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Differences between Australian adolescents with eating disorder symptoms who are in treatment or not in treatment for an eating disorder

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Abstract

Background: Mental health problems frequently occur during adolescence, however few adolescents seek treatment for these problems, especially for eating disorders. The current

study aimed to quantify how adolescents in a clinical sample (i.e., those receiving treatment for an eating disorder), differ in terms of psychological factors (eating disorder symptoms and psychological distress), compared to adolescents with eating pathology in a community sample (i.e., those not receiving treatment). Method: Data were used from a community sample of adolescents with eating disorder pathology who have not sought treatment ($n = 1011$) and a clinical sample of adolescents presenting at eating disorder services for treatment ($n = 153$). Participants reported demographics, and completed questionnaires assessing weight/shape concerns, disordered eating, and psychological distress. Results: Adolescents with a lower BMI, more frequent purging and higher weight/shape concerns were more common in the clinical sample, while those engaging in more frequent driven exercise were less common in the clinical sample. The samples did not differ in severity of psychological distress. Conclusions: The findings highlight the need for increasing mental health literacy about the role of BMI and driven exercise in eating disorder symptom presentation to increase early detection of these disorders among adolescents.

Keywords: Eating disorders, Treatment-seeking, Mental health literacy, Treatment utilization, Adolescence

Differences between Australian adolescents with eating disorder symptoms who are in treatment or not in treatment for an eating disorder

Mental health problems, in particular eating disorders, frequently emerge during adolescence, yet few adolescents seek treatment (Forrest, Smith, & Swanson, 2017; Striegel Weissman & Rosselli, 2017). Eating disorders are characterised by disordered eating and maladaptive weight control behaviours that often encompass additional problems with high levels of body dissatisfaction (American Psychiatric Association, 2013). Eating disorders have been associated with poor psychosocial outcomes, including heightened distress, lower quality of life, and comorbid psychiatric disorders (Fisher, Kreipe, Rees, & Sigman, 1995; Mitchison, Morin, Mond, Slewa-Younan, & Hay, 2015). Compared to other mental health problems, help-seeking among adolescents with eating disorders is low (Merikangas et al., 2011; Swanson, Crow, Le Grange, Swendsen, & Merikangas, 2011). Early intervention efforts are therefore critical and identifying factors that distinguish adolescents who are in treatment for their eating disorder from those not receiving treatment would likely inform strategies to close this treatment gap and aid early intervention.

Treatment seeking in adolescents is commonly associated with demographic factors, as well as severity of the presenting mental health problems (Merikangas et al., 2011). While several demographic factors, mainly older age and female gender, have been found to relate to treatment-seeking among adolescents with eating disorders (Forrest et al., 2017), more recent research has focused on psychological factors. For example, higher symptom severity and higher psychological distress have been associated with greater likelihood of seeking

treatment among adolescents (Forrest et al., 2017; Merikangas et al., 2011). In regards to specific symptoms, purging (e.g., self-induced vomiting, laxatives misuse) have been identified as predictors of treatment-seeking among adults (Regan, Cachelin, & Minnick, 2017), and there is evidence to suggest that this extends to adolescents (Forrest et al., 2017).

However, less is known about how other eating disorder symptoms (e.g., fasting, binge eating, and driven exercise) relate to treatment seeking. While adolescents with anorexia nervosa are more likely to access treatment compared to adolescents with other eating disorders (Forrest et al., 2017; Swanson et al., 2011), it is unclear whether this is driven by specific behaviours (e.g., fasting), heightened weight/shape concerns, or lower BMI. Thus, moving beyond specific diagnostic categories, instead focusing on specific eating disorder symptoms, is critical and may be more informative for health promotion and early intervention initiatives.

