Models for Nutrition Education to Increase Consumption of Calcium and Dairy Products among African Americans$^{1,2}$


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**ABSTRACT** Calcium and dairy consumption are documented to be low among African Americans and have demonstrated benefits to bone growth, overall nutritional status, and health throughout the life cycle. There is also an emerging relationship to the prevention of obesity. This low consumption has been attributed to both cultural and community/environmental barriers. Using a life course construct and an ecological model of health behavior, this paper will illustrate why nutrition education and food consumption behavior at one stage of the life cycle may influence health status at that stage as well as influence health and consumption of calcium and dairy products at subsequent stages. The life course construct recognizes that both past and present behavior and experiences (in this case food and nutrient intake) are shaped by the wider social, economic, and cultural context and therefore may provide clues to current patterns of health and disease. The ecological model, concerned with constructs of environmental change, behavior, and policies that may help people make choices in their daily life, complements the life course approach when examining the potential influence of nutrition education provided by federally funded food and nutrition programs on calcium and dairy consumption behavior across the life cycle. The "critical period model" within the life course construct is operative for calcium, a nutrient for which adequate intake is critically important during adolescence when peak bone density development, necessary for later protection against osteoporosis, is important. *J. Nutr. 136: 1103–1106, 2006.*

**KEY WORDS:** calcium • dairy • African American • obesity • nutrition education

Calcium and dairy consumption have been demonstrated to be low in the African American diet ($^{1}$; Table 1). This is despite the well-established health benefits of calcium and dairy that include improving bone health and a role in risk reduction of chronic diseases such as hypertension, obesity, heart disease, and colon cancer ($^{2,3}$). Lactose intolerance, perception that "milk is for children," substituting soft drinks for milk, eating away from home, having few role models who drink milk, and problems relating to transportation and storage have been documented barriers associated with decreased milk consumption among African Americans ($^{2}$). There is often disagreement between documented lactose intolerance status and reported symptoms. There is also disagreement between the incidence of reported symptoms and dietary restriction of dairy product consumption. Changes in dietary practices such as consuming fewer calcium-rich green vegetables are also associated with reduced overall calcium consumption in this population ($^{1,2}$). This leads to the need for a critical assessment of ways to promote behavior change that may be associated with increasing calcium and dairy consumption. Such changes may allow the African American community to reap the associated health and nutritional status benefits.

Health behavior change is difficult but is most effective when it involves the collective efforts of the individual and the community. Improving the nutritional intake of individuals through better food choices is the result of a complex interaction among sociodemographic, psychosocial, and environmental factors ($^{4–6}$). To accomplish health behavior change, educators must be aware of the barriers and facilitators that influence the consumption of dairy products and other calcium-rich foods.
Calcium Dietary Reference Intake by life stage, intake by the total population and African Americans (AA) and percentage of calcium Adequate Intakes (AI) using data from the Continuing Survey of Food Intake for Individuals (CSFII) 1994, 1994–1996 (1)

<table>
<thead>
<tr>
<th>Life stage, y</th>
<th>Ca AI, mg</th>
<th>CSFII intake total pop. 1994 median, mg</th>
<th>Ca (% AI) total pop. 1994 median, mg</th>
<th>CSFII Intake AA 1994–1996 mean, mg</th>
<th>Ca (% AI) AA 1994–1996 mean, mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>1–3</td>
<td>500</td>
<td>766</td>
<td>153</td>
<td>708</td>
<td>142</td>
</tr>
<tr>
<td>4–8</td>
<td>800</td>
<td>808</td>
<td>101</td>
<td>737</td>
<td>92</td>
</tr>
<tr>
<td>9–13</td>
<td>1300</td>
<td>Male - 980</td>
<td>70</td>
<td>808</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female - 889</td>
<td>68</td>
<td>697</td>
<td>54</td>
</tr>
<tr>
<td>14–18</td>
<td>1300</td>
<td>Male - 1,094</td>
<td>84</td>
<td>914</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female - 713</td>
<td>55</td>
<td>612</td>
<td>47</td>
</tr>
<tr>
<td>19–30</td>
<td>1000</td>
<td>Male - 954</td>
<td>95</td>
<td>971</td>
<td>97</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female - 612</td>
<td>61</td>
<td>529</td>
<td>53</td>
</tr>
<tr>
<td>31–50</td>
<td>1000</td>
<td>Male - 857</td>
<td>86</td>
<td>643</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female - 606</td>
<td>61</td>
<td>499</td>
<td>50</td>
</tr>
<tr>
<td>51–70</td>
<td>1200</td>
<td>Male - 708</td>
<td>59</td>
<td>605</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female - 571</td>
<td>48</td>
<td>482</td>
<td>40</td>
</tr>
</tbody>
</table>

