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Abstract

Purpose

Autism spectrum conditions (ASC) and borderline personality disorder (BPD) have overlapping symptom profiles. Dialectical behaviour therapy (DBT) is an established treatment for self-harm and BPD, but little research has investigated the outcomes of DBT for ASC populations. This exploratory service evaluation investigates the outcomes of a comprehensive DBT programme for adolescents with a diagnosis of emerging BPD and a co-occurring ASC diagnosis as compared to those without an ASC diagnosis.

Design

Differences from the start to end of treatment in the frequency of self-harming behaviours, BPD symptoms, emotion dysregulation, depression, anxiety, the number of A&E attendances and inpatient bed days, education and work status, and treatment non-completion rates were analysed for those with an ASC diagnosis, and compared between those with an ASC diagnosis and those without.

Findings

Significant medium to large reductions in self-harming behaviours, BPD symptoms, emotion dysregulation, and inpatient bed days were found for those with an ASC diagnosis by the end of treatment. There were no significant differences between those with an ASC and those without in any outcome or in non-completion rates. These findings indicate that DBT may be a useful treatment model for those with an ASC diagnosis, though all results are preliminary and require replication.

Originality

This is the first study to report the outcomes of a comprehensive DBT programme for adolescents with an ASC diagnosis, and to compare the changes in outcomes between those with a diagnosis and those without.

Keywords: Dialectical Behaviour Therapy, Autism, Adolescents, Emotion Dysregulation, Self-harm, Borderline Personality Disorder

Article Classification: Research paper

Introduction

There is a considerable yet under-researched symptom overlap between autism spectrum conditions (ASC) and borderline personality disorder (BPD; Dudas et al., 2017). ASCs are a set of neurodevelopmental conditions characterised by deficits in reciprocal social interaction and communication, and restricted and repetitive interests or behaviours (American Psychiatric Association [APA], 2013). BPD is characterised by an intense and long-term pattern of self-harm and suicidal behaviours, emotion dysregulation, and instability in interpersonal relationships, impulse control, and self-image (Lieb et al., 2004). Individuals with either a diagnosis of an ASC or BPD can exhibit deficits in emotion regulation (López-Pérez et al., 2017; Strunz et al., 2015), intense displays of anger, issues with self-identity, and experience instability in interpersonal relationships (Fitzgerald, 2005; Pelletier, 1998). Those with either an ASC or BPD diagnosis are additionally at an increased risk of engaging in self-harm and suicidal behaviours compared with the general population (Blanchard et al., 2021; Hannon & Taylor, 2013), which may further increase when the two diagnoses co-occur (Chabrol & Raynal, 2018; Rydén et al., 2008).

The available evidence for the prevalence of the overlap of BPD and ASC is limited and reports mixed results. A recent meta-analysis reported pooled prevalence rates of 4% and 3% for the co-occurrence of BPD in ASC samples and ASC in BPD samples, respectively (mixed clinical and non-clinical samples; May et al., 2021). However, research within BPD and ASC treatment samples has reported prevalence rates of dual diagnoses as high as 12-15% (Anckarsärter et al., 2006; Rydén et al., 2008). Diagnostic gender bias may influence reported prevalence rates: ASCs are argued to be underdiagnosed in females, owing to a lack of sensitivity of diagnostic tools and criteria for female presentations (Navarro-Pardo et al., 2021) and clinician expectancy bias influenced by gendered historical conceptions of ASCs, previously stereotyped as ‘male’ conditions (Goldman, 2013). Likewise, an inverse

diagnostic gender bias may be the case for BPD, which is more commonly diagnosed in females than males (Lieb et al., 2004). Therefore, there may be a greater degree of ASC co-occurrence in BPD treatment populations than previously reported prevalence rates would suggest, and vice-versa. Investigating the outcomes of established treatments for BPD for those with co-occurring BPD and ASC diagnoses is therefore important, especially given the associations of the two conditions with life-threatening behaviours.

Dialectical behaviour therapy (DBT) is a principle-based intervention originally developed for the treatment of self-harm and suicidal behaviours in adults with a BPD diagnosis (Linehan, 1993a, 1993b) that has since been adapted for adolescent populations (Miller et al., 2007). The clients of a DBT programme are taught a mix of acceptance and change-based strategies that attempt to increase emotion regulation skills (Salsman & Linehan, 2006). This is consistent with Linehan's (1993a) biosocial theory, which posits that BPD is primarily a condition of emotion dysregulation. Treatment is structured around a treatment hierarchy consisting of reducing life-threatening, therapy-interfering, and quality-of-life-interfering behaviours, in that order (Linehan, 1993a).