Whether or not adolescents seek treatment often depends on their parents. A common barrier reported by parents is the belief that their child's symptoms are not severe enough to require professional help (Owens et al., 2002; Tapp et al., 2018). Given the poor mental health literacy surrounding the spectrum of eating disorders (Gratwick-Sarll, Bentley, Harrison, & Mond, 2016), one explanation is that earlier symptoms, such as deviations from normal eating, are missed, and parents are more likely to recognise a child's potential eating disorder once it manifests as a physical problem (e.g., low BMI, as observed in anorexia nervosa). While BMI is generally higher among adolescents with eating disorders (Mitchison et al., 2019), and associated with greater psychopathology and impairment, due to the earlier onset of anorexia nervosa compared to bulimia nervosa and binge eating disorder (Nagl et al.,

2016; Nicholls, Lynn, & Viner, 2011), as well as the poor mental health literacy of the variability in eating disorders among both parents and general health practitioners, we hypothesised that among adolescents, low BMI would serve as a physical indicator of a potential eating disorder that warrants help from a relevant service.

Thus far the literature has highlighted the role of symptom severity (e.g., higher weight/shape concerns, more frequent purging) and levels of distress as factors relating to treatment-seeking in adolescents with eating disorders (Forrest et al., 2017; Merikangas et al., 2011; Swanson et al., 2011). However, most previous research has relied on community samples. Although the use of community samples is important for understanding the general population, individuals with eating disorders recruited from these samples are not likely to be representative of the small proportion of adolescents who present for treatment at eating disorder services. Importantly, while appropriate early intervention is critical in long-term outcomes (Treasure & Russell, 2011), delivering evidence-based treatment for eating disorders often requires specialised training in manualised treatments, which few clinicians are administering in standard practice (Simmons, Milnes, & Anderson, 2008). Therefore, to make conclusions about adolescents who attend specialised eating disorder services, it is important to sample this clinical group specifically.

The current study aimed to address these gaps by comparing adolescents recruited from the community, who meet criteria for an eating disorder but had never sought treatment, to adolescents who presented at eating disorder services for treatment. These two groups will be compared in terms of eating disorder symptoms and general psychological distress. Consistent with the available evidence, it was hypothesised that adolescents receiving

treatment for an eating disorder would have a lower BMI, greater symptom severity, and higher psychological distress compared to adolescents not receiving treatment.

Method

Participants and procedure

Data were used from two samples: (1) a community sample of non-treatment receiving adolescents, and (2) a clinical sample of treatment-seeking participants. The sampling procedures for each sample are outlined below.

Community sample. Participants from the community sample were part of the first wave of the EveryBODY study, a longitudinal questionnaire-based study of eating disorders and body image concerns among 5191 Australian high school students (see Trompeter et al., 2018 for the detailed study methodology). The current study used data from participants aged 13-19 years, whose self-reported data yielded symptoms meeting criteria for an eating disorder, but further indicated never having sought treatment for a body image problem ($n = 1011$). Criteria for defining eating disorder diagnostic groups were based on a recent prevalence study using the same sample (Mitchison et al., 2019). Additionally, the current study included participants who met criteria for avoidant/restrictive food intake disorder (ARFID; American Psychiatric Association, 2013), using DSM-5 diagnostic criteria as operationalised in a previous study (Trompeter et al., 2019). In the community sample of adolescents with eating disorders the breakdown of diagnoses was as follows: 2.2% anorexia nervosa, 19% bulimia nervosa, 4.0% binge eating disorder, 43.4% other specified feeding/eating disorder (OSFED); 5.2% atypical anorexia nervosa, 10.7% subthreshold

bulimia nervosa, 1.4% subthreshold binge eating disorder, 13.0% purging disorder, 13.1% night eating syndrome), 15.3% Unspecified Feeding/Eating Disorder (UFED), 10.0% ARFID, and 6.2% met criteria for multiple disorders (i.e., multiple OSFED diagnoses).

