



Traumatic events and post-traumatic symptoms in anorexia nervosa

Paola Longo , Antonella Bertorello, Matteo Panero , Giovanni Abbate-Daga and Enrica Marzola

Eating Disorders Centre, Department of Neuroscience, University of Turin, Turin, Italy

ABSTRACT

Background: Traumatic Events (TEs) are often seen as risk factors not only for the development of eating disorders (EDs) but also for their impact on the severity of clinical presentation and psychiatric comorbidities.

Objective: This study aimed to assess the prevalence and time of occurrence of TEs in the two subtypes of anorexia nervosa (AN; restricting [RAN] and binge-purging [BPAN]) and to investigate differences in TEs (number, type, frequency) as well as clusters of post-traumatic symptoms and emotional dysregulation between the two groups.

Method: Seventy-seven hospitalized women were recruited and divided into two subgroups according to their AN subtype. Participants completed the following self-reported measures: Eating Disorder Inventory-2 (EDI-2), Life Events Checklist (LEC), Impact of Events Scale-Revised (IES-R) and the Difficulties in Emotion Regulation Scale (DERS).

Results: A higher occurrence of TEs was found in patients with BPAN than in those with RAN. In particular, there were significantly more women in the BPAN group than in the RAN group who had been sexually assaulted. Exposure to TEs happened before the onset of illness in most patients, regardless of the AN subtype. Finally, the BPAN group had significantly higher scores in terms of post-traumatic symptoms and emotional dysregulation than RAN patients.

Conclusions: Patients with BPAN showed a higher occurrence of TEs, post-traumatic symptom clusters, and emotional dysregulation than those with RAN. These findings are of interest as treatments could benefit from trauma-informed interventions for those affected by AN, and particularly for those with the binge-purging subtype.

Eventos traumáticos y síntomas posttraumáticos en la anorexia nervosa

Antecedentes: Los Eventos Traumáticos (ETs) con frecuencia se ven como factor de riesgo no solo para el desarrollo de los Trastornos de la conducta alimentaria (EDs por sus siglas en inglés) sino también por su impacto en la severidad de la presentación clínica y las comorbilidades psiquiátricas.

Objetivo: Este estudio tuvo como objetivo evaluar la prevalencia y tiempo de ocurrencia de los ETs en dos subtipos de anorexia nervosa (AN; restrictiva [RAN por sus siglas en inglés] y purga compulsiva [BPAN por sus siglas en inglés] e investigar las diferencias en los ETs (número, tipo, frecuencia) así como también los grupos de síntomas posttraumáticos y desregulación emocional entre los dos tipos. Método: Se reclutaron setenta y siete mujeres hospitalizadas y se dividieron en dos subgrupos de acuerdo al subtipo de AN. Las participantes completaron las siguientes medidas de auto-reporte: El Inventario de Trastornos alimentarios-2 (EDI-2), la Lista de Chequeo de Eventos Vitales (LEC), la Escala Revisada del Impacto de los Eventos (IES-R) y la Escala de Dificultades de la regulación Emocional (DERS).

Resultados: Se encontró una mayor ocurrencia de ETs en pacientes con BPAN que en aquellas con RAN. En particular, hubo significativamente más mujeres en el grupo de BPAN que en el grupo de RAN que habían tenido abuso sexual. La exposición a los ETs sucedió antes del inicio de la enfermedad en la mayoría de las pacientes, independientemente del subtipo de AN. Finalmente, el grupo BPAN tenía significativamente puntajes más altos en términos de síntomas posttraumáticos y desregulación emocional que las pacientes RAN.

Conclusiones: Las pacientes con BPAN mostraron una mayor ocurrencia de ETs, grupos de síntomas posttraumáticos, y desregulación emocional que aquellas con RAN. Estos hallazgos son de interés ya que los tratamientos podrían beneficiarse de las intervenciones informadas en trauma para aquellas afectadas por AN y en particular para aquellas con el subtipo purga compulsiva.