The efficacy of DBT in reducing self-harm and suicidal behaviours and treating BPD (or emerging BPD) symptoms in adult and adolescent populations is well-established (Bahji et al., 2021; Cristea et al., 2017; Kothgassner et al., 2021; Panos et al., 2014), and there is some evidence to suggest DBT significantly reduces depression and anxiety symptoms, as well as global functioning, in adolescents (MacPherson et al., 2013). As DBT is principle-led, it has been flexibly adapted for use in other disorders (e.g. eating disorders). However, little research has investigated the suitability of DBT for those with ASC diagnoses, despite prior research noting the appropriateness of the intervention for this group, including the focus on emotion dysregulation as a treatment target and the emphasis on learning and generalising practical skills to manage difficulties (Hartmann et al., 2012; Huntjens et al., 2020). Several

recent small-scale pilot studies have demonstrated the acceptability and feasibility of a shortened DBT programme and a DBT skills training group for those with an ASC diagnosis (Bemmouna et al., 2022; Ritschel et al., 2021), as well as the effectiveness of a DBT-informed intervention in improving social communication and behaviour (as measured by the Social Responsiveness Scale-2; Hartmann et al., 2019) in those with an ASC diagnosis. A pilot study of a treatment model that shares some common origins with DBT but focuses on disorders of over control rather than emotion dysregulation (radically open-DBT) has also demonstrated significant improvements in global distress by end of treatment for those with an ASC (Cornwall et al., 2021). A protocol for a multicentre randomised controlled trial (RCT) on the efficacy of DBT for treating suicidality and self-harm in adults with ASC diagnoses is available (Huntjens et al., 2020), though the results have not yet been published. However, none of these studies include a comprehensive, full-length DBT programme (i.e. including all core modes of treatment over 8-12 months). Evaluating a comprehensive programme can provide information around the effectiveness of DBT in its most evidenced mode of delivery, as well as indicating the appropriateness of the long treatment duration and variety of therapeutic modes (e.g. individual therapy, group skills training, and phone coaching) for autistic young people. Additionally, all previous studies have focused on adult populations; results may therefore not generalise to adolescent ASC populations where presentations and treatment needs may differ or to outcomes for comprehensive DBT contexts (Levy & Perry, 2011).

The present exploratory service evaluation study aims to investigate the treatment outcomes of a comprehensive (non-adapted) DBT programme for adolescents with co-occurring emerging BPD and ASC diagnoses, and whether these are different from those without a co-occurring ASC diagnosis.

The specific hypotheses under investigation are:

- H₁: Significant improvements in treatment outcomes from assessment to end of treatment will be observed for those with an ASC diagnosis.
- H₂: Changes in treatment outcomes from assessment to end of treatment will be different for those with an ASC diagnosis compared to those without.
- H₃: Treatment completion rates, opt-out rates during DBT pre-treatment, and non-completion rates during DBT treatment will be different for those with an ASC diagnosis compared to those without.

Methods

Programme Description

The National & Specialist Child and Adolescent Mental Health Services (CAMHS), DBT service is a Tier 4 community service which accepts referrals from CAMHS across the UK, if symptoms of emerging BPD are indicated in an individual below the age of 18 (see Camp et al., 2023 and Smith et al., 2023 for service description). After initial assessment, clients are offered up to six sessions of DBT pre-treatment, during which they choose whether to opt-in to the full DBT treatment programme. Eight to twelve months of treatment are offered. The treatment programme consists of once-weekly individual therapy sessions, once-weekly group skills sessions for six months, between-session telephone skills coaching, and weekly clinician consultation meetings (these four elements comprise a comprehensive DBT programme). The DBT skills group consists of three modules (distress tolerance, interpersonal effectiveness, and emotional regulation) of six sessions each. Each module begins with a session on mindfulness, and all modules incorporate 'Walking the Middle Path' skills (Rathus et al., 2015). The parents and carers of clients also have access to a separate six-month DBT skills group, tailored individual and family sessions, and telephone support.

The treatment model is informed by both adult and adolescent DBT models (Linehan 1993a; Miller et al., 2007), as well as the DBT for families and carers model (Fruzzetti, 2019). Clients opt-out of the programme if four consecutive individual or group sessions are missed (Linehan, 1993a). DBT is principle-based, so while no formal adaptations are made for those with an ASC, reasonable formulation-led adaptations to treatment targets, content, and learning accessibility are made where possible and helpful.

