ORIGINAL ARTICLE

Daud Fasting Effects on Haematological, Renal and Lipid Profile in Post Menopausal Women

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ABSTRACT

Background: The health benefits of Ramadan fasting have been extensively researched. Nevertheless, this fasting is only done in the month of Ramadan. Daud fasting then becomes an alternative to Sunnah fasting, to be performed outside the month of Ramadan. However, there is concern regarding the possibility of adverse effects of Daud fasting, especially for the elderly.
Aims: The purpose of this study is to find out the effects of Daud fasting on haematological parameters, renal function, urine ketones and lipid profile in post-menopausal women.
Methods: This research is quasi-experimental. The research subject consisted of two groups, one group consisting of nine post-menopausal women who performed Daud fasting, and the other group of ninepost-menopausal women who did not fast. Blood and urine sampling was done before fasting (first day) and last day of fasting (day 22nd). The data were analysed using a paired T test and Wilcoxon test, and then the independent T test to discover the differences between the two groups.
Results: Daud fasting did not result in any complaints for post-menopausal women. There were no differences to the routine blood parameters, renal function, urine ketones and Low Density Lipoprotein Cholesterol (LDL-C) levels between the groups of post-menopausal women who fast and do not. However, High Density Lipoprotein Cholesterol (HDL-C) levels were decreased significantly.
Conclusion: In a healthy condition, Daud fasting is safe to be performed by post-menopausal women. There were no differences to the routine blood parameters, renal function, urine ketones and Low Density Lipoprotein Cholesterol (LDL-C).
Key words: Daud fasting, post-menopause, haematological parameters, renal function, lipid profile

INTRODUCTION

Fasting is a religious ritual carried out by many religious communities around the world. Fasting in Islam involves abstaining from eating, drinking and doing *jima'* from dawn until sunset, with the intention of obeying God's command. In Islamic law, fasting is categorised into two groups, namely obligatory fasting and Sunnah fasting. An example of obligatory fasting is Ramadan fasting, while examples of Sunnah fasting are that performed in six days in Shawwal, Arafat fasting, three-day fasting in every mid-month, fasting on Mondays and Thursdays, Daud fasting and fasting in the month of Sha'ban. When Moslems perform fasting with a pure and sincere intention only because of Allah, they will feel the lessons and benefits of fasting, both for their physical and spiritual condition[1].

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There has been some research on the usefulness of Ramadan fasting for health, such as weight loss and the amelioration of lipid profile[2]. Ramadan fasting has an important role in controlling blood pressure, gastric, diabetes and smoking habits[3]. In healthy people, Ramadan fasting improves insulin sensitivity[4]. This fasting may also be beneficial to boost mood[5], while Sunnah fasting on Mondays and Thursdays improves the quality of life[6]. However, in Islam, Ramadan fasting outside the month of Ramadan is not allowed.

Daud fasting was often done by the Prophet David (Daud), i.e. fasting on one day and not fasting on the next day[7]. The Prophet Muhammad once said that Daud fasting has more of the virtue of Sunnah fasting than others[7]. It is also explained by Amr bin 'Aus that he had heard from Abdullah bin Amr Ibn' Ash that the Prophet Muhammad once narrated as written by H.R. Bukhori:

Fast one day and break on the other day, that is (known as) the fasting of Daud (AS). And that is the best fasting. I (Abdullah bin Amr' ra.) said: "I am capable of doing more than this," Thereupon the Messenger of Allah (SAW) said: "There is nothing better than this."

There has been no study of Daud fasting by the elderly. The functions of many organ systems decrease in the elderly (e.g., saliva production)[8].

Glucose levels become higher than normal because energy metabolism reduces in the liver[9]. They are at risk of many degenerative diseases and malnutrition[8]. This makes fasting a matter of concern. However, the decreased activity in the elderly causes an increase in body fat[10]. Therefore, the purpose of this study is to determine the effect of Daud fasting on haematological parameters, renal function, urine ketones and lipid profiles in post-menopausal women.