神经性厌食症的创伤事件和创伤后症状

背景: 通常认为创伤事件 (TEs) 不仅是进食障碍 (ED) 发生的风险因素, 也是其对临床表现和精神并发症严重程度影响的风险因素。

目的: 本研究旨在评估在神经性厌食症 (AN) 的两种亚型 (限制型[RAN]和暴食型[BPAN]) 中TEs的流行率和发生时间, 并考查两亚群体TEs (数量, 类型, 频率), 创伤后症状簇以及情绪失调上的差异。

ARTICLE HISTORY

Received 28 February 2019

Revised 9 September 2019

Accepted 3 October 2019

KEYWORDS

Traumatic events; eating disorders; anorexia nervosa; post-traumatic symptom clusters; emotion dysregulation

PALABRAS CLAVE

eventos traumáticos; trastornos de la conducta alimentaria; anorexia nervosa; síntomas posttraumáticos; desregulación emocional

关键词

创伤事件; 进食障碍; 神经性厌食症; 创伤后症状; 情绪失调

HIGHLIGHTS

- Traumatic events are common among patients with both subtypes of anorexia nervosa.
- Higher number and occurrence of TEs were found in patients with binge-purging anorexia nervosa than those with the restrictor subtype.
- Patients with binge-purging anorexia nervosa reported higher post-traumatic symptoms and emotion dysregulation than those with the restrictor subtype.

方法：招募了77名住院妇女，并根据其AN类型分为两个小组。参与者完成了以下自我报告式的测量：《进食障碍量表-2》（EDI-2），《生活事件量表》（LEC），《事件影响量表-修订版》（IES-R）和《情绪调节困难量表》（DERS）。

结果：BPAN患者的TEs发生率高于RAN患者。特别地，BPAN组的女性遭受性侵犯的人数明显多于RAN组。不论AN亚型如何，大多数患者在发病前都曾暴露于TEs。最后，就创伤后症状和情绪失调而言，BPAN组的得分明显高于RAN患者。

结论：与RAN患者相比，BPAN患者表现出更高的TEs发生率，更多创伤后症状簇和情绪失调。这些发现的意义在于，它们提示了对于患有AN的患者，尤其是患暴食型的患者，治疗采用创伤知情的干预措施可能大有益处。

1. Introduction

Eating disorders (EDs) are complex mental illnesses characterized by inappropriate eating patterns, severe psychosocial impairment, and physical consequences (Caslini et al., 2016). Multiple interactions between several risk factors, such as the environment and the individual's biological vulnerability, are thought to be involved in the development of EDs (Carretero-García et al., 2012). Many studies have suggested that traumatic events (TEs) constitute a risk factor for developing psychiatric disorders, including EDs (Brewerton, 2007; Jacobi, Hayward, de Zwaan, Kraemer, & Agras, 2004).

Indeed, research has shown that a history of trauma, in childhood or adulthood, is more frequent in individuals with EDs than in healthy controls, and people with a history of TEs are more likely to develop inappropriate eating behaviours (Briere & Scott, 2007). Moreover, traumatic experiences are often associated with psychological sequelae and a more severe presentation of EDs (Briere & Scott, 2007). Castellini et al. (2018) showed that patients with EDs and a history of trauma reported greater psychopathological complexity and worse long-term outcomes.

Eating patterns are even more altered when TEs are associated with a full-blown diagnosis of post-traumatic stress disorder (PTSD). In particular, patients diagnosed with PTSD frequently report bulimic behaviours and a range of symptoms such as alexithymia, anxiety, depression, self-injuries, low self-esteem, and disturbed cognition and emotions (Briere & Scott, 2007). According to the DSM-5 (American Psychiatric Association [APA], 2013), PTSD is characterized by four major symptom clusters: intrusion (i.e., re-experiencing vividly the traumatic episode through intrusive thoughts, nightmares and flashbacks), avoidance (i.e., the avoidance of event-related memories, thoughts and feelings), negative alteration in cognition and mood (e.g., persistent and exaggerated negative emotions and negative beliefs and expectations, persistent and distorted cognitions about causes and consequences of the events) and hyper-arousal (i.e., altered arousal levels that could imply a greater sense of alert).

Concerning different TE types, childhood sexual abuse is the most studied and reported TE in EDs

(Brewerton, 2007; Caslini et al., 2016; Lipschitz, Winegar, Hartnick, Foote, & Southwick, 1999; Palmisano et al., 2018; Reyes-Rodríguez et al., 2011). However, other severe types of trauma have been described in previous literature, such as physical (Rorty, Yager, & Rossotto, 1994) and emotional abuse (Kent, Waller, & Dagnan, 1999), teasing and bullying (Mazzeo & Espelage, 2002), parental break-up, and loss of a family member (Dalle Grave, Rigamonti, Todisco, & Oliosi, 1996; Mahon, 2000; Tagay, Schlegl, & Senf, 2010). In an attempt to examine the link between PTSD and EDs, researchers hypothesized that typical symptoms of EDs such as food restrictions, binge eating, and purging could facilitate both escape and avoidance of trauma-related memories, thoughts, and feelings, thereby contributing to a decrease in hyperarousal symptoms (Briere & Scott, 2007).