Participants

The overall sample was comprised of 242 adolescents who began treatment at the National & Specialist CAMHS, DBT service between April 2015 and September 2022.

Inclusion criteria for the service included a referral age between 13 and 17 years and 2 to 4 months (depending on service capacity), experience of at least one episode of self-harm in the 6 months prior to assessment, and the presence of symptoms associated with emerging BPD as measured by the Structured Clinical Interview for DSM-IV, BPD subscale (SCID-BPD; First et al., 1997). Exclusion criteria for the service included the presence of another psychiatric disorder or problem requiring more urgent assessment or treatment (including a global learning disability), or the individual having opted-out of the programme in the three months prior to assessment. All young people with an ASC diagnosis were without intellectual disability. At assessment participants had an average age of 16.48 years ($SD = .98$), and an average SCID-BPD score of 6.49 ($SD = 1.82$; total score 9).

Design & Procedure

This service evaluation study used a pre-post test design. Questionnaire measures were collected at assessment and end of treatment for all participants. Participants typically began treatment within two weeks of assessment and completed the final questionnaire measures within two weeks of completing treatment. However, due to the nature of routine service delivery, there was some variability of a few weeks in these timeframes for several participants. The frequency of self-harming behaviours and education and work status were recorded weekly during pre-treatment and treatment via client report. Data on A&E attendance and inpatient bed days were collected via client report during treatment, and through clinical records for the matched period prior to treatment.

The presence of an ASC diagnosis was obtained through clinical records and was the independent variable.

Measures

Frequency of Self-Harming Behaviours

The frequency of self-harming behaviours was operationalised as the count frequencies of these behaviours in the first eight weeks and last eight weeks of treatment; this timeframe facilitates infrequent or variable patterns of self-harming behaviour to be captured, and the changes therein. The definition of self-harming behaviour includes both non-suicidal self-harm and suicidal behaviours. Non-suicidal self-harm refers to any self-injurious behaviour performed without conscious suicidal intent (Turecki & Brent, 2016); suicidal behaviour refers to any self-injurious behaviour performed with the intention or expectation that it will lead to death (Turecki & Brent, 2016). Self-harm and suicidal behaviours were grouped under ‘self-harming behaviours’ due to difficulties in clearly distinguishing intent, similar to previous DBT research (Bahji et al., 2021).

Questionnaire Measures

Cronbach’s Alpha for all questionnaire measures at assessment and end of treatment can be found in Table II [Insert Table II here].

Table II

Cronbach’s Alpha Scores on Questionnaire Measures at Assessment and End of Treatment.

Measure	Cronbach’s Alpha	
	Assessment	End of Treatment
MSI-BPD	.63	.83
DERS		
Non-Acceptance	.57	.92
Goals	.84	.88
Impulsivity	.90	.93
Awareness	.72	.85
Strategies	.88	.92
Clarity	.81	.86
Total	.88	.96
MFQ-YP	.91	.96
SCARED-YP	.92	.96

Note. MSI-BPD: Maclean Screening Instrument for Borderline Disorder. DERS: Difficulties in Emotion

Regulation Scale. MFQ-YP: Mood and Feelings Questionnaire for Young People. SCARED-YP: Screen for

Child Anxiety-Related Disorders for Young People. Table is the authors’ own work.

McLean Screening Instrument for Borderline Personality Disorder (MSI-BPD).

The MSI-BPD (Zanarini et al., 2003) is a 10-item self-report screening measure for symptoms of BPD. Each question reflects a DSM-IV diagnostic criteria for BPD, with two questions for the paranoia/dissociation criteria. A score of 7 or above indicates the possible presence of BPD. The MSI-BPD displays moderate sensitivity and specificity in young people, and good internal consistency (Chanen et al., 2008).

The Difficulties in Emotion Regulation Scale (DERS). The DERS (Gratz & Roemer, 2004) is a 36-item self-report measure of emotion regulation difficulties, where each of the six subscales represents a different facet of these difficulties. Subscale and total scores are derived, where higher scores indicate a greater degree of emotion regulation difficulty. The measure displays good internal consistency, and adequate construct and predictive validity for adolescents (Weinberg & Klonsky, 2009). Preliminary research has indicated that the DERS is suitable for use for adolescents with an ASC (McVey et al., 2021).

