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Exploring self-reported eating disorder symptoms in autistic men

Running Title: Eating disorder symptoms in autistic men

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Keywords: autism, eating disorders, co-occurring conditions, men, adults

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23 **Author confirmation statement**

24 EK & FS designed the study, supervised by CS & KT. FS oversaw data collection. EK
 25 carried out the analysis. All authors contributed towards the drafting of the manuscript. All
 26 co-authors have reviewed and approved of the manuscript prior to submission. The
 27 manuscript has been submitted solely to this journal and is not published, in press, or
 28 submitted elsewhere.

29 **Author disclosure statements**

30 No competing financial interests exist.

31

Abstract

32 **Background:** Whilst research suggests a relationship between restrictive eating disorders and
 33 autism, there is a lack of research in this area from the perspective of autistic men. Our aim
 34 was to explore whether eating disorder symptoms are heightened in autistic men compared to
 35 non-autistic men.

36 **Methods:** We recruited 103 autistic and non-autistic participants through an online study. We
 37 assessed eating disorder symptoms, autistic features, anxiety, depression and body mass
 38 index (BMI) using self-report measures.

39 **Results:** Autistic men ($n=54$) exhibited significantly higher levels of eating disorder
 40 symptoms in the areas of eating ($p < 0.001$), shape ($p = 0.005$) and weight ($p = 0.001$) concerns,
 41 and the global score ($p = 0.046$) compared to non-autistic men ($n=49$). However, autistic men
 42 scored significantly lower in the area of dietary restraint ($p = 0.032$). Global eating disorder
 43 scores did not correlate with autistic traits, but did correlate with anxiety ($p < .001$) and BMI
 44 ($p < .001$) in the autistic group.

Conclusions: This exploratory study suggests that heightened eating disorder symptoms in autistic men may be related to heightened levels of anxiety and higher BMIs, rather than autistic traits. It also highlights that autistic men may experience symptoms not relating to dietary restraint. Future research should consider further exploring the relationship between anxiety, BMI and disordered eating in autism.

Introduction

The relationship between autism and eating problems in children is well established.^{1,2} There is comparatively less research in adults, although there is a growing interest in the relationship between autism and eating disorders (EDs). Research suggests that women with anorexia nervosa (AN) exhibit higher rates of autistic traits than the general population, with around 1 in 4 women with AN qualifying for a diagnosis.³⁻⁵ However, less research has examined the relationship between autism and EDs from the opposite perspective: exploring the presence of ED symptoms in autistic adults.

A recent study found that ED symptomatology appeared to be heightened in autistic individuals.⁶ Of the participants in the sample reporting a current or previous ED, the male:female ratio was 1:2.5. In the general population men are thought to represent around 1 in 4 to 1 in 5 of people with EDs, suggesting that the gender ratio of EDs in autistic populations may be less skewed.^{7,8} Nonetheless, previous research on autism in EDs has been carried out almost exclusively on women only, while autism predominantly affects men.⁹ Therefore, the aim of our study was to explore whether ED symptoms are heightened in autistic men compared to non-autistic men.

Methods

Procedure

We invited autistic and non-autistic people aged 18 and over in the community to take part in an online study titled “Problematic Eating on the Autism Spectrum”. We recruited participants online through Twitter inviting participants to complete questionnaires on a survey website. Participants from any country were able to participate, however they needed to be able to read and write sufficient English to complete the questionnaires. Ethical approval was received from King’s College London Psychiatry, Nursing and Midwifery Research Ethics Panel, reference LRS-17/18-5292.

Participants

Participants were included in this analysis if they self-identified in the study as men. A total of 124 individuals (56 non-autistic men and 68 autistic men) completed the questionnaires. We identified participants as autistic in this study if they self-reported being on the autism spectrum, and the AQ-Short suggested heightened levels of autistic traits. Some men reported a formal diagnosis of autism whereas others reported self-diagnosis. Self-diagnosed men were included in this study as some individuals experience barriers to formal diagnosis, and these participants scored above threshold on the AQ-Short.¹⁰ We identified participants as non-autistic if they reported having never been diagnosed as autistic, and if they scored below the cut-off indicative of heightened levels of autistic traits on the AQ-Short. Participants not meeting these group criteria were excluded, leaving a sample of 54 autistic men and 49 non-autistic men.

Measures

Participants self-reported demographic data and ED history. Participants were asked if they were currently experiencing an ED, if they had previously experienced an ED, and to provide information on illness duration. We calculated body mass index (BMI) from self-reported

weight and height: an underweight BMI was defined as < 18.5 , an overweight BMI defined as ≥ 25 , and an obese BMI defined as ≥ 30 .