Similarly, PTSD symptomatology may be a non-specific risk factor for developing an ED. Additionally, it could be potentially related to psychiatric comorbidities and illness maintenance (Brewerton, 2007; Briere & Scott, 2007; Caslini et al., 2016; Castellini et al., 2018; Lipschitz et al., 1999; Palmisano et al., 2018; Reyes-Rodríguez et al., 2011).

Furthermore, it has been proposed that emotion dysregulation could mediate the association between TEs and EDs (Mills, Newman, Cossar, & Murray, 2015; Moulton, Newman, Power, Swanson, & Day, 2015; Racine & Wildes, 2015). Emotion dysregulation has been defined as a multidimensional concept consisting of difficulties in interpreting and adaptively responding to emotional states (Gratz & Roemer, 2004). Individuals that suffered sexual abuse in childhood reported more significant difficulties in regulating emotions (Gratz & Roemer, 2004). Similarly, those individuals who reported trauma history had difficulty in emotion regulation (Pollak, 2008). Interestingly, emotion dysregulation is considered to be essential in both the onset and maintenance of EDs (Haynos, Roberto, Martinez, Attia, & Fruzzetti, 2014; Pearson, Wonderlich, & Smith, 2015; Racine & Wildes, 2015).

It is of note that most studies investigating PTSD in EDs classified patients in a categorical fashion, grouping them according to the presence versus the absence of PTSD. However, two studies considered other PTSD-

related conditions. Firstly, Mitchell, Mazzeo, Schlesinger, Brewerton, & Smith (2012) focused on partial and subthreshold PTSD demonstrating that interpersonal trauma, PTSD, and subthreshold or partial PTSD were prevalent among men and women with EDs. Secondly, Gleaves, Eberenz, and May (1998) found the severity of PTSD symptoms was significantly related to anxiety, depression, and dissociative experiences. To be as inclusive as possible, in this study we adopted the latter methodology. We looked at PTSD-related symptoms instead of requiring a formal PTSD diagnosis.

Given the research above, only little attention has been paid so far to the relationship between PTSD symptoms, emotion dysregulation and EDs. Therefore, this study aims to bridge this gap in the literature with a two-fold aim: (a) to assess the prevalence, type, and time of occurrence of TEs in a sample of patients with anorexia nervosa (AN), both subtypes [restricting (RAN) and binge-purging subtype (BPAN)]; (b) to describe differences between RAN and BPAN groups with respect to patients' TEs (i.e., type, number and frequency), PTSD-related symptoms, and emotion dysregulation. We expected to find differences in the TE type, number, and frequency between the RAN and BPAN groups with higher levels of PTSD-related symptoms and emotion dysregulation in those with BPAN than in those with RAN.

2. Methods

2.1. Participants

The sample consisted of 77 female inpatients with RAN or BPAN (APA, 2013) as diagnosed by an experienced psychiatrist according to a clinical interview conducted upon admission. Patients were consecutively recruited at the Eating Disorders Centre of the 'Città della Salute e della Scienza' hospital of the University of Turin, Italy.

Inclusion criteria were AN diagnosis, female sex, and age between 18 and 35 years. Exclusion criteria were as follows: (a) Wechsler Adult Intelligence Scale-Revised Intellectual Quotient score <85 (Wechsler, 1997), (b) history of cranial trauma with loss of consciousness, (c) lifetime or current alcohol or substance dependence, (d) medical problems (e.g. epilepsy, diabetes, refeeding-related organic problems).

All participants signed a written informed consent form according to the ethical committee of the University of Turin.

2.2. Procedure

Patients' recruitment started in November 2017 and ended in December 2018. After hospital admission,

trained nurses measured participants' body mass index (BMI). Upon the day of admission, an experienced psychiatrist interviewed all patients. Data was gathered on the duration of their illness (with a specific focus on illness onset), as well as general and eating psychopathology. Participants were then asked to complete the self-reported measures within the first week of hospitalization.

2.3. Materials

Participants were asked to complete the following self-reported measures:

Eating Disorders Inventory-2 (EDI-2; Garner, Olmstead, & Polivy, 1983) was used to evaluate eating psychopathology, measuring behaviour relevant for EDs. The inventory consists of 91 items and 11 subscales measuring: (1) drive for thinness, (2) bulimia, (3) body dissatisfaction, (4) ineffectiveness, (5) perfectionism, (6) interpersonal distrust, (7) interoceptive awareness, (8) maturity fears, (9) asceticism, (10) impulse regulation and (11) social insecurity.

