RESEARCH ARTICLE

Effect of intermittent fasting on various health parameters in obese type 2 diabetics: A pilot study

Vikram Bhandari¹, Sheveta Dureja², Rachna Bachhel², Mridu Gupta², Rubani Sidhu³

¹Department of Pharmacology, Sri Guru Ram Das Institute of Medical Sciences and Research, Amritsar, Punjab, India, ²Department of Physiology, Government Medical College, Amritsar, Punjab, India, ³Department of Medicine, Sarvhit Gastrocity, Amritsar, Punjab, India

Correspondence to: Sheveta Dureja, E-mail: shevetadureja@gmail.com

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ABSTRACT

Background: Diabetes mellitus type 2 is fast becoming a cause of concern for governments world over and people at large as it has immense socio-economic impact. A diabetic patient usually goes through phases of being overweight, obese, and insulin-resistant before being classified as a patient of type 2 diabetes. Fasting, though practiced for centuries, is a novel approach for delaying progression and possibly reversing diabetes mellitus. Aim and Objectives: The aim of the study is to look for the effect of intermittent fasting on various health parameters in obese type 2 diabetics. Materials and Methods: The study was conducted at a tertiary care facility in Amritsar. Twelve obese volunteers in the age group of 20–60 years with type 2 diabetes mellitus not controlled with metformin alone were included in the study. All the participants were told to follow intermittent fasting protocol of 16:8 for a period of 4 weeks. At the beginning of the study, weight, height, body mass index, waist circumference, waist-hip ratio, fasting blood sugar, and serum insulin, were recorded in each participant. At the end of the 4 weeks period, all the measurements were repeated and compared with baseline values using the student t-test. Results: There was a highly significant decrease in the anthropometric indices and fasting blood sugar as compared to baseline values at the end of the 4-week period without any change in fasting serum insulin levels. Conclusion: There is a favorable effect of intermittent fasting on anthropometric indices and fasting blood sugar levels without any improvement in fasting serum insulin.

KEY WORDS: Diabetes; Fasting; Obesity

INTRODUCTION

Diabetes mellitus type 2 is a chronic metabolic disease and is a leading cause of morbidity and mortality worldwide. India has a large number of diabetics and it is predicted to affect 109 million by 2035.¹ Diabetes mellitus is a major cause of increased incidence of cardiovascular, cerebrovascular, and other peripheral vascular diseases.² Obesity plays a major role in the etiology of type 2 diabetes mellitus and contributes to about 80% of the patients.³ The incidence of obesity is on the rise in developing countries such as India due to urbanization and lifestyle changes. Increased visceral fat deposition in obese persons leads to the development of insulin resistance and metabolic syndrome.⁴ The management of diabetes mellitus includes oral hypoglycemics, insulin, and lifestyle modifications. Nowadays, the main focus for the management of diabetes mellitus is pharmacological interventions while dietary changes and lifestyle modifications are conveniently given a miss. Medications control the symptoms but do not prevent the advancement of the disease. Weight loss and lifestyle changes play a key role in the management of obesity and diabetes. Lifestyle modifications include dietary changes, exercise, or...
a combination of both. Dietary interventions have a major contribution towards weight loss and are the most common target for the treatment of obesity and diabetes. Bariatric surgery has become popular treatment option for weight loss in morbidly obese. Bariatric surgery options range from minimally invasive endoscopic procedures to more advanced robotic surgery. All these procedures aim to limit the stomach size and hence cut calories. These procedures are very costly, have inherent risks, and are associated with long-term complications. Therapeutic fasting has shown similar benefits of calorie restriction leading to weight loss and better glycemic control without any risks of long-term complications. Intermittent fasting or time-restricted feeding is a method in which participant is asked to eat during certain hours of the day and fast for the rest. In India, religious fasting is also observed by many communities such as Muslims fast from dawn until dusk during the Islamic month of Ramadan. Many studies have shown the beneficial effects of Ramadan fasting on various health indices. Intermittent fasting protocols can be 16:8 (16 h fasting and 8 h eating window), 20:4 or OMAD (one meal a day). 16:8 is the most common variation and can be easily accomplished by skipping breakfast or dinner as per individual preference. Various studies have shown intermittent fasting to help in weight loss and better glycemic control in patients with diabetes mellitus type 2. Intermittent fasting offers cost-effective, low-risk alternative for weight and blood glucose management.

Hence, a small pilot study with obese type 2 diabetic patients, was planned to evaluate the role of intermittent fasting (16:8) for weight loss and fasting blood glucose control.

MATERIALS AND METHODS

The present study was conducted at a tertiary health care facility in Amritsar. Prior approval from the Institute Ethics Committee was taken. Twelve obese volunteers in the age group of 20–60 years with type 2 diabetes mellitus, not controlled with metformin alone were included in the study. Subjects on insulin and sulfonylureas, ischaemic heart diseases, uncontrolled hypertension, and diabetic complications were excluded from the study. Informed consent was obtained from all the volunteers. Participants were informed about the study protocol and were educated about the detection and management of hypoglycemia and other adverse events.

