

Invited commentary

Religion, diet and research

Religion seeks its expression in diet, and for many individuals dietary practices reflect religious persuasion. Most religions have dietary norms or instructions. For some religions these precepts are very specific about what, how and when to eat or avoidance of certain foods. In his essay 'Religion, spirituality and a vegetarian dietary', Blix (2001) noted: 'Since the dawn of civilization, there has been an inexorable intertwining of food and religion. The earliest of recorded history is rife with the interconnections. The plethora of cultures with their divergent practices and behaviors still share this one commonality, for humans seem incapable of separating nourishment of the body from sustenance for the soul.' The connection between diet and religion remains present among many large segments of the populations of developed as well as developing countries.

A detailed description of dietary instructions by world religions is beyond the scope of the present commentary. However, most religious dietary precepts fall into two general categories: (1) a temporal abstinence from all or certain foods (fasting); (2) stable and distinctive dietary habits that differ from the general population. Most, but not all, religious diets proscribe a variety of foods on a temporal or permanent basis, and thus those diets become restrictive in nature. In the context of a specific religious diet, a series of sequential questions need to be addressed. How nutritionally adequate is a religious diet? Is it healthy? Perhaps more interestingly, does following a particular religious dietary pattern lead to better health? In the case of a seemingly affirmative answer, how should the purported health effect of the diet be disentangled from other healthful habits of the religious group? The scientific scrutiny of religious diets is relevant to nutritionists, because it helps optimize nutrition for those who choose to follow such diets and improves our overall understanding of diet and health.

The practice of going without food at certain times is called fasting, from the Anglo-Saxon *fasten* or to hold oneself from food. Fasting is defined as abstinence from food, partial or total, or from proscribed foods. Ancient Chinese and Hindu writings contemplate this practice; Jews, Christians and Muslims have observed fasting rituals for millennia. However, little is known of their nutritional and health effects. Muslims practise diurnal fasting, refraining from all food and drink in the light hours of the day during the month of Ramadan. Some Christians practise a modified fast, refraining from a variety of foods, many of animal origin, on certain days of the week or for longer periods.

The present issue of the *British Journal of Nutrition* contains a report on a study by Sarri *et al.* (2004), assessing the nutritional characteristics and adequacy of Greek Orthodox Christian diets during the annual fasting seasons. The Orthodox Church specifies avoidance of meats, dairy products and eggs during their three fasting seasons, which total more than 180 d per year. Thus, devout followers of these dietary instructions become 'de facto' vegetarians for more than half of the year, every year. In the study of Sarri *et al.* (2004), the diet of sixty subjects adhering to church dietary restrictions was compared with matched controls, who did not follow them at all. The study allowed two types of comparisons: fasters and controls, and among the fasters, pre- to post-fasting values. Interestingly, the overall diet of the faithful adherents was higher in fibre and most micronutrients except Ca, and lower in total and saturated fat, *trans* fatty acids and total energy than the non-fasting controls. Thus, the overall nutrient intake profile of those who fasted regularly was more favourable. Moreover, important changes in food intake patterns could be observed among adherents to the church dietary recommendations. Compared with their regular diet, during the fasting periods, the absence of meats, dairy and eggs in the diet was compensated by a fourfold increase in the intake of legumes and moderate increases of fruits and vegetables, potatoes and cereals. In addition, the intakes of pastries and alcohol decreased. The direction of all these changes in food intake is in accordance with current dietary guidelines for chronic disease prevention (Potter, 1997; Nutrition Committee, 2000).

In a previous paper concerning the same study, the authors reported a decrease in BMI and improvements in the serum lipid profile of Greek Orthodox fasters at the end of the fasting seasons, but serum lipid values reversed somewhat during their non-fasting periods (Sarri *et al.* 2003). Beneficial changes in serum apoproteins and lipoproteins have been reported among hyperlipidaemic subjects while fasting during Ramadan (Adlouni *et al.* 1997; Akanji *et al.* 2000). However, in other studies serum lipids did not change (Maislos *et al.* 1998; Temizhan *et al.* 2000). Unfavourable changes in the lipid profile of diabetic patients have been observed during the Ramadan fast, probably due to changes in diet and biochemical responses to fasting (Yarahmadi *et al.* 2003). Thus, in a society of plenty, temporal abstinence from animal foods may result in adequate diets demonstrating some health benefits in normal adults. Diurnal total fasting may be appropriate for the healthy, but offers some challenges for the ill.

Within a given society, the contrast of dietary habits between certain religious groups and the general population offers research opportunities. Indeed, some religious groups have been considered 'a natural experiment', a place to test the relationship between particular dietary habits and health-disease outcomes. The Seventh-Day Adventists, a widely studied religious group with distinctive diet and lifestyle, are perhaps the best example. More than 300 reports have been published in the scientific literature describing their diet and health effects (Loma Linda University Adventist Health Study, 2004). The Adventist Church proscribes the use of tobacco and alcohol and the consumption of biblically unclean foods, such as pork and shellfish. In addition, the church recommends consumption of fruits, vegetables, wholegrain cereals, legumes and nuts, and avoidance of meats, heavy desserts, condiments and stimulant drinks (White, 1938). In light of these recommendations, about half of the Adventists in the USA are vegetarian or eat meat less than once per week. However, the proportion of vegetarian Adventists in other countries is < 50%. Adventists follow other food recommendations to varying degrees. Vegetables, nuts, fruits and legumes are, on average, eaten more often than in the general population; however, some Adventists consume very little of these foods.