Two models will be used to examine approaches that may be useful in increasing calcium and dairy product consumption within the African American community: the life course and ecological models. The life course model is useful because it posits that events and behaviors at one life stage impact health status at that stage as well as influence health status at subsequent stages. It further states that both past and present experiences are shaped by social, economic, and cultural contexts, thus allowing its basic constructs to be supported by the ecological model for health promotion that includes influences of behavior, policy, and the environment (7–10). Other important features of the ecological model are consideration of the physical environment in relation to people at individual, interpersonal, organizational, and community levels as well as how these dimensions may interact to influence behavior. There is growing evidence in the life course model to support “critical periods,” times when an event is more likely to lead to an outcome. The “critical period” is important when examining the relationship between calcium intake during adolescence and peak bone mass achievement (9).

Using the constructs from these models, this paper will describe how nutrition education, especially that available from federally funded food and nutrition assistance programs (FFFNAP), 4 may help to improve calcium and dairy consumption throughout the life cycle (11). It will highlight cultural and community barriers to adequate calcium and dairy intake in the diets of African Americans while suggesting ways that community-based organizations and media may partner in facilitating nutrition education and behavior change.

Calcium and dairy intake

Adequate calcium intake is necessary for optimal health throughout the life cycle. Calcium’s role in the development of strong bones and teeth is well established. Calcium is also related to cardiovascular function, nerve conduction, muscle contraction, as well as normal heart rhythm and blood clotting. Research indicates that calcium-deficient diets are a risk factor for such diseases as pre-eclampsia, cardiovascular disease, hypertension, cancer, and osteoporosis and that adequate dairy intake may independently reduce the risk of obesity (2–4,12–14).

Current recommendations or Adequate Intakes (AI) for calcium from the Dietary Reference Intakes (DRIs) from the Food and Nutrition Board of the National Academy of Sciences are 500 mg for children 1–3 y, 800 mg for children aged 4–8 y, 1,300 mg for adolescents aged 9–18 y, 1,000 mg for adults aged 19–50 y, and 1,200 mg for adults 51 y and older (3). Based on findings from the Continuing Survey of Food Intake for Individuals (CSFII), 1994–1996, most African Americans consume less calcium than the total population (1) (Table 1).

A variety of food groups contribute to the calcium content of the African American diet (Table 2). Boys 6–19 y and girls 6–11 y received most of their calcium from the dairy group. However, beyond these ages, both genders received about 30% of their calcium from grain products, about 25% from dairy products, about 15% from the meat group, and about 11% from vegetables. Among dairy products, whole milk contributed substantially to calcium intake throughout all life stages, although milk desserts (~15%) and milk drinks (~25% boys and 10% girls) made important contributions (1).

Based on a self-assessment of diet quality relative to calcium, most African Americans felt that their calcium intake was “about right” (1). They also perceived dietary guidance to eat at least 2 servings of dairy per day to be “very important.” There was very little variance in these indicators by region of the country, urbanization, food stamp usage, education level, percentage of poverty, and category of body mass index (BMI). It is interesting to note that people with a BMI of <25.0 (19.4%) were more likely to consume at least 2 servings of dairy per day compared to those with a BMI 25 or higher (12.8%) (1). This epidemiologic association supports the emerging evidence documenting the possible independent relationship between dairy consumption and obesity risk reduction.

Nutrition education throughout the life cycle

Preconception period. Preconception, the period before pregnancy and usually encompassing teenage years and early adulthood, was identified in the 1992 IOM report on Nutrition During Pregnancy and Lactation as an important period for intense nutrition education to achieve optimal prepregnancy nutritional status (15). Unfortunately, teens are often outside

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4 Abbreviations used: ABC, Associated Black Charities; AI, Adequate Intakes; BMI, body mass index; CSFII, Continuing Survey of Food Intake for Individuals; DRI, Dietary Reference Intakes; FFFNAP, Federally Funded Food and Nutrition Assistance Programs; IOM, Institute of Medicine; NBN, National Black Nurses; NMA, National Medical Association; NOBIDAN, National Organization of Blacks in Dietscics and Nutrition; WIC, Women, Infants and Children’s Supplemental Nutrition Program.
Breastfeeding is the optimal primary nutritional source for newborns during the first year of life (17). Efforts to encourage and support breastfeeding should begin during pregnancy and continue as long as necessary to maximize breastfeeding exposure. Mothers should be aware of the health benefits for them as well, including postpartum weight loss if energy intake is appropriate. Transitional feeding, beginning no earlier than 6 months, is an important time to begin good nutrition practices that will provide children with a foundation for lifelong healthy attitudes and behaviors related to eating. Simple practices such as feeding to satiety (not overfeeding children) and introducing solid foods responsibly will support healthy eating patterns (17,18). It is often during the second year, when the child’s growth and appetite slow, that feeding problems begin. Alerting parents and caretakers to the changes in energy and nutrient needs of toddlers may help avoid some of the anxiety noted when older children seem to eat less food (17). If children come out of this stage eager to engage in vigorous physical activity, eating a variety of healthy foods, and eating to satiety, they have a good foundation on which to build. WIC is the federally funded food and nutrition program most likely to impact this stage. Generally children are not at risk for calcium or dairy deficits during this stage.

