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Social Support and Links to Quality of Life Among Middle and Older Age Autistic Adults

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Abstract

Social support has a positive impact on quality of life (QoL) in neurotypical older adults and young autistic adults, but the association for older autistic adults is unclear. Autistic adults (n=388; mean age=40-83 years) were recruited via Simons Powering Autism Research for Knowledge research match. Participants completed questionnaires online querying demographic information, depression and anxiety symptomatology, QoL (Physical, Psychological, Social, Environmental, Autism-specific) and social support (instrumental, subjective and social interactions). Regression analyses examined whether different aspects of social support explained the variance in each domain of QoL. A significant proportion of the variance (36-58%) in QoL was explained. Subjective social support significantly contributed to the models for all aspects of QoL; Physical and Psychological QoL were also explained by social interactions, whereas Social, Environmental and Autism-specific QoL were additionally explained by instrumental support. Social support is an important contributor to the QoL of middle-aged and older autistic adults, after accounting for demographic factors and depression. Further studies are required to understand whether age-related changes in social support and QoL are the same for autistic as non-autistic older adults in order to identify and implement appropriate support.

Lay Abstract

Social support can take many forms, such as instrumental (practical) help, social interactions, or the subjective satisfaction with personal relationships. Social support is known to affect quality of life in both neurotypical older and autistic young adults. Quality of life reflects how satisfied an individual is with their life either overall or in a certain area. We know little about middle-aged and older autistic adults' experiences of social support or quality of life. In this study 388 adults aged 40-83 years old, completed online questionnaires assessing demographic information, depression and anxiety symptoms, quality of life (Physical,

Psychological, Social, Environmental, Autism-specific) and social support (instrumental,

subjective and social interactions). Even after accounting for demographic variables, depression

and anxiety, social support contributed to explaining individuals' quality of life. To our knowledge

this is the first paper to examine the relationship between social support and quality of life in

middle-aged and older autistic adults. Improving social support may have a significant impact on

the quality of life of older autistic adults. Future studies should examine whether age-related

changes in social support (size, content and arrangement of social networks) that are common

in neurotypical aging, also occur among older autistic adults.

Introduction

There is extensive literature describing the positive impact of social support on mental and physical health and on quality of life in the general population and those with psychiatric disorders (Brookes et al., 2012; Campos et al., 2014; Chachamovich et al., 2008). Social support is often described as a supportive social network. However, it is multidimensional and reflects access to interpersonal resources including social interactions, perceived emotional support, and practical or instrumental support (Kelly et al., 2017; Sahin et al., 2019; Tyler, 2006). High overall social support has been shown to have both direct and indirect positive effects on mental and physical health outcomes. Direct effects link increased social support with reduced depression, suicidal thoughts and time to mortality; whereas indirect effects may act by reducing depression or stress which in turn positively impacts quality of life, mood and suicidality (Holt-Lunstad et al., 2010; Pan et al., 2018; Sahin et al., 2019). Research has shown that as individuals reach later life, social support reduces and has a significant negative impact on mood and suicidality (Hybels et al., 2011; Pan et al., 2018). Given that difficulties in social communication and interactions are a core diagnostic feature of autism spectrum disorder (ASD), it has been questioned whether the impact of variable levels of social support is the same for autistic versus non-autistic individuals. To date, few studies have examined social support among autistic adults and to our knowledge no study has examined social support among middle-aged or older autistic adults.

Studies examining social support among autistic adolescents and young adults have identified lower rates of overall social support compared to comparison groups of both neurotypical individuals and those with specific reading disability (Bishop-Fitzpatrick et al., 2017; Humphrey & Symes, 2010; Renty & Roeyers, 2006). In a sample of 41 autistic young and middle-aged adults (mean age=30 years), support from friends was rated as low compared to both ADHD and neurotypical comparison groups, but no differences were observed for ratings

of support from family or a significant other (Alvarez-Fernandez et al., 2017). Given the potential

buffering effects associated with good social support in the general population, low social

support could be an added risk for already poor quality of life outcomes for autistic adults

(Bennett et al., 2005; Jennes-Coussens et al., 2006; Kamio et al., 2012; Kamp-Becker et al.,

2010; van Heijst & Geurts, 2014) compared to neurotypical individuals . Subjective quality of life

can be defined as the individual's perception of their satisfaction with life within the context of

their own society and value system, and relating to the expectations and concerns of the

individual (Harper & THE WHOQOL GROUP, 1998). As such, quality of life (rated subjectively

by the individual) is often used as a relevant outcome measure across different cultures,

societies and groups, including autistic individuals (Burgess & Gutstein, 2007).