The Moods and Feelings Questionnaire for Young People (MFQ-YP). The MFQ-YP (Costello & Angold, 1988) is a 33-item self-report screening measure for depression in young people. Higher scores indicate a greater degree of depressive symptoms, with scores above 28 indicating the possible presence of major depression (Daviss et al., 2006). The MFQ displays good validity, reliability, and internal consistency in adolescent samples (Thabrew et al., 2018).

The Screen for Child Anxiety-Related Emotional Disorders for Young People (SCARED-YP). The SCARED (Birmaher et al., 1997) is a 41-item self-report screening measure for anxiety disorders in young people. A score of 25 or above indicates the possible presence of an anxiety disorder (Birmaher et al., 1999). The SCARED has demonstrated good internal consistency, test-retest reliability, discriminant validity (Birmaher et al., 1997, 1999), and good convergent and divergent validity (Monga et al., 2001).

Health Economic Outcome Measures

The number of inpatient bed days and A&E attendances were operationalised as count frequencies for the period during treatment and for the matched period before treatment.

Education and work status at the start and end of treatment was coded as either 1 (in education or work) or 0 (not in education or work).

Statistical Analysis

All data were analysed using IBM SPSS statistics, version 28 (IBM Corp, 2021). Two datasets were used for analysis, one involving those who completed treatment ($N = 153$), and one involving all participants who were deemed suitable for the programme at assessment ($N = 242$). The first dataset was used to address hypotheses one and two, and the second was used to address hypothesis three. For hypothesis one, only those with an ASC diagnosis who completed treatment ($n = 21$) were included.

Missing data were analysed for each dataset separately. In the first dataset, there was 5.04% missing data. The results of Little's missing completely at random test (Little, 1988) indicated that data were missing at random ($X^2 = 190.56, p = 1.00$). Expectation maximisation (EM; Dong & Peng, 2013) was used to impute missing data for continuous outcomes. In the second dataset, there were no missing data present for the variables-of-interest (ASC diagnosis and Treatment Completion).

Paired t-tests, exact sign tests, and McNemar's tests were used to investigate differences in treatment outcomes for those with an ASC diagnosis between assessment and end of treatment (hypothesis one). Independent samples t-tests and Mann-Whitney U tests were used to investigate group differences in symptom changes between assessment and end of treatment on continuous treatment outcomes for those with an ASC diagnosis and those without; associations between the presence/absence of an ASC diagnosis and categorical treatment outcomes were assessed using a Fisher's Exact test (hypothesis two). A Fisher's

exact test was used to analyse associations between the presence/absence of an ASC diagnosis and treatment non-completion (hypothesis three). Where data violated assumptions of parametric tests, non-parametric alternatives were used.

Results

Data Preparation

A priori power analyses were conducted using G*Power version 3.1 (Faul et al., 2009) and indicated, for the within- and between-subjects analyses respectively, sample sizes of 156 and 1416 would be required to detect a small effect ($d = .20$), 27 and 228 to detect a medium effect ($d = .50$), and 12 and 72 to detect a large effect ($d = .80$), with power set at 80% (Cohen, 1988).

The data were screened to ensure that the assumptions of the analyses were met. Normality was assessed using Shapiro-Wilk tests, skewness and kurtosis values (where skewness values between +/-2 and kurtosis values between +/-7 signified normality [Curran et al., 1996]), and inspection of Q-Q plots and histograms. Several univariate outliers were identified. As these univariate outliers did not render variable distributions non-normal, and reflected real but extreme values, they were included in analysis. Mahalanobis distance scores indicated the presence of one multivariate outlier in the dataset for hypotheses one and two, $MD = 96.77$, $p = <.001$. This score was removed from further analysis as it skewed distributions to non-normality.

For hypotheses one and two the Bonferroni correction was applied per hypothesis to control the family-wise error rate, such that statistical significance was assessed at $p = .004$.

Participants

Sociodemographic characteristics for those with an ASC diagnosis and those without for the complete sample can be found in Table 1 [Insert Table I here]. Fisher's exact tests were performed to investigate whether there was a significant association between each of the demographic variables and the presence of an ASC diagnosis; no significant associations were found. The results of the Fisher's exact tests per demographic variable can be found in Table I.