Eating Disorder Examination Questionnaire (EDE-Q)

The EDE-Q is a self-report measure of ED behaviours assessing the presence of disordered eating attitudes and behaviours over the past 28 days.¹¹ This provides four subscale scores: Restraint, Eating Concern, Shape Concern and Weight Concern, as well as a Global summary score. A higher score indicates higher levels of ED pathology. In line with previous research in this area, a cut-off of ≥ 4 for each subscale was used as a marker of clinical significance.¹² The EDE-Q has not previously been used in autistic populations.

AQ-Short

The AQ-Short is an abridged, 28 item version of the Autism Spectrum Quotient (AQ), a self-report measure of autistic traits in adults.¹³ The scale contains 28 descriptive statements, to which participants respond on a Likert scale. A higher score indicates higher levels of autistic traits, with a cut-off score of >65 potentially indicating autism.

Hospital Anxiety and Depression Scale (HADS)

The HADS is a 14 item self-report scale designed to assess the presence of anxiety and depression in adults.¹⁴ Participants respond to descriptive statements on a Likert scale, with a higher score indicating higher levels of anxiety or depression. The HADS has previously been validated in autistic populations.¹⁵

Data Analysis

We made statistical comparisons in Stata (Version 15) using non-parametric tests after Shapiro-Wilk tests indicated non-normal distribution. We calculated group differences using

Mann-Whitney U tests. Due to small cell sizes, Fisher's Exact Test was used to compare categorical group differences. We calculated Spearman's Rho coefficients to explore associations between EDE-Q Global summary scores and autistic traits, anxiety, depression and BMI for the autistic group.

Results

Participant characteristics are summarised in Table 1. Autistic participants were significantly older than the non-autistic group, and reported significantly higher BMIs. Autistic men scored significantly higher on the AQ-Short, on the HADS anxiety scale, and on the HADS depression scale. There were no significant differences in race/ethnicity across groups, although 29.63% of autistic men did not respond to this question without giving a reason.

No non-autistic man reported being currently diagnosed with an ED, but 2 did report having previously recovered. One autistic man reported having a current ED diagnosis, and 6 reported having recovered. However, autistic men were not significantly more likely to have any lifetime experience of an ED.

Group differences in ED symptomatology are summarised in Table 2. Autistic participants reported significantly higher mean scores on Eating, Shape and Weight Concern subscales, and the Global score, compared to non-autistic men. However, autistic participants reported significantly lower mean scores on the Restraint subscale. Whilst more autistic participants scored above the threshold for clinical significance on all subscales compared to non-autistic men apart from the Restraint subscale, differences were only significant on the Weight Concern subscale. Autistic men were not significantly more likely to regularly engage in eating disordered behaviours.

There was no significant correlation between the EDE-Q Global score and the AQ-Short total score, or the HADS depression score in the autistic group. There was a significant

positive correlation between the EDE-Q Global score and the HADS anxiety score ($r=0.44$, $p<.001$) and BMI ($r=0.40$, $p=.047$).

The direction of these findings were not found to significantly differ when only autistic men who self-reported a formal diagnosis of autism, rather than self-diagnosis, were included in the analysis.

Discussion

The aim of this study was to explore self-reported ED symptoms in autistic men. Autistic men scored significantly higher in the areas of Eating, Shape and Weight Concern, and the Global summary score, as measured by the EDE-Q compared to non-autistic men. However, they scored significantly lower in the area of dietary restraint. Correlational analyses suggest that these heightened symptoms may be related to the heightened levels of anxiety in this population, and higher BMIs, rather than the degree of autistic traits.

That anxiety, and not autism, was found to relate to ED symptoms in autistic men is potentially positive for the prognosis for autistic men experiencing ED behaviours: whilst autism is a lifelong condition, anxiety can be treated with interventions specifically tailored to autistic individuals.¹⁶ This suggests that co-occurring ED behaviours may potentially improve with a reduction in anxiety. Approximately 50% of autistic adults experience an anxiety disorder at some point in their lifetime, and anxiety is also known to be heightened in AN.¹⁷⁻²⁰ With this study supporting a potential relationship between autism, anxiety and ED symptoms, future research should explore whether anxiety in autism could potentially act as a risk factor for the future development of an ED or as a shared mechanism: a recent systematic review indicates that the high prevalence of social anxiety seen in AN could also be linked to heightened autistic traits in this population.²¹

BMI was also found to correlate with higher global scores on the EDE-Q in autistic men. In non-autistic populations, heightened EDE-Q scores are similarly associated higher BMIs.²² This may be particularly relevant for autistic people as previous literature suggests that autistic people are more likely to have a BMI defined as overweight or obese. This has led to suggestions that autism may be associated with eating behaviours relating to excessive energy intake.^{6, 23-25} At present autism has been most explored in the ED literature from the perspective of co-occurring AN in women, an ED associated with low weight and dietary restriction. However, the finding that autistic men in fact scored significantly lower than non-autistic men on measures of dietary restraint suggests a need for research on non-restrictive disordered eating behaviours in autism.

