

Childhood Onset Exercise Addiction or Atypical Anorexia Nervosa During Covid-19: Case Report

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Case report

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Abstract

Background:

Childhood-onset Anorexia Nervosa is recognised to be atypical in presentation, both in terms of degree and type of eating pathology, exercise and compensatory behaviours, with many falling short of full diagnostic criteria. Failure to consider an eating disorder diagnosis in youth who present with extreme weight loss may have serious immediate and long term impacts. However, failure to consider other non-organic causes of weight loss may be equally detrimental to the child's health.

Case Presentation:

This case reports on the acute presentation of a 12-year old boy with no prior eating concerns, who presented to hospital in a severely malnourished state 8 weeks into lockdown. To compensate for Covid-19 induced restrictions on sporting activity, this boy had followed a self-imposed daily schedule of arduous exercise, without increasing his nutritional intake. The case report examines the clinical features suggestive of Anorexia Nervosa along with a discussion on the diagnostic differential of exercise addiction, and the treatment implications. The case report highlights the unintended consequences of the pandemic restrictions.

Conclusion:

Accepting that pre-pubertal onset of Anorexia Nervosa, may be atypical, it is important to maintain an open mind in cases without goal directed weight loss. Although weight loss was indeed significant in this case, its occurrence was due to an excessive exercise regime, originating perhaps as a coping strategy in response to Covid-19 restrictions, but becoming addictive and impairing in nature. Worldwide responses in an effort to halt the spread of Covid-19 pandemic have been far reaching, impacting children and families in ways hitherto never imagined. Clinicians need to be alert to potentially maladaptive coping strategies and atypical and altered pathways of presentations, especially in younger children. This case illustrates some of these features.

Background

Anorexia Nervosa (AN) is a disorder characterised by self-imposed food restriction leading to weight loss, coupled with intense fear of weight gain, or of being fat and an over-evaluation of body weight and shape (DSM-5). Associated behaviours may include over-exercising, binge eating, purging, and use of diet pills or laxatives. In children failure to progress along the expected weight trajectory occurs with detrimental effects on physical health. Although the illness typically has its age of onset in adolescent, it may present both in pre-pubertal children and older adults. Of particular concern is that prevalence rates of Anorexia Nervosa have more than doubled in recent years (Steinhausen & Jensen (2015)), increasing both in adolescents and younger aged children (Nicholls et al 2011), as have rates of hospital admissions (Holland et al 2016). The most recent community-based studies using DSM-5 criteria have reported

estimated lifetime prevalence of AN for females of 6.2% and 0.3% for males (Silen et al, 2020). Poorer prognostic outcomes are a concern in pre-pubertal youth. AN is recognized to have high morbidity and mortality rates (Smink et al, 2013). In a large study (n=68) of hospital treated youth under 14 diagnosed with AN, followed up for a mean of 7.5years, only 41% were reported as having a good outcome (Herpertz-Dahlmann et al, 2018) Given low body fat stores in children, weight loss rapidly leads to medical compromise and early onset AN more often present to the paediatrician and results in hospital admission (Herpertz-Dahlmann et al, 2018). Typically the illness predominates in females with a ratio of 10:1, however in pre-pubertal children the ratio drops to 4:1. . Presentation in younger children may be atypical, with proportionally more boys presenting, ratio of girls: boys 4:1 (Madden et al, 2009). Early recognition and appropriate treatment is essential to optimise treatment outcomes.

Although the aetiology of AN is not fully understood, and treatment often assumes an agnostic approach, it is considered to multifactorial with contributions from cultural, familial, individual and genetic and biochemical domains. Adverse childhood events, stressors, bully-victim status and personality traits of perfectionism have also been suggested (Copeland et al, 2015).