Clinical sample. Participants from the clinical sample were part of the TrEAT study ($n = 283$), a clinical database of people attending treatment services for an eating disorder. Data were included from seven services located in two major cities in Australia (Sydney and Perth). Prior to their first treatment session, all clients aged 13 and over with a suspected eating disorder were asked to complete a self-report questionnaire on eating disorder pathology. Clients were informed about the research study and asked for separate consent for their data to be used for research purposes (85.4% consent rate). Following their first appointment, the treating clinician was asked to provide additional diagnostic information. For the purposes of the current study, data of participants aged 13-19 years, who consented for their data to be used for research purposes, were included ($n = 153$). Of these participants, clinician-provided diagnostic data were available for 61% ($n = 93$) of participants, the breakdown of diagnoses was as follows: 43% anorexia nervosa, 10.8% bulimia nervosa, 6.5% binge eating disorder, 32.3% OSFED (26.9% atypical anorexia nervosa, 3.2% subthreshold bulimia nervosa, 2.2% purging disorder), 5.4% UFED, and 2.2% ARFID.

Measures

Psychological Distress. Participants' psychological distress was measured using the Kessler Psychological Distress Scale (K10) (Kessler et al., 2002) in both samples. The measure assesses the occurrence of anxiety and depression symptoms in the preceding four

weeks. Participants rate each item (e.g., *In the last 28 days, how often did you feel nervous?*) on a 5-point scale (1 = *None of the time* to 5 = *All of the time*). Scores on all 10 items were summed to calculate a total score ranging from 10-50 with higher scores indicating higher psychological distress. Scores can be categorised as follows: < 15 = 'low psychological distress', 16-21 = 'moderate psychological distress', 22-29 = 'high psychological distress', > 29 = 'very high psychological distress' (Australian Bureau of Statistics, 2012).

The scale is widely used with general population samples and has excellent validity and reliability among adolescents (Bentley, Gratwick-Sarll, Harrison, & Mond, 2015). Adequate internal consistency was shown in the current study in both the community sample (Cronbach's alpha = .92; McDonald's ω = .93) and the clinical sample (Cronbach's alpha = .92; McDonald's ω = .93).

Weight/Shape Concerns. All participants' weight/shape concerns were assessed using the combined weight and shape concerns subscale of the EDE-Q (Fairburn, Cooper, & O'Connor, 2008). The measure comprises 12 items assessing eating disorder related body image concerns over the previous 28 days. Participants rate the frequency/severity of their weight and shape concerns (e.g., *How dissatisfied have you been with your shape*) on a 7-point Likert scale (0 = *No days/Not at all* to 6 = *Everyday/Markedly*). Items on the subscale are averaged to provide a mean score, whereby higher scores indicate higher severity. The subscale has demonstrated good reliability among Australian adolescents (Gall et al., 2016; Mond et al., 2014). Adequate internal consistency was shown in the current study both in the community sample (Cronbach's alpha = .94; McDonald's ω = .95) and in the clinical sample (Cronbach's alpha = .96; McDonald's ω = .97).

Disordered eating. Participants' disordered eating symptoms were assessed using individual items from the EDE-Q (Fairburn et al., 2008) to obtain a frequency score for binge eating, purging (vomiting and laxative use), and driven exercise. Participants indicate the frequency of each behaviour over the past 28 day using an open response format. The response format for the item measuring fasting differed in the two samples. In the clinical sample, a 7-point Likert scale (0 = 0 days to 6 = *Every Day*) was used, whereas in the community sample an open response format was used. Thus to compare fasting between the samples, the scores from the community sample were placed in bands corresponding to the 7-point Likert scale used in the clinical sample. All disordered eating behaviours were treated as continuous variables, with higher scores indicating higher frequency of the behaviour.

Body mass index (BMI). All participants provided their self-reported height and weight measurements, which were used to determine BMI (weight (kg)/ height (m)²). BMI percentiles were calculated in line with the CDC guidelines to account for both age and gender (Centers for Disease Control and Prevention, 2017). Previous research has found that self-reported height and weight measurements are strongly correlated with anthropometric measurements in adolescents (Goodman, Hinden, & Khandelwal, 2000).