Table I*Sociodemographic Characteristics of the Complete Sample*

	No Diagnosis		Diagnosis		<i>p</i>
	<i>n</i>	%	<i>n</i>	%	
Total	215		27		
Sex Assigned at Birth					1.00
Natal Female	208	97	27	100	
Natal Male	7	3	0	0	
Gender Identity					.10
Female	177	82	23	85	
Male	19	9	0	0	
Non-binary	11	5	4	15	
Other	4	2	0	0	
Missing ^a	4	2	0	0	
Sexual Orientation					.50
Heterosexual	45	21	6	22	
Gay/Lesbian	20	9	2	7	
Bisexual	42	20	10	37	
Other	17	8	5	19	
Missing ^a	91	42	4	15	
Ethnicity					.36
White	158	73	19	71	
Black	11	5	2	7	
Asian	4	2	2	7	
Mixed	27	13	4	15	
Other	7	3	0	0	
Missing	8	4	0	0	
Education and Work Status					.18
In Education and/or Work	140	65	23	86	
Not in Education and/or Work	35	16	2	7	
Missing	40	19	2	7	

Note. Table is the authors' own work.

^a Data on sexual orientation were only collected from 2017 onwards.

Changes in Outcomes Across Treatment for Those With an ASC Diagnosis

Descriptive and inferential statistics for changes in treatment outcomes between the start and end of treatment can be found in Table III [Place Table III here]. Significant medium to large reductions in scores between assessment and end of treatment (indicative of improved outcomes) were found for those with an ASC diagnosis on the MSI-BPD and the DERS Total and Non-Acceptance, Goals, Impulsivity, and Strategies subscales. The results of all other paired t-test comparisons were non-significant.

Table III

Descriptive statistics and t-test Results for Change in Outcome Scores Between Assessment and End of Treatment for those with an ASC Diagnosis

Measure (Range)	ASC Diagnosis (<i>n</i> = 21)							
	Assessment		End of Treatment		<i>t</i>	<i>df</i>	<i>p</i>	<i>g</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
MSI-BPD (0-10)	8.86	1.35	6.88	2.58	3.28*	20	.002*	0.67
DERS								
Non-Acceptance (6-30)	23.57	5.62	19.89	5.77	2.54*	20	.01*	0.54
Goals (5-25)	22.67	2.46	19.76	4.44	3.13*	20	.003*	0.66
Impulsivity (6-30)	23.76	3.60	18.38	5.90	4.49*	20	<.001*	0.94
Awareness (6-30)	22.43	2.77	19.34	5.42	2.71 ^a	20	.007 ^a	0.57
Strategies (8-40)	33.62	4.52	26.07	7.90	4.27*	20	<.001*	0.90
Clarity (5-25)	18.43	3.47	16.54	2.49	2.36	20	.014	0.50
Total (36-180)	144.48	13.64	119.95	27.87	4.24*	20	<.001*	0.89
MFQ-YP (0-66)	49.41	8.78	42.83	10.28	2.06 ^a	20	.03 ^a	0.43
SCARED-YP (0-82)	54.15	9.96	53.38	10.84	0.27	20	.40	0.56

Note. *M* = Mean. *SD* = Standard Deviation. *t* = *t*-value. *df* = Degrees of Freedom. *p* = *p*-value. *g* = Hedge's *g*.

MSI-BPD: Maclean Screening Instrument for Borderline Personality Disorder. DERS: Difficulties in Emotion Regulation Scale. MFQ-YP: Mood and Feelings Questionnaire for Young People. SCARED-YP: Screen for Child Anxiety-Related Disorders for Young People. Table is the authors' own work.

* Significant after controlling for multiple comparisons using the Bonferroni correction.

^a Not significant after Bonferroni correction, but was before.

Exact sign tests were used to examine changes in treatment outcomes for non-parametric data. The results of the exact sign tests showed significant large reductions in the frequency of self-harming behaviours between the start ($M = 12.57$, $Mdn = 6.00$, $SD = 23.37$) and end ($M = .95$, $Mdn = 0$, $SD = 2.44$) of treatment, $z = -2.75$, $p = .002$, $r = -.60$, and in the number of occupied inpatient bed days in the matched periods before ($M = 60.14$, $Mdn = 2.00$, $SD = 102.14$) and during ($M = 1.00$, $Mdn = 0$, $SD = 4.58$) treatment, $z = -3.02$, $p = <.001$, $r = -.66$. The reduction of the number of A&E attendances before ($M = 3.48$, $Mdn = 2.00$, $SD = 4.08$) and during ($M = .71$, $Mdn = 2.00$, $SD = 1.15$) treatment was large but non-significant, $z = -2.43$, $p = .007$, $r = -.53$.

