needed to fall below this cut-off. The ADHD Rating Scale-IV: Home Version has a good internal consistency (Cronbach's  $\alpha = 0.92$ ), as well as good test-retest reliability (Cronbach's  $\alpha = 0.85$ ; 40). Furthermore, the ADHD Rating Scale-IV: Home Version has adequate predictive validity in ADHD samples, ranging from 60 to 85% accuracy [40].

**The Family Quality of Life Scale.** The Beach Center FQOL Scale [30] was used to measure mothers' perception of overall FQOL and each individual subscale of FQOL. FQOL is comprised of five different domains: Family Interaction, Parenting, Emotional Well-being, Physical/Material Well-being, and Disability-Related Support. Each of the five domains on the measure consists of 4–6 items. This measure is specifically intended for use with families who have a child with a developmental disability [42]. Items on the measure include “My family members talk openly with each other” and “Our family solves problems together”. Mothers completed the measure using a 5-point Likert scale that ranged from 1 (*very dissatisfied*) to 5 (*very satisfied*). The scale has high internal consistency across all subscales ( $\alpha = 0.88 - 0.94$ ). The Beach Center FQOL Scale has shown to have good concurrent validity with two other scales that measure family relationships and functioning, the Family APGAR and the Family Resources Scale [43].

### Analytic Strategy

Following data collection, participant responses were imported directly from Qualtrics [38] into SPSS. The independent/predictor variable was child diagnostic status (ASD, ADHD, or ASD + ADHD) and the dependent/outcome variable was maternal ratings of FQOL.

### Results

In order to test the hypothesis that mothers of children with ASD + ADHD experience lower levels of FQOL in comparison to mothers of children with ASD or ADHD alone, a one-way,  $3 \times 1$  (Child diagnostic status [ASD, ADHD, ASD + ADHD]  $\times$  Outcome [FQOL]) between-groups ANOVA was performed. Prior to conducting the ANOVA, the assumption of normality, assumption of variance, and assumption of independence were tested and satisfied. Results of the ANOVA for the total FQOL scale did not yield a statistically significant effect between the three groups,  $F(2, 114) = 1.44$ ,  $p = .242$ ,  $\eta_p^2 = 0.025$ . Although this result was not statistically significant, the ASD + ADHD group experienced the lowest levels of FQOL ( $M = 3.66$ ,  $SD = 0.08$ ) on average, in comparison to the ASD ( $M = 3.85$ ,  $SD = 0.09$ ) and ADHD groups ( $M = 3.84$ ,  $SD = 0.12$ ), as predicted. Additionally, the ANOVA analysis yielded a small effect ( $\eta_p^2 = 0.03$ ; 44). Additional ANOVAs were conducted for each of the five domains of the FQOL scale. Of the five domains of FQOL, the Emotional Well-being subscale yielded a significant result  $F(2, 114) = 3.49$ ,  $p = .034$ . Multiple comparisons method was used to look for specific differences between pairs of groups. The ASD + ADHD group scored the lowest on the Emotional Well-being subscale and this group was significantly lower than the ASD group only ( $p = .034$ ), but not the ADHD group only ( $p = .220$ ). There was no significant difference in Emotional Well-being between the ASD group and ADHD group ( $p = .935$ ). See Table 3 for all ANOVA subscale results.

### Discussion

Very limited research exists examining FQOL in ASD populations, and no known research has looked at FQOL in ADHD or ASD + ADHD populations. The current study examined potential differences in FQOL in these populations. Within the present study, there were not significant differences between mothers of children with ASD + ADHD and mothers of children with either ASD or ADHD alone in