Demographic variables. To control for potential demographic differences in the two samples various demographic variables (i.e., socio-economic status (SES), age, gender, and migration status) were also included. Participant's SES were measured using the postal area index (POA), an index of relative socio-economic advantage and disadvantage issued by the (Australian Bureau of Statistics, 2016). Other demographic factors measured included age,

gender, and immigrant status (categorized as 'born in Australia' compared to 'born overseas').

Data analytic plan

Analyses were conducted using SPSS version 24. First, sample characteristics were examined to test for univariate group differences using t-tests for continuous variables and chi-square analysis of differences for categorical variables. Second, to examine whether groups differed in terms of psychological factors, logistic regression analyses were conducted adjusting for demographic characteristics (age, gender, SES, and migration status). Third, to address the hypothesis that adolescents from a clinical sample would present with lower BMI, higher distress and higher severity of eating disorder symptoms compared to their community-sample peers, hierarchical binary logistic regression analyses adjusting for demographic variables and psychological factors were conducted. Lastly, a separate hierarchical binary logistic regression analyses was conducted among participants with complete diagnostic data to determine whether group differences remained after controlling for diagnosis.

In all analyses age was centred at a meaningful zero by using the minimum age (13 years) as a minimum score, so that odds-ratios (OR) refer to an increase in one year in age. SES was divided by 100 in order for the OR to correspond to an increase of 1 standard deviation on the SEIFA index. BMI percentile was divided by ten in order for the OR to correspond to an increase of 10% in BMI. All other continuous variables were standardized for the OR to correspond to an increase of 1 standard deviation.

The regression models showed no evidence of multicollinearity (Tabachnick & Fidell, 2001), however the assumption of normality was violated. Therefore, bootstrapping analyses were conducted to provide bias-corrected p -values. This method provides robust results when the assumption of normality is violated (Field & Wilcox, 2017). To maximize available data, pairwise deletion was employed to deal with missing data.

Results

Sample characteristics

As shown in Table 1, the two samples differed in terms of demographic and psychological factors. However, levels of psychological distress were similar between the samples, whereby 7.6% of students reported low levels, 17.4% moderate levels, 26% high levels and 49% reported very high levels of psychological distress.

< Table 1 >

Group differences

We next examined whether the group differences in psychological factors remained after adjusting for demographic characteristics using logistic regression analyses; the differences remained significant for most psychological factors. Adolescents from the clinical sample had lower BMI ($\chi^2(5) = 498.17, B = -0.25, p < .001$), reported more frequent fasting ($\chi^2(5) = 514.96, B = 0.33, p < .05$), and purging ($\chi^2(5) = 508.63, B = 0.47, p < .001$), but less frequent driven exercise ($\chi^2(5) = 507.41, B = -0.47, p < .01$) compared to adolescents from the community sample. The two groups did not differ in regards to psychological distress

($\chi^2(5) = 505.70, B = 0.01, p = .837$), binge eating ($\chi^2(5) = 505.93, B = 0.10, p = .487$), or weight/shape concerns when adjusting for demographics ($\chi^2(5) = 512.30, B = 0.27, p = .143$)

Multivariate analyses

The final model included all demographic and psychological factors as simultaneous predictors of group membership. The logistic regression model was statistically significant, $\chi^2(11) = 522.29, p < .01$. The model explained 77.0% (Nagelkerke R^2) of the variance in treatment status and correctly classified 96.5% of cases. As can be seen in Table 2, weight/shape concerns were significantly higher among adolescents from the clinical sample compared to those from the community sample, when adjusting for all other factors. Furthermore, more frequent purging and driven exercise remained significant. While more frequent purging was associated with a higher likelihood of being in the clinical sample, more frequent driven exercise was associated with a lower likelihood of being in the clinical sample. As with previous analyses, there was no significant difference between the two groups on levels of psychological distress.

<Table 2 >

To examine whether differences remained after controlling for diagnosis, the regression model was re-run with participants who had complete diagnostic data and who met criteria for a single disorder ($n = 915$). After adding diagnosis to the regression model, the interpretation of the results was largely unchanged, with the exception that BMI no longer predicted group membership (see supplementary material). Unlike previous results with the

entire sample, weight/shape concerns were not significant in any additional analysis. That is, even prior to controlling for diagnosis, weight/shape concerns were not significantly different in this reduced sample. Thus it is unclear whether controlling for diagnosis impacts findings that weight/shape concerns are higher in the clinical group compared to the community sample.

