

a career in primary care. Whether one is involved in primary education or practicing clinically, this information should be a reminder of the potential impact of these activities. If more medical students and residents within the United States are encouraged to gain international experience in health care, could it decrease the shortage of primary care physicians?

Acknowledgments: The opinions and assertions contained herein are the private views of the author and are not to be construed as official or as reflecting the views of the US Air Force Medical Department or the US Armed Forces at large.

Philip M. Flatau, MD, FS
Eglin Air Force Base Family Medicine
Residency
Eglin AFB, FL

REFERENCES

1. Thompson MJ, Huntington MK, Hunt D, Pinsky LE, Brodie JJ. Educational effects of international health electives on US and Canadian medical students and residents: a literature review. *Acad Med* 2003;78:342-7.
2. Association of American Medical Colleges. 2007 Graduation questionnaire. www.aamc.org/data/gq. Accessed August 27, 2009.
3. Haq C, Rothenberg D, Gjerde C, et al. New world views: preparing physicians in training for global health work. *Fam Med* 2000;32(8):566-72.
4. Bissonette R, Route C. The educational effect of clinical rotations in nonindustrialized countries. *Fam Med* 1994;26(4):226-231.
5. Smith JK, Weaver DB. Capturing medical students' idealism. *Ann Fam Med* 2006;4:S32-S37.
6. Drain PK, Primack A, Hunt D, Fawzi WW, Holmes KK, Gardner P. Global health in medical education: a call for more training and opportunities. *Acad Med* 2007;82:226-30.
7. Godkin M, Savageau J. The effect of medical students' international experiences on attitudes toward serving underserved multicultural populations. *Fam Med* 2003;35(4):273-8.
8. Feldman K, Woloschuk W, Delva D, Brenneis F, Wright B, Scott I. The difference between medical students interested in rural family medicine versus urban family or specialty medicine. *Can J Rural Med* 2008;13:73-9.
9. Gupta AR, Wells CK, Horwitz RI, Bia FJ, Barry M. The international health program: the fifteen-year experience with Yale University's internal medicine residency program. *Am J Trop Med Hyg* 1999;61:1019-23.
10. Pust RE, Moher SP. A core curriculum for international health: evaluating ten years' experience at the University of Arizona. *Acad Med* 1992;67:90-4.
11. Ramsey AH, Haq C, Gjerde CL, Rothenberg D. Career influence of an international health experience during medical school. *Fam Med* 2004;36(6):412-6.

New Research

Effect of Weekly Fasting on Blood Lipid Levels

To the Editor:

Residency programs with research mentors are more likely to have high overall research productivity.¹ This letter presents clinical research done by faculty within a residency program modeling research behavior for residents. The work was based on a clinical question posed by a faculty member and discussed within the residency: How does abstaining from food and drink in a regular pattern impact blood lipids? Evidence suggests that fasting has favorable effects on blood lipid levels, based on research performed on subjects participating in fasting as a part of the Muslim observance of Ramadan.²⁻⁶ Based on a review of the literature, there are no studies on the physiological or biological effects of abstaining from food for ≥ 24 -hour periods on a regular basis. This form of fasting is practiced within some religious circles as a discipline of their faith, and there are weight loss diets that ascribe to such forms of fasting.

The specific aim of this prospective study was to measure lipid levels after regular fasting in healthy males ages 35-55 years. We hypothesized there would be favorable changes in lipid profiles, primarily increases in high density lipoprotein (HDL).

Methods

We enrolled a total of 10 Caucasian males ages 40-54 who agreed to fast for a 24-hour period once a week for 8 weeks. Blood pressure and weight were recorded and blood was drawn at the initial visit, after 4 weeks of fasting and after a total of 8 weeks of fasting. Nine of the subjects had at least one set of complete lab results. Desirable lipid values are HDL ≥ 40 mg/dL, HDL-2 sub-class (large, buoyant, most heart protective) >10 mg/dL,

and HDL-3 sub-class (small, dense, less protective) >30 mg/dL.