Examining the association between social support and psychosocial and health-related

outcomes in young and middle-aged autistic adults (mean age=24 years), Bishop-Fitzpatrick

and colleagues (2017) found a direct positive effect of social support on quality of life. However,

the source and type of social support may also impact results. Greater perceived social support

from family and friends (but not significant others) was associated with higher mental-health

related quality of life among autistic adults (mean age=31 years; Khanna et al., 2014). An

examination of the different components of social support found that perceived informal support

(e.g., support from friends or relatives) and number of unmet formal support needs (number of

domains where support is needed but neither informal nor formal support from professionals is

available) were negatively associated with quality of life (Renty & Roeyers, 2006). A further

study found that tangible material support had a direct effect on depression among autistic

adults (Hedley et al., 2017). In contrast, perceived support through having someone to talk

through problems or having people available to share activities, had no effect on depression in

this sample. It remains unclear to what extent the type of social support impacts different

aspects of mental health or quality of life among autistic adults.

Autistic adults often experience poorer quality of life compared to clinical and general population comparison groups (Bennett et al., 2005; Jennes-Coussens et al., 2006; Kamio et al., 2012; Kamp-Becker et al., 2010; McConachie et al., 2018; Stuart-Hamilton et al., 2009; van Heijst & Geurts, 2014). Better subjective quality of life among younger autistic adults is associated with factors such as having good social and practical (professional or family) support (Kamio et al., 2012; Renty & Roeyers, 2006) and better daily living skills (Kamp-Becker et al., 2010), but not IQ, age or severity of autistic traits (Kamp-Becker et al., 2010; van Heijst & Geurts, 2014). Therefore, these findings suggest that both greater interpersonal social support and practical (instrumental, tangible, material) support can have independent positive impacts on quality of life for autistic young adults. Whether different aspects of social support similarly impact quality of life among middle-aged and older autistic adults has not yet been explored.

The current study seeks to examine social support and its associations with quality of life among middle-aged and older autistic adults (40+ years of age) for the first time. We hypothesized that social support will be associated with self-report quality of life, even after accounting for variables such as demographic, physical health, anxiety and depression. We explored whether the pattern of associations is the same or different for aspects of quality of life. Due to the limited previous literature examining quality of life and social support in middle-aged and older autistic adults, we characterized the data across the decades and explored the data for possible age-effects.

Methods

Participants

Participants were recruited online via Simons Foundation Powering Autism Research for Knowledge (SPARK; SPARK Consortium, 2018) research match. All participants took part in a

broader online study of adult development/aging of 40+ year old autistic adults and were

compensated $25 for their time. The study was approved by the local institutional review board

and followed procedures in accordance with the Declaration of Helsinki. Accordingly, all

participants provided informed consent. A total of 388 autistic individuals aged 40-83 years were

included in the current analyses. For details see Table 1.

The sample was composed of "independent" autistic adults as designated by SPARK.

These adults can consent for themselves and thus are unlikely to have a co-occurring

intellectual disability. Moreover, none of the participants in the current study reported intellectual

disability as a prior medical diagnosis on their health history questionnaire. In order to be

included in the SPARK registry, participants were required to have received a diagnosis of ASD

given by medical/clinical professionals. To further validate the ASD clinical diagnosis information

provided, 387 of the 388 participants completed the 28-item self-report Autism spectrum

Quotient-28 (AQ28; Hoekstra et al., 2011). Scores >65 are considered to be above the cut-off

indicating a positive screen for ASD. 97.4% of participants in the current sample scored >65.

Measures

Demographic Information and Health Conditions

Participants provided detailed demographic information including age, race, ethnicity,

sex assigned at birth, and presence of physical health conditions. As health conditions are

known to have a significant negative impact on quality of life, the number of physical health

conditions that likely affect activities of daily living were coded and summed for each participant

and used as a variable in analyses. Health conditions coded as affecting activities of daily living

included chronic pain, fibromyalgia, multiple sclerosis, chronic obstructive pulmonary disorder,

and various forms of arthritis. Age, sex assigned at birth and and presence of physical health

conditions were included as covariates in the analyses.

Quality of Life

Subjective quality of life was measured via the 26-item World Health Organization

Quality of Life Instrument (WHOQOL-BREF; Harper & THE WHOQOL GROUP, 1998) and the

Autism-specific quality of life measure (ASQOL; McConachie et al., 2018). The WHOQOL-

BREF is an abbreviated version of the WHOQOL-100, designed for use across different

cultures. The WHOQOL-BREF includes 24 items that probe 4 domains: Physical Health (7

items), Psychological Health (6 items), Social Relationships (3 items), Environmental Health (8

items), and two questions inquire about perceptions of overall quality of life and health.