All the participants were told to follow the intermittent fasting protocol of 16:8 which included 16 h of fasting and 8 h of eating window for a period of 4 weeks. Water, zero-calorie coffee, and tea were permitted in the fasting window. During eating window of 6 h, they were encouraged to take a balanced diet. At the beginning of the study, fasting blood sugar, serum insulin, body mass index (BMI), waist circumference, and waist-hip ratio were recorded in each participant. Subject’s body weight and height were measured by standard techniques and expressed in kilograms and centimeters, respectively. Bodyweight was measured with the help of the digital scale and height was measured in standing position without shoes with same clothes every time. Fasting venous sample was taken under aseptic precaution in the morning for measurement of insulin and fasting blood glucose levels. At the end of the 4 weeks period, all the measurements were repeated. These measurements were recorded by the same individual. Insulin level was measured by the radioimmunoassay method. Data were analyzed using Microsoft excel. All the data were expressed as mean ± standard deviation. Statistical analysis was carried out using paired t-test to determine the effect of intermittent fasting on all the parameters measured before and after fasting. \( P < 0.05 \) was taken as significant and \( P < 0.001 \) was considered as highly significant.

RESULTS

The study was conducted to look for the effect of intermittent fasting (16:8) for a period of 4 weeks on various health parameters in obese type 2 diabetics.

Our study revealed that there was highly significant decrease in the mean body weight as compared to baseline values at the end of 4 weeks period \( (P < 0.001) \). BMI, waist circumference, and waist-hip ratio were significantly decreased after intermittent fasting for 4 weeks \( (P < 0.001) \) [Table 1]. In the present study, the mean fasting blood glucose levels improved significantly as compared to initial values after adopting intermittent fasting for 4 weeks \( (P < 0.001) \) [Table 2]. There was no statistically significant difference in the mean value of fasting serum insulin values as compared to baseline readings after 4 weeks duration of intermittent fasting \( (P > 0.1) \) [Table 2]. There was no adverse event reported by any participant during intermittent fasting.

DISCUSSION

The present study revealed that there is improvement in various anthropometric indices and other health markers in obese type 2 diabetic patients after following 16:8 intermittent fasting regimen for 4 weeks.

Our study showed that there was significant decrease in weight, BMI, waist circumference, and waist-hip ratio in participants after 4 weeks of intermittent fasting resulting probably from the decreased number of calories consumed by the participants during their eating window. Our results match with a similar study which showed beneficial effects of intermittent fasting on various anthropometric indices in type 2 diabetics. A study conducted on obese type 2 diabetic patients revealed improvement in weight and other biometric indices after following 18 h of fasting daily.
Table 1: Anthropometric indices before and after intermittent fasting

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Baseline values</th>
<th>After 4 weeks</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (kg)</td>
<td>108.16±21.74</td>
<td>106.92±21.46</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Height (m)</td>
<td>1.68±0.01</td>
<td>1.68±0.01</td>
<td>=1.00</td>
</tr>
<tr>
<td>BMI (Kg/m²)</td>
<td>37.87±4.53</td>
<td>37.43±4.44</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Waist circumference (inches)</td>
<td>48.54±3.75</td>
<td>47.92±3.41</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Waist hip ratio</td>
<td>0.90±0.03</td>
<td>0.88±0.03</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

BMI: Body mass index

Table 2: Fasting blood glucose levels and serum insulin before and after intermittent fasting

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Baseline values</th>
<th>After 4 weeks</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fasting blood glucose</td>
<td>157.33±18.03</td>
<td>137.41±14.85</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Serum insulin</td>
<td>28.13±6.23</td>
<td>28.21±6.15</td>
<td>=0.1</td>
</tr>
</tbody>
</table>

There is one similar study conducted on healthy middle-aged men which also revealed beneficial effects of intermittent fasting on weight loss.[13] On analyzing the mean fasting blood glucose, it was seen that 16 h intermittent fasting daily for 4 weeks had a favorable effect on fasting blood glucose levels. Our results are in accordance with various studies conducted to evaluate the similar effect.[3,12,14] In the present study there is no significant decrease in serum insulin levels as compared to baseline values at the end of 4 weeks period of fasting. Our findings are in agreement with a study which showed that there was no improvement in fasting serum insulin levels after 18 h of fasting daily for 2 weeks in type 2 diabetic subjects.[12] A study conducted on 54 patients with type 2 diabetes which concluded that there was improvement in insulin levels and insulin sensitivity after adopting two meals regimen and intermittent fasting for 12 weeks.[13] The sample size in our study was small and we studied the effect of fasting for 4 weeks only so the effect of intermittent fasting on insulin resistance was not significant but it was clearly elucidated that fasting improved fasting blood glucose levels.

Strength and Limitations

The present study is a pilot study with limited number of participants for short duration. A longer duration study with large number of participants is required to see if the results promised in this study holds true in a long run.

CONCLUSION

Our study revealed the favorable effects of intermittent fasting on anthropometric indices and fasting blood sugar levels without any improvement in fasting serum insulin.

REFERENCES


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