Discussion

The current study aimed to examine differences in eating disorder symptoms and general psychological distress levels between adolescents receiving treatment for an eating disorder, and those not in treatment. Supporting the hypotheses, the current findings showed that adolescents with lower BMI, higher weight/shape concerns, and more frequent purging was more common in the clinical sample compared to the community sample. By contrast, adolescents who engaged in more frequent driven exercise were more common in the community sample compared to the clinical sample. This may highlight a lack of mental health literacy surrounding the role of driven exercise in eating disorder pathology, or indeed problems in distinguishing healthy exercise from driven exercise (i.e., unhealthy exercise). Driven exercise is a key transdiagnostic symptom within eating disorder pathology and commonly reported by adolescents with eating disorders (Fietz, Touyz, & Hay, 2014). Exercise, however, is frequently viewed as positive and encouraged within society. For example, evidence suggests that the public – and individuals affected – believe that the occurrence of purging is “pathological” while the occurrence of driven exercise is more likely to be seen as normative or even desirable (Mond, 2014, 2016).

Contrary to hypotheses, psychological distress was not related to treatment status. This is in contrast to previous research (Forrest et al., 2017; Regan et al., 2017), and may be due to methodological differences. While previous research had examined treatment-seeking within the same community sample, the current study compared adolescents from a clinical sample (increasing our confidence that this group was receiving appropriate treatment for an eating disorder) to a community sample. This finding highlights the unmet need for treatment of eating disorders, as adolescents not in treatment (who represent the vast majority of adolescents with an eating disorder; Merikangas et al., 2010, 2011) were found to be experiencing similarly high levels of psychological distress as their counterparts who were in treatment. Indeed, reported levels of distress in the current study were substantially above the population average (Lawrence et al., 2015); only 6% of adolescents report experiencing 'very high' psychological distress in general population samples, compared to half of adolescents in the current study.

Taken together, these findings suggest that public health information should focus on the role of driven exercise in eating disorders to aid referral to treatment. Furthermore, increased education regarding the role of weight in eating disorders among adolescents might be required. While BMI has been found to be unrelated to treatment-seeking in adult samples (Grillot & Keel, 2018; Regan et al., 2017), the current study indicates that BMI was significantly lower in adolescents accessing treatment. This is likely due to the high rates of anorexia nervosa in the clinical sample, as BMI was no longer significant after controlling for diagnosis. These findings may also reflect lower rates of eating disorder detection and/or referrals in adolescents who do not meet criteria for anorexia nervosa.

While the current study had several strengths, some limitations should be noted. First, it did not examine barriers to treatment. Thus it is unclear why adolescents in the community sample did not access treatment for their eating disorder. Furthermore, the current study did not control for other types of treatment-seeking in the community sample or the possibility of comorbid diagnoses. Moreover, the current study was unable to compare diagnostic differences in the two samples. While we conducted additional analysis to determine whether group differences remained after adjusting for diagnosis, due to measurement differences in determining diagnosis no inferences about the role of diagnosis could be drawn. In particular, the different proportions of individuals with ARFID in the two samples may have contributed to some of the observed differences in weight/shape concerns (Nicely, Lane-Loney, Masciulli, Hollenbeak, & Ornstein, 2014). Future research should aim to investigate the role of diagnosis to complement the findings regarding eating disorder symptoms of the current study. Furthermore, treatment-seeking in the community sample was assessed using 'body image problems' as a proxy for 'eating disorder'. Given the low rates of self-identification among adolescents with eating disorders (Gratwick-Sarll et al., 2016), using such a non-technical term likely resulted in better understanding among participants. However, it is possible that adolescents who were receiving treatment for an eating disorder that did not focus on body image (e.g., from a dietician) were not captured. Lastly, the current study relied on self-report data. While all measures used in the current study have shown good psychometric properties and are widely used in population-based research, potential self-report biases should be noted.