Participants respond on a 5-point Likert Scale (1=very dissatisfied to 5=very satisfied). The

ASQOL asks nine additional questions regarding quality of life for autistic individuals

(McConachie et al., 2018). The ASQOL total score is computed by averaging the scores of the

first eight items. The four subscales from the WHOQOL-BREF and the ASQOL total score were

used as dependent variables in the analyses. The WHOQOL-BREF has good internal

consistency (Cronbach's alphas=0.73-0.86 across domains), discriminant validity (when

distinguishing 'ill' versus 'well' respondents, all domain p-values <0.001), and test-retest

reliability (between r=0.66 and r=0.87). For the ASQOL, internal consistency (Cronbach's

alpha=0.82) and test–retest reliability (ICC=0.76) were good (McConachie et al., 2018).

Social Support

Social support was measured using the 23-item modified version of the Duke Social

Support Index (DSSI; Koenig et al., 1993). The DSSI is comprised of three scales: the Social

Interaction (SIS; 4 questions), Subjective Support (SSS; 7 questions), and Instrumental Support

(ISS; 12 questions) Scales. The SIS inquires about the quality and quantity of social interactions

(e.g., how often the respondent has attended a non-work-related gathering in the past week).

The SSS probes the respondent's subjective sense of social support, including the quality of

their close relationships (e.g., whether the respondent feels that they are listened to by their family/friends). The ISS provides an objective measure of social support, reflecting whether individuals obtain the support they need in everyday life (e.g., whether the respondent has family/friends who will help them when they need help). Higher scores on the DSSI subscales reflect greater levels of social support. Subscales from the DSSI were used as independent variables of interest in the analyses. The 23-item DSSI, as well as an 11-item version of the questionnaire, were derived from a longer 35-item measure of social support (Landerman et al., 1989). Both the 23- and 11-item versions of the DSSI contain the SSS and SIS; however, only the 23-item DSSI contains a subscale querying instrumental support (i.e., the ISS; Koenig et al., 1993). In a study of community-dwelling older adults in Australia, the total score of the 11-item measure, which is comprised of a subset of items in the 23-item DSSI used here, demonstrated good concurrent and construct validity as well as good internal consistency (Cronbach's alpha=0.77) and test-retest reliability (Goodger et al., 1999). Good internal reliability and construct validity has been demonstrated for the 4-item SIS (Cronbach's alpha=0.80) and the 7-item SSS (Cronbach's alpha=0.80) (Powers et al., 2004). The 23-item DSSI has shown good validity among both younger and older community-dwelling adults in China, with the subscales demonstrating good reliability, construct validity and internal consistency (Cronbach's alpha ≥0.88; Pan et al., 2018) in evaluating social support (Jia & Zhang, 2012; Pan et al., 2018).

Items from the WHOQOL-BREF and DSSI were reviewed for potential overlap. One item was deemed similar across the two questionnaires, from the WHOQOL-BREF one question asks "How satisfied are you with your personal relationships?" (contributing to the Social Relationships subscale) and one question from the DSSI asks "How satisfied are you with relationships with family and friends?" (contributing to the SSS). Mean scores for these scales on the WHOQOL-BREF and DSSI were recalculated excluding the relevant questions, and analyses performed again to assure that results were not driven by the overlapping item.

Depression and Anxiety Symptomatology

Self-reported depression and anxiety symptomatology were measured so that their effects could be accounted for as covariates in analyses. Depression symptomatology was assessed using the 9-item Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001). Participants reported on the presence/frequency of depressive symptomatology on a 4-point Likert scale ("Not at all," "Several days," "More than half the days," "Nearly every day"). Scores range from 0-27, with scores ≥10 indicating moderate or severe depression. Using a cut-off of ≥10 the PHQ-9 has been shown to have 88% sensitivity and specificity for major depressive disorder (Kroenke et al., 2001). The 7-item Generalized Anxiety Disorder scale (GAD-7; Spitzer et al., 2006) was used to quantify anxiety symptomatology. The GAD-7 probes the presence and severity of anxiety symptoms on a 4-point Likert scale ("Not at all," "Several days," "More than half the days," "Nearly every day"). Total scores range from 0-21, with scores ≥10 indicating moderate or severe anxiety. Using a cut-off of ≥10 the GAD-7 has shown good sensitivity (89%) and specificity (82%). The internal consistency of the GAD-7 was excellent (Cronbach's alpha=.92; Spitzer et al., 2006).

Data Analysis

Correlational analyses were used to examine the associations between variables of interest prior to regression analyses. Linear regression analyses were employed to identify the demographic and social support factors that explained variance in each quality of life subscales in turn (Physical, Psychological, Social, Environmental, ASQOL). In order to characterize quality of life and social support in middle-aged and older autistic adults, means and standard deviations were reported for three age-groups (40-49, 50-59, 60+), and ANOVAs were performed to explore differences in these scores between the age-groups.

