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HEALTH BENEFITS OF DAIRY FOODS FOR MINORITIES

SUMMARY

Minorities — African Americans, Hispanics, American Indians, Alaska Natives, Asians, Native Hawaiians, and other Pacific Islanders – are expected to increase from about 25% of the U.S. population to nearly 50% by 2050. Growth in this segment of the population is raising awareness of disparities in health between minorities and Whites and is presenting new challenges for health professionals.

Many minorities are at higher risk for major chronic diseases (e.g., hypertension, stroke, obesity) than Whites. Consumption of dairy foods and dairy food nutrients (e.g., calcium) may help to reduce the risk for some of the chronic diseases disproportionately affecting minority groups. Unfortunately, dairy food intake is low for many minorities. Because milk and other dairy products are the major source of calcium, low intake of these foods among minorities compromises their calcium status.

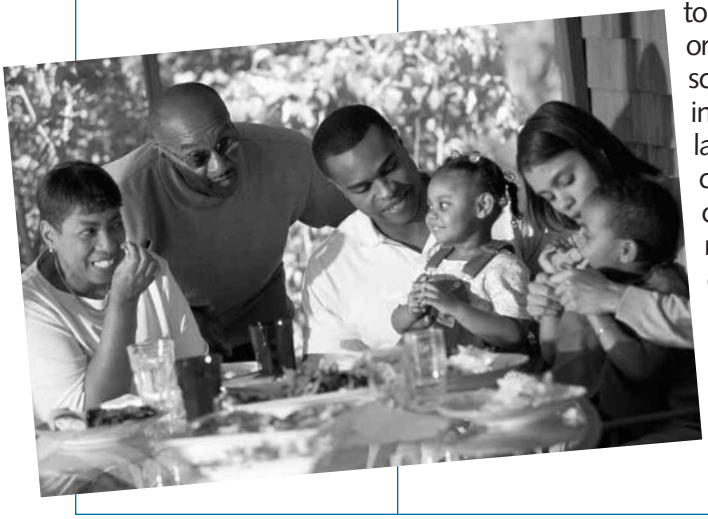
A variety of factors likely contribute to minorities' low intake of dairy foods. Lactose intolerance is cited most often as the reason minorities avoid or limit intake of dairy foods. Although many minorities are lactose maldigesters (i.e., have low levels of the enzyme, lactase, necessary to digest lactose or milk's sugar), scientific studies indicate that most lactose maldigesters can comfortably consume recommended intakes of dairy foods. In fact, consuming lactose improves lactose digestion.

For minorities (and non-minorities) who are lactose intolerant, smaller servings of milk consumed with meals, yogurts with live active cultures, aged hard cheeses, and lactose-free or -reduced dairy products are generally well tolerated.

Considering dairy's beneficial roles in health, it is important for minorities to include recommended servings of these foods in their diet. The blood pressure-reducing effect of the low fat DASH (Dietary Approaches to Stop Hypertension) diet, which is rich in lowfat dairy foods, fruits, and vegetables, is twice as beneficial for African Americans as for Whites. Intake of dairy foods is also associated with reduced risk for stroke, a disease prevalent among African Americans and Hispanics.

Although African American women may be at lower risk for osteoporosis than other minority populations, their risk increases with aging of the population. Further, the consequences of osteoporotic-related fractures are more serious for African American women than for White women. Consuming calcium-rich foods such as dairy products, adequate intake of vitamin D (e.g., as found in vitamin D-fortified milk), and regular physical activity are lifestyle strategies to help prevent osteoporosis in minorities and non-minorities alike. New research indicates that calcium, especially from dairy foods, may help to control body fat, thereby reducing risk for obesity, a disease prevalent among many minorities.