McNemar's tests were used to examine within-group differences in education and work status between the start and end of treatment, finding non-significant differences, $p = .50$.

Differences in Changes in Outcomes Across Treatment Between Those With an ASC Diagnosis and Those Without

Descriptive and inferential statistics for all clinical outcome change scores can be found in Table IV [Place Table IV here]. No significant differences between those with an ASC diagnosis and those without were found in change scores across all clinical outcome measures.

Table IV

Descriptive Statistics and t-test Results for Groups on Clinical Outcome Change Scores Between Assessment and End of Treatment.

Measure	No Diagnosis <i>n</i> = 131		Diagnosis <i>n</i> = 21		<i>t</i>	<i>df</i>	<i>p</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
MSI-BPD	2.89	2.92	1.98	2.85	1.33	150	.18	0.31
DERS								
Non-Acceptance	4.48	6.50	3.68	6.61	0.53	150	.61	0.12
Goals	3.53	4.87	2.91	4.26	0.55	150	.59	0.13
Impulsivity	6.33	6.79	5.38	5.49	0.61	150	.55	0.14
Awareness	3.30	5.08	3.08	5.22	0.18	150	.86	0.04
Strategies	7.92	8.82	7.55	8.10	0.18	150	.86	0.04
Clarity	3.34	4.10	1.89	3.67	1.53	150	.13	0.36
Total	28.90	28.98	24.52	26.53	0.65	150	.52	0.15
MFQ-YP	13.98	15.79	6.59	14.64	2.01 ^a	150	.05 ^a	0.47
SCARED-YP	8.80	13.02	0.77	13.34	2.61 ^a	150	.01 ^a	0.61

Note. M = Mean. SD = Standard Deviation. t = t-value. df = Degrees of Freedom. p = p-value. d = Cohen's d.

MSI-BPD: Maclean Screening Instrument for Borderline Personality Disorder. DERS: Difficulties in Emotion Regulation Scale. MFQ-YP: Mood and Feelings Questionnaire for Young People. SCARED-YP: Screen for Child Anxiety-Related Disorders for Young People. Table is the authors' own work.

* Significant after controlling for multiple comparisons using the Bonferroni correction.

^a Not significant after Bonferroni correction, but was before.

Mann-Whitney U tests were used to assess between-group differences for non-parametric data. The difference in the change in frequency of self-harming behaviours between the start and end of treatment was small and non-significant between those with an ASC diagnosis ($M = 11.62$, $Mdn = 4.00$, $SD = 23.67$) and those without ($M = 5.25$, $Mdn = 2.00$, $SD = 10.61$), $U = 1542.50$, $z = .90$, $p = .37$, $r = .07$. Group differences in the change in the number of inpatient bed days between the matched periods before and during treatment were small and non-significant between those with an ASC diagnosis ($M = 59.14$, $Mdn = 2.00$, $SD = 100.29$) and those without ($M = 39.91$, $Mdn = 1.00$, $SD = 72.45$), $U = 1480.00$, $z = .57$, $p = .58$, $r = .05$. The difference between the change in the number of A&E attendances before and during treatment was small and non-significant between those with an ASC diagnosis ($M = 2.76$, $Mdn = 2.00$, $SD = 4.02$) and those without ($M = 1.37$, $Mdn = 1.00$, $SD = 3.10$), $U = 1614.50$, $z = 1.31$, $p = .19$, $r = .02$.

To investigate whether changes in education and work status were associated with the presence/absence of an ASC diagnosis, Fisher's exact tests were performed. No significant associations were found, $p = .55$.

Differences in Non-completion Rates Between Those With an ASC Diagnosis and Those Without

In total, 242 adolescents began DBT treatment. For those without an ASC diagnosis ($n = 215$), 132 (61.40%) completed treatment, 38 (17.70%) opted-out during pre-treatment, and 45 (20.90%) opted-out during treatment. For those with an ASC diagnosis ($n = 27$), 21 (77.80%) completed treatment, 2 (7.40%) opted-out during pre-treatment, and 4 (14.80%) opted-out during treatment. To investigate whether non-completion rates were associated with the presence/absence of an ASC diagnosis, a Fisher's exact test was performed. No significant associations between non-completion rates and the presence/absence of an ASC diagnosis were found, $p = .27$.