Results

Correlational Analyses

Correlational analyses were performed for all continuous variables of interest, to inform the inclusion of variables in the regression analyses. *Demographic and health variables*: Age correlated significantly with Psychological and Environmental quality of life, with better quality of life being associated with older age. The number of health conditions affecting daily functions correlated significantly and negatively with all quality of life variables except Social quality of life. *Mental health:* Depression and anxiety symptomatology correlated significantly with all five quality of life subscales (Physical, Psychological, Social, Environmental, ASQOL), indicating lower depression and anxiety ratings were associated with better quality of life. *Social Support:* All three domains of social support (ISS, SSS and SSS) correlated highly significantly and positively with all five quality of life subscales, indicating better social support was associated with better quality of life. See Table 2 for full details.

Regression Analyses

Linear regression analyses were performed to explore the demographic and social support factors that explained variance in each quality of life subscale separately (Physical, Psychological, Social, Environmental, ASQOL). Independent variables were entered in three steps. Step 1: sex assigned at birth, age, number of health conditions affecting daily life; Step 2: depression symptom score, anxiety symptom score; Step 3: ISS, SSS and SIS scores from the Duke Social Support Index.

Physical Quality of Life

Step 1: Demographic factors explained a significant proportion (17.5%) of the variance in physical quality of life scores with sex assigned at birth (males reporting higher QOL than females) and number of health conditions contributing significantly to the model (F=26.90,

$p<.001$; age did not contribute significantly to the model). Step 2: Depression and anxiety symptomatology explained a further 35.7% of the variance, although only depression symptoms contributed significantly to the model ($F=85.87$, $p<.001$). Step 3: A further 2.2% of the variance in Physical QoL was explained by social support factors, with subjective support and social interaction contributing significantly to the model ($F=58.22$, $p<.001$). Instrumental support did not contribute significantly to the model. See Table 3 for details.

Psychological Quality of Life

Step 1: Demographic variables explained a small but significant proportion (3.4%) of the variance in Psychological QOL, with age and number of health conditions contributing significantly to the model ($F=4.43$, $p=.004$). Step 2: Mental health variables explained a further 43.9% of the variance, with only depression contributing significantly to the model ($F=67.67$, $p<.001$). Step 3: Social support explained a further 7.9% of the variance in Psychological QOL, with subjective support and social interaction contributing significantly to the model ($F=57.54$, $p<.001$). Instrumental support did not contribute significantly to the model. See Table 4 for details.

Social Quality of Life

Step 1: Demographic variables did not significantly explain the variance in Social QOL ($R^2=.012$; $F=1.55$, $p=.202$). Step 2: Mental health factors significantly explained 23.7% of the variance in Social QOL, with depression and sex assigned at birth both contributing significantly to the model ($F=25.03$, $p<.001$). Step 3: Social support explained a further 11.1% of the variance in Social QOL. Instrumental support and subjective support scales contributed significantly, as well as depression and sex assigned at birth ($F=26.36$, $p<.001$). The social interactions score did not contribute significantly to the model. See Table 5 for details.

Environmental Quality of Life

Step 1: Demographic factors explained a small but significant proportion (8.4%) of the variance in Environmental QOL with sex assigned at birth (males reporting higher QOL than females) and number of health conditions contributing significantly to the model (F=11.55, p<.001). Step 2: Mental health explained a further 24.4% of the variance with depression contributing significantly to the model (F=36.83, p<.001). Step 3: Social support explained a further 9.2% of the variance in Environmental QoL; instrumental support and subjective support scales contributed significantly (F=33.90, p<.001). The social interactions score did not contribute significantly to the model. See Table 6 for details.

Autism Specific Quality of Life

Step 1: Demographic factors explained a small but significant proportion (6%) of the variance in Autism Specific QOL with sex assigned at birth (males reporting higher QOL than females) and number of health conditions contributing significantly to the model (F=8.03, p<.001). Step 2: Mental health explained a further 31.6% of the variance with both depression and anxiety contributing significantly to the model (F=45.51, p<.001). Step 3: Social support explained a further 20.8% of the variance in Autism Specific QOL; instrumental support and subjective support scales contributed significantly (F=65.64 p<.001). The social interactions score did not contribute significantly to the model. See Table 7 for details.

Analyses were repeated for the SSS and Social Relationships QoL scale recalculated to exclude the overlapping item. Results show the same pattern of associations and models remained statistically significant suggesting that similarity between the items were not driving results (results not reported).