Following the declaration of the Corona Virus infection as a pandemic by the WHO in March 2020, governments around the world instigated various measure to contain the virus. In Ireland, as with many countries, these included, but were not limited to, closure of all non-essential business, schools and universities, gyms, restriction of usual sporting events and training and limits on social gatherings. Many of these have had a direct impact on the lives of children. Family life has also been disrupted for many, with enforced job closures, job losses for some or working from home orders for others. Prior experience with pandemics has alerted us to the risk of negative effects on mental health and wellbeing, with increases in anxiety, depression and stress (Mauder et al, 2006, Kumar & Nayar 2020) Already data is emerging to this effect from Covid-19 in adult (Ettman et al, 2020) and in children (Racine et al, 2020). Large scale population surveys have also shown significant effects on eating and exercise behaviours, with deterioration in eating symptomatology in those with pre-existing eating disorders (Phillipou et al 2020). 64.5% of the sample reported increased restricting, with one quarter to one third showing increased frequency of binge eating and purging (Phillipou et al 2020). Interesting self-reported exercise levels increased for some (47.3%) and decreased for others (36%). Other population studies have highlighted the fear among those with AN of sourcing foods consistent with their meal plan (Termorshuizen et al 2020) and the increased weight-control behaviours seen have been attributed by some authors to reflect a defence against perceived loss of control (Graell et al 2020). Reports have also described the added care-giver burden experienced by the family during lockdown, along with the urgent need to modify but continue to provide access to care (Walsh & McNicholas 2020). Qualitative reports have offered insights into the difficulties brought about by these restrictions, but such reports have been restricted to the adult cohorts (Clarke et al, 2020, McCombie et al, 2020).

This paper reports on the acute presentation of a young boy with no prior eating concerns, who presented to hospital in a severely malnourished state 8 weeks into lockdown. It examines the clinical features suggestive of Anorexia Nervosa along with a discussion on diagnostic differentials, and treatment

implications. It examines the impact of the pandemic restrictions on his presentation. Ethical exemption was granted and written consent received by the family. Names and minor details have been changed to protect subject anonymity.

Case Presentation

Oliver is a 12 year old boy admitted to the paediatric hospital, following precipitous weight loss, as a result of increase exercise in an otherwise very active and sporty boy. According to his mother, this commences the 'day after lockdown' and was not linked with any intentional reduction in food intake or body image dissatisfaction. In fact Oliver maintained the position that he was too thin. In the days after lockdown, to replace his previous structured day, he started running 10-11k a day, initially alongside his mother's daily walk, and later independently and much faster. He later joined his brother in cycling 10-20k daily and spent evening hours on the trampoline, unrelated to weather. He joined the family for meals as per norm with no reduction in usual amounts or variety consumed, and there was no obvious change in his mood state.

During Covid-19 restrictions, Oliver missed his social contact and school routine and recreated this himself with his own personally driven and initiated exercise schedule. At the time of lockdown, Oliver's father had been abroad and his absence from the family home further prolonged by a two-week enforced post-holiday quarantine. Mother was balancing a heavy work-at-home schedule with providing for her other children, and the extent of Oliver's exercise and associated weight loss, in the presence of usual eating and general demeanour had gone unnoticed until father's return. It was at that point that mother attended her family physician, and based on the extent of weight lost, presented to the Emergency department.

Degree of weight loss: Pre-morbidly Oliver's weight was estimated at 33.1kg, corresponding to a Body Mass Index (BMI) of 15.6 (15th %) or 90% Ideal Body Weight (IBW). He lost almost 5 kilos in 2 month and was medically very comprised on admission. His admission weight was 27.5Kg, BMI 12.9 (0.03%) or IBW 70.35%.

Oliver's developmental milestones are within normal boundaries. He was always somewhat of a faddy eater, eating much less than even his younger siblings, but never suffered any ill consequences. Mother estimated typical daily intake at 1300- 1500 calories daily. He is talented athletically, plays soccer and football competitively, with a heavy but structured training timetable schedule of daily soccer training, and weekend competitive games with two different clubs. He is popular at school with many friends and academically very able. He engaged well with his family, was generally very active but not perceived to have difficulties with attention or impulsivity. There was no suggestion of any pre-morbid anxiety, obsessional features or low mood. Although he generally liked routines, and well planned activities, mum was adamant that there were no social communication difficulties. He was self-sufficient, empathetic and not overly emotional, tending to deal with difficulties or upsets himself. Given mother's work with children

with special needs, she felt that this was a precise and accurate reflection of his presentation. There was no prior contact with mental health services.