METHODS

The research design was a quasi-experimental. The study obtained a letter of ethical eligibility from the Research Ethics Committee of the Faculty of Medicine of UII number 20/Ka.Kom.Et/70/KE/V/2015. The research population consisted of a group of geriatrics in Kalasan, Sleman, Yogyakarta, Indonesia. The subject was determined by using convenient sampling that met the inclusion and exclusion criteria. The inclusion criteria were healthy women who were post-menopausal, performing Daud fasting for 22 days (11 days of fasting: day 2nd, day 4th, until day 22nd). Daud fasting is abstaining from eating, drinking and sexual intercourse from dawn until sunset. The exclusion criteria were taking medicine for dyslipidaemia within the last 3 months, taking vitamin C within the last 2 weeks, drinking alcohol, smoking and suffering from a specific illness. A total of 18 post-menopausal women were enrolled, 9 women who performed Daud fasting and 9 women who did not fast. All the participants had signed an informed consent form. During fasting, subjects were followed up by phone every week to check for any side effects.

Blood sampling in fasting group was done before fasting (first day) at 7 am before breakfast and last day of fasting (day 22nd) at 5 pm. Blood sampling on non-fasting group was performed on the first day and the 22nd day at 7 am before breakfast. All the samples were sent to the laboratory of the clinical pathology RSUP Dr Sardjito. The haematological examination used the automatic haematology analyser (Sysmex Xn1000) with impedance method. The analysis of lipid profile, creatinine and Blood Urea Nitrogen (BUN) used a spectrophotometer (Cobas 6000) with CHOD-PAP method for lipid profile analysis, enzymatic uricase methods for BUN analysis and Jaffe reaction on the examination of creatinine levels[11]. Meanwhile, urine ketones used rapid test methods.

Descriptive statistics were indicated by mean and standard deviation (95% confidence interval). The data analysis used the Paired-samples T test and Wilcoxon rank-sum test (depend on data distribution) to find out about changes in haematological parameters, renal function, weight and Body Mass Index (BMI) before and after Daud fasting for 22 days, as well as Fisher's exact test for the urine ketones parameter. The difference between fasting group and non-fasting group was examined by Independent-samples T test, or Mann-Whitney U test (depend on data distribution).

RESULTS

There were 23 subjects willing to participate in this research. Medical examinations were made of these 23 people, and 18 of those,with ages ranging from 49 to 64 years, were selected. Both groups had no history of chronic disease, and the results of the examination of blood pressure, electrocardiogram (ECG) and blood sugar were normal. There was no difference in the average of age, blood pressure and blood sugar levels between the fasting group and non-fasting group. The predominant educational level of the fasting group was senior high school, while the non-fasting group was mostly junior high school. The employment status of the fasting group was mostly housewife, and that of the non-fasting group was equally housewife/entrepreneur (Table 1).

The group of post-menopausal women who fasted did not experience any significant complaints, such as dizziness, weariness or dehydration. The respondents could perform activities as usual. The results of the blood chemistry test on the last day of fasting show that Daud fasting did not cause any changes or abnormal values of blood chemistry. Means of BUN level, serum creatinine level and urine ketones of the fasting group were normal. Changes in the levels of BUN, creatinine and urine ketones, compared to the non-fasting group, were not significant (Table 2).

Twenty-two days of Daud fasting significantly ($p < 0.05$) reduced weight, BMI, and the levels of LDL-C, respectively 1.15±1.2kg; 0.49±0.55kg/m^2 and 2.67±13.95mg/dl (Table 2). However, the changes in body weight, BMI and LDL-C levels did not differ from the respondents who did not fast. Lipid profile for HDL-C after Daud fasting significantly decreased ($p = 0.015$) and was significantly different from the group that did not fast, since their levels of HDL-C were increased (Table 2). There was no change in the haematological parameters before and after fasting, and there was no difference from the subjects who did not fast (Table 3).