overall FQOL. That said, the trends observed (i.e., lowest overall FQOL in the ASD+ADHD group) aligned with the study's hypothesis. While this finding could be due to a true lack of significant differences in FQOL between groups, it is possible that non-significant differences were seen because of a lack of power. This lack of power could have resulted from unequal group sizes. The ADHD group only had a total of 22 participants, compared to the ASD and ASD+ADHD groups which had over 40 participants each. Furthermore, our total sample size of 117 participants was lower than our required total sample size of 159 participants to achieve 80% power. The current study did find a significant difference in the Emotional Well-being subscale of FQOL, with the ASD+ADHD group scoring significantly lower than the ASD only group. One possible explanation for this finding could be due to the perceived lack of social support parents of children with ASD+ADHD experience [45, 46]. Previous research has found that parents of children with ASD+ADHD report less support from their partners compared to parents of children with one of these disorders alone [45, 46]. Furthermore, depression symptoms have also been found to be elevated in parents of children with ASD+ADHD [47]. The lack of social support and elevated depression symptoms may impact Emotional Well-being in these families, therefore reducing their overall FQOL.

The situation with the COVID-19 pandemic may have also affected results. Much recent research shows the negative impact the pandemic has had on families of children with neurodevelopmental disabilities [48, 49]. Parents of children with ASD and ADHD have found it much more challenging to manage their children's behaviours [49]. Therefore, the perspectives of FQOL found in this study may be affected by life and support changes due to the pandemic [49]. Recruitment for the current study started in February 2020 before the COVID-19 pandemic began, and continued through to March 2021. The impacts of COVID restrictions and supports varied over time and across locations over this period [48, 49].

Although not significant, the results from this study may suggest that the additional and unique needs often experienced by children with ASD+ADHD impacts mothers' FQOL more so than in families where children have only one of these disorders. If this is the case, the decreased FQOL scores found in families of children with ASD+ADHD may be due to the intensified externalizing behaviours often found within these child populations, in comparison to children with ASD or ADHD alone [11, 12, 50]. Exacerbated externalizing behaviours could in turn interfere with parent-child relationships [51]. These children may also be more dependent on their parents due to exacerbated externalizing behaviours hindering adaptive functioning for everyday living skills [52].

## Strengths and Limitations

A primary strength of this study was that it is the first to examine FQOL in ASD, ADHD, and ASD+ADHD populations, therefore providing a foundation for future research to build on. Additionally, the measures used in the current study were specifically designed for the populations being studied. For example, the Beach Center FQOL scale was designed through qualitative interviews with both families of individuals with disabilities, as well as service providers who experience developmental disabilities firsthand [2].

It is important to also identify several limitations in the current study. First, the design of the survey did not account for the impact of having more than one child with a diagnosis of ASD and/or ADHD. It is uncertain whether having more than one child with a diagnosis may affect levels of FQOL more or less than having just one child with a diagnosis. Another limitation is that this was a self-report study, leaving open the risk for response bias. However, the sample population involved in the present study (i.e., mothers of children with ASD) have been shown in previous research to be good informants when it comes to reporting on their child's ASD symptomology [53]. Furthermore, the online anonymous nature of the study tends to reduce social desirability biases [54]. Moreover, in terms of FQOL ratings, self-perception is the construct of interest.

Another limitation of the current study is that the sample size of the ADHD group was much smaller than hoped. This limited the present study as small sample sizes restrict statistical power, therefore making it possible that this study was not able to detect a true effect [55]. With the small and unequal sample size in this study, Type II error was increased to approximately 69%, resulting in a very increased probability of having a false negative. This may be a possible reason for the nonsignificant results in the current study [55]. To effectively address the research question of whether mothers of children with ASD, ADHD, and ASD+ADHD significantly differ in their ratings of FQOL, a larger sample size is needed.

The lack of power resulted in other limitations. In the current study, those with comorbid intellectual disability were included. This inclusion was undertaken as no significant differences were found between mothers of children with and without intellectual disability. Although there were no significant differences found in the current study, this may be due to the small sample size. There is some research which suggests that intelligence may influence FQOL [56]. Furthermore, the lack of power in the current study did not allow for the inclusion of more variables in our main analyses. Sociodemographic variables such as child gender would be an important variable to control for, as it has been shown to influence related constructs such as parenting

stress [57]. That said, none of the sociodemographic variables (child and mother age, partner status) compared in the current study significantly differed between groups.