Oliver is the middle of 5 healthy and well-adjusted children aged from 17 to 10. His parents describe a happy marriage and no difficulty with co-parenting. Mother describes some personal difficulties with weight maintenance and past dieting behaviour, with weight fluctuation of 2 stone. At the time of presentation, she was happy with her weight, and had an exercise routine built into her day to ensure stability. Father is tall and thin, as are all his siblings. All the family are sporty, of slim physique and Oliver's older brother was a national athlete for many years. The family follow a very healthy diet of home based and natural ingredients and limit social media use. Parents described and displayed a good and nurturing home environment with low levels of expressed emotions.

MSE: Oliver was extremely thin, gaunt, with a very visible skeletal frame. He found it hard to engage and eye contact was generally poor. Speech was low in volume and conversation restricted. He denied any evidence of eating psychopathology and endorsed an obsession with a need to exercise, and its mood elevating component. He denied any attempt to limit his calorie intake, sated he enjoyed his meals, but denied any feelings of hunger, 'it had never occurred to me to eat more, and no one told me'. He described his mood good until he was prevented from exercising, and denied any ideas or behaviours linked to self-harm. There was no evidence of any abnormal thought form or perceptual abnormalities. His thought content was very much focussed on his desire to return to his usual sports, go home and play with his friends. He was eager to follow the treatment plan and be discharged.

Medical examination revealed a catechetic boy, with cardiac insufficiency with low heart rate (30s at night time), low blood pressure and abnormalities in his biochemistry and haematology results. Electrocardiograph revealed sinus bradycardia with normal QTc.

Impression: At the time of admission Oliver was severely undernourished, having lost an excessive amount of body weight in a short time, secondary to significant imbalance between energy expenditure and intake, but with no eating disordered psychopathology. He was not felt to meet criteria for anorexia nervosa, and a working diagnosis of exercise addiction was considered (Table 1). Child Behaviour Check List completed by parents suggested no area of clinical concern. Oliver completed the Rosenberg Self-Esteem scale, scoring 40/40. He scored very highly on the exercise addiction scale, scoring 29/30, indicating significant difficulties. By contrast his global score on the Eating Disorder Examination Questionnaire (EDE-Q) was 0.39, suggesting no pathology, reflected by very low scores on each of the subscales: Restrain: 0; Shape: 0.75 and Weight 0.8.

Table 1

Diagnostic Criteria for Anorexia Nervosa: DSM-5, as pertains to Oliver

Diagnostic Feature	Oliver
Significant food restriction leading to failure to continue along developmentally appropriate weight trajectory	No food restriction, calories consumed as before, but inadequate to energy expended
Fear of becoming fat or gaining weight	No fear weight gain
Over valuation or distorted view of body weight and shape (or parts of body)	Perceives self as underweight, eager to return to pre-morbid state
Behaviour motivated by desire to avoid weight gain, maintain low body weight,	No, exercise was part of a desire for structure and became mood boosting

Progress on admission:

Oliver commenced a refeeding program, with a gradual increase from 1400 calories/day to a meal plan of 2000-2400 with phosphate and thiamine supplements. He found it very difficult to eat all the food offered, eating as little as 4-500 calories per day initially. This low intake was driven by severe abdominal discomfort upon refeeding, reflux, and severe constipation. Oliver had no bowel movement over a 4 week period, despite heavy doses of laxatives. Clinical examinations and plain film of abdomen did not reveal any evidence of impaction. His mood dropped significantly as he struggled to adhere to the meal plans, tolerate painful abdominal peristaltic movements, leading to poor weight gain. His parents also struggled with what they perceived to be the multi-disciplinary team's over focus on weight restoration and a fear that Oliver's complaints were misinterpreted as wilful refusal, rather than an inability to eat. They considered discharge against medical advice. An early intensive transitional out-patient plan was progressed to facilitate family engagement and assist with careful weight restoration. Oliver was allowed trials home for family meals and over-nights, despite being medically compromised, with careful monitoring by his mother. Initial progress was met with a significant drop in weight and low sodium which precipitated a medical re-admission and a need for cardiac monitoring. Oliver admitted he had been spitting out half of the food plated by his mother, for fear of a return of his abdominal pain. After one week of medical stabilization, transitional care continued with twice weekly psychiatry/medical review, allowing discharge to community child and adolescent mental health service (CAMHS) after 2 weeks. His weight was 30.4kg, BMI 14.5, IBW 82.6%, still below pre-morbid levels.