Data Characterization

As there is currently little data describing how autistic adults describe their own experiences of social support and quality of life, mean and standard deviations for three age groups (40-49.9; 50-59.9; and 600+) are reported in Table 1. Differences between age-groups for demographic information were examined. Few age-related differences were noted across the three groups. A significant age-group difference was observed only for the mean score for the Psychological WHOQOL-BREF sub-scale ($F=3.24$, $p=.040$). Post-hoc analyses demonstrated a significant difference between forty year olds and those over sixty, but no other group differences (Tukey HSD, Mean difference=-.264, $p=.032$). No other age-group differences in social support and quality of life were observed (results not shown). No age-group differences were observed in AQ scores ($F=.05$, $p=.955$).

Discussion

This study revealed strong associations between different aspects of quality of life and social support in middle-aged and older autistic adults for the first time. In keeping with the literature from both non-autistic older adults and autistic young adults, better quality of life was associated with greater social support. One of the unique features of the current study was that it examined different aspects of quality of life (Physical, Psychological, Social and Environmental, Autism Specific) as well as different aspects of social support (subjective, social interactions and instrumental). Thus the current study allowed us to examine the unique patterns of associations between different aspects of quality of life and different facets of social support, and to examine associations in a group of middle-aged and older autistic adults.

A significant proportion of the variance in each aspect of quality of life was explained by social support, even after accounting for demographic, health and mental health factors. Although each aspect of quality of life was significantly associated with social support, regression analyses suggested distinct patterns of importance for different aspects of social

support. All components of quality of life (Physical, Psychological, Social Relations, Environmental, and Autism Specific) were significantly explained by subjective social support and reported depression symptomatology. In addition, Physical and Psychological quality of life were explained by the number and quality of social interactions, whereas Social and Environmental quality of life were explained by instrumental support. Variance in Autism Specific quality of life was additionally explained by anxiety symptomatology and instrumental support.

These results demonstrate the importance of perceived or subjective social support for middle and older age autistic adults, and are consistent with findings from previous studies of younger autistic adults. In one study both perceived stress and perceived social support explained a significant proportion of the variance in overall quality of life for young and middle-aged autistic adults (Bishop-Fitzpatrick et al., 2017). Other studies suggested that perceived support from family and friends or maternal support specifically are significantly associated with psychological, social and health-specific quality of life for young autistic adults (Kamio et al., 2012; Khanna et al., 2014). However, it is worth noting that not all studies find this pattern of associations. One study examining the impact of friendship on outcome variables found no association between number of friends and life satisfaction (although more friends was associated with lower symptoms of anxiety and depression; Mazurek, 2013). It is worth noting that satisfaction with friendships (i.e., a subjective assessment of friendship quality) may be more important than the number of friends (i.e., a simple quantification of the number of friendships). To our knowledge only one study has examined the impact of both perceived and actual support on overall quality of life in autistic adults. Support characteristics overall (perceived social support, received formal and informal support) explained a significant proportion of the variance in overall quality of life among younger autistic adults (Renty & Roeyers, 2006). However, post-hoc analyses demonstrated that perceived informal support

(akin to subjective social support in the current study) and unmet actual support needs were significantly associated with quality of life, whereas received practical support was not in that sample. In the current study instrumental support significantly contributed to explaining the variance in Social, Environmental and Autism-specific quality of life. It is worth noting that the association between perceived social support and quality of life is also recognized in the neurotypical aging literature (Hajek et al., 2016; LaRocca & Scogin, 2015; Sahin et al., 2019). In one study, perceived social support alone explained 22.1% of the variance in overall quality of life (Sahin et al., 2019).

In keeping with studies in both younger autistic adults and non-autistic adults across adulthood, mental health factors such as presence of anxiety and depression symptoms also explained a significant portion of variance in quality of life (Chachamovich et al., 2008; Kamio et al., 2012; Layte et al., 2013; Mason et al., 2018, 2019). Previous studies have found that psychiatric comorbidities explain a significant proportion of the variance in different aspects of quality of life for young and middle-aged autistic adults (Kamio et al., 2012; Mason et al., 2018). For example, one previous study of autistic adults found that self-reported depression and anxiety symptoms were significantly associated with Physical, Psychological and Environmental quality of life while Social quality of life was only associated with depression symptoms (Mason et al., 2019). Studies in older neurotypical adults show a similar pattern of results, with mental health factors, and depression specifically (even at low levels), significantly impacting the quality of life of older neurotypical adults (Chachamovich et al., 2008; Kisvetrova et al., 2021; Layte et al., 2013).

Sex assigned at birth explained a significant amount of variance in Physical and Environmental quality of life. This reflected the finding that males reported higher Physical and Environmental quality of life compared to females. This pattern of better self-reported quality of

life among males compared to females is frequently observed among neurotypical older adults (Campos et al., 2014; Gallicchio et al., 2007; Rollero et al., 2014; but see Kirchengast & Haslinger, 2008 for higher quality of life in females).

