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Original article

Do Chronic Medical Conditions Increase the Risk of Eating Disorder? A Cross-Sectional Investigation of Eating Pathology in Adolescent Females with Scoliosis and Diabetes

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Abstract

Purpose: To investigate levels of eating pathology in female adolescents diagnosed with a chronic condition causing appearance change (adolescent-onset idiopathic scoliosis), a chronic condition affecting nutritional behavior (insulin-dependent diabetes mellitus), and healthy age-matched controls.

Method: Cross-sectional comparison of 192 females aged 11–19 years; 76 individuals diagnosed with scoliosis, 40 diagnosed with diabetes, and 76 control participants. Disordered eating behavior was quantified using the Eating Disorder Examination Questionnaire, and weight and body mass index (weight [kg]/height [m^2]) measurements were taken for each participant.

Results: The scoliosis group weighed less and had lower BMI scores ($p < .001$) than control participants. Of the participants with scoliosis, 25% were severely underweight, but only two met the behavioral criteria for anorexia nervosa; in others no association with disordered eating behaviour was found. Eating disorders were significantly more common ($p < .05$) in the diabetes participants than in the control group, with 27.5% of the group classified as having bulimia or binge eating disorder. All those classified as overweight or obese in the diabetes group were classified as pathological in terms of eating behavior.

Conclusions: The relationship between scoliosis and low body mass is a concern but is not a result of an eating disorder. Etiological mechanisms remain unclear and require further investigation. In the diabetes participants, bulimia and binge eating may prejudice effective condition management. Implications for successful adaptation, treatment intervention, and future research are discussed.

Keywords: Scoliosis; Diabetes; Adolescents; Eating disorder; Underweight; Chronic illness; Disfigurement

As part of the developmental process of adolescence the individual undergoes dramatic physical, psychological, and social change. For the adolescent with a chronic illness, these changes may impact on the ability of the adolescent and their family to successfully negotiate the demands of this period [1]. Chronic health conditions may increase dissatisfaction with the body and feelings of isolation from peers, potentially increasing the risk of psychopathology associated with adolescence, such as eating and body image disorder [2]. Although it did not explicitly assess eating disorder, one survey of more than 2,000 adolescents with different chronic conditions found an increased risk of body image dysphoria and unhealthy weight loss practices [3]. Given the increased likelihood of eating disturbance in females, the risk is likely to be particularly salient in young women with chronic illness.

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In conditions in which dietary intake is relevant to management the salience (and restriction) of food and eating may conceivably increase the risk of developing eating disorder. Although much research consists of case reports of individuals with conditions such as cystic fibrosis [4] and Crohn's disease [5], there is good evidence in type 1 or insulin-dependent diabetes mellitus (IDDM).

Typically diagnosed in childhood, IDDM is distinct from non–insulin-dependent diabetes mellitus which is associated with overweight and obesity, and is thought to be caused by a combination of genetic and autoimmunological processes that destroy the pancreatic cells that produce insulin, a hormone essential for glucose use and storage [6]. IDDM is treated by injections of insulin balanced with food intake and exercise.

The possibility of an elevated risk of eating pathology in individuals with IDDM has been debated for some time [7]; unhealthy weight control practices appear to be very common in adolescents with this condition [8], and a large case-controlled study of girls aged 12–19 years demonstrated twice the incidence of eating disorders in those with diabetes [9], largely because of increased numbers of those with eating disorder not otherwise specified and, to a lesser extent, bulimia nervosa. No cases of anorexia nervosa were found. A positive linear relationship between self-reported disordered eating behavior and poor glycemic control has been found in a wide range of investigations [10,11]. The clinical importance of disordered eating behavior has been confirmed by the reported association between eating pathology and subsequent complications such as retinal lesions [12].

Apart from a focus on diet, it is possible that some other characteristics of chronic conditions may increase the risk of disordered eating behavior. Given the well-documented link between body image disturbance and the formation of disordered eating patterns [13,14] reflected in current theoretical models [15,16], conditions in which there is significant deformity or disfigurement while the individual is undergoing the developmental demands of puberty could increase body image dysphoria, diminish self-esteem and thereby increase the risk of eating pathology.

The prevalence of disordered eating behavior in individuals with deforming or disfiguring conditions has not been investigated. However, there have been indications of extreme underweight in one visibly different population, namely, individuals diagnosed with adolescent-onset idiopathic scoliosis (AIS). This progressive spinal deformity affects 2–3% of the female population [17]. It is not life threatening but can radically change appearance. As well as asymmetry of the shoulders, waist, breasts, and hips (because of spinal curvature), vertebral rotation causes the attached ribs to move out of alignment and to become prominent when the patient is seen in profile [18].

One study has reported a high incidence of extreme underweight in adolescent females diagnosed with the condition, with 25% having a body mass within the range defined as anorexic [19]. There is no known biological/physiological mechanism that could account for the level of underweight observed, and it is possible that this finding may be indicative of an increased risk of restrictive eating pathology in this population.

In summary, the investigation of eating pathology in chronically ill adolescent populations has been limited, although there is good evidence for an increase in particular types of eating disorder in young people with IDDM, and evidence of significant weight loss of unknown origin in a condition affecting appearance (AIS). A salient issue in this area is population heterogeneity, specifically, how different condition characteristics could affect the likelihood of eating disturbance.

The present investigation assessed the prevalence of eating pathology in female adolescents diagnosed with a condition causing significant appearance change (adolescent-onset idiopathic scoliosis), a condition affecting nutritional behavior (IDDM) and healthy age- and gender-matched control subjects. It was therefore possible to compare the eating behavior of the two chronic illness groups, as well as to determine whether the nature and prevalence of eating pathology differed in relation to the general adolescent female population.

It was hypothesized that eating disorders would be more prevalent in participants with disorders affecting dietary intake (IDDM) and physical deformity (ALS) than in controls. It was also hypothesized that there would be a difference in the type of eating disorder seen in the two conditions.

Methods

Participants

The inclusion criteria for the scoliosis group were: female gender, age 11–19 years, and diagnosis of AIS by a consultant orthopedic surgeon. Exclusion criteria were diagnosis with any other serious medical or psychiatric condition that could affect body weight, metabolic rate, or food absorption. Identical criteria were used for the other groups, with the amendments that they should be diagnosed solely with IDDM by a consultant diabetologist (diabetes group) and not be diagnosed with any serious medical condition (control group). Fully informed consent was obtained from all participants, and also from parent(s) for adolescents less than 16 years of age. All procedures were approved by local research ethics committees.

Participants in the scoliosis group were recruited from outpatient clinics held at a regional treatment center for spinal deformity. The diabetes group was recruited from out patient clinics in four acute care hospitals. Control participants were recruited from three schools in a similar geographical area.