The development of effective dietary interventions to improve minorities' calcium and overall nutritional status requires health professionals to become sensitive to the ethnic and cultural-specific dietary behavioral patterns of diverse minority groups. D



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INTRODUCTION

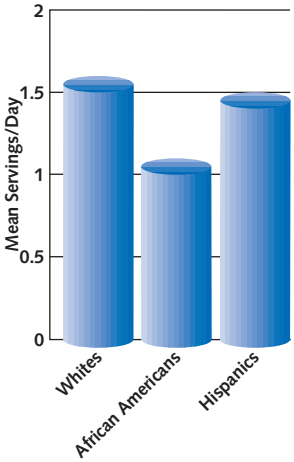
Racial and ethnic minority groups make up a larger share of the U.S. population than ever before (1). These groups include African Americans, Hispanics (i.e., Mexican Americans, Puerto Ricans, Cuban Americans), American Indians and Alaska Natives, Asians, and Native Hawaiian and other Pacific Islanders (2). Although African Americans are now the country's largest minority group, by 2010 the Hispanic population is expected to outnumber African Americans. The Asian American population and, to a lesser extent, the Indian and Alaskan Native population are also experiencing increases in growth (3).

The rise in culturally distinct groups in the U.S. is increasing awareness of their health, and, in particular, health disparities between minorities and Whites (4). Compared to Whites, many minority population groups face higher risks for several major chronic diseases such as coronary heart disease, hypertension, stroke, diabetes, obesity, and some cancers (5-7). A major goal of the U.S. Department of Health and Human Services' *Healthy People 2010* is to eliminate health disparities based on race and ethnicity (4).

Accumulating scientific research indicates that consumption of dairy foods and dairy food nutrients such as calcium helps to protect against some chronic diseases disproportionately threatening many minority groups (8). For example, the Dietary Approaches to Stop Hypertension (DASH) study found that a low fat diet rich in lowfat dairy foods, fruits, and vegetables was twice as effective in reducing blood pressure in African American groups as in Whites (9,10). Unfortunately, some minority groups avoid dairy products because of perceived or real lactose intolerance, thereby limiting their intake of calcium and other essential nutrients for health (8,11). Yet, research demonstrates that most minorities such as African Americans with lactose maldigestion can consume a dairy-rich diet without developing symptoms of intolerance (11,12). This *Digest* reviews minorities' consumption of dairy foods and dairy food nutrients, in particular calcium; barriers to consuming a dairy rich diet; and dairy's role in reducing risks for some major chronic diseases afflicting minorities.

Considering many minorities' low intake of calcium and high risk for calcium deficiency-related diseases, efforts need to be made to encourage minorities to consume calcium-rich dairy products.

Figure 1. Mean Number of Servings of Dairy Products Consumed/Day (16)*



*USDA's *Food Guide Pyramid* recommends 2 to 3 servings of dairy products/day.

MINORITIES' CONSUMPTION OF DAIRY FOODS AND DAIRY FOOD NUTRIENTS

Dairy food intake varies among and within racial and ethnic minority groups and is influenced by factors such as the degree of acculturation to dominant American cultural beliefs and values (13-16). When compared to USDA's *Food Guide Pyramid* (17), African Americans consume fewer servings of dairy foods/day than Whites, Mexican Americans, or other Hispanic groups (16, Figure 1). However, all groups fail to meet Pyramid recommendations of 2 to 3 servings of dairy foods/day (16). Ethnic and racial differences in dairy food intake are evident in childhood (18,19). A recent investigation found that African American children consumed 40% fewer servings of dairy foods/day than White children (18).

Relatively little information is available regarding the dairy food intake of other minority groups such as Asian/Pacific Islanders, American Indians, and Alaska Natives. Dairy products are not part of the traditional Korean or Chinese diets (14,15). However, dairy food intake of Korean and Chinese Americans increases with acculturation or length of stay in the U.S. (14,15). Alaska Natives are reported to consume milk infrequently, except in coffee or tea (20).

Milk and other dairy products are the major dietary source of calcium, providing 72% of the calcium available in the U.S. food supply (21). Few other foods provide calcium naturally in such concentrated amounts. In addition, milk and other dairy products provide substantial amounts of other essential nutrients including protein, vitamin D (if fortified), riboflavin, niacin, vitamin B_{12}, vitamin A, phosphorus, and potassium (21). As such, intake of dairy foods improves the overall nutritional quality of the diet (22-24). This is especially important for some minority groups such as African Americans, a substantial proportion of whom have particularly poor diets (25,26).