This report was intended as an exploratory study in the context of a lack of prior research in this area. Consequently, there are a number of limitations, including the reliance on self-report for the presence and validation of an autism diagnosis, demographic data (including height and weight), and ED history and symptomatology. In particular, the EDE-Q has not previously been used in autistic populations, and further examination of this measure in this community is required. Additionally, the fact that the study was advertised as exploring “problematic eating” may have introduced selection bias by encouraging people experiencing eating problems to take part. Further research should consider exploring the issues raised in this report in the context of a more controlled study, including more accurate assessments of autism status, and a larger sample size.

Conclusions

Autistic men appear to experience elevated levels of ED symptomatology. However, this is not in the areas of dietary restraint highlighted by previous research into AN and

autism.²⁷ The elevated ED behaviours found in this sample may be related to the heightened levels of anxiety and higher BMIs seen in the autistic group, rather than autistic traits.

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Table 1

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Title: Participant characteristics across groups

	Non-Autistic	Autistic	Test statistic	<i>p</i> value
	M(SD)	M(SD)		
Age	32.81 (1.61)*	38.80 (1.83)*	<i>U</i> = 986.5*	0.027*
BMI	24.44 (0.48)**	27.77 (0.79)**	<i>U</i> = 817.5**	0.001**
AQ-Short score	9.49 (0.61)**	22.41 (0.30)**	<i>U</i> = 0**	<0.001**
HADS Anxiety	6.88 (0.58)**	12.28 (0.66)**	<i>U</i> =529.5**	<0.001**
HADS Depression	4.43 (0.44)**	8.76 (0.59)**	<i>U</i> = 530**	<0.001**
Race/Ethnicity <i>n</i> (%)				0.202
White	39 (79.59%)	35 (64.81%)		
Asian	4 (8.16%)	0 (0%)		
Black	0 (0%)	0 (0%)		
Latinx	1 (2.04%)	2 (3.70%)		
Mixed	3 (6.12%)	1 (1.85%)		
No response	2 (4.08%)	16 (29.63%)		

* p < .05, **p < .01

Table 2

Title: Group differences on the EDE-Q

	Non-Autistic	Autistic	Test statistic	<i>p</i> value
Subscale scores	M(SD)	M(SD)		
Restraint	1.73 (0.21)*	1.2 (0.21)*	<i>U</i> = 1004*	0.032*
Eating Concern	0.49 (0.12)**	1.13 (0.17)**	<i>U</i> = 801.5**	<0.001**
Shape Concern	1.54 (0.18)**	2.52 (0.24)**	<i>U</i> = 888.5**	0.005**
Weight Concern	1.22 (0.17)**	2.28 (0.23)**	<i>U</i> = 829**	0.001**
Global	1.25 (0.14)*	1.78 (0.18)*	<i>U</i> = 1021*	0.046*
Number scoring above subscale thresholds (≥ 4)	<i>n</i> (%)	<i>n</i> (%)		<i>p</i> value (Fisher's Exact Test)
Restraint	3 (6.12)	3 (5.56)	-	1.00

Eating Concern	1 (2.04)	2 (3.70)	-	1.00
Shape Concern	2 (4.08)	9 (16.67)	-	0.055
Weight Concern	3 (6.12)*	11 (20.37)*	-	0.045*
Global	1 (2.04)	4 (7.14)	-	0.366

Number endorsing specific behavioural items	<i>n</i>(%)	<i>n</i>(%)		<i>p</i> value (Fisher's Exact Test)
Excessive exercise	1 (2.04)	0 (0.00)	-	0.48
Dietary restraint	0 (0.00)	0 (0.00)	-	-
Binge episodes	9 (18.37)	17 (31.48)	-	0.173
Self-induced vomiting	0 (0.00)	0 (0.00)	-	-
Laxative misuse	0 (0.00)	1 (21.85)	-	1.00
* $p < .05$, ** $p < .01$				

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