It is also worth noting that there is little evidence of age-differences in quality of life or social support measures among autistic adults in the current study. This is somewhat discrepant from findings in non-autistic older adults. Previous research has suggested that non-autistic older adults may have better quality of life compared to middle-aged adults, although in later old age quality of life has been shown to be reduced, possibly related to declines in health (Diehr et al., 2013; Raggi et al., 2016). One study has suggested that age-effects on quality of life may be curvilinear with a person's quality of life peaking in their late sixties and declining thereafter (Layte et al., 2013). Social support has also been shown to change with age among non-autistic adults, although the pattern of change is complex. Some studies suggest that the nature (friends vs. family), but not the size, of social support networks may change with age, whereas other studies have shown increased social isolation with aging, and different trajectories at different age ranges (Czaja et al., 2018; Field & Minkler, 1988; van Tilburg, 1998). The results in the current study suggest few age-effects, although it is unclear if this may reflect a different (less negative) pattern of age-effects for middle-aged and older autistic adults or some effect of sampling differences in either the recruitment of or diagnostic criteria applied to autistic adults of different ages. Ultimately, to answer these important developmental questions, longitudinal data during middle and older adulthood in ASD are needed in order to evaluate changes in quality of life or social support, including evaluating the potential for both linear and non-linear trajectories of change.

The current study should be considered with certain strengths and limitations in mind. The cognitive demands of the survey and the participants' generally high education level

suggest that this sample has abilities within the normal range or higher, and therefore does not

fully reflect the experiences of all autistic adults (e.g., those with co-occurring intellectual

disability). However, the sample also includes a large number of middle-aged and older autistic

adults, particularly those assigned female at birth, both of which are under-studied groups. To

our knowledge this is the first study to examine the impact of social support on quality of life

among middle-aged and older autistic adults.

In conclusion, this study of 388 middle-aged and older autistic adults found that social

support, in particular subjective social support, explained a significant proportion of the variance

in different aspects of quality of life. Social support remained significantly associated with quality

of life even after accounting for the effects of demographic and health factors, and symptoms of

anxiety and depression. Results suggest that different aspects of social support (instrumental,

subjective and social interactions) are important for outcomes for middle-aged and older autistic

adults. Therefore interventions bolstering different forms and types of supports may cascade to

benefit older autistic adults. Further longitudinal studies are required to explore the impact of

common age-related changes such as size, content, quality, and arrangement of social and

other support networks on outcomes for autistic adults.

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Table 1: Descriptive statistics for measures by age group

	Total N=388	40-49.9 N=188	50-59.9 N=118	60+ N=82
Demographic				
Age, mean (SD)	52.19 (9.20) Range 40-83	44.61 (2.88)	54.33 (2.96)	66.47 (5.06)
Sex assigned at birth (m,f)	161, 277	66, 122	51, 67	44, 38
Number of health conditions affecting daily life, mean (SD)	0.20 (.465) Range 0-3	0.18 (.425) Range 0-2	0.23 (.513) Range 0-3	0.20 (.483) Range 0-3
[†] Race, count (White, African-American, Asian, Native American/Alaska Native, Multiracial, Other)	316, 10, 7, 5, 39, 10	[†] 150, 8, 5, 2, 17, 5	96, 2, 1, 2, 12, 5	70, 0, 1, 1, 10, 0
Ethnicity, count (Latinx, Not Latinx, Unknown)	26, 356, 6	172, 13, 3	107, 9, 2	77, 4, 1
Education, count				
No high school	2 (0.5%)	1 (0.5%)	0	1 (1.2%)
Some high school	10 (2.6%)	6 (3.2%)	2 (1.7%)	2 (2.4%)
GED diploma	10 (2.6%)	7 (3.7%)	2 (1.7%)	1 (1.2%)
High school graduate	15 (3.9%)	11 (5.9%)	3 (2.5%)	1 (1.2%)
Trade/vocational school	19 (4.9%)	10 (5.3%)	5 (4.2%)	4 (4.9%)
Associate's degree	40 (10.3%)	21 (11.2%)	15 (12.7%)	4 (4.9%)
Some college	63 (16.2%)	31 (16.5%)	19 (16.1%)	13 (15.9%)