Although most minority groups consume less calcium than recommended, this is particularly true for many African Americans (4,16,27-32, Figure 2). According to USDA data, African Americans consume 661 mg

calcium/day compared to 834 mg/day for Whites, 807 mg/day for Mexican Americans, and 767 mg/day for individuals of other Hispanic origin (16). Racial differences in calcium intake are evident as early as in the preschool years (28).

Although some minority groups may obtain most of their calcium from non-dairy foods such as green leafy vegetables and legumes, these foods generally provide lower amounts of calcium per serving than do most dairy foods (33). Also, some components such as phytates in cereals and oxalates in spinach reduce the bioavailability of calcium (33).

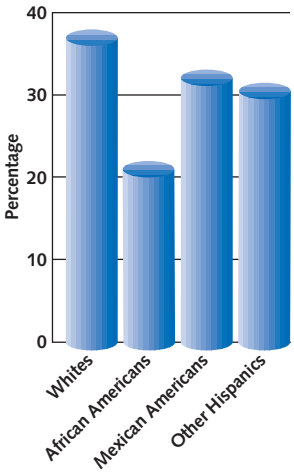
BARRIERS TO A DAIRY-RICH DIET

Studies of food preferences indicate that dairy foods are not among many minorities' traditional favorite foods (14,34-36). Barriers to consuming dairy foods and improving the calcium status of minorities relate to such factors as culturally determined food preferences, lack of knowledge, unavailability of dairy products, and unfamiliarity with dairy foods (12-15,20,34-36).

Lactose intolerance, real or perceived, is most often given as the reason why minorities avoid or limit intake of dairy foods. Lactose intolerance is the development of gastrointestinal symptoms of varying severity in individuals with lactose maldigestion (i.e., low levels of the enzyme, lactase, necessary to digest lactose or milk's sugar) (8). Lactose maldigestion occurs in about 15% of Whites, 53% of Mexican Americans, 62% to 100% of Native Americans, 80% of African Americans, and 90% of Asian Americans (37). However, lactose maldigestion does not necessarily result in lactose intolerance (symptoms) or prevent minorities from consuming recommended intakes of dairy foods (11,12,38).

Several studies demonstrate that lactose intolerance is overestimated and that symptoms following milk intake are often due to factors, such as strong beliefs, unrelated to lactose intake (8,11,38). Individuals, including minorities, who have lactase deficiency can consume recommended intakes of calcium from dairy foods (11,12,38). In a recent investigation of African American adolescent females, 82% of whom were lactose maldigesters, intake of 1,200 mg calcium/day from dairy foods was consumed without symptoms of intolerance (12).

Figure 2. Percentages of Individuals with Diets at or Above 100% of the 1989 Recommended Dietary Allowances (RDAs) for Calcium (16)



Scientific evidence indicates that most minorities can comfortably consume recommended servings of milk and other dairy products, especially with meals.

Gradually increasing intake of lactose-containing foods improves tolerance to lactose (12,38). When African American adolescent girls, most of whom were lactose maldigesters, consumed a dairy-rich diet (i.e., four servings/day, mostly milk) for 21 days, they experienced an overall improvement in lactose digestion as measured by a breath hydrogen test (12).

For lactose intolerant minorities (and non-minorities), the following dietary strategies can be used to improve tolerance to dairy products: adjust the amount of lactose consumed at any one time; drink milk with a meal or snack; try yogurts with live active cultures, many cheeses (especially aged), and lactose-free or lactose-reduced products; and gradually increase daily intake of lactose-containing foods (8,11,38).

DAIRY'S ROLE IN REDUCING RISKS FOR MAJOR CHRONIC DISEASES THREATENING MINORITIES

Hypertension. A diet rich in dairy foods helps to reduce the risk for hypertension among minorities, particularly African Americans, a high-risk group (9,10,39,40). African Americans develop hypertension earlier in life and experience greater severity and increased mortality rates from hypertension-related sequelae than their White counterparts (5,41). In general, the prevalence of hypertension in Hispanics and American Indians is similar to that in Whites (5,40). Lower rates of hypertension are reported in Asian/Pacific Islanders than in Japanese Americans or Whites (5).

