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Effects of a personalized VLCKD on body composition and resting energy expenditure in the reversal of diabetes to prevent complications

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There are many ways to measure excessive weight measured. Calculating your body mass index (BMI) is a most common method. To calculate BMI divide a person's weight in kgs by the height in meters squared. Ideally there are categories of weight a person can fit into Normal Weight, Underweight, Obesity, Severe Obesity, Excessive Weight.

If an individual who is prone to diabetes due to various factors also has excessive weight, the cells in his/her body become less responsive to insulin that is released from the pancreas. Evidence suggests that fat cells compared to muscle cells are excessively resistant to insulin. If people suffering from type 2 diabetes exercise regularly, they are able to reduce the severity of insulin-resistance. This happens because the muscles that are fired up while exercising make use of the extra glucose found in the blood. Hence, their bodies do not produce insulin and the glucose in their bodies is no longer directed towards the fat cells. It has also been observed that people who have excessive weight on their waist, i.e. are apple shaped are more prone to obesity compared to someone who has excessive weight on their buttocks and thighs, i.e. are pear shaped. It is also seen that people affected by excessive weight or who are obese are more likely to be affected by type 2 diabetes. In fact, people suffering obesity are also prone to cardiac problems, certain forms of cancer, osteoarthritis, etc. To understand how diabetes and obesity can be a problem, it is essential to know what happens in the body when there is excess glucose.

Insulin is a vital hormone in your body that controls the amount of glucose (sugar) in your bloodstream. The pancreas are responsible for producing insulin. Insulin converts the sugar in the body into energy, which is then used by the cells (and, thereby, the body) to perform various functions. Obesity can lead to fat deposits all over the body. Fat inhibits the cell's ability to absorb and use glucose, which leads to the body developing insulin-resistance. As a result, the blood sugar levels increase and the patient develops Type 2 diabetes.

It is important to note that the link between obesity and diabetes begins forming at an early age. Researchers state that obese children are 4 times more likely than other children to develop diabetes by the time they reach 25 years of age.

The reversion of diabetes and the treatment of long-term obesity are difficult challenges. The failure mechanisms of rapid weight loss are mainly related to the wasting of lean mass. This single-arm study aims to evaluate the effects of a very low-calorie ketogenic diet (VLCKD) on body composition and resting energy expenditure in the short term reversal of diabetes mellitus Type 2. For eight weeks, subjects were administered a personalized VLCKD with protein intake based on lean mass and synthetic amino acidic protein supplementation. Each subject was assessed by anthropometry, Dual-energy X-ray Absorptiometry(DXA), bioimpedentiometric analysis (BIA), indirect calorimetry, and biochemical analysis. The main findings were the saving of lean mass, the reduction of abdominal fat mass, restored metabolic flexibility, the maintenance of resting energy expenditure, and the reversion of diabetes. These results highlight how the application of preventive, predictive, personalized, and participative medicine to nutrition may be promising for the prevention of diabetes and enhancement of obesity treatment.

Keywords: diabetes; reversibility; obesity; nutrition; prevention; body composition; indirect calorimetry; lean mass; resting energy expenditure; VLCKD

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