Life Events Checklist (LEC; Blake et al., 1995) was used to assess the occurrence of traumatic events. LEC is a self-reported trauma assessment of the Clinician-Administered PTSD Scale. It lists 16 potentially traumatic events: natural disaster, accidents or explosions, car or train or flight accident, severe accident at job place or at home, exposure to toxic substances, physical violence, being assaulted with a weapon, sexual assault, other kind of sexual assaults (e.g. unwanted and/or uncomfortable sexual experiences), exposure to fights, being kidnapped, physical illness, severe human suffering, sudden or violent death, unexpected close person's death, serious harm or death of someone caused right from her, any other traumatic or stressful events. Patients are asked to report which events they have suffered, in which way (i.e. being the actual victim, a witness, or being close to a person a TE happened to) and at what age.

Impact of Event Scale-Revised (IES-R; Weiss, 2007) was used to assess post-traumatic symptoms. This consists of 22 questions measured on a 5-point Likert Scale (0–4, 'not at all' to 'to a great extent'). The three subscales of the IES-R reflect the three (out of four, APA, 2013) clusters of symptoms presented in Post-Traumatic Stress Disorder; (1) intrusion, (2) avoidance, (3) hyper-arousal.

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) was used to test the challenges in regulating emotions. It consisted of 36 items rated on a 5 point Likert scale which assessed six domains: (1) awareness of emotional responses, (2) understanding of emotions, (3) non-acceptance of emotions, (4) capability to engage in goal-directed action being upset, (5) ability to refrain from impulsive action experiencing negative emotions and (6)

effective emotion regulation strategies. Higher scores correspond to greater difficulty in regulating emotions.

2.4. Statistical analysis

The SPSS 24.0 statistical software package (IBM SPSS Statistics for Windows, Version 24.0. Armonk, NY: IBM Corp) was used for data analysis. A t-test was conducted to evaluate significant differences in the number of TEs, post-traumatic symptoms, and emotional dysregulation between the RAN and BPAN groups. The Pearson's chi-squared test was used to assess any differences between categorical variables. Moreover, a one-way Analysis of Covariance (ANCOVA) was performed to control the difference between RAN and BPAN for confounding variables. After descriptive analysis, patients with no traumatic events were excluded from the data analysis ($n = 4$). A p -value of <0.05 (two-tailed) was considered statistically significant.

3. Results

3.1. Demographic and clinical features of the sample

The sample consisted of 77 adult female inpatients diagnosed with AN: 40 were affected by RAN and 37 by BPAN. No differences were found between the RAN and BPAN groups in terms of age, years of illness, age at illness onset and BMI (see Table 1). Those with BPAN reported higher scores than those with RAN on all EDI-2 'core' subscales: drive for thinness, bulimia and body dissatisfaction (data not shown).

3.2. Traumatic events: prevalence, type, and timing

The majority of RAN (90%) and all BPAN patients (100%) reported the occurrence of TEs (i.e., as measured as a yes/no response), with a significantly higher occurrence of TEs in BPAN than in RAN (Pearson Chi-squared = 3.903; $p = 0.048$).

Regarding the type of TEs suffered, a significant difference between the two subtypes was found with sexual assault occurring more frequently in individuals with BPAN than RAN. Patients with RAN

had suffered from a physical illness, severe human suffering, or the unexpected death of a close relative/acquaintance. While physical violence, sexual assault, and other kinds of sexual assaults mainly occurred in those with BPAN (see Table 2). Moreover, those in the BPAN group reported significantly more TEs (i.e. as measured as a cumulative number of lifetime TEs) than those in the RAN group (Table 2).

No significant differences regarding the timing of the TEs were seen between the two groups. Exposure to TEs happened before the onset of illness for 58% of RAN patients, and for 81.1% of BPAN patients (Pearson's Chi-squared: 4.498; $p = 0.105$). However, 16.7% of RAN and 8.1% of BPAN patients could not clearly define the timing of TEs.

3.3. Post-traumatic symptoms and emotional dysregulation in AN subtypes

Patients with BPAN scored significantly higher than those with RAN on all three IES – R subscales and in terms of emotion dysregulation, as measured by the DERS (Table 3). After controlling for TEs number as a confounding variable, all differences remained significant. Although the difference between RAN and BPAN was maintained, it is of note that the number of TEs resulted as significantly impacting only on the IES-R intrusion subscale (data not shown).