Discussion

This service evaluation aimed to investigate treatment outcomes for a comprehensive DBT programme for adolescents with co-occurring emerging BPD and ASC diagnoses. Changes in outcomes between assessment and end of treatment were investigated for those with an ASC diagnosis, and those with an ASC diagnosis and those without were compared on changes in treatment outcomes and non-completion rates across treatment. The results suggest that for those with an ASC diagnosis there was a decrease in the frequency of self-harming behaviours, self-reported BPD symptoms, and emotion dysregulation from the start to the end of DBT, as well as a reduction in the number of inpatient bed days during treatment as compared to before treatment. Improvements in outcomes and non-completion rates across treatment were found to not significantly differ between those with an ASC diagnosis and those without, indicating that the outcomes and treatment retention of DBT may be similar for those with an ASC diagnosis and those without. However, it is of note that the small sample of those with an ASC diagnosis mean that the analyses of the present study are underpowered for the detection of small and medium effects; therefore results should be interpreted with caution and future studies with larger samples will be needed for confirmation.

The findings that the frequency of self-harming behaviour reduced across treatment for those with an ASC diagnosis, and that these reductions were similar between those with an ASC diagnosis and those without, support the results of DBT effectiveness studies for adolescent populations (Bahji et al., 2021), though this is the first study to report this outcome in adolescents with an ASC diagnosis. The primary treatment target of DBT is reducing life-threatening behaviours (Linehan, 1993a); reductions in self-harming behaviour provide some evidence that this treatment target was met for many with an ASC diagnosis. A reduction in the number of A&E attendances or inpatient bed days during treatment as compared to before

treatment may also indicate a reduction in life-threatening behaviours, and while the number of inpatient bed days were found to significantly reduce for those with an ASC diagnosis, the number of A&E attendances were not, though the effect size was large. However, reductions were similar in both outcomes between those with a diagnosis and those without, and the pre-post comparison for A&E attendance for those with an ASC diagnosis was associated with a large effect size. This non-significant finding may be an artefact of the low power of the study and warrants further investigation in future research.

Reducing emotion dysregulation is another key treatment target of DBT and thought to underpin other difficulties (Linehan, 1993a), and the developing literature surrounding the role of emotion dysregulation in ASCs suggests that it is a common and clinically significant symptom that should be addressed by interventions (Beck et al., 2020; Cai et al., 2018). The pattern of significant reductions found on the DERS subscales is therefore encouraging, indicating that those with an ASC diagnosis experienced significant medium to large improvements in general emotion regulation, effective strategy use to manage emotions, impulse control, engagement in goal-directed behaviours when experiencing intense emotions, and the willingness to experience and accept emotional responses (Gratz & Roemer, 2004) from the start to end of DBT. Self-reported awareness and clarity of emotional responses were not found to significantly improve for those with an ASC diagnosis between assessment and end of treatment, and were associated with the smallest effect sizes of the DERS subscales. However, improvements on the awareness and clarity subscales across treatment, as well as on all other DERS subscales, were found to be similar between those with an ASC diagnosis and those without. These findings partially reflect those of a recent pilot study examining the effectiveness of DBT for adults with an ASC diagnosis, which found significant large reductions in the DERS total, awareness, impulsivity, and

strategies subscales between the start and end of a shortened DBT programme (Bemmouna et al., 2021).

Reductions in depression, anxiety, and emerging BPD symptoms have been reported in other uncontrolled pre-post evaluations of DBT for adolescents, and reductions in depression at end of treatment in some RCTs (Kothgassner et al., 2021; MacPherson et al., 2013). In this study, the presence of emerging BPD symptoms significantly reduced across treatment for those with an ASC diagnosis, with a medium effect size. Scores did not reduce to below clinical cut-off on the MFQ-YP or the SCARED-YP, and while reductions were not significantly different on these outcomes between those with an ASC diagnosis and those without, they were associated with medium effect sizes; significance may have been influenced by low power. Future research into DBT for those with an ASC should include measures for depression and anxiety symptoms, to further clarify these findings. Education and work status was also not found to significantly differ between the start and end of treatment for those with an ASC, and changes did not significantly differ between diagnostic groups. While depression, anxiety, and general functioning are outcomes of interest, they are secondary to the primary DBT treatment target of reducing life threatening behaviours within the context of a specialist CAMHS service, where individuals will often be stepped-down to less intensive psychological services for outstanding emotional difficulties to be addressed.