Zoom out-patient sessions were planned with his CAMHS, given reduced face-to-face contact during Covid-19. Oliver found these sessions very difficult, finding it hard to engage and missing out on non-verbal cues. Subsequent Zoom calls were with his mother who reported on adherence to the meal plan, (he was eating 1800-2000 without resistance), weekly weights, any physical symptoms, and general re-engagement with family and social life. Casual sporting activities were gradually re-introduced. With time, and restoration of initial weight lost, additional snacks were dictated by preference rather than imposed.

He was discharged from CAMHS 8 weeks post hospital discharge and correspondence 2 months later, 6 months post initial presentation, with an enclosed photo of Oliver enjoying a 'McDonalds' equivalent, reported he was 'back to his normal self' with pre-morbid eating habits and reaching his pre-morbid weight. Oliver did not receive any neuroleptic medication during admission.

Covid-19 impact: Oliver created his own daily routine following the imposed lock down and loss of his previously busy schedule of football training and competitive matches. Initially this followed the family's engagement in health optimisation during Covid-19, and pursued as a shared activity, but quickly surpassed it, and seemed to take primacy over other activities. Oliver seemed increasingly driven and addicted to the mood boosting effects of his exercise, and being unaware of any hunger sensations, continued with his previous scheduled meal and snack routines. He maintained contact with some friends through social media, and the family coped well with any additional stressors from both parents and all children working and studying from home. The inability of face-to-face clinical sessions made ongoing CAMHS difficult for Oliver, due to his difficulty picking up subtle non-verbal cues and his difficulty with emotional intelligence but flexibility of CAMHS approach allowed safe medical monitoring by empowering and informing his mother.

Discussion And Conclusions

At the time of admission although severely undernourished, having lost an excessive amount of body weight in a short time, this was secondary to significant imbalance between energy expenditure and intake, and in the absence of any eating disordered psychopathology. Oliver did not meet criteria for anorexia nervosa, and a working diagnosis of exercise addiction was considered.

Childhood-onset Eating Disorders (ED) typically describes the onset of eating psychopathology in children under the age of 13 years. Although the DSM-5 does not have any specifiers for childhood onset Anorexia Nervosa, it is recognised in the literature to present in an atypical fashion, both in terms of degree and type of eating pathology, exercise and compensatory behaviours, with many falling short of the diagnostic criteria for AN (Madden et al, 2009; Nicholls et al, 2011)

Although early onset cases present with lower self-reported eating psychopathology, lower rates of bingeing, purging, or engaging in excessive exercise as a means of weight and shape control, early onset cases have been reported to lose weight faster, presenting with lower percentage of ideal body weight on admission (Peebles et al. 2006). Given children have less adipose tissue than older aged youth; this places them at high risk of medical destabilisation (Madden et al, 2009). Many studies suggest earlier onset to be associated with a lowering of the female preponderance when compared to adolescent or adult onset cases. 1 in 4 cases reported by a national study in Australia were male (Madden et al, 2009) and 1 in 5 in United Kingdom and Ireland (Nicholls et al, 2011). Studies that have examined outcomes have highlighted the family and healthcare burden, with two-thirds of cases still in active treatment one year later.