4. Discussion

To our knowledge, this is the first study comparing subtypes of AN concerning traumatic events (TEs), post-traumatic symptoms and emotional dysregulation. Three main findings emerged. Firstly, patients diagnosed with BPAN were more likely than RAN to present a history of trauma which occurred before the onset of AN, and this was more likely to be related to a sexual assault. Secondly, individuals with BPAN reported more TEs than those with RAN. Finally, higher levels of both post-traumatic symptoms and emotion dysregulation were shown by those with BPAN than by patients with RAN.

This study aimed firstly to assess the prevalence, type and timing of TEs in a sample of individuals with AN divided according to their diagnostic subtype, and secondly to describe the differences in the TEs, PTSD-related symptoms and emotion dysregulation between the subgroups. Our findings suggest that there is a difference in TEs suffered between AN subtypes with a higher occurrence in those with BPAN than in those with RAN. Our findings agree with those already present in literature that describe an association between TEs and bulimic behaviours (Briere & Scott, 2007).

To fill the existing gaps in the literature, we also explored the type of TEs suffered between AN subtypes. We found that sexual assault was significantly

Table 1. Demographic and clinical variables of the sample.

	RAN ($n = 40$) Mean (SD)	BPAN ($n = 37$) Mean (SD)	t	p
Age, years	24.85 (9.54)	26.08 (8.59)	-.593	.555
Duration of illness, years	8.77 (9.57)	8.88 (8.04)	-.054	.957
Age at illness onset, years	17.92 (3.79)	17.48 (4.90)	.436	.664
BMI*	14.64 (2.01)	15.59 (1.62)	-1.964	.054

BMI = body mass index; RAN: restricting anorexia nervosa; BPAN: binge-purging anorexia nervosa.

*available for 73 participants (34 BPAN and 39 RAN) because 4 patients were weight-restored.

Table 2. Differences in type and number of traumatic experiences (TEs) between participants with anorexia nervosa restricting subtype (RAN) and binge purging subtype (BPAN).

	RAN (n = 40) N(%)	BPAN (n = 37) N(%)	Chi squared	p
Natural disaster	3(7.5)	0(0)	3.215	.073
Accidents or explosions	0(0)	0(0)		
Car or train, or flight accident	1(2.5)	1(2.7)	<.001	.984
Severe accidents on job place, or at home	0(0)	0(0)		
Exposure to toxic substances	0(0)	0(0)		
Physical violence	(25)	4(10.8)	.668	.414
Being assaulted with a weapon	0(0)	0(0)		
Sexual assault	1(2.5)	4(10.8)	1.845	.174
Other kind of sexual assaults	1(2.5)	7(18.9)	4.872	.027
Exposure to fights	0(0)	0(0)		
Being kidnapped	0(0)	0(0)		
Physical illness	8(20)	8(21.6)	.004	.991
Severe human suffering	5(12.5)	2(5.4)	1.515	.218
Sudden or violent death	2(5)	1(2.7)	1.117	.291
Unexpected close person's death	7(17.5)	3(8.1)	1.237	.226
Serious harm or death of someone caused right from her	0(0)	0(0)		
Any other traumatic or stressful event	6(15)	7(18.9)	.063	.522
No events	4(10)	0(0)	.063	.801
	RAN (n = 36) Mean (SD)	BPAN (n = 37) Mean (SD)	t	p
Number of TEs	3.14 (2.39)	4.44 (2.25)	-2.409	.019

Table 3. Differences in post-traumatic symptoms and emotion dysregulation between patients with anorexia nervosa restricting subtype (RAN) and binge purging subtype (BPAN).

	Total sample (n = 73)		Test statistics		
	RAN (n = 36) Mean (SD)	BPAN (n = 37) Mean (SD)	t	t-test p-value	ANCOVA p-value
IES-R intrusion	11.94 (10.71)	19.30 (10.29)	-2.992	.004	.031
IES-R avoidance	9.89 (8.98)	17.43 (8.98)	-3.589	.001	.009
IES-R hyper-arousal	6.94 (7.89)	14.30 (8.79)	-3.758	<.001	.002
DERS	101.72 (21.524)	117.92(20.465)	-3.272	.002	.007

IES-R = Impact of Events Scale Revised.

DERS = Difficulties in Emotion Regulation Scale.

more common in those with BPAN than RAN. This coincides with earlier data that reported a significant association between childhood sexual abuse and binge-purging behaviours (Caslini et al., 2016). Although the significance threshold was not reached, those with BPAN commonly reported other physical illnesses, while those with RAN frequently reported both physical illness and the sudden and unexpected death of someone close. Future research should be performed to examine these findings.