### Pregnancy

Nutritional status during the preconception period is extremely important for pregnancy outcome. Because most people do not know they are pregnant until late in the first trimester or later (15), identification and correction of nutritional inadequacies critical to first-trimester fetal development is extremely difficult. Thereafter, the “catch-up” continues to be challenging because of the high nutritional demands of pregnancy. However, pregnancy does represent a “teachable moment” because interest and motivation are usually high, and there are scheduled periodic encounters with health care professionals. The federally funded Women, Infants and Children’s Supplemental Nutrition Program (WIC) has been documented to positively affect pregnancy outcome with both the supplemental foods and nutrition education provided (1,15). Because adequate calcium intake is an important consideration during pregnancy, nutrition education for the entire family may be reinforced during this period. It should be recognized that failing to lose weight gained during pregnancy may be a risk for overweight/obesity. This effect could be cumulative across multiple pregnancies, thus contributing to the epidemic of obesity in the United States (16).

### Infancy/toddler/preschool

Breastfeeding is the optimal primary nutritional source for newborns during the first year of life (17). Efforts to encourage and support breastfeeding should begin during pregnancy and continue as long as necessary to maximize breastfeeding exposure. Mothers should be aware of the health benefits for them as well, including postpartum
Young adults. As young adults transition from high school to higher levels of education or job training and on to a job or career, there may be a decrease in physical activity without an accompanying decrease in energy consumption. In part because of time pressures and limited food acquisition and preparation skills, there may also be an increase in the prevalence of food consumption patterns that do not meet the U.S. Dietary Guidelines. Young men and women in this age group have the lowest calcium and dairy intake with little variation by ethnicity (1,21). Habitual optimal intake of calcium and dairy is desirable, and strategies for increasing intake include consuming dairy foods with meals, yogurt for snacks and desserts, flavored milks and calcium-fortified beverages, and having these foods readily available, especially in vending areas (21,22).

Elderly. Nutrition education to increase calcium and dairy consumption in the elderly is especially important in the African American community because of the myth that “they don’t get osteoporosis.” As African American women are living longer, they are at increased risk of bone thinning resulting from the obligatory loss of bone during the postmenopausal period. In fact, the National Osteoporosis Foundation documents that over 300,000 African American women have osteoporosis (23–26). There is a strong need for nutrition education for the elderly that clearly spells out practical, culturally specific, innovative approaches to incorporating dairy products into the daily dietary intake of the elderly. Furthermore, nutrition educators need to understand barriers such as past negative experiences, limited availability, and few culturally appropriate marketing strategies and to understand current food consumption patterns and lifestyle of this population (1,2).

Nutrition education in African American communities

It is proposed that marketing calcium/dairy nutrition education messages to African Americans involving culturally appropriate professional groups such as the National Medical Association (NMA), National Black Nurses (NBN), and National Organization of Blacks in Dietetics and Nutrition (NOBIDAN) as well as community-based organizations such as Associated Black Charities (ABC), faith-based organizations, fraternal groups, and youth organizations such as Jack & Jill may be instrumental in helping to increase intake because their members usually come from the target communities. Calcium consumption messages should include sources from vegetable and grain groups with clarity regarding the contribution that these foods may make to total calcium intake (1,2).

Media, especially radio, may be effective if the messages are clear with emphasis on benefits, emphasize the difference between myth and reality relative to lactose intolerance, and use culturally appropriate language (1,2,24,27).

Conclusion

Low calcium and dairy consumption among African Americans may lead to compromised bone health, overall nutritional status, and health throughout the life cycle. There is also an emerging relationship between adequate dairy intake and the prevention of obesity. Low dairy and calcium consumption has been attributed to cultural, community, and environmental barriers; however, nutrition education can be an important facilitator to improve intakes. Engaging schools and worksites in supporting good nutrition and physical activity habit development and maintenance can provide the critical component of community participation. To develop effective programs to increase dairy and calcium intake among African Americans of different ages, health professionals and nutrition educators should take into account the many ways that nutrition status and food behaviors can be influenced by nutrition experiences during different life stages as well as wider social, economic, and cultural experiences. Implementing health-promoting diet and physical activity behaviors will result in an increase in health and wellness at each stage of the life cycle.

LITERATURE CITED