Table 1 Baseline characteristics of subjects (n=18)

Characteristics	Fasting	No fasting	*p*
Age	55.11±3.96	56.67±5.57	0.5[a]
Last education level	Senior High school	Junior High School	0.124[c]
Occupation	housewife	Housewife/entrepreneur	1[c]
Systolic blood pressure, mmHg	120±11.18	132.89±30.14	0.67[a]
Diastolic blood pressure, mmHg	72.22±6.67	71.11±6	0.73[b]
Blood glucose level, mg/dl	129.67±21.66	132.89±30.14	0.8[a]

[a]Independent-samples T test, [b]Mann-Whitney, [c]Two-Sample Kolmogorov-Smirnov Test

Table 2 Changes in anthropometry and blood chemistry, fasting group and non-fasting group

	Fasting			Non-fasting group			*p* [a]	*p*[b]
	Before	After	Δ	Before	After	Δ		
Weight, kg	53.8±7.2	52.64±8	-1.15±1.28	62.64±4.5	62.07±4.1	-0.57±1.07	0.31	0.036*
BMI, kg/m²	22.84±2.93	22.35±3.31	-0.49±0.55	25.67±1.87	25.44±1.72	-0.57±1.07	0.3	0.028*
LDL-C, mg/dl	139.44±26.63	136.78 ±20.04	-2.67±13.95	147.56±53.72	146.55±48.88	-1±14.9	0.34	0.03*
HDL-C, mg/dl	65.44±11.63	57.44±10.06	-8±7.87	58.33±9.84	64.67±8.51	6.33±5	0.00*	0.021*
BUN, mg/dl	11.73±4.15	12.73±2.2	1±3.6	10.13±2.46	11.01±1.4	0.7±2.03	0.93	0.374
Creatinine,mg/dl	0.8±0.18	0.84±0.12	0.037±0.13	0.71±0.16	0.83±0.11	0.13±0.15	0.209	0.59
Urine ketones	negative	positive (+1) for two participants		negative	negative		0.471	

[a]The difference between fasting and non-fasting (Independent-samples T test, Mann-Whitney U test or Fisher test)
[b]The difference after and before fasting (Paired-samples T test or Wilcoxon rank-sum test)
Δ After minus before; *significant (p<0,05)

Table 3 Changes in haematology parameter

	Fasting			Non-fasting group			*p* [a]	*p*[b]
	Before	After	Δ	Before	After	Δ		
Leucocyte, /mm^3	6.45±1.41	6.84±1.2	0.39±1.13	5.83±2.16	6.68±1.34	1.03±1.89	0.25	0.328
Erythrocyte, /mm^3	4.15±0.42	4.22±0.44	0.07±0.18	4.49±0.44	4.42±0.49	-0.07±0.49	0.425	0.207
Haemoglobin, gr/dl	12.27±1.0	12.35±1.07	0.09±0.46	12.45±1.12	12.65±1.18	0.2±0.41	0.72	0.582
Haematocrit, %	36.2±2.76	37.15±3.13	0.95±1.35	37.16±3.3	37.21±3.45	0.04±2.79	0.391	0.067
Platelet, /mm^3	303.7±100.9	255.4±104.8	-48.33±139	202.33±77.01	186±80.89	-16.33±98.4	0.895	0.329
Neutrophil, %	55.4±10.65	56.6±12.32	1.17±7.93	51.31±10.17	51.07±8.34	-0.24±11.81	0.77	0.671
Lymphocyte, %	33.81±10	32.25±10.86	-1.56±6.23	37.92±8.55	39±39±7.74	1.47±9	0.453	0.475
Monocyte, %	7.41±1.82	7.38±1.48	-0.02±1.56	5.98±1.74	5.84±1.57	-0.13±1.67	0.886	0.967
Eosinophil, %	2.94±1.7	3.2±2.5	0.26±1.15	3.79±3.54	3.16±2.23	-0.63±2.62	0.366	0.523
Basophil, %	0.39±0.26	05.5±0.22	0.17±0.16	0.33±0.22	0.54±0.25	0.21±0.31	0.93	0.013*

Data were presented as mean ± SD (95%CI); Δ after minus before; *significant (p<0.05)
[a]The difference between fasting and non-fasting (Independent-samples T test, Mann-Whitney U test or Fisher test)
[b]The difference after and before fasting (Paired-samples T test or Wilcoxon rank-sum test)