The non-completion rates of those with an ASC diagnosis did not significantly differ from those without in pre-treatment or in treatment, indicating similar treatment retention across groups. The treatment completion rates observed in this study (77.80%) are comparable to those of other pilot studies of shortened DBT (71.43%; Bemmouna et al., 2021) and DBT skills training (81.25%; Ritschel et al., 2021) programmes for adult ASC populations, and taken together, provide some preliminary evidence for the acceptability of DBT for those with an ASC diagnosis. The overlap between emerging BPD symptoms

meeting diagnostic cut-offs and ASC diagnoses within this study's sample was 12.56%, similar to rates reported within other clinical samples (Anckarsärter et al., 2006; Rydén et al., 2008). However, the reliability of ASC diagnosis was not assessed in this study, and future research should consider using a more comprehensive assessment of ASC symptom profiles than the presence/absence of a diagnosis, in order to capture those falling outside this binary grouping who may warrant an ASC diagnosis.

In terms of clinical implications, the findings of this service evaluation suggest that DBT may be an appropriate model of treatment for young people with an ASC diagnosis who engage in self-harming behaviours and experience emotion dysregulation. However, given the lack of clinically significant change on the MFQ-YP and the SCARED-YP, if the primary difficulty was identified as depression or anxiety without self-harming behaviour, then another treatment may be more appropriate. An additional implication for practice is that the pattern of significant and non-significant reductions on DERS subscales across treatment imply that practices in DBT that aim to improve the clarity and awareness of emotions (including mindfulness and emotion regulation practices) may require optimisation or additional scaffolding for adolescent ASC populations. The finding of non-significant improvement in changes in education and work status across treatment may also suggest that clinicians may need to further support autistic young people with the 'Building Mastery' component of the Emotion Regulation skills module. Generally, the flexibility of DBT allows for neuro-affirmative adaptations to be made throughout treatment via collaboration between client and clinician, dependent on client needs (e.g. adapting exposure tasks to accommodate sensory sensitivity, including neurodiversity within the biosocial formulation model; see Hartman et al., 2023, Chapman & Botha, 2022 for general neuro-affirmative recommendations). Aspects of the DBT model may already be amenable to some neurotypes (e.g. the highly-structured nature of therapy sessions). However, it is also important for

clinicians to consider where the DBT model may subtly encourage neurotypical/allistic norms onto adolescents with an ASC diagnosis that may have undesired consequences (e.g. the potential for promoting masking of autistic traits) and attend to these instances throughout treatment in a way that is neurodiversity-affirmative and informed by the needs/preferences of the young person.

Strengths and Limitations

This study is the first to investigate outcomes for those with ASC diagnoses in a comprehensive DBT programme for adolescents and uses a naturalistic clinical research methodology which increases external validity. However, the degree of experimental control of potential extraneous variables (such as treatment length or the severity of BPD symptoms, including self-harming behaviours) was therefore limited, and missing data were present. There was also a lack of gender and ethnic diversity in the sample, though the majority white and female sample is representative of the typical sociodemographic profile of DBT research and treatment populations. Another limitation is the low power of the study for the detection of small and medium effects, meaning it is possible that significant small to medium differences were missed in this study due to low power, as highlighted above. Finally, Chronbach's alpha scores were low for the MSI-BPD and DERS non-acceptance scales at assessment (.63 and .57, respectively), though they did increase to acceptable levels by end of treatment (.83 and .92, respectively). This change may be reflective of the severity and diversity of the difficulties experienced by participants at assessment; their responses to different items may have varied and an increase in internal consistency by end of treatment may reflect a reduction in symptom severity and diversity. Nevertheless, findings from these scales should be treated with caution due to the low alpha scores at assessment.

Conclusions and future directions

Though the present study is subject to several limitations, it is a first step towards understanding the outcomes of a comprehensive (non-adapted) DBT programme for adolescents with emerging BPD and co-occurring ASC diagnoses. As this research is exploratory in nature, all findings should be treated as preliminary and interpreted with caution. The results do however suggest that DBT for adolescents may be a useful model for the treatment of self-harm, emotion dysregulation, and emerging BPD symptoms for those with ASC diagnoses. Future research is encouraged to develop the findings of this study by examining the efficacy and effectiveness of comprehensive DBT programmes for improving outcomes in adolescents with ASC diagnoses, in the hope of improving clinical knowledge surrounding the symptom overlap of the conditions and the utility of treatments offered to this group.

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