In conclusion, findings from the current study have important implications for health promotion and early intervention programs, those seeking to improve awareness and understanding of the role of driven exercise in eating disorder pathology and of eating disorders among adolescents with higher BMIs in particular. Furthermore, these findings may inform clinical practice in helping clinicians translate findings from research conducted in community samples, and how these relate to adolescents presenting for treatment at eating disorder services.

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Data Sharing Declaration

Deidentified data are available upon request from the senior author (DM), pertaining to approval from the authors' institutional ethics committee

Conflicts of Interest/Disclosures:

Professor Hay receives/has received sessional fees and lecture fees from the Australian Medical Council, Therapeutic Guidelines publication, and New South Wales Institute of Psychiatry and royalties/honoraria from Hogrefe and Huber, McGraw Hill Education, and Blackwell Scientific Publications, Biomed Central and PlosMedicine and she has received research grants from the NHMRC and ARC. She is Chair of the National Eating Disorders Collaboration Steering Committee in Australia (2012-) and Member of the ICD-11 Working Group for Eating Disorders (2012-2019) and was Chair Clinical Practice Guidelines Project Working Group (Eating Disorders) of RANZCP (2012-2015). In the past 5 years she has consulted for, conducted education of Psychiatrists, and prepared a report under contract for Shire Pharmaceuticals. All views in this paper are her own.

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Phillipa Hay, Christopher Basten, Mandy Goldstein, Christopher Thornton, Gabriella Heruc, Susan Byrne, and Deborah Mitchison are directors of/employed by clinics from which data was used in this study.

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TablesTable 1. *Descriptive statistics of demographic and psychological factors in both samples.**Means and standard deviations are presented.*

Variables	Community sample ($n = 1137$)	Clinical sample ($n = 153$)
Age (in years)	14.83 (1.33)*	16.30 (1.71)*
Gender (% female)	73.8*	91.5*
SES	985.58 (41.18)*	1091.87 (57.50)*
Migrant Status (% born overseas)	7.8*	14.8*
BMI-percentile	61.59 (29.44)*	34.80 (29.72)*
Weight/shape concerns	3.68 (1.77)*	4.27 (1.77)*
Distress	29.50 (10.43)	30.50 (9.32)
Binge Eating Frequency (past 28 days)	4.51 (7.55)*	7.21 (13.36)*
Purging Frequency (past 28 days)	0.92 (2.95)*	3.38 (6.42)*
Driven Exercise Frequency (past 28 days)	5.90 (8.34)*	3.09 (6.79)*
Fasting	0.89 (1.32)*	1.48 (1.87)*

Note. Significant differences between the groups are indicated.* $p < .05$

Table 2. *Bootstrapped results from binary regression analyses using centered variables. Reference group: Clinical sample.*

Variables	B	SE	pvalue	Odds Ratio	95% CI Odds Ratio
Age (in years)	1.11	.19	<.001	2.91	[2.16, 3.92]
Gender	-1.02	.54	.068	0.42	[0.14, 1.27]
SES	4.57	.58	<.001	74.92	[32.60, 172.20]
Migrant Status	-.038	.77	.561	1.52	[0.14, 2.32]

Note. Reference category for gender is female, reference category for migrant status is ‘born overseas’.

BMI-percentile	-0.36	.08	<.001	0.71	[0.62, 0.81]
Weight/shape concerns	0.54	.25	.028	1.63	[1.00, 2.68]
Distress	-0.25	.25	.327	0.81	[0.52, 1.26]
Binge Eating	0.02	.18	.916	1.02	[0.71, 1.46]
Purging	0.45	.19	.010	1.49	[1.07, 2.09]
Driven Exercise	-0.66	.21	<.001	0.54	[0.36, 0.82]
Fasting	0.09	.19	.631	1.09	[0.74, 1.60]