Baccalaureate degree	117 (30.2%)	56 (29.8%)	34 (28.8%)	27 (32.9%)
Graduate/professional degree	111 (28.6%)	44 (23.4%)	38 (32.2%)	29 (35.4%)
AQ scores, mean (SD)	86.57 (10.60)	86.65 (10.74)	86.62 (10.71)	86.30 (10.23)
Mean (SD) Scores				
Physical QoL	3.22 (.858)	3.16 (.884)	3.22 (.847)	3.36 (.804)
Psychological QoL*	2.94 (.794)	2.87 (.809)	2.93 (.781)	3.14 (.755)
Social QoL	2.88 (.959)	2.85 (.980)	2.89 (.972)	2.92 (.900)
Environmental QoL	3.45 (.805)	3.40 (.819)	3.42 (.767)	3.61 (.817)
Autism QoL	2.98 (.829)	2.92 (.854)	2.98 (.822)	3.12 (.772)
Instrumental Support Scale	.554 (.304)	.578 (.319)	.527 (.307)	.537 (.258)
Subjective Support Scale	.611 (.390)	.594 (.402)	.605 (.374)	.657 (.387)
Social Interaction Scale	1.85 (.457)	1.85 (.465)	1.80 (.420)	1.91 (.487)
Depression Score	11.29 (7.96)	11.95 (8.25)	11.52 (7.78)	9.43 (7.32)
Anxiety Score+	13.94 (9.00)	15.19 (9.04)	13.69 (9.17)	11.45 (8.20)

SD=standard deviation; QoL=quality of life; [†] N=387 as one person missing from 40-49.9 group (n=187); Group difference (between 40-49.9, 50-59.9, and 60+) are only noted on * Psychological QoL Mean score (F=3.24, p=.040) and + Anxiety score (F=5.09, p=.007).

Table 2: Correlation table showing associations between QoL subscales and variables of interest.

	Physical QoL	Psychological QoL	Social QoL	Environmental QoL	Autism Specific QoL
Age	r=.088	r=.111 *	r=.029	r=.103 *	r=.093
Number of health conditions affecting daily life	r=-.357 **	r=-.133 **	r=-.082	r=-.226 ***	r=-.161 ***
Anxiety Score	r=-.504 **	r=-.519 ***	r=-.342 ***	r=-.425 ***	r=-.507 ***
Depression Score	r=-.670 ***	r=-.687 ***	r=-.485 ***	r=-.544 ***	r=-.591 ***
Instrumental Support Scale	r=.230 ***	r=.263 ***	r=.338 ***	r=.374 ***	r=.495 ***
Subjective Support Scale	r=.459 ***	r=.592 ***	r=.527 ***	r=.529 ***	r=.668 ***
Social Interaction Scale	r=.314 ***	r=.373 ***	r=.299 ***	r=.323 ***	r=.269 ***

QoL = Quality of Life

Table 3: Regression Analyses for the Physical Quality of Life subscale of the WHOQOL-BREF

Predictor (n=384)	Physical QoL		
	Std. Beta	**Std. Error Beta**	**t-statistic**
<u>Step 1</u>			
Sex	-.192	.082	-4.13 ***
Age	.073	.004	1.54
Number of health conditions affecting daily life	-.343	.086	-7.33 ***
Model Summary	**R^2=.175; F=26.90, p<.001**		
<u>Step 2</u>			
Sex	-.144	.062	-4.01 ***
Age	-.013	.003	-0.353
Number of health conditions affecting daily life	-.244	.066	-6.79 ***
Anxiety Score	-.032	.005	-0.596
Depression Score	-.591	.006	-11.06 ***
Model Summary	**R^2=.532; F=85.87, p<.001**		
<u>Step 3</u>			
Sex	-.156	.062	-4.37 ***
Age	-.024	.003	-0.669
Number of health conditions affecting daily life	-.245	.065	-6.95 ***

Anxiety Score	-.041	.005	-0.784
Depression Score	-.504	.006	-8.74 ***
Instrumental Support Scale	-.069	.115	-1.70
Subjective Support Scale	.126	.101	2.74 **
Social Interaction Scale Coded Mean	.100	.074	2.55 *
Model Summary	**R^2=.554; F=58.22, p<.001**		

* p≤.05; ** p≤.01; p≤.001; QoL = Quality of Life

Table 4: Regression Analyses for the Psychological Quality of Life subscale of the WHOQOL-BREF

Predictor (n=384)	Psychological QoL		
	Std. Beta	Std. Error Beta	t-statistic
Step 1			
Sex	-.049	.082	-0.964
Age	.109	.004	2.12 *
Number of health conditions affecting daily life	-.134	.086	-2.65 **
Model Summary	**R2=.034; F=4.43, p=.004**		
Step 2			
Sex	.008	.061	0.210
Age	.016	.003	0.405
Number of health conditions affecting daily life	-.023	.065	-0.609
Anxiety Score	-.016	.005	-0.282
Depression Score	-.670	.006	-11.81 ***
Model Summary	**R2=.472; F=67.67, p<.001**		
Step 3			
Sex	-.002	.058	-0.056
Age	.005	.003	0.143
Number of health conditions affecting daily life	-.022	.060	-0.629