DISCUSSION

The findings of this study indicate that Daud fasting by the elderly does not lead to excessive gluconeogenesis effects and metabolic acidosis. It was noted that the urine ketones in the fasting group were still within normal limits and participants didnot feel physically weak. Previous studies showed an increase of fatty acid synthesis and gluconeogenesis enzyme in the elderly who fasted[12] so the urine ketones in the elderly who fasted were higher than in young adults[13]. The longer the fasting time, the higher the levels of ketones[14]. However, Daud fasting was only performed for 14 hours, so it has not led to an increased level of ketones. These results show that the ratio of BUN to creatinine was above 12 mg/dl, meaning that there was no liver failure, no low-protein diet or no hunger[15]. On the day of fasting, participants ate and drank at 4am and 6pm. Unfortunately, the limitations of this study did not calculate the proportion of water, fat, protein and carbohydrate intake.

Daud fasting in the elderly did not lead to dehydration or a decline in renal function. BUN and creatinine levels are still within normal limits. In addition, they were not significantly different between the fasting and non-fasting groups. Previous research on young adults performing Ramadan fasting shows that there is no change in urea or creatinine levels[16]. Even in patients with kidney transplants, there is no difference before and after Ramadan fasting[17] and there is no difference with patients undergoing kidney transplantation who do not fast[18]. Research on the elderly shows an increase in BUN and creatinine after Ramadan fasting in those with cardiovascular disease risk but still within the normal limits[19]. Ramadan fasting is abstain from food and drink from sunset to sunrise every day during one month but Daud fasting is only every other day.

Fasting has been extensively verified as very beneficial for health. It can improve the immune system, prevent cancer and improve memory, mood and quality of life[5,6]. Fasting could be expected to prevent ageing due to a decreased risk of the incidence of degenerative diseases. The results of this research indicate that Daud fasting done for 22 days by healthy geriatric women can reduce weight, BMI and LDL-C level although statistically the decrease is not different from those who do not fast. Previous research on the elderly also shows a decrease in BMI, although not significantly[19]. In addition, the HDL-C levels decrease significantly after Daud fasting but still within normal limits. This may be due to a change in the dietary composition during fasting. There was no significant changes in LDL/HDL cholesterol ratio after Daud fasting. The LDL/HDL cholesterol ratio>3 indicate cardiovascular risk, but this ratio after fasting was only 2.4±0.66[20]. Other research shows that there are still variations in the levels of HDL-C and LDL-C after Ramadan fasting, but there is a tendency for fasting to have good effects, i.e. a decrease in the levels of LDL-C and an increase in the levels of HDL-C[21].

There were no significant differences in haematological parameters except basophil, and this was still within normal limits. Other research by Furuncoglo*et al*[22] shows that haemoglobin decreases and is significantly different after Ramadan fasting and lymphocytes increase significantly, but haematocrit, total leukocytes, platelets and granulocytes are not significantly different. In young adult athletes who exercise 2–3 hours a day, fasting does not change the value of the normal white blood cell count (WBC), lymphocytes and neutrophil. Instead, it increases the value of C4 and immunoglobulin A, meaning that fasting can actually be protective because it improves the immune system[23].

CONCLUSION

There were no differences to the routine blood parameters, renal function, urine ketones and Low Density Lipoprotein Cholesterol (LDL-C).Daud fasting is safe to be performed by healthy post-menopausal women, but the composition of the meal and break should include adequate macronutrients and micronutrients, because there is a tendency to malnutrition in the elderly.