The wide range of dietary habits coupled with no use of tobacco or alcohol make Adventists a very attractive study population (Willett, 2003). The former increases the statistical power to investigate dietary hypothesis and the latter reduces the possibility of confounding by these lifestyle factors. A recent book compiles and summarizes the finding of the epidemiological studies conducted among Adventists (Fraser, 2003). Early studies of Adventists in several countries documented the distinct diets of this religious group and the differences in disease rates compared with the general population of the respective countries (Phillips *et al.* 1980; Fraser, 2003). In general, overall mortality, CVD and cancer rates were substantially lower among Adventists, which may be because of their diet or other lifestyle factors. Subsequent studies have revealed that vegetarian Adventists have lower rates of hypertension, diabetes, heart diseases and some cancers, and have greater longevity than non-vegetarian Adventists (Sabaté, 2001; Fraser, 2003). Beyond establishing the adequacy and health benefits of some vegetarian diets, conducting research in this religious group has proven to be a fruitful field of nutritional investigation. Adventist Health Study researchers were the first to discover the many relationships between diet and disease. For instance, the consumption of nuts or wholewheat bread reduces the risk of heart disease (Fraser *et al.* 1992) and tomato consumption reduces the risk of prostate cancer in men (Mills *et al.* 1989).

A central rationale in the scientific inquiry of religious diets is that the biological and metabolic mechanisms of diet and health-disease associations in religious people are the same as those in non-religious ones; thus, much of what is learned in this area of research should be applicable to the general population. Whether for 'holy' religious precepts, 'solemn' public health recommendations or 'simple' common sense advice from our mothers or

neighbours, consuming a healthy diet, regardless of the reason, results in better health for anyone.

Joan Sabaté

Department of Nutrition
School of Public Health
Loma Linda University
Loma Linda
CA 92350
USA

jsabate@sph.illu.edu

References

- Adlouni A, Ghalim N, Benslimane A, Lecerf JH & Saile R (1997) Fasting during Ramadan induces a marked increase in high-density lipoprotein cholesterol and decrease in low-density lipoprotein cholesterol. *Ann Nutr Metab* **41**, 242–249.
- Akanji AO, Mojiminiya OA & Abdella N (2000) Beneficial changes in serum apo A-I and its ratio to apo B and HDL in stable hyperlipidaemic subjects after Ramadan fasting in Kuwait. *Eur J Clin Nutr* **54**, 508–513.
- Blix G (2001) Religion, spirituality, and a vegetarian dietary. In *Vegetarian Nutrition*, pp. 507–532 [J Sabaté, editor]. Boca Raton, FL: CRC Press.
- Fraser GE (2003) *Diet, Life Expectancy and Chronic Disease, Studies of Seventh-Day Adventists and Other Vegetarians*. New York: Oxford University Press.
- Fraser GE, Strahan TM, Sabaté J, Beeson WL & Kissinger D (1992) Effects of traditional coronary risk factors on rates of incident coronary events in a low-risk population: The Adventist Health Study. *Circulation* **86**, 406–413.
- Loma Linda University Adventist Health Study (2004) Bibliography of Health-related Research Studies among Seventh-Day Adventists. <http://www.llu.edu/llu/health/abstracts> (accessed 30 May 2004).
- Maislos M, Abou-Rabiah Y, Zuili I, Lordash S & Shany S (1998) Gorging and plasma HDL-cholesterol – the Ramadan model. *Eur J Clin Nutr* **52**, 127–130.
- Mills PK, Beeson WL, Phillips RL & Fraser GE (1989) Cohort study of diet, lifestyle, and prostate cancer in Adventist men. *Cancer* **64**, 598–604.
- Nutrition Committee (2000) American Heart Association (AHA) dietary guidelines. Revision, 2000: a statement for healthcare professionals. *Circulation* **102**, 2284–2299.
- Phillips RL, Garfinkel L, Kuzma JW, Beeson WL, Lotz T & Brin B (1980) Mortality among California Seventh-Day Adventists for selected cancer sites. *J Natl Cancer Inst* **65**, 1097–1107.
- Potter JD (1997) *Food, Nutrition and the Prevention of Cancer: A Global Perspective*. London: World Cancer Research Fund and Washington, DC: American Institute of Cancer Research.
- Sabaté J (editor) (2001) *Vegetarian Nutrition*. Boca Raton, FL: CRC Press.
- Sarri KO, Lindardakis MK, Bervanaki FN, Tzanakis NE & Kafatos AG (2004) Greek Orthodox fasting rituals: a hidden characteristic of the Mediterranean diet of Crete. *Br J Nutr* **92**, 277–284.
- Sarri KO, Tzanakis NE, Linardakis MK, Mamalakis GD & Kafatos AG (2003) Effects of Greek orthodox Christian church fasting on serum lipids and obesity. *BMC Public Health* **3**, 16.
- Temizhan A, Tandogan I, Donderici O & Demirbas B (2000) The effects of Ramadan fasting on blood lipid levels. *Am J Med* **109**, 341–342.

White EG (1938) *Counsels on Diet and Foods*. Washington, DC: Review and Herald.

Willett W (2003) Lessons from dietary studies in Adventists and questions for the future. *Am J Clin Nutr* **78**, 539S–543S.

Yarahmadi SH, Larijani B, Bastanhigh MH, *et al.* (2003) Metabolic and clinical effects of Ramadan fasting in patients with type II diabetes. *J Coll Physicians Surg Pak* **13**, 329–332.