Anxiety Score	-.030	.005	-0.574
Depression Score	-.482	.006	-8.34 ***
Instrumental Support Scale (ISS)	-.063	.107	-1.54
Subjective Support Scale	.303	.094	6.53 ***
Social Interaction Scale Coded Mean	.102	.068	2.57 **
Model Summary	**R^2=.551; F=57.54, p<.001**		

* p≤.05; ** p≤.01; p≤.001; QoL = Quality of Life

Table 5: Regression Analyses for the Social Quality of Life subscale of the WHOQOL- BREF

Predictor (n=384)	Social QoL		
	Std. Beta	Std. Error Beta	t-statistic
Step 1			
Sex	.066	.101	1.280
Age	.044	.005	0.844
Number of health conditions affecting daily life	-.090	.106	-1.749
Model Summary	**R²=.012; F=1.55, p=.202**		
Step 2			
Sex	.108	.089	2.38 *
Age	-.021	.005	-0.447
Number of health conditions affecting daily life	-.007	.094	-0.148
Anxiety Score	.036	.007	0.529
Depression Score	-.526	.008	-7.78 ***
Model Summary	**R²=.249; F=25.03, p<.001**		
Step 3			
Sex	.127	.083	2.96 **
Age	-.012	.004	-0.291
Number of health conditions affecting daily life	.001	.087	0.027
Anxiety Score	.012	.007	0.194
Depression Score	-.301	.008	-4.36 ***
Instrumental Support Scale	.115	.154	2.35 *

Subjective Support Scale	.311	.136	5.61 ***
Social Interaction Scale Coded Mean	.032	.099	0.683
Model Summary	**R^2=.360; F=26.36, p<.001**		

* p≤.05; ** p≤.01; p≤.001; QoL = Quality of Life

Table 6: Regression Analyses for the Environment Quality of Life subscale of the WHOQOL-BREF

Predictor (n=384)	Environmental QoL		
	Std. Beta	Std. Error Beta	t-statistic
Step 1			
Sex	-.143	.082	-2.86 **
Age	.090	.004	1.81
Number of health conditions affecting daily life	-.218	.086	-4.41 ***
Model Summary	**R²=.084; F=11.55. p<.001**		
Step 2			
Sex	-.100	.070	-2.32 *
Age	.018	.004	0.404
Number of health conditions affecting daily life	-.137	.075	-3.18 **
Anxiety Score	-.050	.006	-0.790
Depression Score	-.470	.006	-7.35 ***
Model Summary	**R²=.328; F=36.83, p<.001**		
Step 3			
Sex	-.083	.067	-2.03 *
Age	.024	.004	0.583
Number of health conditions affecting daily life	-.129	.070	-3.21 ***
Anxiety Score	-.077	.005	-1.29
Depression Score	-.263	.007	-4.00 ***

Instrumental Support Scale	.116	.124	2.50 *
Subjective Support Scale	.253	.109	4.79 ***
Social Interaction Scale Coded Mean	.064	.079	1.42
Model Summary	**R^2=.420; F=33.90, p<.001**		

* p≤.05; ** p≤.01; p≤.001; QoL = Quality of Life

Table 7: Regression Analyses for the Autism Quality of Life scale

Predictor (n=384)	Autism QoL		
	Std. Beta	Std. Error Beta	t-statistic
Step 1			
Sex	-.156	.085	-3.09 **
Age	.075	.005	1.49
Number of health conditions affecting daily life	-.151	.089	-3.01 **
Model Summary	**R^2=.060; F=8.03, p<.001**		
Step 2			
Sex	-.015	.070	-2.60 **
Age	-.108	.004	-0.352
Number of health conditions affecting daily life	-.063	.074	-1.52
Anxiety Score	-.156	.006	-2.54 *
Depression Score	-.454	.006	-7.36 ***
Model Summary	**R^2=.376; F=45.51, p<.001**		
Step 3			
Sex	-.076	.058	-2.21 *
Age	.003	.003	0.082
Number of health conditions affecting daily life	-.050	.061	-1.46
Anxiety Score	-.195	.005	-3.84 ***
Depression Score	-.151	.006	-2.70 **
Instrumental Support Scale	.208	.107	5.34 ***
Subjective Support Scale	.385	.094	8.75 ***
Social Interaction Scale	.048	.014	0.177

Model Summary	R²=.583; F=65.64 p<.001

* p≤.05; ** p≤.01; p≤.001; QoL = Quality of Life