Genetic and lifestyle factors likely contribute to the disparity in hypertension between African Americans and Whites (31,42). A low intake of dairy food nutrients (e.g., calcium, potassium, magnesium) may contribute to African Americans' high risk for hypertension (8-10,31,40). The DASH combination diet, a low fat dietary pattern emphasizing fruits and vegetables

(i.e., 8 to 10 servings/day) and lowfat dairy products (i.e., 3 servings/day, predominantly lowfat milk) has been demonstrated to be particularly effective in lowering blood pressure in African Americans (9,10). Systolic blood pressure decreased by 6.8 mm Hg in African Americans consuming the DASH combination diet compared to 3.0 mm Hg in Whites (10). These reductions in blood pressure were achieved without a decrease in sodium intake or weight loss (9,10).

The excessive hypertension in African Americans may be explained in part by multiple dietary inadequacies (31). Substantial scientific evidence indicates that increasing intake of calcium or calcium-rich dairy foods lowers blood pressure (43-46). Studies specifically involving African Americans support calcium's hypotensive effect (47,48). Diastolic blood pressure decreased by an average of 1.9 mm Hg in African American adolescents who consumed 1,500 mg calcium/day for eight weeks (48). The calcium-induced reduction in blood pressure was greater (i.e., 4.9 mm Hg) in teens with the lowest calcium intakes (48). Calcium, particularly by interacting with other nutrients in foods such as dairy foods, favorably affects blood pressure (41,48). In a recent investigation of 180 urban minority adolescents at risk for hypertension, blood pressure was lower in those who had higher intakes of a combination of nutrients, including calcium, potassium, magnesium, and vitamins (49).

African Americans' low potassium intake may also contribute to their high risk for hypertension (31,50-52). Increasing potassium intake for three weeks in African Americans whose typical intake of this nutrient was low (32 to 35 mmol/day) reduced systolic and diastolic blood pressures by 6.9 and 2.5 mm Hg, respectively (51). Potassium's hypotensive effect appears to be greater in African Americans than in Whites and in those who habitually consume low rather than high potassium intakes (51,52). The high potassium level of the DASH diet may explain some of this diet's effectiveness in reducing African Americans' blood pressure.

The finding that African Americans are particularly responsive to the blood pressure-lowering effects of the DASH diet, a low fat diet rich in lowfat dairy foods, fruits, and vegetables, indicates that hypertension need not be an inevitable characteristic of this minority group.

Stroke. The incidence of, and mortality from, stroke vary among different racial and ethnic groups. African Americans have a 2.4-fold and Hispanics a two-fold increase in age-adjusted stroke incidence compared to Whites (53). After adjusting for age, deaths from stroke are almost 80% higher in African Americans than in Whites (4).

Intake of dairy foods, by increasing dietary calcium, potassium, and magnesium, has been demonstrated to reduce risk for stroke (54,55). An inverse association between calcium intake and in particular dairy calcium (e.g., milk, yogurt, hard cheeses, ice cream) was found in a study of 86,000 middle-aged women (98% white) who participated in the Nurses' Health Study (54). Potassium and magnesium in milk may also be important in reducing stroke risk (56,57). Milk and other dairy products provide 18.4% of the potassium and 15.8% of the magnesium available in the U.S. food supply (21). According to a recent study, a low intake of dietary potassium predicted stroke mortality in African American men who overall consumed less dietary potassium than White men (56). The U.S. Food and Drug Administration has approved a health claim regarding intake of potassium-containing foods and reduced risk of high blood pressure and stroke on the labels of qualified foods (e.g., non-fat milk and some yogurts) (58). Dietary intake of magnesium is also associated with reduced risk of stroke (57).