We used unidirectional *t* tests to determine if the group improved over time. Where appropriate (ie, LDL levels), we tested the null hypotheses that difference in scores were greater than or equal to zero. That is, improvement was defined as a negative score. When improvement was reflected by a positive difference (HDL levels), we tested the null hypotheses that scores were less than or equal to zero.

Results

The mean age of participants was 46 years, mean weight at the start of study was 200 pounds, and mean BMI was 28.23 (range 22.32-33.23). There was no significant change in weight or blood pressure during the study. On average, participants began the study with lipid panel results mainly within the normal range. The total HDL (34.7mg/dL \pm 3.7), HDL-2 (7.9mg/dL \pm 1.6), and HDL-3 (12.9mg/dL \pm 1.3) were not within desirable range at the start of the study. LDL, VLDL, and triglycerides did show decreases during the study, but changes did not reach statistical significance. HDL-2 levels showed statistically significant increases during the first 4-week study period ($P=.04$) but only a trend upward overall ($P=.07$). The final HDL-2 value was 10.2mg/dL (± 3.7), a level in the desirable range for heart health. Total HDL trended upward as well ($P=.06$), going up to 39.8mg/dL (± 8.2). Overall, HDL increased 15%, HDL-2 increased 28%, and HDL-3 increased 11%, whereas LDL decreased 9%, triglycerides decreased 5%, and Lp(a) decreased a dramatic 43%.

Discussion

The lack of more statistically significant results in this study is related to several factors, including the general good health of the subjects, small sample size, and the consequential influence that any single individual's condition

may have on average scores. Study results do suggest that regular fasting improves the most protective form of good HDL cholesterol, and a significant decrease was seen in Lp(a), the primary component of LDL. Additional studies need to be done to further elucidate the relationship between fasting and cholesterol levels.

Sally P. Weaver, PhD, MD

Daly Dietrick, MD

Waco Family Medicine Residency

Program

Waco, TX

Cindy Passmore, MA

Faculty Development Center

McLennan County Medical Education

and Research Foundation

Waco, TX

Corresponding Author: Address correspondence to Dr Weaver, Waco Family Medicine Residency Program, 1600 Providence Drive, Waco, TX 76707. 254-750-8214. sallyweaver@me.com.

REFERENCES

1. Mills OF, Zyzanski SJ, Flocke S. Factors associated with research productivity in family practice residencies. *Fam Med* 1995; 27(3):188-93.
2. Adlouni A, Ghalim N, Benslimane A, Lecerf JM, Saile R. Fasting during Ramadan induces a marked increase in HDL cholesterol and decrease in LDL cholesterol. *Ann Nutr Metab* 1997;41(4):242-9.
3. Aksungar FB, Eren A, Ure S, Teskin O, Ates G. Effects of intermittent fasting on serum lipid levels, coagulation status and plasma homocysteine levels. *Ann Nutr Metab* 2005;49(2):77-82. Epub 2005;March 29, 2005.
4. Maislos M, Abou-Rabiah Y, Zuili I, Iordash S, Shany S. Gorging and plasma HDL-cholesterol—the Ramadan model. *Eur J Clin Nutr* 1998;52(2):127-30.
5. Maislos M, Khamaysi N, Assali A, Abou-Rabiah Y, Zvili I, Shany S. Marked increase in plasma high-density-lipoprotein cholesterol after prolonged fasting during Ramadan. *Am J Clin Nutr* 1993;57(5):640-2.
6. Rahman M, Rashid M, Basher S, Sultana S, Nomani MZ. Improved serum HDL cholesterol profile among Bangladeshi male students during Ramadan fasting. *East Mediterr Health J* 2004;10(1-2):131-7.

This Letters to the Editor column was edited by Joseph Scherger, MD, MPH