

# Anorexia nervosa requiring admission in adolescents

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## Abstract

**Question** I recently saw in my office a patient whom I had initially diagnosed with anorexia nervosa 6 months earlier and she was continuing to lose weight. Her physical examination findings in the office revealed a blood pressure of 85/55 mm Hg and a heart rate of 55 beats/min at rest. Should patients such as this one be sent to the hospital for inpatient monitoring and treatment?

**Answer** There is a lack of clear evidence-based guidelines for hospital admission of adolescents with anorexia nervosa, resulting in a high degree of variation in practices among physicians. Clinical judgment based on expert opinion seems to be the main driver of the decision to admit for inpatient care. Acceptable indications for a patient's admission include the following: weight is less than 75% of ideal body weight, temperature is lower than 35.5°C (95.9°F), heart rate is less than 45 beats/min, systolic blood pressure level is lower than 80 mm Hg, orthostatic change in pulse is higher than 20 beats/min, or orthostatic change in blood pressure is greater than 10 mm Hg. Consultation with an adolescent medicine specialist is highly recommended for adolescents with these vital signs.

**A**norexia nervosa is a complex eating disorder characterized by 3 components: persistent restriction of food intake causing substantial weight loss; intense fear of gaining weight or becoming fat; and disturbance in self-perceived weight or shape.<sup>1</sup> In the restricting type of anorexia, weight loss is accomplished primarily through limiting food intake or excessive exercise; and in the binge-eating or purging type, the individual engages in recurrent episodes of binge eating or purging behaviour.<sup>1</sup>

## Chronic condition

Anorexia nervosa is the third most common chronic disease among female adolescents, with prevalence rates of 0.3% to 1.2%<sup>2</sup> and a female-to-male ratio of 10:1.<sup>3</sup> Incidence rates are highest in female adolescents aged 15 to 19 years.<sup>3</sup> Among 469 female adolescents from large cities in the United States, the incidence of anorexia nervosa was 104 per 100 000 person-years.<sup>4</sup> The estimated lifetime prevalence of the disease ranges from approximately 0.5% to 3.7%.<sup>5</sup> Anorexia nervosa holds the highest overall mortality rate of any mental illness,<sup>3,6</sup> ranging from 5% to 20%,<sup>7,8</sup> with mortality rates increasing as age of assessment increases.<sup>9</sup> Despite its prevalence and severity, there is a lack of clear evidence-based guidelines for hospital admission of adolescents with anorexia nervosa.

## Guidelines for anorexia nervosa

Family physicians are often the first to make the diagnosis of anorexia nervosa.<sup>10</sup> While guidelines regarding hospitalization for patients with anorexia nervosa have been available for a number of years,<sup>5</sup> there is a high degree of variation in admission practices among

physicians.<sup>2</sup> A study in which 51 Canadian and American physicians caring for adolescents with anorexia nervosa were interviewed found a high degree of variation in admission practices because physicians often used clinical judgment in the absence of clear evidence-based criteria for admission.<sup>2</sup> Common complications associated with anorexia nervosa that might warrant hospitalization include severe weight loss,<sup>2,11</sup> hypothermia,<sup>11-14</sup> bradycardia,<sup>2,11-14</sup> hypotension,<sup>2,11,13,14</sup> and orthostatic changes in pulse and blood pressure.<sup>11,12</sup>

**Weight.** Ideal body weight (IBW), the weight of a healthy individual based on height, age, and sex,<sup>15</sup> is considered by experts to help determine whether hospitalization is warranted for patients with anorexia nervosa.<sup>11,16,17</sup> In a North American survey of physicians, more than half (52%) agreed that admission for adolescents is warranted at a weight of less than or equal to 75% of IBW (with a range to consider admission of 60% to 85% of IBW).<sup>2</sup> Furthermore, the Society for Adolescent Medicine<sup>11</sup> and the American Academy of Pediatrics<sup>16</sup> suggest that adolescents with less than 75% IBW should be hospitalized.

Low IBW has been associated with a higher risk of mortality.<sup>18</sup> A 3-year (1949-1952) study of 733 malnourished children in Mexico found the mortality rate within the first 48 hours of admission to hospital to be approximately 11% higher in patients with less than 60% IBW than in those with 61% to 75% IBW.<sup>18</sup> While this study examined infants and those in preschool, and not adolescents, children are also characterized by rapid growth and high nutritional needs.<sup>18</sup>

**Hypothermia.** Among 65 children aged 10 to 20 who were admitted to the Eating Disorder Clinic of the Lucile Packard

Children's Hospital at Stanford in California, all of them had a temperature lower than 36.3°C, and 45% had a temperature below 35.5°C.<sup>13</sup> Guidelines suggest that a temperature lower than 35.5°C (95.9°F) is an indication for hospital admission for adolescents with anorexia nervosa.<sup>11,16,17,19</sup>

**Bradycardia.** Sinus bradycardia is documented in up to 80% of patients with anorexia nervosa<sup>20</sup> and might lead to sudden unexpected death.<sup>6</sup> Among 23 patients aged 11 to 20 admitted with anorexia, 70% had a heart rate of less than 50 beats/min upon admission.<sup>6</sup> The Society for Adolescent Medicine,<sup>11</sup> formed by representatives from American and Canadian adolescent medical clinics, as well as the American Academy of Pediatrics,<sup>16</sup> recommend hospital admission when daytime heart rate is less than 50 beats/min and nighttime heart rate is less than 45 beats/min. Other guidelines based on expert opinion recommend admission when heart rate is less than or equal to 40 beats/min.<sup>2,17</sup>

**Change in pulse and blood pressure.** Hypotension and orthostatic change in pulse and blood pressure are key indicators for hospitalization for adolescents with eating disorders.<sup>14</sup> A study by Hudson et al<sup>19</sup> suggests hospitalization when systolic blood pressure is less than 80 mm Hg. The Society for Adolescent Medicine proposes that blood pressure levels lower than 80/50 mm Hg warrant hospitalization.<sup>11</sup> The American Academy of Pediatrics<sup>16</sup> and the Royal Australian and New Zealand College of Psychiatrists<sup>17</sup> recommend hospitalization at a systolic blood pressure level less than 90 mm Hg. Orthostatic change in pulse of more than 20 beats/min and orthostatic change in blood pressure of more than 10 mm Hg also serve as indications to admit.<sup>11,16,17</sup>

Medical considerations such as anemia, neutropenia,<sup>13</sup> dehydration, electrolyte disturbances, arrested growth and development, and acute food refusal, as well as social concerns and mental illness, should be considered when deciding on admitting adolescents with anorexia nervosa.<sup>11</sup>

## Conclusion

While severe weight loss, hypothermia, bradycardia, hypotension, and orthostatic changes in pulse and blood pressure are common indicators for hospitalization of adolescents with anorexia nervosa, the threshold is mostly based on expert opinion with no clear evidence. Thus,

general practitioners should be alert to hemodynamic changes in children with suspected or confirmed anorexia nervosa and should consult adolescent medicine specialists regarding the need for admission to the hospital. 🌿

### Competing interests

None declared

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