

# Effect of Ramadan Fasting

*by* Johannes Sembiring

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## Effect of Ramadan Fasting on Body Mass Index of Type 2 Diabetes Mellitus Patients

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### Author Details

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Johannes Sembiring<sup>1</sup>, Julahir Hodmatua Siregar<sup>2</sup>, Selamat Ginting<sup>3</sup> & Saiful Batubara<sup>4</sup>

### Authors Affiliations

<sup>1,3</sup>.Insitut Kesehatan Deli Husada, North Sumatra<sup>2,4</sup>.Faculty of Medicine, Universitas Islam Sumatera Utara

Article Error Email: jul\_ahirhs@yahoo.co.id

**Abstract:** It notes that some religion rituals may heal the Diabetes Mellitus patients. This research was carried out to seek the effect of Ramadan fasting Muslim Ummah (community). It observed the patients those are suffering from chronic diseases such as Diabetes Mellitus (DM). In fasting patients did not eat and drink during 13.5- 14 hours. At the time of fasting that there will be changes such as: activity, diet, hours of work, activities at night as *tarawih* (night prayer) and *tadarusan* (Holy Quran Recital). To determine the effect of Ramadan fasting on body mass index in patients with type 2 diabetes mellitus, a prospective longitudinal study of the fasting month of Ramadan until the end of the fasting Ramdhan was done. It took 19 patients who had been diagnosed with type 2 diabetes at Adam Malik Hospital. The data collected by taking blood samples at the beginning and end of the fasting of Ramadan fasting. Data were analyzed using paired T- test, wilcoxon. From 19 patients with type 2 diabetes, as many as 13 respondents (68.4%) male sex with a mean age of 57.26 years. Statistical tests performed showed me significant value in BMI ( $p < 0.05$ ), Waist Circumference ( $p < 0.05$ ). There are significant value of BMI, Waist Circumference and blood fasting glucosa in patients with type 2 diabetes before and after Ramadan fasting

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**Keywords:** Blood Sugar level; Ramadhan fasting; diabetes; BMI

## INTRODUCTION

Religion rituals could affect the patients. This research sought the data of Ramadan fasting effects on Diabetes Mellitus patients in North Sumatra Province of Indonesia. In Indonesia, as a country in the tropics, the duration of fasting Ramadan is around 13.5-14 hours without eating and drinking during the fasting period. The provision of glucose for fasting people will change from 8-16 hours of absorption of food, so that people who are fasting will experience the process of gluconeogenesis. During the month of Ramadan there will also be many changes in human activities such as diet, working hours and will add activities at night such as *tarawih* (night prayer) and *tadarusan* (Holy Quran Recital) which means increasing physical activity at night. Fasting itself is a worship that must be performed by every Muslim community, including people suffering from chronic diseases such as Diabetes Mellitus (DM).

With changes in diet and religious activities in the form of physical activity by carrying out circumcision prayers in the month of Ramadan, it will cause changes in the physiology of the human body during fasting (Azizi, 2010; Jaleel et al, 2011; Azizi, 1998; Azizi, 2002). Some forms of changes in body physiology that may occur are related to with

metabolic processes such as changes in blood parameters, lipid profiles, hs-CRP, leptin, ghrelin, albumin and others in fasting people (Azizi, 2010; Jaleel et al, 2011; Azizi, 1998; Azizi, 2002; Kamal et al, 2012; Alzoghaibi et al, 2014).

This study sought the effect of Ramadan fasting on the body mass index of type 2 DM patients in Medan. The objectives of this study were: Daily Blood Sugar Control (DBSC), 2PP, body weight, BMI and waist circumference in type 2 DM patients in Medan.

