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Original Article

The Effect of Ramadan Fasting on Body Weight of Healthy Young Hospital Workers

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ABSTRACT

Introduction: This study was undertaken to assess the effect of Ramadan fasting on body weight of healthy young working people. **Material and Methods**: Sixty nine (33 female and 36 male) healthy hospital workers who fastened during ramadan were recruited into the study. The subjects were expected to fasten 90 % of ramadan days(27 days). Their weight, total body fat were measured with TANITA. Same measurements were taken at the end of ramadan and twice more in the third and the sixth months. 3 cases did not continue fastening so the study was completed with 66 cases (32 female-34 male). **Results**: There was a statistically significant weight loss, but not in terms of fat tissue between the cases at the end of ramadan. That weight loss was higher in the male gender. However two months after ramadan, the cases were found to gain weight. Weight gain did not continue thereafter but at the end of six months the cases did not return to their pre ramadan body weight. **Conclusion**: A period of fasting like heavy dieting may cause marked weight gain afterwards. This is thought to be the effect of a hyperphagic period taking place after fasting and/or change of eating habits to high fat diet during Ramadan. Current weight management treatments generally assume that skipping meals leads to weight gain and advise against it. That Ramadan fasting causes a possible late weight gain must be kept in mind. **Key words**: Ramadan fasting, weight gain, weight loss, skipping meals

1. INTRODUCTION

Muslims fast from sunrise to sunset during the holly month of Ramadan, the 9th lunar month. Fasting is one of the five pillars of Islam. It includes avoidance of any drinking, eating, smoking and sexual intercourse during day time. After a full day, fasting ends in sunset and must restart by dawn. People usually take one meal in the sunset and one another before dawn. Since the lunar calendar is 11 or 12 days shorter than the solar calendar, every year Ramadan starts 11 or 12 days earlier than the previous year. Ramadan completes a

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one year tour nearly once in 33 years. Therefore the duration of fasting may vary from 13 to 18 hours per day.

Fastening also takes place in some major religions like Christianity and Judaism. It does not only prohibit drinking and eating but also orders honest human behaviour. It is accomplished with the contribution of all organs including the brain and the heart. According to Islam it is a form of test of patience and control of ones wishes. 'There are many who end up only with hunger and thirst after Ramadan' says the prophet Muhammad (SAV). Which points that Ramadan is a form of worshipping which is much complex and deeper than if naively thought.

Some people are exempt totally or temporarily from fasting. This includes children, old people with medical conditions, pregnant or brest feeding women, women on menstrual cycles, mentals and travelers.

In this study we aimed to assess if such long hours of fasting for a month caused weight change and determine the consequent follow up.

2. MATERİAL AND METHOD

The study was accomplished in 2013 when ramadan was between July the 9th and August the 7th (back in 1978 it was between similar days as July the 13th and August the 12th). The duration of fastening was 15 hours and 50 minutes for the first day and 13 hours 56 minutes for the last day.

69 (33 female and 36 male) healthy hospital workers who planned to fasten during ramadan were recruited into the study. None of the subjects had any known disease and were under any form of medication. They were expected to fasten at least 90 % of ramadan days(27 days). Initially their weight, total body fat were measured with TANITA (digital scale for body fat and weight). Same measurements were taken at the end of ramadan and twice more at the third and sixth month point. 3 cases did not continue fastening so the study was completed with 66 cases (32 female-34 male)

Statistical Analysis: Statistical analysis was performed using the statistical package SPSS 17.0. For each continous variable normality was checked by Kolmogorov-Smirnov and Shapiro-Wilk tests and by histograms. Body weight and other pre-post measure data were analyzed with Repeated Measure Analysis. Since analysis of variance was significant, comparisons were applied using Paired T test and Wilcoxon Test. Values of $p<0.005$ were considered statistically significant.

3. RESULTS

In the present study there was a statistically significant weight loss, but not in terms of fat tissue between the cases at the end of ramadan($p=0.0001$). That weight loss was higher in the male gender ($p= 0.016$). However three months after ramadan, the cases were found to have significant weight gain which exhibited itself as an increase in body fat ($p=0.0001$) That weight gain was higher in females ($p=0.015$). Weight gain did not continue but at the end of six months the cases did not return to their pre ramadan body weight and stil exhibited marked weight gain when compared to preramadan period.

The changes in weight and fat right after and at the third and sixth month point after ramadan are presented in tables

Table 1: Fat change at three months and six months after ramadan

Table 2: Fat change according to gender

Table 3: Weight change throughout the study

4. DİSCUSSİON

In our study, the cases lost significant weight at the end of ramadan. The fat tissue did not change. In literature some studies have shown minimal weight loss in ramadan which is quickly regained after ramadan[1]. A study on two groups, reports a small

weight gain in one and a small weight loss in the other[2].

