

What is Starvation Syndrome?

Starvation Syndrome

When starved of energy, the human body responds in a way known as “Starvation Syndrome”.

Starvation syndrome (or semi-starvation) refers to the physiological and psychological effects of prolonged dietary restriction. The effects of starvation syndrome are commonly observed in individuals with eating disorders, who often severely restrict their energy intake, eat irregularly, and engage in compensatory behaviours (e.g., purging), which reduce energy absorption. Many of the symptoms once thought to be primary symptoms of eating disorders are actually symptoms of starvation.



The Minnesota Starvation Experiment

The Minnesota Starvation Experiment is the best example of the wide-ranging physical, cognitive, social and behavioural effects of starvation. Between 1944 and 1945, the University of Minnesota studied the effects of dietary restriction and the effectiveness of dietary rehabilitation strategies. The study recruited 32 fit, young male volunteers, who were conscientious objectors to the military service. The study had three phases:

- 3-month control: participants ate normally
- 6-month semi-starvation period: caloric intake of each participant was reduced by 50%
- 3-month recovery: participants were re-nourished

During the semi-starvation period, men lost on average 25% of their baseline body weight. Unexpectedly, semi-starvation also had a dramatic impact on the physiological, psychological, cognitive, and social functioning of the men.

Physical Changes

- Heart muscle mass reduced by 25%
- Heart rate and blood pressure decreased
- Basal metabolic rate slowed down

- Feeling cold all the time
- Fluid retention (edema)
- Dizziness and blackouts
- Loss of strength, high fatigue
- Hair loss, dry skin
- Decreased hormone levels, causing lack of sexual desire and other changes

Emotional Changes

- Depression
- Anxiety
- Irritability
- Loss of interest in life

Changes in Thinking

- Impaired concentration, judgement and decision-making
- Impaired comprehension
- Increased rigidity and obsessional thinking
- Reduced alertness

Social Changes

- Withdrawal and isolation
- Loss of sense of humour
- Feelings of social inadequacy
- Neglect of personal hygiene
- Strained relationship



Attitudes and Behaviour Relating to Eating

- Thinking about food all the time
- Meticulous planning of meals
- Eating very fast or very slowly
- Increased hunger, binge-eating
- Tendency to hoard (e.g. collecting recipes)
- Increased use of condiments (e.g., spices) for flavour

Symptoms of starvation syndrome are observed in any individual who has prolonged restricted access to food, no matter what the reason (e.g., prisoners of war or effects of an eating disorder). **Physical re-nourishment and weight restoration is therefore essential to reverse these symptoms.**

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How is Starvation Syndrome Relevant to Eating Disorders?

The physiological and psychological effects of semi-starvation observed in the Minnesota Experiment mirror the experience of many individuals with eating disorders. Many eating disorder symptoms are actually a direct result of semi-starvation.

You may be thinking:

“This information isn’t relevant to me because I’m in the average or overweight range”

However, research shows that a person does not have to be underweight to experience symptoms of starvation. Starvation syndrome may be observed if a person’s nutritional intake is poor, irregular, or unbalanced, or if they engage in compensatory behaviours that reduce energy absorption, irrespective of their weight. Individuals with anorexia nervosa, bulimia nervosa and binge eating disorder are therefore all vulnerable to experiencing symptoms of semi-starvation.

A crucial distinction between men in the Minnesota Study and individuals with eating disorders is that, in addition to experiencing symptoms of starvation, individuals with eating disorders have significant fears about their shape, weight, appearance and eating. When a person who is starving has the opportunity to eat, they will eat. A person with an eating disorder will continue to restrict what they are eating due to their fears. It is therefore crucial that eating disorder recovery focuses on physical re-nourishment as well as psychological treatment to address anxiety and fear about eating.

Reversing Symptoms of Starvation

Participants in the Minnesota Experiment were re-nourished during a 3-month recovery phase. By normalising their eating through regular rations, the



men recovered from many of the physiological and psychological effects of starvation.

Rate of recovery varied among the men, with some taking longer than others to normalise their eating.

Many also reported persistence of symptoms well into the re-nourishment phase (e.g., feeling ‘out of control’, experiencing low mood, inability to identify hunger/fullness cues, episodes of binge eating). Importantly, these symptoms subsided over time with consistent, adequate nutrition.



Recovery from an Eating Disorder

The good news is that the effects of semi-starvation are reversible. By consuming nutritionally balanced meals regularly throughout the day the body will return to normal physical and psychological functioning.

(*see handout ‘Regular Eating for Recovery’ for more information).



Remember, it takes time, and symptoms of semi-starvation may persist in the short-term during physical re-nourishment.

When the brain is properly nourished, it can carry out vital processes such as perception, problem solving,

planning, memory, decision making, and emotion regulation. These processes are essential for a person to engage in psychological treatment for their eating disorder. This is why eating disorder treatment often begins with physical re-nourishment. Once semi-starvation has been corrected, an individual will be in a better position cognitively to address the underlying thoughts and feelings that keep disordered eating behaviours going.

You may need to consult a medical practitioner, psychologist, dietitian or other health professional for support with re-nourishment or to help you manage your anxiety while you are making changes. Remember, the effects of semi-starvation are reversible with consistent, adequate nutrition!