## RESEARCH METHODS

This type of research is a longitudinal / experimental prospective study, with a sample size of 19 respondents and the study population was DM patients in Medan. Inclusion Criteria: 1. diabetes Patients with type 2 who have been diagnosed, Muslim and willing to perform Ramadan fasting for a month. 2. Patients with type 2 diabetes without complications (controlled). Exclusion criteria: 1. DM patients with complications. Data collection was done as follows: 1). All subjects were asked for consent to participate in the study by filling out and signing the informed consent form; 2). Samples identity included name, age, gender, body weight (BW) and height (H) and measuring BMI and waist circumference. Blood samples were taken one week before fasting and one week before Eid, for examination.

## RESEARCH RESULT

Basic Characteristics of Respondents were 19 patients with type 2 diabetes who had met the inclusion criteria. A total of 13 respondents (68.4%) were male with a mean age of 57.26 years. From the results of blood pressure measurements obtained a mean systolic blood pressure of 136.62 mmHg and a diastolic blood pressure of 86.58 mmHg. The mean height of the respondents was 156.74 cm. Generally, respondents (89.5%) performed tarawih regularly and 13 respondents (68.4%) prayed 23 cycles of tarawih. The majority of respondents carried out tadarus as many as 17 people (89.5%). **Table 1.**

### Weight and DBSC, 2PP, LP, BMI Before and After Ramadan Fasting

The average body weight before fasting was 66.21 kg, while after fasting it decreased to 64 kg. By using the T dependent test, there was a significant difference in the mean between before and after fasting ( $p < 0.001$ ). **Table 2.**

Meanwhile, the mean DBSC before fasting was 122.89 mg / dl and after fasting it decreased to 117.89 mg / dl. However, using the Wilcoxon test, there was no significant difference in the mean between the two measurements ( $p = 0.432$ ). **Figure 1.**

The Blood Sugar Level value of 2PP before fasting was 177.11 mg / dl and after fasting it decreased to 171.63 mg / dl. By using the Wilcoxon test, a significant difference in the mean of the two measurements was found ( $p = 0.039$ ). **Figure 2**

The mean baseline BMI score of 26.86 and the end of 25.96, with the Wilcoxon test showed a statistically significant difference between BMI before and after fasting with p value  $< 0.05$ . The mean value of initial waist size was 91.26 and at the end of 90.74, with the T-test showed a statistically significant difference between waist size before and after fasting with p value  $< 0.05$ . **Figure 3. Figure 4. Figure 5.**

## DISCUSSION

### The relationship between body weight, body mass index and waist circumference with Ramadan fasting.

Weight loss, BMI and Waist Size (WS) are widely associated with diet programs or restricting calorie intake, including fasting. below will explain the impact on body weight, BMI and waist circumference and will be discussed separately.

#### Weight

The results of this study indicate that in univariate ways, the overall sample data shows a varying decrease from 1-5 kg with an average decrease of 2.21 kg. In the bivariate test with the mean difference test (T-Test), it was found that fasting had a significant effect on weight loss ( $p < 0.001$ ). This result is in line with the explanation from Azizi (2010) which states that there is an effect of fasting on weight loss in his writing with the title "Islamic Fasting and health". This can be explained by doing fasting, there will be a reduction in carbohydrate intake and then followed by the mobilization of luscious to produce energy for activities so that it affects body weight.

#### Body Mass Index (BMI)

The results of this study showed that in univariate way the overall sample data showed a decrease in BMI. Initial BMI  $26.86 \pm 5.10$  and final BMI  $25.96 \pm 5.18$ . and after being tested with the Wilcoxon Union, there was a significant difference in value ( $p < 0.05$ ). This result is in line with the explanation by Mazidi (2014) who stated that the effect of fasting on weight loss and MBI in his writing entitled "Effects of Ramadan Fasting on a lipid profile: A Narrative Review". This can be explained by doing fasting, there will be a reduction in carbohydrate intake and then it will be followed by the mobilization of luscious to produce energy for activities so that it affects body weight. The existence of a direct influence on body weight will also affect the body mass index.

#### Waist Size (WS)

The results of the mean value of initial waist circumference 91.26 and 90.74 at the end, with the T-test test showed a statistically significant difference between LP before and after fasting with  $p$  value  $< 0.05$ .