Self reported weight gain in ramadan and self reported causes -which are large meals is also available[3]. A study on two groups of fasting and non fasting pregnant women showed a lesser weight gain and energy intake for fasting group but reported ramadan to have no significant adverse effects on the health of pregnant women.[4]

Table 1: Fat change at three months and six months after ramadan

	Mean+SD	Median	Min-Max	p
%fat before ramadan	31,2±6,5	32,2	18,7-44,1	Ref
%fat after ramadan	31,1±6,4	32,1	19,5-43,3	0,296
%fat 3 months after ramadan	32,2±6,3	32,7	19,6-44,2	0,0001
%fat 6 months after ramadan	32,3±6,4	33	20,0-44,5	0,0001

Table 2: Fat change according to gender

	Men		Women		
	Mean+SD	Min-Max	Mean+SD	Min-Max	p
%fat before ramadan	26,0±4,1	18,7-33,7	36,1±4,0	27,2-44,1	
%fat after ramadan	25,8±4,0	19,5-33,4	36,0±3,8	27,0-43,3	
%fat 3 months after ramadan	27,2±4,0	19,6-35,1	36,8±4,0	27,4-44,2	0,047
%fat 6 months after ramadan	27,2±4,2	20,0-35,4	37,1±3,9	27,7-44,5	

Table 3: Weight change throughout the study

Weight	N	Mean	Median	Min-max	p		
before ramadan	66	67,6±7,0	68,2	51,1-85,4	Ref		
after ramadan	66	66,2±6,7	66,4	49,8-84,6	0,0001	Ref	
3months after ram.	66	68,2±7,0	68,3	52,0-87,3	0,002	0,0001	Ref
6months after ram.	66	68,7±7,1	69,8	51,5-88,1	0,0001	0,0001	0,0001
%change after ram.	66	-2,0±1,7	-2,2	-7,2-2,8	Ref		
%change after 3 mo	66	0,9±2,2	1,3	-5,0-7,6	0,0001	Ref	
%change after 6 mo	66	1,7±,3	2,1	-5,5-8,4	0,0001	0,0001	

May meal skipping be a reason for weight gain? An association between weight gain and breakfast skipping has been reported which maybe linked to meal skipping in Ramadan[5-6-7]

There are reports of an inverse relationship between meal frequency and adiposity. The extensive work of Fabry and co-workers was the first to demonstrate an inverse relationship between habitual meal frequency and body weight in human subjects. It has been postulated that this may be explained by favourable effects of increased meal frequency on appetite control and possibly on gut peptides as well. On the other hand it has also been shown that such an association does not exist. [8]

That our cases exhibited significant weight gain three months after ramadan which was still lasting at the sixth month, necessitates a clarification. After fasting; an attenuated hyperphagic response was noted during refeeding in mice which was thought to be fasting induced. [9]

Similarly: previously obese mice after a diet period showed a markedly increased fasting induced hyperphagia which led to accelerated body weight gain as compared with otherwise matched controls[10].

Another study on rodents showed a hyperphagic state after intervention for weight loss[11]. It is known that a reduction in hepatic ATP generates a stimulus that triggers feeding behavior. Fasting has been shown to produce substantial reductions in liver ATP, ATP/ADP, and phosphorylation potential. These results show that liver energy production recovers slowly during refeeding with a time course that parallels the compensatory poliphagic change in eating behavior. [12]

When considering that dieting predisposes the lean (rather than the overweight or obese) to regaining more body fat than what had been lost (i.e. fat overshooting), it integrates the results derived from the re-analysis of body composition data on fat mass and fat-free mass (FFM) of experimental research on energy restriction and refeeding conducted on human subjects. These suggest that feedback signals from the depletion of both fat mass (i.e. adipostats) and FFM (i.e. proteinstats) contribute to weight regain through the modulation of energy intake and adaptive thermogenesis, and that a faster rate of fat recovery relative to FFM recovery (i.e. preferential catch-up fat) is a central outcome of body composition autoregulation in lean individuals. Such a temporal desynchronization in the restoration of the body's fat vs. FFM results in a state of hyperphagia that persists beyond complete recovery of fat mass and interestingly until FFM is fully recovered. However, as this completion of FFM recovery is also accompanied by fat deposition, excess fat accumulates. [13]

It has also been hypothesised that direct targeting of brain areas involved in the perception of food as a rewarding stimulus accounts for initial hyperphagia caused by high-fat diet (HFD). A change in the eating habits of our cases after Ramadan (preferring HFD) may be a reason for hyperphagia and weight gain. [14]

During the course of HFD anhedonia, anxiety and sensitivity to stressors develops which perpetuates high fat feeding and developement of obesity. Removal of HFD enhances stress responses and heightens vulnerability for palatable foods by increasing food-motivated behaviour. [15]

5. CONCLUSİON

Islam is a religion of peace. It is the last and most reliable of major religions. According to Quran the prophet Muhammad (SAV) first received relevations in the lunar month of Ramadan. Fasting is ordered not only for inflicting hunger or thirst on people but also for self-control and empathy for those who are less fortunate . Ramadan is a time of spiritual reflection, improvement and increased devotion and worship.

Healthy young hospital workers lost weight during Ramadan and started to gain weight after Ramadan and were heavier when compared to pre-Ramadan period six months later. This is thought to be the effect of a hyperphagic period taking place after fasting and/or change of eating habits to high fat diet during Ramadan.

Our study may be considered as the first to open insights to the aftermath of Ramadan fasting in terms of body weight change. A pitfall of this study is the lack of an age and health matched control group. The cases were thought to be controls of themselves. The field and the link between fasting and obesity is open for further studies.

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