Regarding timing, TEs occurred before the onset of illness in 58.3% of RAN patients, and 81.1% of BPAN patients. This result is comparable with Reyes-Rodríguez et al. (2011), who showed that most TEs happened before illness onset. Moreover, this finding supports the hypothesis that TEs are a putative risk factor for EDs (Brewerton, 2007; Jacobi et al., 2004; Kent & Waller, 2000). However, in our sample, a number of patients also reported TEs after illness onset. Further research should deepen as to whether TEs sequelae after the onset of illness could somehow

be worsened by AN and if post-traumatic symptomatology and AN share the same maintenance and treatment-resistance factors, as recently suggested (Castellini et al., 2018).

Concerning the number of TEs and post-traumatic symptoms, we found that patients with BPAN reported significantly more TEs and scored higher than patients with RAN on all post-traumatic symptoms, as measured by the IES-R (i.e., intrusion, avoidance and hyper-arousal). This is of interest since patients with BPAN showed higher levels of PTSD-like symptoms than those with RAN, suggesting a major effect of TEs on the severity of PTSD clinical presentation. This may be due to the type of TE experienced by BPAN patients, or to a greater vulnerability of PTSD in those with the BPAN subtype. According to the literature, another possible explanation is that BPAN patients suffered more TEs. Many researchers have shown that cumulative TEs are related to a higher risk of PTSD and greater severity of the post-traumatic symptoms (Green et al., 2000; Karam et al., 2014; Wilker et al., 2015). However, our

findings provide only partial support to the aforementioned literature; in fact, after controlling for TEs number the differences on IES-R between RAN and BPAN were still significant. Nevertheless, TEs number, although not modifying the difference in IES-R scores between RAN and BPAN significantly impacted only on the IES-R intrusive subscale. This is of note, since – differently from other IES-R subscales – intrusive symptoms were found to intensify in case of multiple TEs. This finding raises the interesting possibility that multiple TEs impair patients' ability to defensively remove them thus becoming an additional heavy burden. Therefore, close attention should be paid to these aspects in every-day clinical practice mostly with polytraumatized patients. However, the comparison between RAN and BPAN groups on this is novel, so it is hard to make a direct comparison with previous literature.

Patients with BPAN showed higher emotion dysregulation when compared to RAN, also after controlling for TEs number. Although these are novel findings since our data focused on traumatized patients, this result is only partially in line with previous studies (Brockmeyer et al., 2014; Haynos et al., 2014). Notwithstanding, earlier literature found differences in the DERS impulsivity-related subscale between diagnostic subgroups. Therefore, the greater emotional dysregulation of the BPAN group could be related more to their general psychopathology rather than to their traumatic background, notwithstanding the relationship between TEs and bulimic behaviours (Briere & Scott, 2007). In fact, the multifaceted role of emotional dysregulation as a potential mediator in the association between TEs and EDs has been already acknowledged (Mills et al., 2015; Moulton et al., 2015; Racine & Wildes, 2015). However, future studies relying on larger samples are needed to disentangle both connections and time relationships between TEs, emotional dysregulation and diagnostic subtype of AN.

5. Conclusions

To our knowledge, this is the first study that investigates occurrence, type and number of TEs, post-traumatic symptoms and emotion dysregulation in both subtypes of AN. Results are relevant as they expand knowledge about the differences in TE features and post-traumatic symptomatology between AN subtypes. From a clinical standpoint, these findings suggest the importance of assessing in detail post-traumatic symptoms, focusing on each cluster as well as on emotion dysregulation. This is particularly important as individuals who suffered a TE can be reluctant to share this in treatment due to feelings of shame and avoidance of negative emotions. Furthermore, the development of a specific treatment

focused on a continuum of severity of post-traumatic symptoms, even when full-blown PTSD cannot be diagnosed, is warranted.

Nevertheless, some limitations should be acknowledged. Firstly, this study had a cross-sectional design so that no causal links can be clarified. Secondly, all data rely on self-reporting assessments and recall biases cannot be ruled out. Thirdly, the number of participants in each subsample was relatively small so these results cannot be generalized (e.g., differences in TEs between AN subtypes may be underpowered). Fourthly, this study did not assess the timing of emotion dysregulation relating to the occurrence of the TEs. Finally, given the instruments available for assessments, we could only investigate three out of four (according to the DSM-5, APA, 2013) PTSD clusters.