Given the atypical presentation, especially the varied endorsement of typical eating psychopathology, and the higher rates of presentation in boys, such youth may be at risk of delayed diagnosis and treatment and iatrogenic harm by nature of inappropriate investigations for weight loss. The alternative is also true, an assumption that all weight loss, or a high drive for exercise relates to an undisclosed eating disorder might also lead to inappropriate treatment, therapeutic fatigue and family disengagement. Although Oliver never endorsed any eating psychopathology during his stay, and he showed a willingness to eat high calorie foods to help in his recovery, his parents felt that some of the clinicians were working on the assumption of an undisclosed or yet to emerge eating disorder, and this led to difficult family-clinician engagement at times, including a discharge against medical advice event. Given the steady, if slow, progress once Oliver's gastric symptoms remitted, and the ongoing commitment by his parents to adhere to mutually agreed safety plan, it allowed an opportunity to continue working therapeutically with the family consider alternative diagnosis.

Exercise addition

Exercise is generally considered as healthy and mood enhancing, and indeed is recommended as a way to stay healthy during the current pandemic. Un-relentless pursuit and obsessional engagement in exercise to the point of injury, over-use or disengagement from other activities, is problematic. Prevalence studies range from 0.5% to 52%, depending on whether the general population or competing triathletes (Blaydon et al, 2002). There are no available studies on rates in children. Exercise addiction shares many of the constructs more typically associated with addictive behaviours, such as the salience or importance of the activity, sense of loss of control and need to engage in increasing amounts, and withdrawal symptoms when thwarted. The mood enhancing effect may also drive behaviour. Many of these features applied to Oliver, his exercise regime increased over the weeks, and he opted to pursue them ahead of social engagement with family, or alternative activities. He was also able to acknowledge the mood boosting components, pre-exercise anticipation and enhanced mood following his daily schedule. When disallowed following hospital admission, he felt irritable by his immobility, but was also somewhat fatigued by his weakened medical state.

The Exercise Addiction Inventory (EAI) offers a structured and reliable method of report. (Terry et al. 2004). Whilst pursuit of exercise is often part of an eating disorder presentation, it may occur in the absence of any eating psychopathology, and in the absence of any reduced health-related quality of life (Lichtenstein et al. 2013). Personality traits such as perfectionism and narcissism, often associated with ED have been described, directed to athletic excellence, and an ability to withstand high degrees of bodily distress in terms of pains and exercise related injuries (Lichtenstein et al. 2013). However un-relentless exercise, not met with adequate nutrition, can lead to serious weight loss, body disfigurement and illness along with loss of insight. Treatment is directed towards re-establishing health, moderation of activity, through cognitive behavioural approaches. Medication may be helpful for any associated depression, anxiety or medical compromise. Oliver's treatment plan followed these lines.

Conclusion

Accepting that pre-pubertal onset of Anorexia Nervosa, may be atypical, it is important to maintain an open mind in cases without goal directed weight loss. Although weight loss was indeed significant in this case, its occurrence was due to an excessive drive to exercise. In Oliver's case, this might be seen as a coping mechanism to the ongoing stress brought about by Covid-19 restrictions. His failure to recognise bodily hunger signs which would have protected against the extent of the weight lost might have been a developmental vulnerability. Maternal delayed awareness might have also been associated with additional roles placed on his mother, working at home, temporarily single-handedly parenting 5 children, concern for husband abroad and then in quarantine. The relatively short resolution of Oliver's difficulties no doubt lies in the family's structured yet nurturing style, and flexibility by the hospital and community services to adapt during a time of an unprecedented pandemic.

Abbreviations

AN: Anorexia Nervosa; BMI: Body mass Index; IBW: Ideal Body Weight; EDE-Q: Eating Disorder Examination Questionnaire; CAMHS: Child and adolescent mental health services; ED: Eating Disorder; EAI: Exercise Addiction Inventory.

Declarations

Ethical Approval and Consent to participate:

Ethics exemption was received.

Consent for publication:

Informed assent and consent have been received from the family for publication.

Availability of supporting data:

Not applicable

Competing interests:

The author, Fiona McNicholas has no competing interests.

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Authors' contributions:

The paper was written in full by Prof Fiona McNicholas

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