In a study conducted by Saleh 2005 with a sample size of 60, where the sample also undergoes a month of fasting, there is a difference in values. In the male sample obtained waist circumference values at the beginning of fasting ( $94.68 \pm 11.01$ ) and at the end of fasting  $92.00 \pm 10.70$ . This weight loss is due to the efficient utilization of body fat during fasting. These results have also been reported that fasting people who are overweight lose more than normal weight than normal weight people during the fasting month of Ramadan. Obesity has been recognized as a serious risk factor for mortality and morbidity of cardiovascular disease in the general population as well as in sufferers diabetes mellitus. Hence the reduction in waist circumference observed in this study during 4 weeks of fasting may translate into significant health benefits for those who fast (Saleh et al, 2005).

#### DBSC, BSL 2PP with Ramadan fasting

## Fasting Blood Sugar Levels

From the univariate results of fasting blood sugar levels, it can be seen from each sample that 12 people experienced an increase, 1 person had a fixed value and 6 people experienced a decrease, but in total, it was found that there was a tendency to decrease fasting blood sugar levels at the end of fasting. The DBSC value before fasting was 122.89 mg / dl and after fasting it decreased to 117.89 mg / dl. However, using the Wilcoxon test, there was no significant difference in the mean between the two measurements ( $p = 0.432$ ). Previous research conducted by Saleh 2005 on a sample of 60 people also showed that there was no significant mean value of fasting blood sugar levels at the time of fasting and the end of fasting in Ramadan (early fasting  $5.55 \pm 0.58$ mmol, end of fasting  $5.55 \pm 0.55$ mmol). Other studies conducted by Laajam 1990, Salman 1992 and Dehghan 1994 obtained the same results (Laajam, 1990; Salman et al, 1992; Dehghan et al, 1994). This may be due to various differences in the food consumed during fasting both in the amount and type of food eaten as well as differences in body metabolism. Besides that, the bias is also caused by the drugs that the research subjects are taking (Elnasri, 2006).

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## Fasting Blood Sugar Levels 2 hours

The BSL value of 2PP before fasting was 177.11 mg / dl and after fasting it decreased to 171.63 mg / dl. By using the Wilcoxon test, a significant difference in the mean of the two measurements was found ( $p = 0.039$ ). This is probably due to the recent absorption state of the glucose turnover rate of 2 mg / kg / min. In normal adults, a slight decrease in serum glucose of between 3.3 and 3.9 mmol / l (60-70 mg / dl) occurs within hours of fasting; decrease in serum glucose but stops due to breakdown of glycogen, and a decrease in both glycogen synthesis and glycolysis in the liver. These changes are the result of decreased insulin and increased glucagon and sympathetic activity. In the early stages of the post-absorption period, decreased glucose is associated with depletion in hepatic glycogen stores (Heber, 2001).

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## Limitations

The research has limitations including: 1) The sample is small so that it may not be able to reflect the actual results. 2) The activities and diet of the sample patients cannot be uniformed so that it can interfere with the results of the measurements taken. (ETS)

## CONCLUSIONS AND SUGGESTIONS

### Conclusion

- Fasting does not cause a significant decrease in Fasting Blood Sugar Levels (DBSC).
- Fasting causes a decrease in body weight (BW), waist size (WS), body mass index (BMI).

### Suggestion

- DM patients who are fasting are expected to reduce their consumption of food in the form of fried or high fat foods, in order to improve the lipid profile which can help prevent cardiovascular complications.
- To other researchers, it is expected to be able to verify the results of this study with research with a larger number of samples.



- Institutions can take advantage of the results of this study as material for assessment and research development related to the effect of fasting on the endocrine system.