In conclusion, we found that patients with BPAN frequently reported a history of trauma and higher levels of both post-traumatic symptoms and emotion dysregulation as compared to those with RAN, also after controlling for TEs number. In spite of the aforementioned limitations, these findings could have interesting clinical implications in helping clinicians to adopt a trauma-focused perspective in their every-day therapeutic work with AN sufferers.


Disclosure statement

No potential conflict of interest was reported by the authors.

ORCID

Paola Longo  <http://orcid.org/0000-0003-1347-7054>

Matteo Panero  <http://orcid.org/0000-0002-9385-0332>

Giovanni Abbate-Daga  <http://orcid.org/0000-0002-5826-5664>

Enrica Marzola  <http://orcid.org/0000-0003-1328-9678>

References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (DSM-5[®])*. Washington, DC: American Psychiatric Pub.
- Blake, D. D., Weathers, F. W., Nagy, L. M., Kaloupek, D. G., Gusman, F. D., Charney, D. S., & Keane, T. M. (1995). The development of a clinician-administered PTSD scale. *Journal of Traumatic Stress, 8*(1), 75–90.
- Brewerton, T. D. (2007). Eating disorders, trauma, and comorbidity: Focus on PTSD. *Eating Disorders, 15*(4), 285–304.
- Briere, J., & Scott, C. (2007). Assessment of trauma symptoms in eating-disordered populations. *Eating Disorders, 15*(4), 347–358.
- Brockmeyer, T., Skunde, M., Wu, M., Bresslein, E., Rudofsky, G., Herzog, W., & Friederich, H. C. (2014). Difficulties in emotion regulation across the spectrum of eating disorders. *Comprehensive Psychiatry, 55*, 565–571.