Conflict of interest: The author has nothing to disclose

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REFERENCES

1. Albirr Foundation UK. Aṣ-ṣawm (Il digiuno). Milano: Albirr Foundation; 2008.
2. Mazidi M, Rezaie P, Chaudhri O, Nematy M. The effect of Ramadan Fasting on Cardiovascular Risk Factors and Anthropometrics Parameters: A Systematic Review. Pakistan J Med Sci. 2015;31.
3. Rahman O, Islam MR. Association between fasting of Ramadan and risk factors of diabetes: A study from Rajshahi city in Bangladesh. Adv J Food Sci Technol 2011;3:360–65.
4. Gnanou JV, Caszo BA, Khalil KM, Abdullah SL, Knight VF, Bidin MZ. Effects of Ramadan fasting on glucose homeostasis and adiponectin levels in healthy adult males. J Diabetes Metab Disord 2015;14:55.
5. Fond G, Macgregor A, Leboyer M, Michalsen A. Fasting in mood disorders: neurobiology and effectiveness. A review of the literature. Psychiatry Res 2013;209:253-8.
6. Islami N, Fahmi M, Shahar S, Das SK, Taha CSC, Ngah WZW. Efficacy of fasting calorie restriction on quality of life among aging men. Physiol Behav 2011;104:1059-64.
7. Aminati A. Recommendation of Daud fasting in Hadith (study about the optional of Daud fasting and its benefits).UIN Walisongo;2015.
8. Amarya S, Singh K, Sabharwal M. Changes during aging and their association with malnutrition. J Clin Gerontol Geriatr. 2015;6:78-84.
9. Verburgh K. Nutrigerontology: why we need a new scientific discipline to develop diets and guidelines to reduce the risk of aging-related diseases. Aging Cell2015;14:17-24.
10. JafariNasabian P, Inglis JE, Reilly W, Kelly OJ, Ilich JZ. Aging human body: changes in bone, muscle and body fat with consequent changes in nutrient intake. J Endocrinol. April 2017:JOE-16-0603.
11. Burtis CA, Ashwood E, Bruns D. Tietz Fundamentals of Clinical Chemistry. Elsevier; 2008.
12. Spindler SR, Dhahbi JM, Mote PL. Protein turnover, energy metabolism, aging, and caloric restriction. In: Advances in Cell Aging and Gerontology 2003;14:69-86.
13. Foster KJ, Alberti KG, Hinks L, Lloyd B, Postle A, Smythe P,et al. Blood intermediary metabolite and insulin concentrations after an overnight fast: reference ranges for adults, and interrelations. Clin Chem. 1978;24:1568–72.
14. Nicholson JK, O'Flynn MP, Sadler PJ, Macleod AF, Juul SM, Sönksen PH. Proton-nuclear-magnetic-resonance studies of serum, plasma and urine from fasting normal and diabetic subjects. Biochem J 1984;217:365–75.
15. Sacher RA, McPherson R. Widmann's Clinical Interpretation of Laboartory Tests. 11th ed. Philadelphia.: Davis Company; 2008.
16. Cheah SH, Ch'Ng SL, Husain R, Duncan MT. Effects

of fasting during Ramadan on urinary excretion in Malaysian Muslims. Br J Nutr 1990;63:329–37.
17. Salem EE, Akhili IM, Akikli AB. The effect of Ramadan fasting on the kidney function of renal transplant recipients. Arab J Nephrol Transplant 2010;3:29–32.
18. Hejaili F, Qurashi S, Binsalih S, Jaradt M, Al Sayyari A. Effect of Repeated Ramadan Fasting in the Hottest Months of the Year on Renal Graft Function. Nephrourol Mon 2014;6.
19. Baccouche H, Hellara I, Khochtali I, Grissa MH, Boubaker H, Beltaief K et al. Ramadan fasting effects on metabolic parameters in elderly persons with cardiovascular risk factors. J Aging Res Clin Pract 2014;3:200-5.
20. Millán J, Pintó X, Muñoz A, Zúñiga M,Rubiés-Prat J,Pallardo LF, et al. Lipoprotein ratios: Physiological significance and clinical usefulness in cardiovascular prevention. Vasc Heal Risk Manag 2009;5:757–65.
21. Trepanowski JF, Bloomer RJ. The impact of religious fasting on human health. Nutr J 2010;9:1-9.
22. Furuncuoglu Y, Karaca E, Aras S, Yonem A. Metabolic, Biochemical, and Psychiatric Alteratios in Healthy Subjects During Ramadan. Pakistan J Nutr. 2007;6(3):209-211.
23. Khazaei HA, Bokaeian M, Jalili A. The Effect of Fasting on the Immune System of Athletes during Holly Ramadan. Zahedan J Res Med Sci 2014;16:44–6.