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## APPENDICES

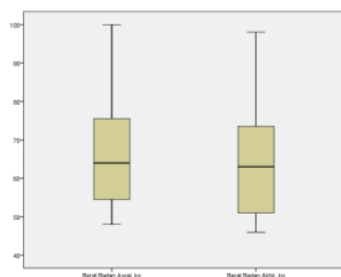
**Table 1.** Basic Characteristics of Respondents

<b>Basic Characteristics</b>	
Gender, n(%)	
Male	6 (31,6)
Female	13 (68,4)
Age (Year)	57,26 (10)
TDS (mmHg)	136,62 (13,83)

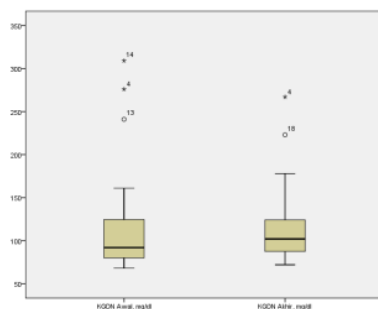
TDD (mmHg)	86,58 (7,46)	
	Before Fasting (SB $\pm$ SD)	End of Fasting (SB $\pm$ SD)
Height (cm)	156,74 (7,84)	156.74 (7.84)
Weight (Kg)	66,21 (13,91)	64 (13.84)
Daily Blood Sugar Control (DBSC) (mg/dl)	122,89 (72,20)	117.89 (52.42)
Blood Sugar Control 2PP (mg/dl)	177,11 (57,86)	171.63 (52.67)
BMI, (cm)	26.86 (5.1)	25.96 (5.18)
Waist size (cm)	91.26 (13.46)	90.74 (13.36)

**Table 2.** Body weight and Blood Sugar Control (KGD) at the beginning and at the end of Ramadan fasting

	Start (SB $\pm$ SD)	End (SB $\pm$ SD )	p
Weight, (kg)	66,21 (13,91)	64 (13,8)	<0,001
DBSC, (mg/dl)	122,89 (72,20)	117,89 (52,42)	0,432
2PP (mg/dl)	177,11 (57,86)	171,63 (52,67)	0,039
BMI	266.86 (5.1)	25.96 (5.18)	0,0001
Waist size (cm)	91.26 (13.46)	90.74 (13.36)	0,001

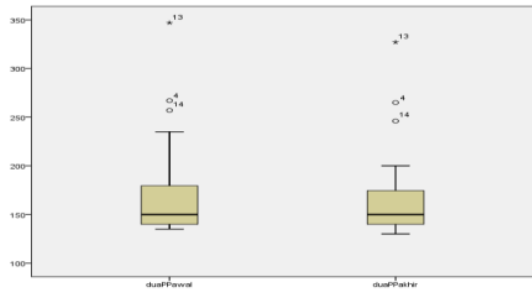


**Figure 1.** Boxplot Graph of Weight Difference between Before and After Fasting

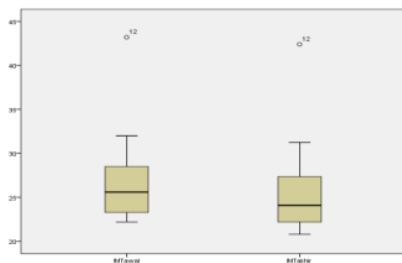


**Figure 2** Boxplot Graph of DBSC Difference between Before and After Fasting

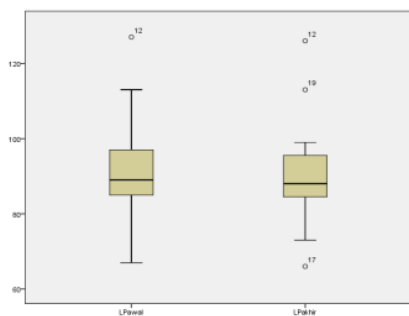




**Figure 3.** Boxplot Graph The KGD2PP Difference between Before and After Fasting



**Figure 4.** Boxplot Graph of BMI Difference between Before and After Fasting



**Figure 5.** Boxplot Graph of Difference in LP between Before and After Fasting

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