Osteoporosis. Emerging findings indicate that risk for osteoporosis among many minority populations is underestimated (59). According to preliminary data reported in late 1999 from the National Osteoporosis Risk Assessment (NORA) program, which involves 204,000 postmenopausal women in the U.S. aged 50 years and older, 65.1% of Asian, 58.9% of Native American, and 55.5% of Hispanic women have low bone mineral densities (59). Osteoporosis was identified in 8.2%, 9.5%, and 4.3% of these three groups, respectively (59). Over half (50.5%) of White women had low bone density and 5.2% were osteoporotic. African American women had the

lowest rates of low bone density (38%) with 4% diagnosed with osteoporosis (59). Although African American women in general are at lower risk for osteoporosis than other minorities, between 80 and 95% of fractures in African American women over age 64 are due to osteoporosis (60). Also, African American women who sustain osteoporosis-related fractures suffer increased disability and decreased survival compared to white women (60,61). As the African American population ages, osteoporosis in this minority group is expected to rise further (62).

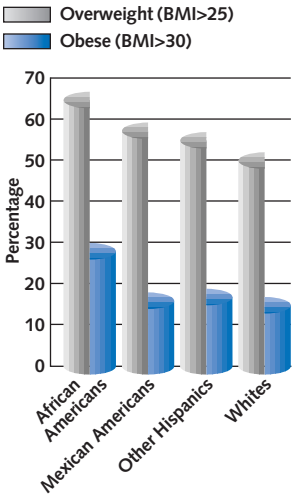
Compared to Whites, African American women's relatively low risk for osteoporosis and osteoporotic-related fractures is largely attributed to their greater bone mineral density at all skeletal sites, which is due to their higher peak bone mass, reached by early adulthood, and their slightly lower rate of bone loss after menopause (61-63). Other explanations for African American women's lower risk for osteoporotic fractures include their larger muscle mass, reduced rates of bone turnover, differences in calcium metabolism (e.g., decreased urinary calcium), higher prevalence of obesity, and bone geometry (i.e., shorter hip axis) (62,63).

The few investigations that have examined calcium's effect on bone health in minority groups such as African Americans and Asians demonstrate that increasing dietary calcium intake increases bone mass in these populations similar to that for Whites (64,65). Adequate intake of vitamin D, regular physical activity, and smoking cessation are also important lifestyle interventions to reduce the risk for osteoporosis (60,61,66).

Scientific evidence indicates that consuming an adequate intake of calcium or calcium-rich foods such as milk and other dairy products throughout life reduces the risk for osteoporosis (8,66,67). Milk and other dairy products are not only a major source of calcium, but they provide other essential nutrients such as vitamin D (if fortified) which increases calcium absorption (21,68). With the exception of vitamin D-fortified milk products and breakfast cereals, few other foods contain vitamin D (68). Although vitamin D can be obtained through exposure of the skin to sunlight, increased skin pigmentation (i.e., melanin) reduces ultraviolet radiation-mediated synthesis of vitamin D_3 (69). As such, intake of dietary sources of vitamin D, such as vitamin D-fortified milk, may make the difference in whether or not dark skinned minorities meet their needs for vitamin D.

To develop effective interventions to improve minorities' calcium and overall nutritional status, health professionals should understand minorities' cultural beliefs and dietary practices.

Figure 3. Weight Status of Individuals 20 Years and Older (16)



Obesity. Overweight and obesity are prevalent among minorities such as African Americans, Hispanics, and Native Americans, particularly women (4,5,16, Figure 3). Identifying the cause(s) of overweight/obesity among minorities is an area of active investigation (70).

Increasing intake of calcium, especially from dairy foods, may help to reduce minorities' risk for obesity (71). Zemel et. al. (71) observed that when obese African American males increased their dietary calcium intake from approximately 400 to 1,000 mg/day by consuming two cups of yogurt/day for one year, their body fat decreased by 4.0 kg. Subsequent observations from experimental animal and human epidemiological studies also indicate that calcium and particularly dairy foods help to control body fat (71).

CONCLUSION

Rapid changes in the racial and ethnic composition of the U.S. population are creating challenges for health professionals and nutrition educators. Raising minorities' awareness of the important role of calcium in health and increasing their acceptance of calcium-rich dairy foods can be problematic when dealing with less acculturated minority populations whose diets may not customarily include dairy foods. Effective dietary and nutrition education interventions must be culturally appropriate for specific minority groups (72). D

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Coming Next Issue:

HEALTH-ENHANCING PROPERTIES OF DAIRY INGREDIENTS

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