Participants were given the option to enter a draw to win one of ten Amazon gift cards. This may have provided participants with external motivation to complete the survey and may have influenced results. However, gift cards were not guaranteed, as only 10 participants were randomly selected for this benefit. Furthermore, the current study was an online survey. If participants had questions or needed clarification, this was not provided given the online nature of the study. Lastly, we were not able to examine the bidirectionality of the relationship between FQOL and children's diagnosis of ASD and/or ADHD. This is a limitation of the research design in the current study.

### Future Directions and Conclusions

This is the first study that examines FQOL in ADHD populations, compares FQOL in ASD to ADHD populations, and examines FQOL in ASD+ADHD populations. This research is well-positioned to advance knowledge in the field of neurodevelopmental disabilities and increase understanding of FQOL for families of children with ADHD and ASD. This research is beneficial for practitioners and clinicians who work with individuals with ASD, ADHD, and ASD+ADHD and their families. Specifically, ASD+ADHD populations may benefit from additional or unique supports that are tailored to their needs due to their risk for increased severity of externalizing behaviours [11, 12]. This research may also inform future research on other related concepts such as parenting stress, parent-child relationships, and parent-teacher relationships, as these are all often linked to FQOL [14, 15].

In order to further assist in the treatment objectives outlined above, the present study should be replicated with a larger sample size to ensure adequate power is reached to detect true effects. Future research should also consider replicating the current study with fathers and their children in order to gain a broader perspective of FQOL, taking a multi-informant approach. Additionally, future research should examine a larger age range of children, and look at the differences between ADHD presentations. Furthermore, the relative impact of children's externalizing behavior and FQOL should be investigated given the higher rates of externalizing behaviours in ASD+ADHD populations [11, 12]. Examining the bidirectionality of FQOL and the core symptoms of neurological conditions such as ASD and ADHD would be another relevant area of focus. Understanding how these two variables influence each other may help clinicians better understand this relationship, aiding in treatment and intervention for these families. Moreover, this study should be replicated during more stable times given the impact of

COVID-19 on families [48, 49]. Service appointments may have been cancelled, children were learning from home, and parents may have lost their jobs during this time period. All of these situations could have impacted families [48]. Greater research in this area could assist clinicians in tailoring particular services based on a family's specific needs. Given that this study is the first known study to compare overall FQOL in ASD, ADHD, and ASD+ADHD populations, it builds a foundation for future research and opens the door to more in-depth knowledge on these populations.

### Summary

The primary goal of this study was to compare FQOL in mothers of children with ASD, ADHD, and ASD+ADHD. An ANOVA revealed no significant differences between overall FQOL across ASD, ADHD, and ASD+ADHD populations. However, the Emotional Well-being subscale revealed a significant result. Post hoc multiple comparisons procedure was run to understand group differences. The ASD+ADHD group scored the lowest on the Emotional Well-being subscale, and this group was significantly lower than the ASD group only, but not the ADHD group only. There was no significant difference in Emotional Well-being between the ASD group and ADHD group. While the finding of no significant difference in overall FQOL could be due to a true lack of significant differences in FQOL between groups, it is possible that non-significant differences were seen because of a lack of power. The current study should be replicated with a larger sample size to ensure adequate power is achieved. This research advances our knowledge about FQOL in ASD and ADHD populations. This research may inform practitioners and clinicians who work with individuals with ASD, ADHD, and ASD+ADHD and their families.

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### Declarations

**Conflicts of Interest** We have no conflicts of interest to disclose

**Ethics Approval** Our study was reviewed and approved by the University of Manitoba's Psychology/Sociology Research Ethics Board (PSREB). PSREB is constituted and operates in accordance with the current *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans*.

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