- Carretero-García, A., Sánchez Planell, L., Doval, E., Rusiñol Estragués, J., Raich Escursell, R. M., & Vanderlinden, J. (2012). Repeated traumatic experiences in eating disorders and their association with eating symptoms. *Eating and Weight Disorders*, 17(4), e267–273.
- Caslini, M., Bartoli, F., Crocamo, C., Dakanalis, A., Clerici, M., & Carrà, G. (2016). Disentangling the association between child abuse and eating disorders: A systematic review and meta-analysis. *Psychosomatic Medicine*, 78(1), 79–90.
- Castellini, G., Lelli, L., Cassioli, E., Ciampi, E., Zamponi, F., Campone, B., ... Ricca, V. (2018). Different outcomes, psychopathological features, and comorbidities in patients with eating disorders reporting childhood abuse: A 3-year follow-up study. *European Eating Disorders Review*, 26(3), 217–229.
- Dalle Grave, R., Rigamonti, R., Todisco, P., & Olivos, E. (1996). Dissociation and traumatic experiences in eating disorders. *European Eating Disorders Review: The Professional Journal of the Eating Disorders Association*, 4(4), 232–240.
- Garner, D. M., Olmstead, M. P., & Polivy, J. (1983). Development and validation of a multidimensional eating disorder inventory for anorexia nervosa and bulimia. *International Journal of Eating Disorders*, 2(2), 15–34.
- Gleaves, D. H., Eberenz, K. P., & May, M. C. (1998). Scope and significance of posttraumatic symptomatology among women hospitalized for an eating disorder. *The International Journal of Eating Disorders*, 24(2), 147–156.
- Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessment*, 26(1), 41–54.
- Green, B. L., Goodman, L. A., Krupnick, J. L., Corcoran, C. B., Petty, R. M., Stockton, P., & Stern, N. M. (2000). Outcomes of single versus multiple trauma exposure in a screening sample. *Journal of Traumatic Stress*, 13(2), 271–286.
- Haynos, A. F., Roberto, C. A., Martinez, M. A., Attia, E., & Fruzzetti, A. E. (2014). Emotion regulation difficulties in anorexia nervosa before and after inpatient weight restoration. *The International Journal of Eating Disorders*, 47(8), 888–891.
- Jacobi, C., Hayward, C., de Zwaan, M., Kraemer, H. C., & Agras, W. S. (2004). Coming to terms with risk factors for eating disorders: Application of risk terminology and suggestions for a general taxonomy. *Psychological Bulletin*, 130(1), 19–65.
- Karam, E. G., Friedman, M. J., Hill, E. D., Kessler, R. C., McLaughlin, K. A., Petukhova, M., ... De Girolamo, G. (2014). Cumulative traumas and risk thresholds: 12-month PTSD in the world mental health (WMH) surveys. *Depression and Anxiety*, 31(2), 130–142.
- Kent, A., & Waller, G. (2000). Childhood emotional abuse and eating psychopathology. *Clinical Psychology Review*, 20(7), 887–903.
- Kent, A., Waller, G., & Dagnan, D. (1999). A greater role of emotional than physical or sexual abuse in predicting disordered eating attitudes: The role of mediating variables. *The International Journal of Eating Disorders*, 25(2), 159–167.
- Lipschitz, D. S., Winegar, R. K., Hartnick, E., Foote, B., & Southwick, S. M. (1999). Posttraumatic stress disorder in hospitalized adolescents: Psychiatric comorbidity and clinical correlates. *Journal of the American Academy of Child and Adolescent Psychiatry*, 38(4), 385–392.
- Mahon, J. (2000). Dropping out from psychological treatment for eating disorders: What are the issues? *European Eating Disorders Review: the Professional Journal of the Eating Disorders Association*, 8(3), 198–216.
- Mazzeo, S. E., & Espelage, D. L. (2002). Association between childhood physical and emotional abuse and disordered eating behaviors in female undergraduates: An investigation of the mediating role of alexithymia and depression. *Journal of Counseling Psychology*, 49(1), 86.
- Mills, P., Newman, E. F., Cossar, J., & Murray, G. (2015). Emotional maltreatment and disordered eating in adolescents: Testing the mediating role of emotion regulation. *Child Abuse & Neglect*, 39, 156–166.
- Mitchell, K. S., Mazzeo, S. E., Schlesinger, M. R., Brewerton, T. D., & Smith, B. N. (2012). Comorbidity of partial and subthreshold PTSD among men and women with eating disorders in the national comorbidity survey-replication study. *The International Journal of Eating Disorders*, 45(3), 307–315.
- Moulton, S. J., Newman, E., Power, K., Swanson, V., & Day, K. (2015). Childhood trauma and eating psychopathology: A mediating role for dissociation and emotion dysregulation? *Child Abuse & Neglect*, 39, 167–174.
- Palmisano, G. L., Innamorati, M., Susca, G., Traetta, D., Sarracino, D., & Vanderlinden, J. (2018). Childhood traumatic experiences and dissociative phenomena in eating disorders: Level and association with the severity of binge eating symptoms. *Journal of Trauma & Dissociation*, 19(1), 88–107.
- Pearson, C. M., Wonderlich, S. A., & Smith, G. T. (2015). A risk and maintenance model for bulimia nervosa: From impulsive action to compulsive behavior. *Psychological Review*, 122(3), 516–535.
- Pollak, S. D. (2008). Mechanisms linking early experience and the emergence of emotions: Illustrations from the study of maltreated children. *Current Directions in Psychological Science*, 17(6), 370–375.
- Racine, S. E., & Wildes, J. E. (2015). Emotion dysregulation and anorexia nervosa: An exploration of the role of childhood abuse. *The International Journal of Eating Disorders*, 48(1), 55–58.
- Reyes-Rodríguez, M. L., Von Holle, A., Ulman, T. F., Thornton, L. M., Klump, K. L., Brandt, H., ... Bulik, C. M. (2011). Posttraumatic stress disorder in anorexia nervosa. *Psychosomatic Medicine*, 73(6), 491–497.
- Rorty, M., Yager, J., & Rossotto, E. (1994). Childhood sexual, physical, and psychological abuse and their relationship to comorbid psychopathology in bulimia nervosa. *The International Journal of Eating Disorders*, 16(4), 317–334.
- Tagay, S., Schlegl, S., & Senf, W. (2010). Traumatic events, posttraumatic stress symptomatology and somatoform symptoms in eating disorder patients. *European Eating Disorders Review*, 18(2), 124–132.
- Wechsler, D. (1997). *Wechsler adult intelligence scale – Revised*. Firenze, Italy: Giunti O.S.
- Weiss, D. S. (2007). The impact of event scale: Revised. In J. P. Wilson & C. S. Tang (Eds.), *Cross-cultural assessment of psychological trauma and PTSD* (pp. 219–238). New York, NY: Springer.
- Wilker, S., Pfeiffer, A., Kolassa, S., Koslowski, D., Elbert, T., & Kolassa, I. T. (2015). How to quantify exposure to traumatic stress? Reliability and predictive validity of measures for cumulative trauma exposure in a post-conflict population. *European Journal of Psychotraumatology*, 6(1), 28306.